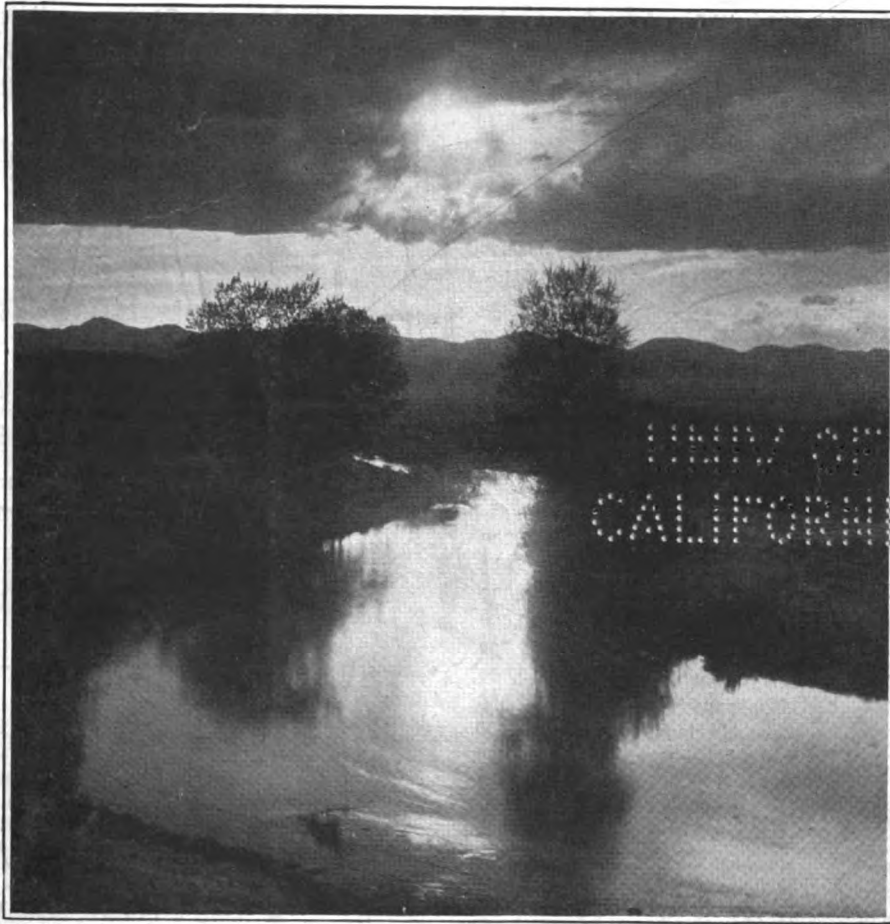


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Colorado Highways BULLETIN

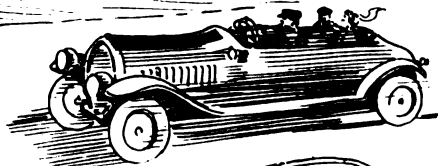
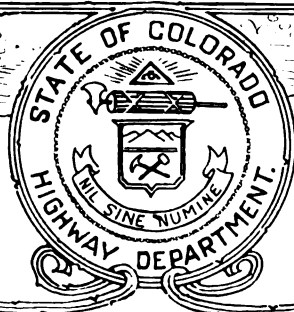
Issued by the State Highway Department

1-2
June 1918
1919



BATHED IN THE GLORY OF THE SETTING SUN.
A Sunset on the Platte River, near Denver, on the Main Highway. Thousands Pass
This Spot Each Day. How Many See It?

June, 1918



States to Expend \$300,000,000 On Roads

APPROXIMATELY \$300,000,000 will be expended for the construction, improvement and maintenance of highways in the United States this year, according to estimates made out by various state highway departments. More funds are available for the work than ever before, and the only question which now looms large as a possible setback is that of the scarcity of labor and of materials.

According to figures secured by the Municipal Journal, from which this digest is made, Colorado ranks twenty-fifth in amount of its expenditure with \$3,635,000 as its estimate. Of this sum, some \$83,000 will be given for work by the Federal Aid and Forestry departments of the United States; approximately \$900,000 is raised by the state half-mill levy, and the remainder, or more than 50 per cent., is contributed by the various counties.

Texas leads the national list with an estimate of \$25,000,000, of which \$1,000,000 raised exclusively through the automobile tax is contributed by the state; \$1,753,973 by the national government, and the rest, \$22,246,027, will be raised by counties or other districts.

The table showing the estimates, in detail, follows:

Texas	\$25,000,000	COLORADO	3,635,000
Indiana	17,380,000	Virginia	3,600,000
Illinois	17,000,000	Missouri	3,500,000
Massachusetts	15,637,000	North Dakota	3,500,000
Iowa	15,500,000	Maine	3,217,000
Arkansas	15,007,000	Arizona	3,000,000
West Virginia	14,000,000	Montana	3,000,000
California	12,000,000	Florida	2,750,000
Minnesota	11,500,000	Maryland	2,700,000
Pennsylvania	11,000,000	Alabama	2,500,000
Kansas	10,500,000	North Carolina	2,500,000
Wisconsin	10,125,000	Michigan	872,000
Tennessee	10,000,000	New Mexico	1,621,000
New York	8,500,000	South Carolina	1,498,000
Washington	*7,216,000	Nebraska	1,279,757
New Jersey	8,000,000	Utah	1,131,754
Ohio	7,210,000	Delaware	1,000,000
Oklahoma	6,000,000	Wyoming	806,000
Oregon	5,652,516	Vermont	685,000
Louisiana	5,300,000	Rhode Island	600,000
Connecticut	5,208,000	Nevada	506,000
Kentucky	4,500,000	New Hampshire	500,000
Georgia	4,200,000	South Dakota	300,000
Missouri	4,000,000		

*Does not include bond issue

†Only Federal figures. State appropriation not fixed yet. Idaho's estimate has not been completed.

The largest construction of new roads in point of mileage will probably be done by Arkansas, where projects calling for 22,000 miles of road are now under way. Probably the largest single project in the United States is included in this figure, a contract covering 168 miles of road to be constructed partly of macadam, partly of gravel, and 115 miles of asphalt on a concrete basis at a cost of \$2,788,000.

Not all of the states expect to expend their entire appropriations, among which New York will probably build roads to about half the amount of \$8,500,000, the sum available. New Jersey, on the other hand, will double its expenditure of \$4,000,000 in 1912.

It is noted in the more detailed figures, not used here because of lack of space, that the counties generally furnish by far the largest proportion of the fund; the state, in the case of Montana, for example, furnishing only the engineering work.

Federal aid plays a large part in the program of all the states, as does the Forestry division in those sections where the department has lands.

A general questionnaire to all highway departments sent out by The Municipal Journal brought out the fact that labor scarcity and cost of materials may result in curtailment of some of the work, but has also resulted in a more efficient handling of the work.

County Road Levies

Moffat and Montezuma lead the counties in the amount of mill levies made each year for work on roads with 7 mills each. From that figure the amount of the county levies gradually grades downward, depending upon the interest taken in road work and also in the levy raised for other purposes.

The figures in detail, together with the assessed valuation of each county, follow:

County Valuations, 1917.

County	Mill Levy	Valuation	County	Mill Levy	Valuation
Adams	2.	\$ 26,170,660	Lake .....	.75	11,508,625
Alamosa	2.	8,290,336	La Plata	2.623	15,244,340
Arapahoe	1.3	18,598,595	Larimer	2.3	40,979,005
Archuleta	2.8	4,803,077	Las Animas	1.5	37,440,456
Baca	1.	6,413,119	Lincoln	1.6	13,678,005
Bent	1.75	11,526,440	Logan	4.21	27,544,988
Boulder	1.95	42,892,240	Mesa	2.2	27,408,230
Chaffee	1.75	10,997,225	Mineral	5.	1,470,052
Cheyenne	1.5	10,728,544	Moffat	7.	5,714,770
Clear Creek	5.5	5,346,050	Montezuma	7.	5,844,653
Conejos	2.5	8,936,977	Montrose	2.7	15,192,880
Costilla	3.5	5,477,907	Morgan	3.3	21,491,890
Crowley	1.1	9,110,705	Otero	1.98	27,650,280
Custer	2.5	2,459,849	Ouray	3.5	5,194,341
Delta	2.6	15,373,800	Park	4.	8,637,650
Denver		330,453,580	Phillips	1.	8,190,356
Dolores	2.	1,582,545	Pitkin	3.5	5,385,630
Douglas	2.	11,113,180	Prowers	2.006	18,784,420
Eagle	3.	7,255,440	Pueblo	1.3	66,064,912
Elbert	2.3	13,722,779	Rio Blanco	2.75	5,728,420
El Paso	1.6	65,710,060	Ri Grande	2.	9,906,550
Fremont	2.8	18,797,830	Routt	5.23	14,247,327
Garfield	6.69	18,310,850	Saguache	2.	11,948,779
Gilpin	3.5	3,350,678	San Juan	3.5	4,172,220
Grand	2.53	4,737,555	San Miguel	3.25	8,845,724
Gunnison	2.2	16,025,760	Sedgwick	1.62	6,888,168
Hinsdale	4.	984,119	Summit	3.	6,474,358
Huerfano	2.5	12,963,074	Teller	2.67	13,848,230
Jackson	2.	5,058,955	Washington	1.5	17,904,363
Jefferson	2.49	22,579,930	Weld	2.7	82,573,620
Kiowa .....	.5	9,085,235	Yuma	1.5	15,233,850
Kit Carson	2.	14,123,033			

1,305,286,409



Feasting on Colorado Scenery. Sheep Grazing Along the Road to Gunnison.

Circle Trips Included In Road Building Program For 1918

TWO, possibly three, new loop trips of surpassing scenic attractions will be made accessible to travelers in Colorado this year, if plans now completed by Commissioner T. J. Ehrhart are carried to a conclusion. Financial arrangements for the work have been made, and the only question not yet solved is that of obtaining labor. Road workmen are becoming an increasingly scarcer commodity, and already some vexatious delays have been caused by inability of contractors to get men in sufficient numbers.

The 1,000-mile trip, which swings out of Denver down through the southwestern portion of the state, and the Fall River route, are the two projects which, it is hoped, will be finished, while the Independence Pass route out of Leadville is a third for which contracts have now been let.

In each instance short links remain to be constructed which, once finished, will permit travelers to swing around in a circle of ever-varying scenic wonders, instead of retracing their steps after arriving at points which mark the ends of the roads.

From a commercial, as well as from a tourist's viewpoint, the 1,000-mile trip may be considered as the most im-

portant of the three. At the present time it is possible for the traveler to go from Denver to Durango or Dolores over good roads and to continue westward if he wishes, but not north. Or, traveling over any one of a variety of routes, he may reach Telluride or Silverton on the north, but cannot then connect up with the southern route.

Two proposals which will offer an alternate choice to the traveler, and either one of which will serve as a connecting link between north and south routes, are now financed and will be started within a short time, labor adjustments alone as a possible obstacle.

The better-known perhaps is the proposed road from Durango to Silverton. This road is 50 miles in length, and completion of a link of 17¼ miles will make it traversable. The project falls within the U. S. Forestry work, and the total cost is estimated at about \$230,000. Work has been delayed because of the government ruling that no labor shall be used on roads which might be used in war work, but negotiations are now under way for the use of a group of 300 Navajo Indians who have been doing road work in Arizona, and there is reason to believe that their services will solve the question.

(Continued on page 22.)

FOREST SERVICE ROAD PROBLEMS

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

WHAT roads shall we construct or improve this year? How many people will they serve; What resources or industries will be developed or aided? What is the amount and character of the traffic, and in what direction will the heavy traffic go? What type of road should be provided to meet these conditions? How much can we afford to spend, and shall we build a single or a double track road? How much should we set aside for the maintenance and repair of our existing roads, and how much for temporary construction to meet immediate traffic needs?

These are some of the questions that the Forest Service must decide. No doubt they will sound familiar to Mr. Ehrhart and to each County Commissioner in Colorado. High mileage, inadequate funds and the ever-present maintenance and repair question—these are your problems and our problems, and how shall we go about solving them?

The answer, broadly speaking, is first a realization of just what the problem is; and second, co-operation and its solution. How then can Federal, State and County agencies get together on this proposition and accomplish the maximum results with a minimum of time and expense?

First, I believe by getting a better understanding of the other fellow's point of view; and second, reconciling differences of opinion and adopting a common plan of operation. My purpose is to state very briefly the Forest Service point of view and to sketch the basic policies which have been evolved by this Department.

The Forest Service spends in the State of Colorado annually for road purposes about \$100,000. Of this amount, about \$65,000 is Colorado's share of the Forest funds made available by the Federal Aid Road Act. Approximately \$30,000 accrues through the ten per cent. road fund, which is equivalent to 1-10th of the total National Forest receipts for the State, the remainder of approximately \$5,000 is represented by miscellaneous work by Service employees which is done as opportunity offers in connection with their regular duties. This appears at first glance like a considerable amount of money, but when you consider that the National Forests of Colorado include within their boundaries over 13,000,000 acres and the mileage of roads constructed, partially constructed and proposed, amounts to approximately 4,300 miles, the matter assumes a different aspect; in other words, the Forest Service has each year to spend on roads within the National Forests about 8 mills per acre, or \$23.00 per mile with present appropriations. A considerable per cent. of these roads are State and County highways upon which the Forest Service has to date spent no money at all, and some of them are as yet entirely unconstructed. However, this does not alter the fact that our funds are

altogether inadequate. Under these circumstances it is apparent that only a limited schedule of work can be undertaken annually and many desirable and even urgent projects must be postponed.

In preparing the annual program for survey and construction, the following factors relative to each project to be considered, are carefully weighed:

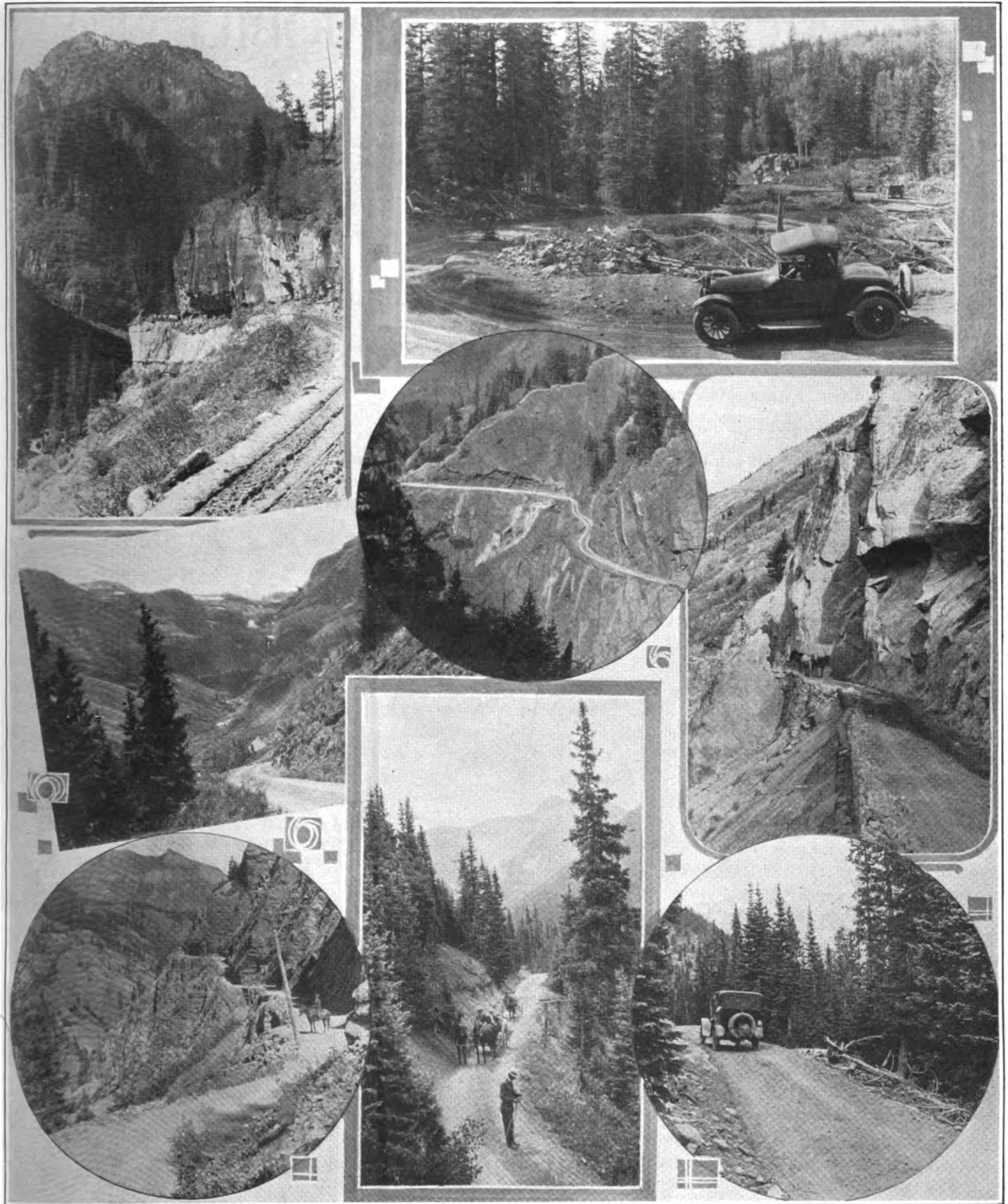
First, the number of people to be benefited; second, the kind and value of resources—State, County and Forest to be developed, and how and to what extent each road will aid in such development, and how soon this development will take place. In short, it is the practice to make a complete economic study of each project for which National Forest aid is requested. Among the resources which are weighed in connection with each project are timber, agriculture, mineral, grazing, water power and recreation. When such a study of a region tributary to a road has been made, it is intended that it will show not only the present and potential resources of the counties and Forests, but also along what general lines the development of the locality should progress, and when and how the proposed road will aid in such development.

Another point which is carefully weighed in connection with each project is the relation it bears to a comprehensive plan for road development covering not only the local Forest and County, but the State as a whole. Tentative plans for a comprehensive highway system for all National Forests in this State have been prepared, and steps are now being taken to present these plans to the State and County authorities for discussion and improvement before the plan is adopted.

Yet another consideration is the financial condition of the local agency. A study is made of the valuation of the Counties affected, both within and without the Forest, the amount of taxes levied, the bonded indebtedness, and the general financial condition of the County and people. The mileage of constructed and unconstructed roads in the County is also given consideration.

In selecting the type of construction, it is the endeavor of the Service to set standards only sufficiently high to take care of probable traffic needs for a reasonable period in the future. It is the intention, however, that careful location surveys, sufficient to insure satisfactory grades and alignment shall precede the expenditure of funds on construction. It is not the intention to construct roads of such high standards as not to be warranted by present traffic conditions. In short the aid is to adopt a practical, workable policy, one which is financially feasible, and to insure by proper location surveys that each dollar expended will count in the ultimate plan of development.

In conducting the maintenance work, it has been found that the patrol system gives the best results. Several crews of this kind are now in the field and are daily demonstrating the economy of systematic methods.



Striking photographs of Colorado highways telling, as no words can, of the difficulties of road construction through the heart of Colorado's ranges. Top: The Camp Bird Road, Uncompahgre N. F., at Windy Point looking up Canyon Creek. A mule team at the point gives some idea of the height of the cliffs. Right: A hairpin turn on Rabbit Ears Pass near Kremmling. Center: Looking up Mill Gulch near Chattanooga in Durango forest. North Lookout peak, 13,674 feet, in background; a stretch in the Ouray-Silverton road at Quartzite point with a sheer drop of 2,000 feet; and the Independence Road, Sopris N. F., showing rock work on cliff. Bottom: Ouray-Silverton road wending along cliff; the State circle highway between Silverton and Red Mountain; and a vista in Monarch Pass, east side of divide with Banana peak in far distance. Photos from U. S. Forest Service.

THE PROPOSED AUTOMOBILE LAW

Denver, Colo., May 16, 1918.

Hon. Thos. J. Ehrhart,
State Highway Commissioner,
Denver, Colorado.

Dear Mr. Ehrhart:

In answer to your inquiry concerning the steps being taken for the drafting of a new automobile law for presentation to the legislature next January, I beg to inform you that I hope to have a rough draft of this law ready for presentation within two or three weeks.

The different automobile associations and a great many individuals of the state along with yourself are giving me much valuable information on which to base this proposed new law. In addition, I have before me the laws of every state of the Union, also of Canada, and it is my purpose to utilize the best points from these different laws. After the rough draft is completed it will be submitted to you and the state highway commission, also to the different automobile associations for amendments and suggestions.

The idea is, that if we can all agree on a new and effective automobile law before the legislature meets we will not experience any difficulty in having it enacted.

Our present law is obsolete in many essential details caused by its having been enacted when the automobile business was in its infancy in this state.

The provision for the license charges are especially objectionable, as our present law charges so much on the manufacturer's advertised rating on a car, whereas the charge should be made on the h. p. as arrived at by scientific measurements. For example, Colorado charges \$2.50 for an automobile of an advertised horse power up to twenty h. p. The most popular automobile found in Colorado has an advertised horse power rating of twenty h. p., whereas the Society of American Engineers (or the scientific measurement of cylinder, etc.) shows that it has a horse power of twenty-two h. p.

Our records show that of the cars licensed in Colorado 57 per cent are in the class rated at \$2.50 advertised h. p., whereas, under the proposed new rating they would be assessed at \$5 each. Under the present law, however, they may be charged only \$2.50. In California a flat rate of forty cents per horse power is charged on all automobiles. A great majority of the states have a similar flat rate, running from 15 or 20 cents per horse power to as high as 80 cents per horsepower.

It should not be a difficult matter for those interested not only in automobiles, but in good roads, to reach an equitable charge per horse power for Colorado. This will be one of the most important features of the bill now being drafted.

Another very important point has to do with the headlight regulations. It is generally conceded that some law is necessary to prevent the use of glaring white lights by autoists, especially in mountain and rural districts. Our present law does not give the protection to which the peo-

ple are entitled and this fault will, I hope, be remedied in the new law.

New rules of the road and especially as regards speed regulations also must be incorporated for the protection not only of the people, but of the autoists themselves. The consensus of opinion seems to be that it is not best to fix a definite speed limit, but rather to deal with this subject by compelling drivers to propel their machines at a rate of speed to be governed by conditions of roads and traffic, allowing each incorporated community to govern the speed limits within its incorporated territory.

Severe fines should be provided and full power and authority given to proper courts for the revocation of licenses of habitual violators of the law. Heavy fines should also be provided for those who fail or refuse to take out new licenses promptly each year.

The foregoing are just a few of the perplexing problems that must be solved through the enactment of a new automobile law.

I am in receipt of communications from Washington urging me to use every influence to encourage the use of automobiles of all descriptions, including passenger cars as well as trucks, the idea being to relieve the railroad congestion as much as possible. The government also is, as you and your commission are fully informed, urging the constant building and improvement of highways. In this connection county commissioners are to be congratulated on the way in which they are co-operating with your department and with the executive officers generally in this splendid work.

Assuring you that I will appreciate any further suggestions you or the county commissioners may make for the drafting of the new automobile law,

Sincerely yours,

JAMES R. NOLAND,

Secretary of State.

JRN/MLP.

COLORADO TO HAVE THROUGH ROAD OVER RANGE THE YEAR AROUND.

Through automobile traffic over the mountain range will be possible all the year around in Colorado as the result of a conference held by the county commissioners of Saguache and Chaffee counties, whereby the Poncha Pass road will be kept open for travel at all times in rain or snow, hail or sunshine.

Announcement of the decision of the commissioners was made to the state highway department by W. L. Philbin, county commissioner of Chaffee, who was in Denver with Senator Frank H. Means of Saguache for the purpose of looking into road arrangements in their district.

"Heretofore," said Mr. Philbin, "there has been a period of from two weeks to a month when through traffic over the range has been impossible because of the heavy snow drifts. Acting in conjunction with Saguache, our county has now perfected a plan whereby we will detour the road for a distance of some 300 yards in the gulch at the top of the range and by keeping grading crews constantly at work, we will be able to give Colorado a through road at all times."

Value of County Organization in Road Work

By Chas. R. McLain, President State Good Roads Association

THE evolution of road building and improvements in Colorado stands without any probable parallel when mileage, population and wealth are considered. The question is frequently asked of me, "Why a State Good Roads Association now that we have a State Highway Commission and such an excellent law under which to operate?"

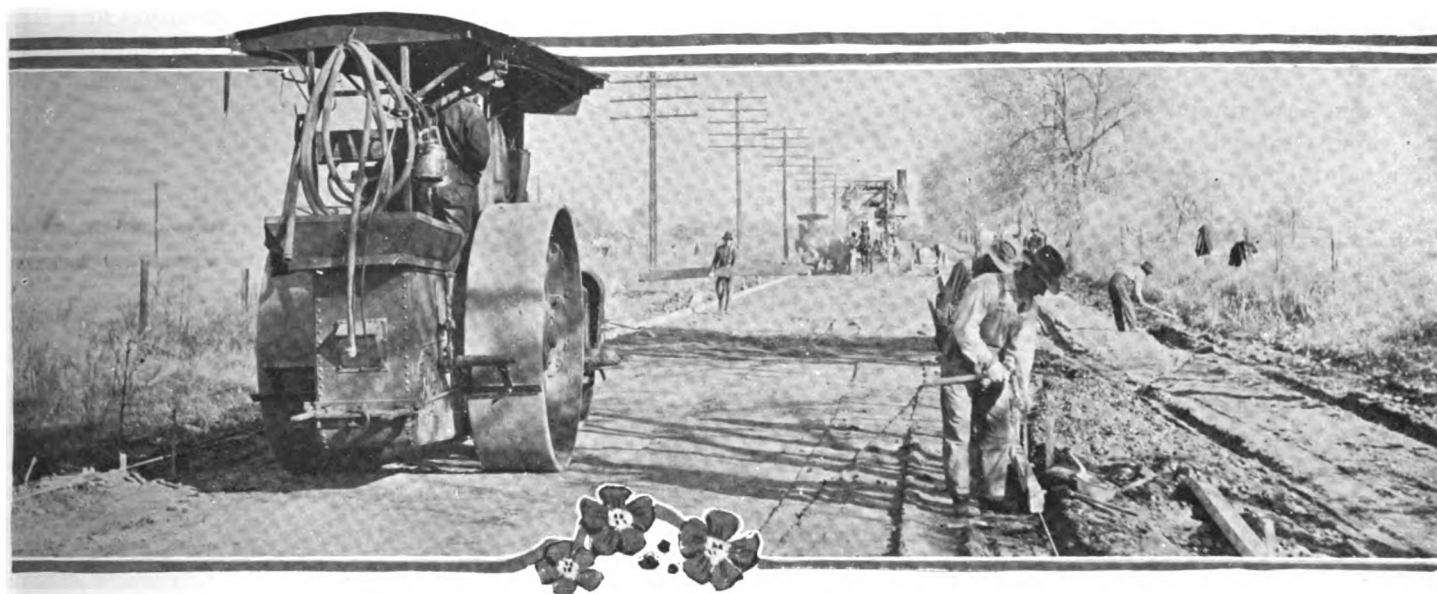
The answer is best found in the accomplishment, all due to the team work, of our united organizations throughout the State. A retrospect must necessarily impress us with the work yet ahead, and with which we are concerned, and emphasizes and intensifies the need for continuation of this community organization and their allied efforts.

means for securing this money by legislative enactment or otherwise.

A bond issue would necessarily involve years of time, but must in the end furnish the relief needed. In the meantime, however, by legislative enactment, all of the inheritance tax may be applied to road building.

Our automobile license tax should at least be doubled. As stated, these two items can be made available by the next session of the legislature, and would go far toward meeting the emergency arising from the necessity of meeting the federal allotment.

The writer is more than burdened with the necessity of community organization, and urges the greatest possible activity in this direction in every county in the State.



Laying Concrete on the Denver-Golden Road.

The province of the community organizations, working through their State Association, has been to formulate laws for a state system of highways, and to provide ways and means for the faithful execution of that work.

We are now more than ever overwhelmed with the importance of roads—goods roads—for Colorado. They are not only a commercial necessity, but it is our patriotic duty, made manifest on every hand, for each and every community to do its utmost to the end of the greatest improvement possible for the roads that we have and the construction of others that are necessary.

We are concerned with the problem of raising \$1,600,000 in ready money with which to meet federal allotments already made to our State for post roads and improvement of same. The paramount issue and burden laid upon the communities of our State is to provide ways and

In road building and improvement, as in war, let us "keep the home fires burning."

It has been decided by the executive committee of the State Good Roads Association that auxiliary societies, with independent organization, should exist in every county of the State, making the membership of each as large as possible. These local auxiliaries are empowered to select as many delegates as they may choose to attend the State Good Roads Convention, to be held in connection with the next meeting of the legislature in Denver, in which State Convention plans should and must be formulated for team work throughout the State to the end that existing emergencies shall be met and provided for.

The mere passing of resolutions will not grade a mile of highways, not build a bridge, nor transform the mountain side into a highway.

Return Loads Will Conserve Truck Power

By Tom Botterill, Chairman Highway Transport Committee, State Council of Defense

FORTY PER CENT. of the motor truck transportation of Colorado is going to waste every day. Sharp competition between business houses, coupled with a lack of a central clearing house, has resulted in a diversity of one-way loads which annually cause a waste of thousands of dollars in actual costs. Like Topsy, the condition has "just grown" until with the tremendous increase in transportation it has reached a point worthy the serious consideration of economists in all fields of commercial activity.

Last year, during the month of August, county commissioners of Colorado united in a census of road travel at the request of the State Highway department. In support of our statement of transportation waste, these figures may be cited:

On the Brighton road there were 106.2 trucks a day.

North of Las Animas the count showed 14.5 trucks a day.

From Denver to Parker some 11 trucks were counted daily.

From Leadville to Buena Vista the average was 23.

From Grand Junction to the State line, 19 passed a given point daily.

From La Junta to Las Animas there were 54 daily; from Rocky Ford to La Junta, 61; and from Fowler to Rocky Ford, 30.

Between Littleton and Denver, 44.6 trucks traveled daily, while 33 came in to Denver from South Broadway and Tejon.

Of the entire volume of travel, fully 90 per cent. carried one-way loads, or, in other words, approximately 40 per cent. of the entire volume of motor truck travel consisted of empty cars. Because of this waste more trucks were employed than would have been necessary had each been carrying a full load all of the time, and the resultant costs of labor, fuel, depreciation, etc., were correspondingly higher than they should have been. Carrying it back still further, these higher costs must have been added on to the cost of materials sold, thus adding to the burden borne by the ultimate consumer.

A practical remedy for this condition can be suggested. Every town of any size in the state has some central body, such as the various chambers of commerce, which maintains an office. By making such a point a clearing house, it would be possible to establish a "return-load" bureau. A. coming into this town every day with a load of produce could register his car, telling its carrying capacity and points made on the return trip. B. desiring to send out a load which is outside his regular delivery could make use of A.'s truck to make the trip.

It may have been that in the past B. would have sent his goods by rail. But the load was not large enough for a car, so he would have had to wait a few days. Then when the load was sent, transportation from rail to consumer

would have been necessary where under the return load plan a back-door delivery would be possible.

Regular deliveries, lower costs, a clearing up of rail congestion, and abolition of cost from rail to consumer may be cited as among the benefits.

A few years ago the plan might not have been practicable since motor truck travel was restricted any way. Today experts who have been on the road say that even the figures quoted for last August have been rendered obsolete by the sweeping developments in commercial motor vehicles, which have resulted in a tremendous increase which is still far from its highest peak.

The actual possibilities of the "return load" vary, of course, according to the type of vehicle employed, but nearly all of them can be used to haul more than the one commodity which they have been restricted to in the past.

The plan is one that makes for conservation at a time when every possible economy is desirable, and surprising results can be obtained if the officials of the chambers of commerce will give it a thorough trial.

Tourists Spend Huge Sums Here

THAT \$13,800,000 was expended in Colorado during the season of 1917 by visiting tourists is the estimate made by N. A. Ballou of the State Highway department and based upon a census conducted during the latter part of August and the first week of September. The figures are, of course, approximated, but they supplement the Tourist Bureau estimates in a way which shows the striking effect of automobile travel upon Colorado's prosperity.

The owners of 111 cars were interviewed. It was found that 523 persons traveled in these machines, or an average of 4.71 to the car. The average length of their visits was 23 days. The total expense was \$38,315, an average per car of \$15 a day, or \$3.19 per person per day.

On the assumption that there were 40,000 machines here from other states with an average expense of \$15 per day per car, the total daily expenditures in this state would amount to \$600,000, or \$13,800,000 for a 21-day stop.

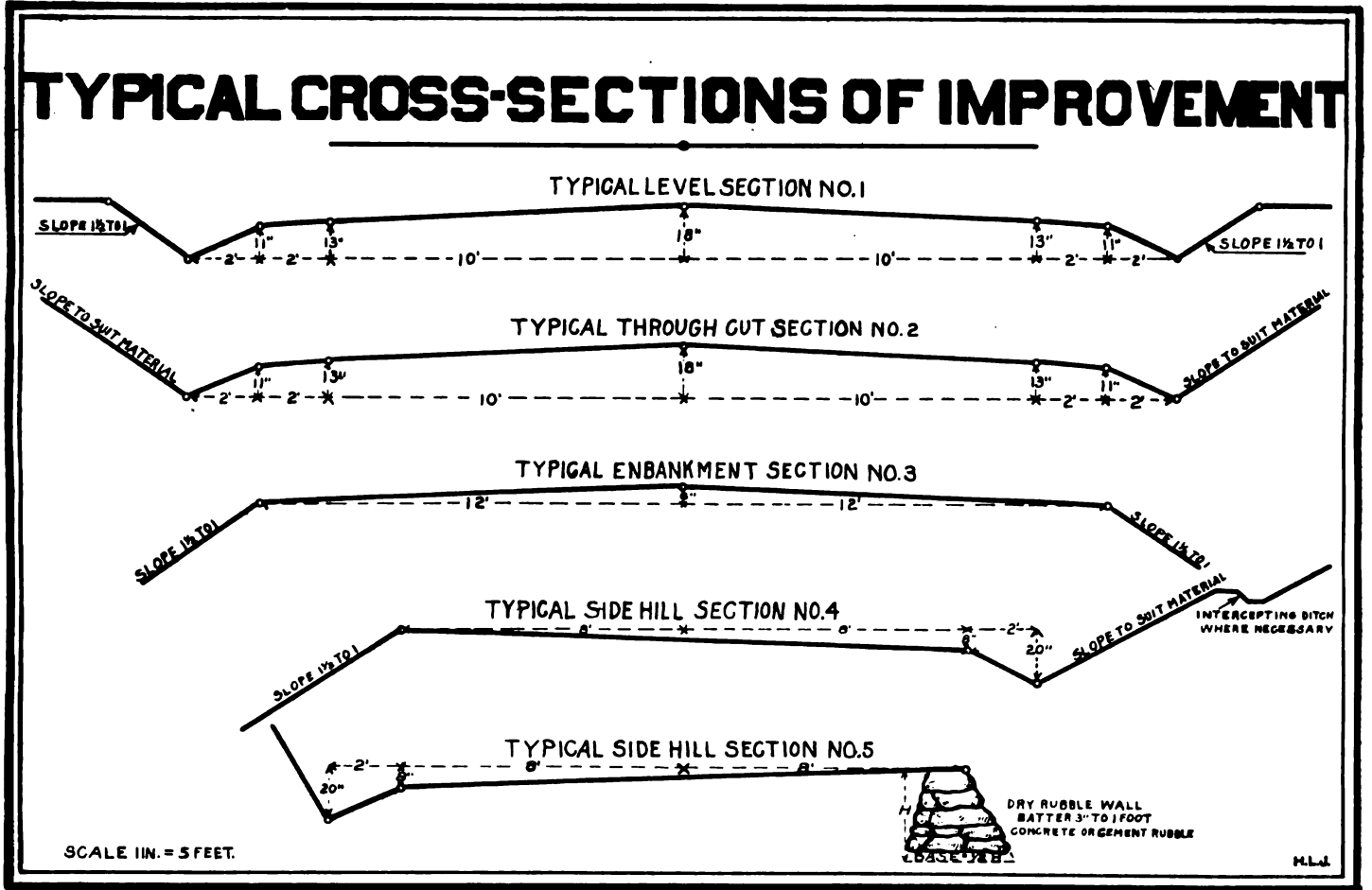
Taking the average of 4.71 passengers to a car as a basis for determining the number of visitors, an estimate of 188,400 people for the season of 1917 is arrived at.

A definite estimate on the effect of the influx on the hotel business was found through a canvass of Colorado Springs hotels where eight out of eleven were able to show that their business had increased 36 per cent. over 1916 through tourist travel. The other three had no definite figures, but were inclined to give the same source credit for their increases.

Thirteen out of 20 Denver hotels were able to show an average increase of 32½ per cent. in foreign automobile business for 1917, the other seven not having definite figures.

Out of five hotels in Pueblo, three reported increases of 50 to 60 per cent., the average from foreign automobile travel being 53 per cent.

The total average for Denver, Colorado Springs and Pueblo on these figures is 40 per cent. increase, and the prospects for the present season are generally considered to be even better.



Standardized Cross-Section Vital to Uniform Roads

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

THE typical road cross-sections illustrated on this page are the standard sections adopted by the State Highway department for all graded roads in the state highway system of Colorado.

These sections have been designed as the outgrowth of our experience with the construction of roads in different parts of the state, and we know that they will meet the requirements of the several counties.

The width of the right-of-way in general should be 60 feet, although in a level district, with few cuts or fills, 40 feet might answer.

In all cases, except on side hills, a top width of 24 feet is called for, this giving the traveler a safe way of at least 20 feet. This also allows ample width for future surfacing.

On the side hills the section calls for a width of 16 feet, with an additional two feet for ditches. Even though this width can not be obtained at the start in many cases, experience has shown that it is advisable to work with this end in view, even though the widening must be done after the road is opened.

In many locations it will be found economical to use a retaining wall on the side hill. These walls may be of dry rubble, cement rubble, or concrete, as indicated on section

No. 5 of our drawing. The foundations of these wells must be looked after and the wall well built, as many of the dry rubble walls have exhibited a tendency to move down the hillside.

On both the through-cut and side-hill work it often will be necessary to provide an upper intercepting ditch to carry the water to the line of drainage at the end of the cut.

Section 3 shows the embankment section with side slopes based on the 1½ horizontal to 1 vertical. This slope is used as the average one at which dry dirt will stand, but in some cases a slope of 2 to 1 will be necessary.

It will be found that any grading machine or scraper can be used in forming these sections and in keeping them in shape. Road superintendents, supervisors, overseers and foremen are urged to work to the sections here presented for both state and county roads, so that our foundations may be uniform, sightly, practical, and, I believe, more economical. In arranging the work-line, stakes should be placed for the sloping and grades, and grade-stakes for the ditching and crown. A crooked line of ditch and grade is unsightly and unworkmanlike, indicating either carelessness or lack of skill.

Judgment and care in laying out the work will be amply repaid by the results obtained.

The Log O' The Hard Pan Triangle Highway

AT the foot of the Six Great Mountains, where the Eagle makes his nest and the wild bluebird, favorite of the Great Manitou, wings his way thru the quaking asp, lie the Twin Lakes, abode of the Resting One. When the spirits are kind, the soft wind breathes upon him and he sleeps peacefully, the while his protectors smile down upon him, their faces reflected in the blue of his water coverlet. But when the sun frowns and the angry clouds gather, then the Resting One stirs uneasily and swift-moving whitecaps form as his hands beat upon the water.

This, tho, is most often in the winter months when the world is cold and gray and harsh and when the summer comes there is again the peace and the everlasting contentment of the high places pervading all about them.

Of late years, Man has tried to leave his mark upon the abode of the Resting One and upon the Six Great Mountains. But his mightiest endeavors become but delicate tracery upon the sides of the protectors and his boats thrown out upon the Lakes are but flecks that toss and spin as the leaping trout are gathered in. Man passes by and wonders, but the Resting One gives them no heed and the Six Great Mountains lie motionless in the summer sun, awaiting only the approach of the evil ones.

For long years only the growl of the bear or the soft breaking of branches as the deer passed by, disturbed the quiet of the Resting One. Then came the trader in search of fur, the miner lured by tales of gold, the settler in quest of a home. Today the road has set its mark upon the hillsides and the chug of the exhaust as the automobile thrusts its way into the heart of the range vies with the roar of the rushing mountain stream, as it threads its silvery way thru the gray cliffs to the Twin Lakes.

Higher in the hills quaking asp, aflame in the setting sun, stand out beyond backgrounds of velvet green pines. From out the glistening snow of the peaks, a boulder covered with moss, juts forth. Purple crocuses mingle with the vivid reds of the paint brush and delicate flowers of every imaginable hue timidly lift their heads to the blue above. The whole is one vast tapestry such as some giant might have used for a rug whilst he bent down to worship.

In all Colorado Nature presents no finer masterpiece and since the days when imagination first fired the spirit of the dauntless traders, passersby have stopped to pay the abode of the Resting One their silent homage.

The Twin Lakes and the Six Great Mountains, Lost Canon, Hope, the Twins, La Plata and Elbert, rest to the northwest of Buena Vista, 165 miles from Denver by the new Hard Pan route, 162 miles from Pueblo, 131 miles from Colorado Springs, and 16 miles from Leadville, one of the richest of the world's mining camps. They can be reached easily from any of the four cities and in each instance, the traveler wends his way thru pleasant valleys, over rugged mountains, on fertile plains along streams of icy translucence to his destination. Roads

now good, ever being bettered, mark the trail and the end of the journey is one all should see.

From Denver the new route, the shortest by 40 miles to Buena Vista, carries the traveler first to Morrison and then along highways fringed by giant red rocks and cottonwoods of olive green to the shelves thru Turkey Creek. Climbing steadily he reaches the top of the first range, then drops down to Conifer.

Proceeding along the trail first traveled, so history tells us, by the Spanish trader Juan de Onata in 1598, and in 1866 and later by the hardy gold freighters, he makes his way to Elk Creek, whence the peaks stand out on every side, snow covering their tops as some fair woman might throw a scarf around rounded shoulders. Bending and twisting, sinuous as the snake, the highway takes its course up hill, then down, past rugged battlements, into mantled hills of pine, where ever and anon, the ax of the lumberman has cut a jagged gash, creating some fantastic monster who seems to writhe and twist as the car approaches.

A last, long downward swoop and the traveler is at Bailey, where he meets his first view of the railroad whose iron trail cuts its way thru the canon. The ascent is easy and the road builder has followed the water grade with the railroad engineer. Past Shawnee and Singleton, thru the cathedral grove of pines at Cassels the machine goes on to Grant, where it leaves the main fork of the river and edges toward Kenosha Pass. The tinkling of a cow bell and the sound of the stream as it hurls itself against the naked rocks alone break the silence. Instead of the greens and blues of the valley the eye finds sullen grays and blinding whites until as the summit is reached the flats stand desolate and alone with only the fringe of mighty peaks about them.

Again the road leads downward and the Great South Park, a solid field of rich wire grass, comes to view. A sharp wind cuts across the open spaces but the car takes the bit and Jefferson, first seen as a spot in the distance, is soon reached. Then Como and the foot of Red Hill and another climb, this time thru reds and greens of surpassing beauty, brings the traveler to Silver Heels Peak and a full view of the back range. Fairplay, with its historic setting as one of the oldest placer mining camps in the state and its superb view of Mt. Bross, the Buffalo Peaks and Mosquito range, is the last town before Buena Vista. Ere that city is reached, however, the traveler cuts across the plains to 63 Ranch and into Trout Creek Pass, whence he obtains a fine panorama of peaks and range, passing en route the great Castle Rocks.

Then comes the finest part of the drive and its climax. Twining thru the pass, the machine enters into a series of hairpin turns and double loops. Up, up, it goes whilst the rays of the afternoon sun catch every point, dyeing them into all colors of the rainbow.

(Continued on page 14.)

COLORADO THE MOTORISTS' STATE

By Harry N. Burhans, Secretary Denver Tourist and Publicity Bureau

THE number of automobile tourists who come to Colorado over man-made roads to enjoy God-made parks is increasing by thousands annually. That interest in touring has suffered no diminution by reason of the world war is shown conclusively in the tremendous influx of tourists from distant states to the federal parks and to the Denver mountain parks in 1917.

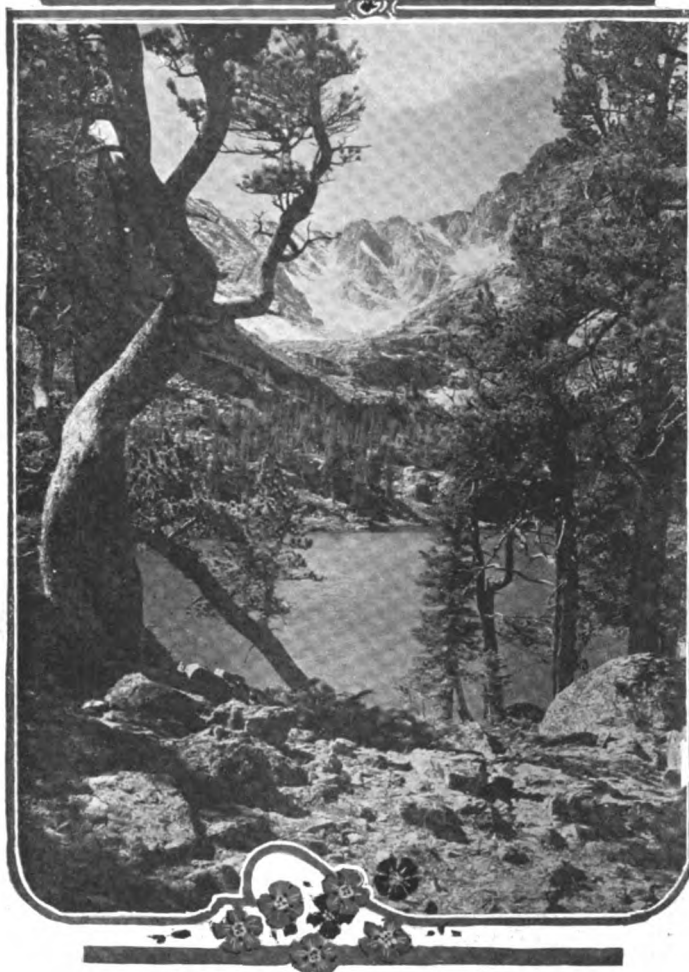
Every part of Colorado is now accessible to automobile travel and the traffic over the state has increased since 1913 over 500 per cent. Colorado-owned cars have increased from 13,000 to over 63,000 and visiting tourists have increased from a few hundred to more than 40,000 in 1917. The vanguard of an army of tourists who have enjoyed the life of the open in the past and the countless thousands of motorists determined to see their own country are already beginning to come to Colorado.

Nowhere in the United States can the lover of nature, the man or woman jaded with war work, exercise his personal liberty and satisfy his every outdoor whim as in the national parks and forests in Colorado. The network of auto roads which traverse these recuperation spots, is but one of their many attractions. The numberless lakes and streams fed from perpetual snows yield unending pleasure and the keenest of sport to fishermen. There are opportunities without end for hiking, golfing, tennis and numerous other outdoor sports and delights.

The glory of an outing in the mountains is not only obtained in the fleeting scenes of grandeur as the car goes spinning along mile after mile thru stately forests and rugged canons, but in the shade of pines and spruces beside some murmuring stream; in cooking appetizing meals over an open fire; in sleeping on a fragrant bough bed; to feel, to breathe the wonderful mountain air, and to awake in the morning refreshed and ready for the

work and pleasure of another day and the scenic wonderland of the Rockies. Comfortable hotels and free auto-camps furnish delightful facilities for the comfort and care of the automobile tourist.

Throughout the country there is universal recognition of the fact that Denver is the gateway to the west, the entry way to twelve national parks and thirty-two national monuments. Across Colorado are sprawled the great ranges of the Rocky Mountains. Eastward lie the rolling plains, the fruitful valleys and the prairies of the wheat belt. The mountain wall of Colorado separates the east from the west, and the change is sudden and complete. Beyond the towering front range lie all the wonder places of the continent. Denver, as the link between the plains and the mountains, occupies a logical place as the hub of this western vacation area. It is the radiating point of many railroads and highways, over which thousands annually spread out to the numerous places of delight that surround it. The automobile and railroad service is making Colorado more and more the resort center of the nation. It is nearer to the cen-



Glacial Lakes, Rocky Mt. National Park.

ter of population than any other region of equal grandeur.

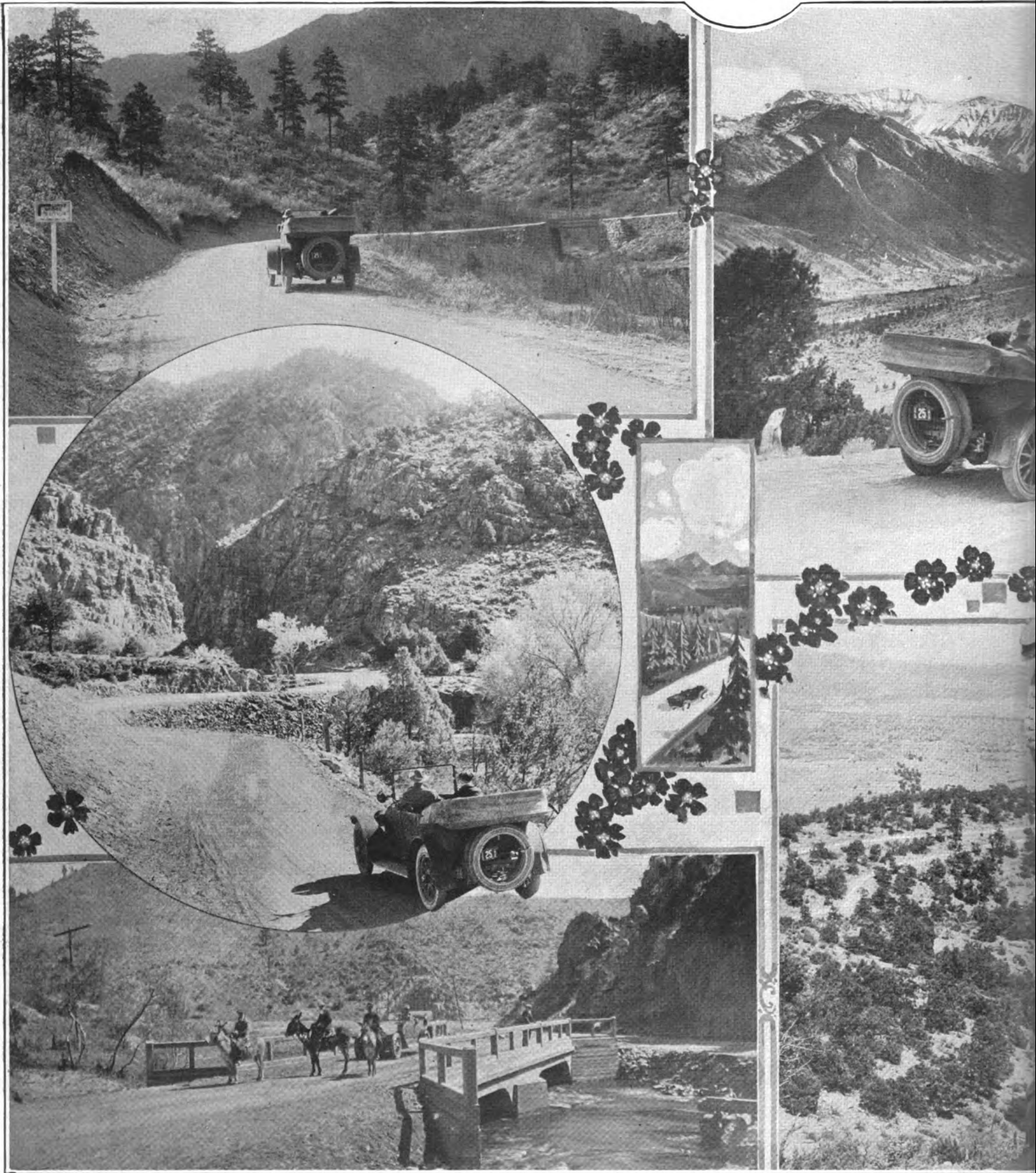
The prediction made early last year by Franklin K. Lane that there would be no diminution in western travel, because of the world war, was splendidly realized.

There were more visitors in Rocky Mountain National park in 1917 than Yellowstone, Yosemite, Glacier, Mount Lassen, Crater Lake, Casa Grande and Mesa Verde combined.

The Mesa Verde National Park, also in Colorado, doubled the number of visitors over 1916, and the two National Monuments in the State. Wheeler and Colorado, showed a vastly increased number of visitors.

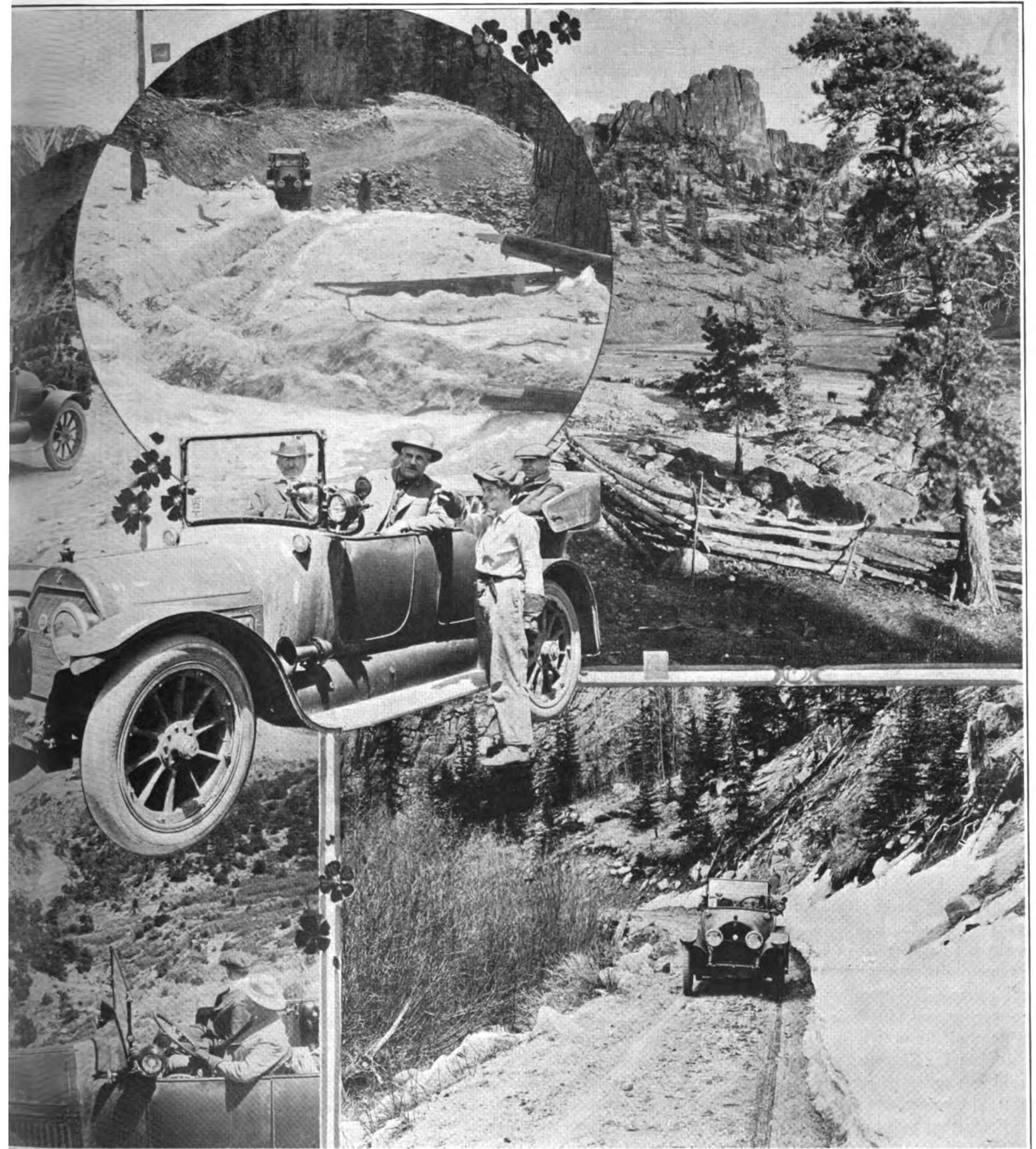
(Continued on Page 22.)

“Immovable, Immortal, Eminent”! Stand Colorado’s Towering



A few of the thousand beauty spots along the Hard Pan Triangle route. Top, left to right: A fine sweep of road approaching the bridge in Dead Man's Canon near Colorado Springs. A superb view of the mighty Princeton peak taken from the heights above Chalk Creek out of Buena Vista and showing the Chalk Cliffs in the foreground. Blocked by a snowdrift 20 feet deep near the top of the Independence pass road, at a height of 10,000 feet. This is one of the finest rides in the state and the picture shows but a tithe of its beauties. Castle Rock, a towering cliff in Trout Creek Pass. Center: Hairpin turns twixt towering cliffs. Cottonwood

Peaks, Guardians of the Peacefully Slumbering Valleys Below.



Hill, with the bridge at the foot, in the Upper Arkansas river canon. Bottom, left to right: Two kinds of horseless carriages on one of the new bridges in Bear Creek canon. On the crest of the hill with the road sweeping in sinuous loops to Priest canon below, a view from the Royal Gorge looking back toward Canon City. A May snow scene in Kenosha Pass where the road twines up along the mountain sides to the top of the range. Insert shows modern maid of range guiding travelers on way. Photographs taken by K. P. Howe, staff photographer, Colorado Highways Bulletin, May 19, 20, 21, 1918.

A Tri-City Route Thru The Heart of The Range

(Continued from Page 10.)

The top is reached and there, towering up from the plains below, stand the college peaks, mighty Princeton and Yale, with Jones, democratically, between them, and Harvard aloof to the right. To the left Ouray, Chipata, Shavino and Antero thrust their noses into the sky. Far to the right are the Six Great Mountains, the entire group higher than Pike's Peak.

Bewildering in their beauty, sublime in their immensity, these are the gateways to the Western slope, fitting guardians to the wealth of the western state.

But the traveler may start from Pueblo or Colorado Springs. If so, ere reaching Buena Vista, his will have been a journey productive in thrills and perfect scenery. From the Smelter City he will travel over lime shale roads, the best in the state, across the mesas, thru Florence, with its great oil fields, and to the mouth of the pass and Canon City. From Colorado Springs he will wind thru Dead Man's Canon and Salt Creek—where Lot's wife sits—past Penrose, first in an ever-circling loop climbing to the mesas, then thru the fertile fruit orchards which reach for miles to Canon City. Or it may be he will go thru the famous Ute Pass and over the divide to the Salt Works.

At Canon, if he possibly can do so, he will go over the skyline, his car seeming to leap from peak to peak, until at last, it appears as if only the void remains. On one side of him will stretch the valley a checkerboard of rich farms and orchards; on the other, the red foothills with the road winding, a mere thread below. It is a magnificent drive, such as only a man of vision could have projected.

Then the Royal Gorge trip! Imagine a twelve-mile drive, the road cutting its way in a steady spiral thru Priest canon. Gradually the plains below take shape and the foothills become dwarfed. The top is reached. Step to a little railed-in rockway; look down. Then if you are a normal human being, you will draw back sharply and on your next look make your way very cautiously and carefully to the ledge. It is the edge of the world with nothing but a man-made bit of rail between you and the Arkansas—a fine-spun silver chain, 3,000 feet below. Over the abyss a flashing bit of blue and black wings its way in supreme indifference increasing your own sense of insignificance. The pipe line and the railroad, great among engineering feats in their day, are but wriggling angle-worms, and the crawling train has become an ant laboriously bearing its burden homeward. The presence of laughing parties of picnickers about you is all that restores the balance to every-day life.

From that point on the drive up the canon over Parkerdale hill and into Pleasant valley is one of those times when one reaches the condition of ultimate enjoyment of life. Towering cliffs and flashing waters are the traveler's companions until he reaches the valley, when

a rich pastoral scene, backed by the peaks of the Sangre de Cristo, meet the eye. Then comes Cottonwood hill with its wide sweeps and the approach to Salida with Princeton just appearing over the range. The last stretch is reached and over fine roads the traveler lets his car out to find stretching before him the panorama of the College Peaks and their companions of the range, steeped in the beauty of the Colorado sun.

Road Appropriations to Counties in 1918

DISTRICT NO. 1.			
County	Improvement	Maintenance	Total
Adams	\$63,500.00		\$63,500.00
Arapahoe	6,375.00	\$ 750.00	7,125.00
Boulder	14,500.00	1,800.00	16,300.00
Clear Creek	3,000.00	1,040.00	4,040.00
Gilpin	1,750.00	550.00	2,300.00
Jefferson	45,094.00	6,156.00	51,250.00
Larimer	13,270.00	2,375.00	15,645.00
Logan	8,300.00	1,700.00	10,000.00
Morgan	6,350.00	1,350.00	7,700.00
Phillips	1,600.00	1,400.00	3,000.00
Sedgwick	1,900.00	700.00	2,600.00
Washington	4,300.00	2,000.00	6,300.00
Weld	23,500.00	6,500.00	30,000.00
Yuma	3,800.00	1,800.00	5,600.00
DISTRICT NO. 2			
Chaffee	2,000.00	2,100.00	4,100.00
Cheyenne	2,000.00	2,000.00	4,000.00
Douglas	2,200.00	1,800.00	4,000.00
Elbert	3,000.00	2,000.00	5,000.00
El Paso	17,500.00	4,500.00	22,000.00
Kit Carson	3,100.00	1,900.00	5,000.00
Lake	3,150.00	1,200.00	4,350.00
Lincoln	2,200.00	2,800.00	5,000.00
Park	3,000.00	1,000.00	4,000.00
Teller	2,950.00	2,050.00	5,000.00
DISTRICT NO. 3			
Baca	1,500.00	1,000.00	2,500.00
Bent	3,200.00	1,000.00	4,200.00
Crowley	2,400.00	800.00	3,200.00
Custer	1,200.00	800.00	2,000.00
Fremont		10,000.00	10,000.00
Huerfano	3,000.00	1,000.00	4,000.00
Kiowa	2,200.00	800.00	3,000.00
Las Animas	9,100.00	2,900.00	12,000.00
Otero	6,950.00	2,050.00	9,000.00
Prowers	5,650.00	1,350.00	7,000.00
Pueblo	20,300.00	2,700.00	23,000.00
Mineral	500.00	2,000.00	2,500.00
Montezuma	2,500.00	1,000.00	3,500.00
Montrose	2,750.00	2,750.00	5,500.00
Ouray	1,500.00	1,500.00	3,000.00
Rio Grande	1,500.00	1,900.00	3,400.00
Saguache	2,300.00	2,200.00	4,500.00
San Juan	600.00	1,000.00	1,600.00
San Miguel	2,600.00	700.00	3,300.00
DISTRICT NO. 5			
Eagle	1,500.00	1,270.00	2,770.00
Garfield	5,500.00	1,000.00	6,500.00
Grand		2,300.00	2,300.00
Jackson		2,000.00	2,000.00
Mesa	4,200.00	5,800.00	10,000.00
Moffat	1,300.00	1,600.00	2,900.00
Pitkin	1,200.00	800.00	2,000.00
Rio Blanco		2,000.00	2,000.00
Routt	3,000.00	2,000.00	5,000.00
Summit		2,800.00	2,800.00
Grand Total			\$433,280.00
Equipment Fund:			
To be used for the purchase of road machinery and operation of same on the roads adjacent to Denver....\$33,000.00			

COLORADO HIGHWAYS BULLETIN



Published Monthly
by the

Colorado Highway
Department

Denver, Colorado.

With the approval of the Colorado State Auditing Board.

Address all communications to Colorado Highway Department, attention Pyke Johnson, editor, Colorado Highways Bulletin.

Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up provided only that orders are sent in before type is re-distributed.

Vol. I. June, 1918 No. 1

THE WAR AND GOOD ROADS.

Twelve months ago the railroads of the United States handled practically all of the freight traffic without strain. Today, the enormous increase in troop and supply movements has created a revolution in transportation problems which has left a permanent impress upon this country. The commercial motor truck has come into its own, and where once steam reigned supreme, long lines of motor trucks now serve as feeders for tremendous stretches of country.

With the evolution of the motor truck has come an evolution in road-building which has already become a problem demanding the immediate attention not only of manufacturers and shippers, but of road-builders, engineers, and even the national authorities at Washington, D. C., to say nothing of automobilists generally. More than 90 per cent. of the roads in this country were constructed to bear only moderately heavy traffic, and the heavy loads and sharp tires of the motor truck are speedily bringing to the front an insistent need for a heavier type of road which must eventually replace the light-surfaced highways of other days.

A bill is already before Congress authorizing the expenditure of huge sums for the upkeep of state roads torn to pieces by war travel, and sooner or later, as the use of the motor truck becomes more widespread, new budgets must be undertaken to cover the enormous increase in costs.

THE FEDERAL AID ROAD ACT.

Thus far the United States government has appropriated to Colorado \$83,690.14 for rural post-road projects and some \$60,000 for forestry roads for the first year's work in a program extending over a period of five years. Roughly speaking, the total amount allotted to this state by the U. S. for the construction of rural postal roads will amount to \$1,600,000. Contrary to a quite general impres-

sion, this money does not pass into the hands of the state, but is administered on state roads by the national government. In order to obtain this allotment, each state must meet the government with an appropriation equaling the national expenditure, and all contracts and projects must be approved by Federal authorities. Maintenance costs must be met by the state.

The act is one that eventually will be of great value to each state, but the fact should be borne in mind that the appropriation to this fund by the state must necessarily limit its activities in other directions, particularly in a commonwealth of the size of Colorado, where the amount set aside for the first year totals close to 10 per cent. of the entire highway fund, growing to a total of 50 per cent. for the fifth year, if it is presumed that the state appropriation remains stationary during that period.

LIVING COSTS AND TRANSPORTATION.

Because of the general use of railroads as freight carriers, there has been a disposition to consider the road chiefly as a purveyor to the traveler in search of pleasure, yet good roads have a direct and important bearing upon the cost of living in each community. The city or town which possesses good roads within its own boundaries, but poor outlets, has a distinct asset within its gates, but not one equal to that of the community whose trunk lines place it in connection with points in all directions. Good roads cut down the freight costs, widen the selling field of farmer and merchant, and attract thousands of automobilists, with their thousands of dollars of buying power. Of what good is the head if the body is severed from it?

STANDARDIZED ROAD BUILDING.

There is a right way to do everything, and while experts sometimes disagree as to procedure, in general, broad, basic principles can be outlined for almost every phase of construction. Road building has now been reduced to a science, and deviation from its rules, save in exceptional cases, is hardly efficient. Years of close study of road-building conditions in this state have developed systems of construction, bookkeeping, etc., which may be considered as standard, and which, if generally employed, will serve to make county and state highways in Colorado uniform.

All of this material is at the disposal of the county commissioners and others interested in road work, and highway department experts are always ready to offer advice or suggestions in moulding the road-building in Colorado to standard.

There are many perplexing questions constantly coming up concerning road and bridge work, routing for trips and other matters of interest to the road-builder and the road-user. Insofar as is possible, the state highway department will be glad to answer any of these inquiries, and to that end will conduct a question box in future issues. Where immediate answers are desired, a note to Colorado Highways will be met with an immediate answer.

SALUTATORY

THE decision to issue this magazine was made by The State Highway Commission with the idea of furthering the highway interests of Colorado by getting into closer touch with the county commissioners of the State, who are the men in authority in levying local taxes for road building purposes and who have active charge of county highway construction, to the end that systematic co-operation in plans and general improvement, may be had. Team work is essential if Colorado's road work is to progress.

It is the desire of the Commission to secure the help and assistance of the road associations, motor clubs and business organizations whose members are interested in better roads. In addition we expect to feature the scenic trips of Colorado in such manner as to attract the attention of tourists.

We will publish facts that may be accepted as official and politics will not be permitted space. We would appreciate letters on road and tourist subjects and scenic and road views will be very acceptable.

We ask the help and assistance of all Coloradans in making this magazine an attractive, readable, State Highway periodical.

T. J. EHRHART,
Commissioner, State Highway Department.

Automobilists Will Hold New Tags from Year to Year

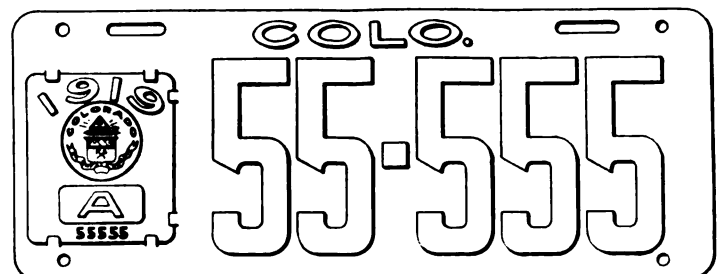
The 1919 automobile license tags for car owners will be a decided innovation in the way of license plates. Under the system in vogue since the state law became effective in 1913 new license tags were purchased each year. Under the new system just adopted by James R. Noland, secretary of state, a contract has been let to the R. Hardesty Manufacturing company of Denver for a plate or tag guaranteed for five years. Under this new plan the owner retains the same tag year after year. At the left end of this tag a slide plate 3x3½ inches is arranged so that it is fastened to the main tag or plate. The slide plate contains the year number, the seal of the state, the license number in miniature figures, and the letter A, B or C, according to the class of license represented. For example, cars that pay a ten dollar license carry the letter A; those paying a five dollar license carry the letter B; and those paying a two dollar and fifty cent license carry the letter C. This alphabetical arrangement is made to prevent persons owning five and ten dollar cars from running on a license that costs only two dollars and fifty cents.

This slide plate is a different color from the main tag and will be changed each year. The saving in the postage and express will amount to more than a thousand dollars a year, as these side plates weigh only a trifle. The tag-purchasing money saved will also amount to many thousands of dollars in the course of the five-year term. The original tag will cost the state twenty-seven cents each and is guaranteed for five years. The state heretofore has been paying 11 cents to 11½ cents for plates each year. The small slide plate is to cost not to exceed 2½ cents under the five-year guarantee from the Hardesty company. The new tag is generally conceded to be the best and most economi-

cal tag yet placed on the market. It is of eighteen gauge steel and the letters and figures are raised and are welded to the plate.

The tag proper will have a dark brown body, the numerals being aluminum. The slide plate for 1919 will be blue. This slide plate will be of a different color each succeeding year and the fact that it carries a state seal makes it a felony to counterfeit it.

The automobile fees, less the cost of tags and collections amounting to less than eight per cent of the total, are divided between the state and county commissioners for the building and upkeep of good roads. These collections have grown by leaps and bounds, the collections last year exceeding those of 1916 by approximately one hundred thousand dollars. For 1916 there were 47,500 licenses issued in Colorado. This number was increased to 65,000 in 1917 and it is expected that at least 80,000 will be issued in 1918. For 1919 the secretary of state has ordered one hundred thousand tags, anticipating that the business is going to continue to grow.



Photograph of New Automobile License Tag.

Field Notes From District No. 1, State Highways

CONTRACTOR STACK is working on the Golden road. Concreting was started on April 26, and if weather conditions hold good he should finish this work in forty working days. Under favorable conditions, the road will be open for travel July 1.

Work on the bridges from Morrison up to Evergreen is nearly completed, the only delay being caused by the non-arrival of the steel to this time. With the delivery of the metal work will be completed within two weeks.

The completion of these thirteen bridges will mark the substitution of steel bridges for wood on the entire road from Denver to Evergreen.

The work is being done by the Colorado Construction company. C. B. Sheeley and George Davis are in charge.

The department of improvements of the city of Denver is maintaining the roads from Morrison through the Mountain park system and over Lookout mountain and Genesee peak to the city of Golden. The city is doing this work, while the cost is divided between the city and the state highway department. The satisfactory manner in which the maintenance has been kept up is due to the "patrol" system used by Denver and affords a strong argument for the extension of this plan.

The work of this department is under the charge of W. F. R. Mills and Superintendent Steinhauer of Denver.

Work is projected on the Turkey creek road for further improvement from Morrison to Baileys, Colo. Reduced grades, easier turns and an improved drainage system are contemplated.

Widening and improvement of the Floyd hill road, in Clear Creek and Jefferson counties, will be undertaken this season.

A mile or more of the Denver-to-Morrison road will be resurfaced this year. Heavy travel has worn the highway down in spots, and these will be filled and gone over. Arrangements have also been made to see that the Arapahoe end of this road is brought up to standard.

Work has been started on the resurfacing of the north Golden-Denver road and with favorable weather conditions this highway should be in first-class condition within sixty days. The improvements will consist of scarifying and resurfacing of most of the portion west of Mt. Olivet.

In Adams county work is nearly completed on the new bridge over Clear creek on Boulevard F, just north of the city limits.

Following this road north along the great north and south highway, surfacing will be done in Boulder and Larimer counties during the present season.

On the Brighton highway the state maintenance outfit has scarified and reshaped the entire road to Brighton during the past two weeks. Surveys have been started for the hard surfacing of the first mile and a half of this road running north from the Denver city limits, and it is hoped that contracts will be let for this work within the next sixty days.

On the Denver-Limon road, which runs through Aurora and past the new recuperation camp, work was in progress all last year, and is now going on, consisting of grading and surfacing. The grading was completed last year from Limon to Deertrail, and also between Aurora and Bennett. Work is now being done between Deertrail and Bennett and Bennett and Denver on this same road.

Assistance was given by the state and counties to the town of Aurora to enable it to gravel that piece of the road which runs through the township.

South from Denver work has been started on the Denver-Littleton road by Contractor Charles Connor. Grading and bridge work is now in progress, and the contractor will make every effort to push this work to completion early this season. When this work is completed it will give a hard road from the center of the city of Denver to the town of Littleton.

From Littleton to Castle Rock the counties and state have surfaced the Colorado Springs highway, and now have a maintenance crew at work.

In Boulder county a convict camp is still at work upon the Nederland highway, which probably will be completed early this season. The camp will then be transferred to the South St. Vrain road, which will give the state another entrance to Estes park by way of Allens park.

In Boulder, Gilpin and Jefferson counties the road known as Coal Creek road will be finished this season by the completion of the four-mile stretch near Pine Cliff. This will furnish a new gateway into the Rollinsville and Nederland section of the state.

The convict crew in Larimer county is still at work on the Poudre Canon road. They are nearing completion of the Big Narrows, the most difficult section of the entire road.

Considerable work was done on the road to Estes park through Loveland canon last season, and it is contemplated that a good deal more will be done this year and next on it. This is the most important inlet to Estes park, and must be widened and graded to put it in good shape. Work is also in progress on the road from Loveland to the mouth of the canon.

In Boulder and Larimer counties the road from Lyons to Ester park was graded and drained and put into first-class condition during the past season by the state and the two counties. This road is subject to very heavy traffic, carrying the freight from the railroad into Estes park, and this improvement will make this entrance one of the best into the park.

In Jefferson county work has been in progress for the last two seasons on the Guy hill road and a great deal of progress has been made. Gilpin county has also put its end of the road in good condition for travel as well as the highway leading from Central City to Nederland.

In Larimer county the road through Estes park to Grand lake is now all under contract save for a six-mile stretch at the head of the Poudre river, which can be very readily completed when the other contracts have been finished. This will complete the road from Estes park over the divide to Grand lake, and it is hoped that the contractors will be able to finish the work this year. The state is paying the entire cost of this improvement. The road will be a link in the road from Denver to Loveland through Estes park, Grand lake, to Fraser and over the Berthoud pass to Idaho Springs, Golden and Denver. Its completion will afford automobilists another new trip of rare scenic attractions through the Rocky Mountain National park.

In Weld county the road from Brighton to Greeley and from Greeley to the Wyoming state line has been graded and surfaced. Work will be in progress this year on this line and the road will be kept in good condition. The road from Greeley to Loveland has been graveled by Weld and Larimer counties, and Weld county has graded and graveled the road from Greeley east toward Fort Morgan during the past season. Crews are now at work upon a new 600-foot concrete bridge over the Platte river on this road

Federal Aid Act and Projects in Colorado

By James A. Whittaker, District Engineer, U. S. Office Public Roads

THE Federal Aid Road Act, which became a law July 11, 1916, appropriates the sum of \$75,000,000 for expenditures under direction of the Secretary of Agriculture to assist the forty-eight states in the construction of highways. This sum is made available to the amount of \$5,000,000 in the fiscal year 1917, and increases by a like sum each year until the fifth year, when the sum of \$25,000,000 is available. The Act carries an additional appropriation of \$1,000,000 a year for ten years to assist in the survey, construction, and maintenance of roads and trails within or partly within the National Forests.

Authority for the immediate administration of this Act was delegated by the Secretary to the Director of the Office of Public Roads and Rural Engineering. And the Director desiring closer contact with the State organizations, and as an aid to the expeditious handling of the questions involved by the Act, established ten district offices, in each of which is placed a district engineer as his representative.

Before the Act could be placed in effect, a careful and exhaustive examination of the State Laws was necessary in order to know in which States were properly authorized highway departments. Seventeen States were found to be not properly equipped, so in these additional legislation was necessary, but now, after the proroguing of the legislatures of these States, we find the administration of this Act embracing the Secretary of Agriculture and the highway departments of forty-eight States.

To the States is delegated the designation of projects, the making of surveys, and the preparation of plans and specifications of the proposed work. The expense incident thereof is entirely borne by the State. If the Secretary of Agriculture decides the project complies with the requirements of the Act, then an agreement is executed, by the terms of which, upon completion and approval of the work specified to be done, the Federal Government reimbursed the State the agreed upon pro rata part, which in no case shall exceed 50 per centum.

Local authorities of State sub-divisions, when soliciting their State Highway Department to approve and request Federal Aid for a particular highway, should first select a road which complies with the terms of the Act and the Rules and Regulations promulgated by the Secretary, namely it shall fulfill the postal requirements; shall be a section of the State Highway System; the improvement desired shall be substantial in character and shall meet at least the needs and demands of present traffic requirements. Unless the selected project will satisfy all of these requirements, they will avoid disappointment and save themselves and the State officials time and expense by not submitting such projects.

Up to and including February 28, 1918, forty-five States had submitted a total of 383 project statements, of which 265 have been approved, six disapproved, three cancelled, and four withdrawn. Plans, specifications and estimates have been approved to the number of 86. The total mileage covered by these projects was 4,453.66, and the total cost, \$28,164,672.77, of which the States asked the Federal Government to assume the payment of \$11,129,815.69. The types recorded include all classes from graded earth roads to the highest type of surfaced pavement, excepting therefrom wood blocks, which type has not yet been requested.

The procedure to be followed in securing co-operation from the fund appropriated for roads within or partly within the National Forests differs from the above inasmuch that the petition of the local sub-divisions after approval by the State Highway Department is filed with the District Forester, who investigates the merits of the projects, which, if recommended by the Forester, is then submitted to the Secretary of Agriculture and agreement executed, generally with the State Highway Depart-

ment, although in exceptional cases, with the official representative of the County in which the project is situated. The amount of federal funds is not expected to exceed 50 per cent. of the proposed cost. After perfecting the agreement, the Secretary, represented by the District Engineer of the Office of Public Roads and Rural Engineering, then undertakes the survey and construction and inspects the maintenance of the project. The expenditure of the joint funds for these projects is made directly by the representative of the Federal Government.

The ten offices for district administration are located at Portland, Oregon; San Francisco, California; Denver, Colorado; Minneapolis, Minnesota; Omaha, Nebraska; Fort Worth, Texas; Chicago, Illinois; Montgomery, Alabama; Troy, New York; and Washington, D. C. Colorado, with Arizona, New Mexico, and Wyoming, comprise District No. 3, for which the district office is located in the Tramway Building at Denver. The survey and construction of Forest Road Projects in Forest Districts 2 and 3 is under direction of this office.

For Federal Aid in these four States to May 1, 1918, Arizona has submitted four projects having a length of 56 miles and an estimated cost of \$321,576.99; Colorado, eight projects with a length of 172 miles and estimated cost of \$520,188.04; New Mexico, fourteen projects covering 244 miles and at a cost of \$866,982.33; and Wyoming, sixteen projects embracing 188 miles and estimated to cost \$387,366.88. The totals for the four States are forty-two projects covering improvements upon 671 miles, at a cost of \$2,096,114.14.

The Colorado projects comprise: (1) The Denver-Littleton in Arapahoe County, 3.95 miles of concrete road with gravel shoulders, estimated cost, \$74,396.98; (2) The Walsenburg-Trinidad in Huerfano and Las Animas Counties, one mile brick and 76 miles gravel, \$260,191.91; (3) Granite-Twin Lakes in Lake and Chaffee Counties, 11.94 miles of gravel and shale, \$37,089.80; (4) Rifle-Meeker in Garfield and Rio Blanco Counties, 30 miles gravel and earth, \$79,082.85; (5) Placerville-Norwood in San Miguel County, 2.99 miles graded earth, \$7,480.00; (6) Lamar-Springfield in Prowers County, 3.08 miles gravel and shale, \$10,030.20; (7) Norwood-Naturita in Montrose County, 26 miles, \$29,999.20; (8) Meeker-Craig in Moffat and Rio Blanco Counties, 17.5 miles, \$21,916.40.

The agreement has been executed for Project No. 1, and it is now under construction by contract let by the State Highway Department. The remaining projects have been tentatively approved by the Secretary. Plans and specifications for Projects Nos. 4 and 6 were received by the district office and forwarded for the Secretary's approval during April. Plans for the remaining projects had not been filed on May 1.

The forest road work in the same States comprises agreements for the location survey, plans and estimates of one project of 95 miles in Arizona and two projects covering 150 miles in Wyoming. Also, the location survey and construction of one project in South Dakota of 16.6 miles, estimated to cost \$57,500.00; and four Colorado projects which total 119.24 miles and cost \$373,422.00. The Colorado projects are: Sedalia-Decker Springs, 18.59 miles, estimate, \$36,402.00; Rabbit Ears Pass, 20.75 miles, estimate, \$20,500.00; Monarch Pass, 27.1 miles, estimate, \$83,450.00; and Durango-Silverton, 52.8 miles, estimate, \$233,070.00.

Owing to the necessity of aiding war industries and the production of war necessities, all agreements, whether for State or forest roads, includes a clause which makes the construction secondary to these purposes. And while the State officials and the Secretary may postpone construction during the continuance of the war, yet it is not at present thought that construction of the above projects will be seriously or continuously delayed.

On The Road with the Crews of District 2

ON the north and south highway in Douglas county surfacing has been completed from the county line to Colorado Springs. Provision has been made for the maintenance of this road for the coming season. Three concrete bridges are under construction in Douglas county and at least two will be constructed this year in El Paso county on this road.

It is also proposed to straighten out the line in El Paso county and eliminate some of the curves as soon as right of way can be secured.

From Castle Rock east to Kiowa the road is graded and in passable condition at this time. A new bridge is contemplated just west of the town of Kiowa on this road. The road will also be extended east from Kiowa to River Bend, joining the Limon road at that point.

The Perry Park branch of the North and South highway has been graded and the Cherry Creek road will be further improved during this season. The road from Sedalia to Decker Springs will be further improved this year, this work being done jointly by the U. S. Forestry department and the state highway department.

In El Paso county the road up Ute Pass and through Teller county and Park county will be further improved by grading and elimination of curves during the present season. It is intended also to further improve the continuation of this road down Trout Creek to Buena Vista where the highways link up with the Leadville road.

In Chaffee and Lake counties the improvement of the main road up the Arkansas river will be undertaken this season by the Federal and state governments. Federal Aid Project No. 3 is located on this road.

Further work will be done this year on the Independence Pass road as soon as weather conditions will permit.

It is hoped that work will be started on the Forestry Aid project over Monarch Pass this season. Maintenance will be kept up on the road down the river between Salida and Canon City.

Work will be done on the Platte river road between Fairplay and Jefferson county line in Park county.

Crews are working now on the road between Cripple Creek, Victor and Canon City and it is believed that this highway will be open this season. This road is along the right of way of the old Cripple Creek-Canon City railroad and will open a new route into the gold district, with some particularly fine scenery and a good grade.

Work is now being done on the road from Colorado Springs toward Limon, and on the highway due east from Colorado Springs. The road south to Pueblo has been graveled and will be kept in good condition throughout the season.

A gang has just completed work upon three new bridges and a fourth is proposed on the line of the Union Pacific highway in Lincoln county. Work is also in progress on the east and west main highway through this county as well as on the north and south connecting highway. With the exception of the character of the work the statement also holds true of Kit Carson and Cheyenne counties on the Golden Belt and Union Pacific highways.

The cut-off line between Colorado Springs and Canon City has been gone over and is now in good condition. This line affords a short cut from Colorado Springs to the Arkansas river road.

In Park county from Fairplay north there is now a good road over Hoosier Pass to Breckenridge, and in Lake the road from Leadville to Tennessee Pass is in first-class condition and it is expected that the pass will soon be open.

From Salida south the road up to Poncha Pass is in good travelable condition and is now open.

Log of Grand Mesa Road

THE following log of the Grand Mesa road from Delta, Colorado, to the Midland Trail has been compiled by the state highway department for the benefit of those interested in taking this trip across the mesa and into the oil shale country:

Delta hotel, go east two blocks.		Bridge	21.6
Turn right.		Bridge	22.6
Turn left	2.8	Upper Cottonwood creek bridge	24.9
R. R. Crossing.....	3.0	Gate	25.4
Turn right	3.2	Kiser Creek bridge	26.5
Turn left	3.8	Kiser Lake	30.6
Turn right	4.0	Bridge	30.9
Turn left	4.8	Daniels Lake	31.5
Turn right	5.1	Bridge	31.7
Turn left. bridge.....	5.3	Baron Lake to left.....	32.3
Take left-hand road....	5.4	Camping Grounds to left.	32.4
Turn left	6.8	Top of Grand Mesa.....	39.0
Turn right	8.5	Turn right	42.0
School to right	10.5	Bridge	42.7
Eckert	11.1	New road	48.9
Bridge	13.5	Turn right	52.3
Turn right	14.9	Cross road	53.5
Cedaredge	16.0	Collbran	54.4
Turn left	17.0	Plateau City	55.5
Turn right	17.2	New bridge	58.0
Turn left	19.3	Bridge	59.1
Turn right	19.5	Bridge, Junction Midland	
Bridge	20.4	Trail	66.5

CONVICT CAMPS IN STATE.

Five convict camps are working on state and county highways in Colorado. These camps employ approximately 250 men under the direction of Mr. Thomas J. Tynan, warden, and his superintendents. They are working in Larimer, Weld, Garfield, Boulder and Pueblo counties.

FOREST SERVICE FUNDS.

Twenty-five per cent of the receipts from U. S. Forest reserves are turned over to the state by the National government and distributed pro rata, according to the average of forest reserve in each county. The money is divided by the county commissioners between the school and road funds, but at least 5 per cent must go to the schools. Probably 90 per cent of the total fund has been used in road improvement

Adams county now has an automobile for every ten persons of its population.

County Commissioners At Home and Abroad

COUNTY Commissioner M. A. Walsh and Ex-Representative James Dilts of Eagle county were in Denver May 7 to see about the improvement of the road over Battle mountain from Red Cliff through Gilman to Minturn. Four miles and a half of this road will be improved under the Federal Aid Road act.

Work on the Delta-Nucla road was the purpose which brought Senator Stephan to Denver May 6. Mr. Stephan was also particularly interested in the Grand Mesa road between Delta and Collbran.

Commissioner Gus Johnson of Jefferson county was in to talk over the improvement of State Route No. 1.

Commissioner Sam Greenwood of Boulder is taking a trip to the coast for his health. He is expected to return soon in greatly improved shape.

Commissioners Burns Mill and H. E. Miller of Boulder stopped in to check up on the improvement of the South St. Vrain road to Allen's park.

Commissioners Wagner and Galloway of Telluride, San Miguel county, are making plans for the improvement of the road to Rico.

Attorney Carpenter and Commissioners W. B. Dunham and W. I. Myler of Montezuma are preparing for work on the road from Dolores to Rico and from Mancos to Cortez.

Commissioner Robert Young of Walsenburg conferred with state officials on the road from Pueblo to Trinidad. The highway is included in Federal Aid Project No. 2.

Commissioner Robert Scott of Trinidad was also in in reference to the same project.

R. D. McDonald, one of the principal stockholders in the Tarvia Construction company, was in Denver recently to inspect the stretch of road which his company is constructing just outside the city limits on the Boulder road. Construction was delayed owing to the poor base material, but Mr. McDonald is confident that the road will prove up in good shape. Crushed gravel, thoroughly compacted and retreated with tarvia will be added to the surface and the Tarvia people will not conclude their work until satisfied. The state highway department has not accepted the contract yet, the Tarvia people guaranteeing its satisfaction. The work is an experiment in this state.

R. P. McDonald of the McDonald Construction company is in Salda erecting a superstructure on the Salda bridge across the Arkansas river.

The Weld county board was in en masse to talk over projects in their district with Commissioner Ehrhart.

Commissioner David Crocket and County Attorney Morgan of Arapahoe have outlined the work for the season in their district.

Commissioners Reickenberg, W. M. Smith and W. M. McCallum from Lincoln, as well as the mayor and the town council from Limon, have made plans for the improvement of the Golden Belt highway, and also the construction of concrete bridges for that road.

Commissioner Charles Engle of Rico, Dolores county, has been in to discuss the opening of the road thru Rico. It is hoped to include part of this road in one of the Federal Aid projects of the coming year.

Senators Wm. Adams and Geo. E. West are keenly interested in the Durango-Silverton road, which they hope to see pushed by the national government this season.

Dr. Bartlett, chairman of the road committee of the Civic and Commercial association of Denver, dropped in to confer with Commissioner Ehrhart about work on roads adjacent to Denver.

County Road Superintendent William Parish of Costilla county is devoting especial attention to the La Veta Pass road and the highway from Fort Garland to San Luis.

Commissioner W. H. Whalen and Superintendent of Highways Elmer Wiley of Gunnison county expect to improve Monarch Pass and the Crested Butte highways this season.

Commissioner James A. Stinson of Baca county is busy with details on the Lamar-Springfield highway. Part of this road is included in Federal Aid Project No. 6, and the rest of it in later Federal projects.

F. J. Bawden, county treasurer of San Juan, was in on his way home from Camp Pike, where he has been visiting his son.

Engineer James of Telluride dropped in while on his way east to talk over the situation in regard to San Miguel roads, especially the Lizzard head and Cedar highways.

Commissioners R. G. Webster and H. G. Tiffany of Adams county are at work on plans for improvement of the Boulevard F and Brighton and Limon roads.

Commissioner C. M. Morton of Sterling, Logan county, is looking after the graveling of the Platte river road and the opening up of the road north of Sterling.

Commissioner Edmund Becker of Grand county is pushing the work on the main highways in his district.

County Attorney Carl Seigfried of Ouray is interested in the improvement of the road from Ouray to Red Mountain.

Ex-County Commissioner Davis of Montrose called in on his way east to talk over the general road situation in his district.

Work on the Canon City road by the convict crew and further improvements on the Santa Fe trail east of Pueblo are among the matters Commissioner J. W. Thomson reports are under way. He was in Denver recently with John Cowden, chairman of the Crowley commissioners.

Washington, Yuma, Phillips, Logan and Sedgwick counties have also graded and opened new north and south roads connecting with the main east and west state highways.

The difficult hill between the towns of Georgetown and Silver Plume will be reduced to a 6 per cent. grade during the coming season under plans which are now being made, and complete surveys have been made over Berthoud pass for the reduction of the grade and the widening of the highway. A survey was also made from Silver Plume to the top of the divide, looking to the eventual completion of the road over Loveland pass.

The Blue Lodge of Colorado Road Builders

Not all of the road building is done by act of national, state or county government, even upon public highways. Occasionally there are men who see the need of a road in some section and who proceed to see that the road is built, upon their own initiative, and even at their own expense.

Such a one is "Cement Bill" Williams of Golden, Colorado, who was the first to initiate actual work on the Mt. Lookout road, now a connecting link from Golden to the Denver parks.

William Williams (to give him his full cognomen) decided in 1912 that the highway to the top of Mt. Lookout ought to be built. Reconnaissance work had already been done on the line by

James Maloney, Frank Morris and E. E. Montgomery of the State Highway department, and "Cement Bill" had his line of action pretty well established. Circulating among his friends in Golden, including Mr. Coors, Mr. Linder, Geddis & Seerie, and others, he raised a subscription of about \$2,500, a good part of which he donated himself. Then gathering a crew together he started out and put a mountain trail up to Windy Point following the line of Mr. Maloney's survey. That done he began actual construction of the road, getting as far as Chimney Gulch before his funds ran out. Others failed to fall in with his idea and the work was temporarily abandoned. Later the idea was taken up by the authorities and the superb road today, with very few changes, is a continuation of the "private" enterprise.

Fred Catchpole of Pagosa Springs, is interested in the raising of stock and sheep. Also he is interested in getting them to market. Wherefore and because of which he is interested in good roads. It was in 1912 that his beliefs and convictions began to make themselves felt in more than a local way. Previous to that time he had been working to get his stock to market and with that out of the way, the habit of good roads remained with nothing to keep its attention. So, Mr. Catchpole decided that there should be a road built over Wolf Pass from the San Juan to the San Luis valleys and from that time on, the State Highway department heard from him regularly. In order to further his work Mr. Catchpole, who is a banker, accepted place as county commissioner and the completion of the new outlet between the rich valleys last August, is in no slight way a tribute to his personal interest, aided of course by the residents of his section.

Just now, Mr. Catchpole's activities extend to consideration of a road between Pagosa Springs and Chama, New Mexico, and it is a safe forecast that until that piece of highway is constructed, there will be little rest for state highway officials in this state and in New Mexico.

High in the list of those who have given their services freely in the interests of good roads in Colorado, appears the name of Dr. F. L. Bartlett, now chairman of the good roads committee of the Civic and Commercial Association of Denver. Long before the good road movement began to crystallize Dr. Bartlett was talking to anyone who would listen to him, and when the first road conference was called in 1906 he was one of the most active participants as President of the Colorado automobile club.

In 1912 the Chamber of Commerce initiated a road fund of \$2,500 for the improvement of the road from Denver to Limon and the amount was expended under the personal supervision of Dr. Bartlett. Later he was a leader in the movement for a state highway department and he is now everlastingly pounding away upon the theme of good roads with increasing force.

One of Dr. Bartlett's chief hobbies is the logging of roads and there are few in Colorado who can give him pointers upon any of the highways, county, state or national.

At the same time that "Cement Bill" was working on his road to Mt. Lookout, a group of active road enthusiasts in Idaho Springs were making plans for the improvement of their highway to Denver. At that time state funds were decidedly limited, county funds were at a low ebb and it looked as if any attempt at improvement was almost hopeless.

But the Idaho Springs Boosters were not to be deterred and finally, led by Father McCabe, himself one of the most persistent advocates of good roads in the state, the residents got together and decided to give the rest of the state an object lesson in road work.

A big meeting was held and a few days later, any visitor to Idaho Springs on business was referred to the road for his client. There Father McCabe, Mayor McClelland, Mr. Bush, Mr. Myers, Mr. Kimball and, in fact, most of the men and women of the city, might have been found, pick and shovel in hand, tackling Floyd hill. The result of their work was the improvement of a six-mile stretch which was made passable and put on a better grade.

Idaho Springs was not content, however, and not until the road had been finally brought to standard did they relax their efforts. And even now they are still at it.

The whole history of road building in Colorado is replete with incidents of this kind and wherever there has been need of better highways there has arisen some leader to spur his friends on to the work.

In fact many of the older roads would never have been constructed were it not for this spirit of get-at-it.



"Cement Bill"



Dr. F. L. Bartlett



Fred Catchpole on the Old Pagosa Springs Express.

Road Plans for 1918

(Continued from Page 3.)

The alternate road is that from Dolores to Rico to Telluride, which comes under the head of state and county work. The work remaining on the project consists of the erection of two bridges—one at Rico, the other at the foot of Mt. Lores; the construction of 8,000 feet of road on Mt. Lores, and the completion of a 3½-mile stretch between Telluride and Ophir. The state will expend \$14,000 on this work, while the counties will add \$8,000.

The Fall river road is a link in a beautiful circle trip through the National Park and touching some of the finest views to be had in the state. Contracts have been let for 12 miles of the link remaining incomplete, and work is now under way on this strip. Six miles remains to be contracted for at the head of the Poudre river, but this is in open country and can be quickly linked up, once the heavier work is done. The remaining work of the project will cost approximately \$73,000, all of which expense will be borne by the state.

When this trip is opened the tourist will be able to enter Estes by either the Lyons or Big Thompson canons, skirt along the foot of Long's Peak, then go over the range by the Fall river route, which affords a panoramic sweep of the range beyond the conceptions of those who have yet to make the trip; pass on over to Grand Lake and return by way of Tabernash, Georgetown, Idaho Springs, and the Denver mountain parks.

The third loop project, and the least certain to be finished because of the inaccessibility of the road and the very short working season, is that over Independence. Running out of Leadville, this road will offer a loop which will permit the traveler to go to Glenwood Springs via Independence Pass and return via the Eagle river route. In the event that he is traveling through to points west, north or south, instead of making the circle, it will give him an alternate road in case of bad weather conditions. The cost of this work is estimated at about \$14,000. Counties do not contribute.

Outside of these three special projects, which are of the greatest interest because they are vital links, numerous other roads will be constructed during the present season. The entire fund on hand for the year for road work is \$835,889, of which \$242,818.81 is set aside for use on Federal Aid projects under the Federal act, which requires the state to expend at least dollar for dollar with the U. S. on roads approved by the government.

The largest sum appropriated by the state to any one county will be expended in Adams county, where construction and improvement will amount to \$63,500. Jefferson is second with \$51,250, while Weld will receive \$30,000. All figures save Adams include maintenance as well as other work. Elsewhere in this issue a table shows the distribution of funds for the entire year.

Vouchers issued for the month of April to the various counties reached the total of \$97,539.69, an indication that the various districts of the state are getting their work for 1918 well under way.

Colorado the Motorists' State

(Continued from page 11.)

The Denver Mountain Park System and the Denver City Auto Camp showed phenomenal increase in the number of visitors and campers. There was a large list of campers in the Mount Evans region, the center of the proposed Denver National Park.

The total number of visitors to all the national parks was 487,368.

The Yellowstone had 449 less visitors in 1917 than in 1916.

In 1917 the number of visitors at the Rocky Mountain over 1916 was 66,186.

The record shows 22,243 automobiles to the Rocky Mountain against a total of 19,441 for Yellowstone, Yosemite, Casa Grande, Sequoia and General Grant.

The number of visitors to Yellowstone, Yosemite, Glacier, Mount Lassen, Crater Lake, Casa Grande and Mesa Verde combined in 1917 was 109,765, as against 117,186 for Rocky Mountain.

Yosemite National Park had 2,452 more visitors in 1915 than Rocky Mountain National Park.

Rocky Mountain National Park had 82,676 more visitors in 1917 than Yosemite National Park.

Yellowstone National Park had 20,895 more visitors in 1915 than Rocky Mountain National Park.

Rocky Mountain National Park had 81,786 more visitors in 1917 than Yellowstone National Park.

The following is the total number of automobile visitors to the Rocky Mountain National Park from each state: Arkansas, 20 cars, 83 persons; Louisiana, 13, 67; Texas, 154, 643; New Mexico, 12, 62; Arizona, 19, 81; Colorado, 9,340, 42,537; Utah, 8, 20; Indiana, 32, 105; Montana, 5, 11; Illinois, 181, 638; Oregon, 7, 35; Michigan, 23, 81; Idaho, 6, 20; Wisconsin, 21, 66; Minnesota, 11, 36; North Dakota, 4, 14; South Dakota, 13, 43; Iowa, 311, 1,199; Nebraska, 1,318, 5,369; Missouri, 300, 1,175; Kansas, 748, 3,158; North Carolina, 1, 1; South Carolina, 3, 3; Georgia, 7, 36; Florida, 8, 35; Alabama, 6, 26; Kentucky, 6, 22; Mississippi, 9, 39; Ohio, 49, 216; Tennessee, 12, 43; Connecticut, 3, 8; Massachusetts, 4, 19; Rhode Island, 3, 6; New York, 35, 116; New Jersey, 10, 40; Pennsylvania, 14, 18; Maryland, 1, 4; California, 50, 209; Wyoming, 183, 683; Virginia, 1, 1; West Virginia, 3, 7; Oklahoma, 312, 1,251; Vermont, 1, 2; District of Columbia, 4, 9; England, 1, 4; Scotland, 1, 2; France, 1, 1; Greece, 1, 1; Canada, 2, 6; unknown, 623, 3,220; Rocky Mountain Transportation company, 8,747; wagons, 57; motorcycles, 111. This furnishes a total of 13,913 cars and 70,417 persons.

NIGHT DRIVE-AWAYS INAUGURATED

Night drive-aways have been inaugurated by the U. S. quartermaster department out of Detroit. The motor trucks travel in trains manned by 78 men, carrying 15 days' rations. The driving is done entirely by night.—Good Roads.

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.
John L. Howell, 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.
E. 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.

CLEAR CREEK

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

COSTILLA

J. M. Pacheco, San Pablo.
T. Manchego, Garcla.
W. R. Morris, Ft. Garland.

CROWLEY

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

CONJOS

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. Altvater, Highway Commissioner.

DOLORES

G. L. Garren, Rico.
Charles Engle, Rico.
H. M. Knight, Rico.

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.
W. E. Holt, Mattison.

EL PASO

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

FREMONT

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

GARFIELD

W. F. Adams, 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, Selbert.

LAKE

B. H. Marvin, 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.
Govor 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.
Jas. W. McClain, 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, Holyoke.
Lyman Foster, Holyoke.

PITKIN

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

PROWERS

Fred Williams, Wiley.
S. J. Higbeem, Carlton.
D. 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.

ROUTT

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

SAGUACHE

Geo. Woodward, Saguache.
A. V. Shipper, Villa Grove.
Adam Deltrich, 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 Howe, Greeley.
J. W. Birkle, Platteville.

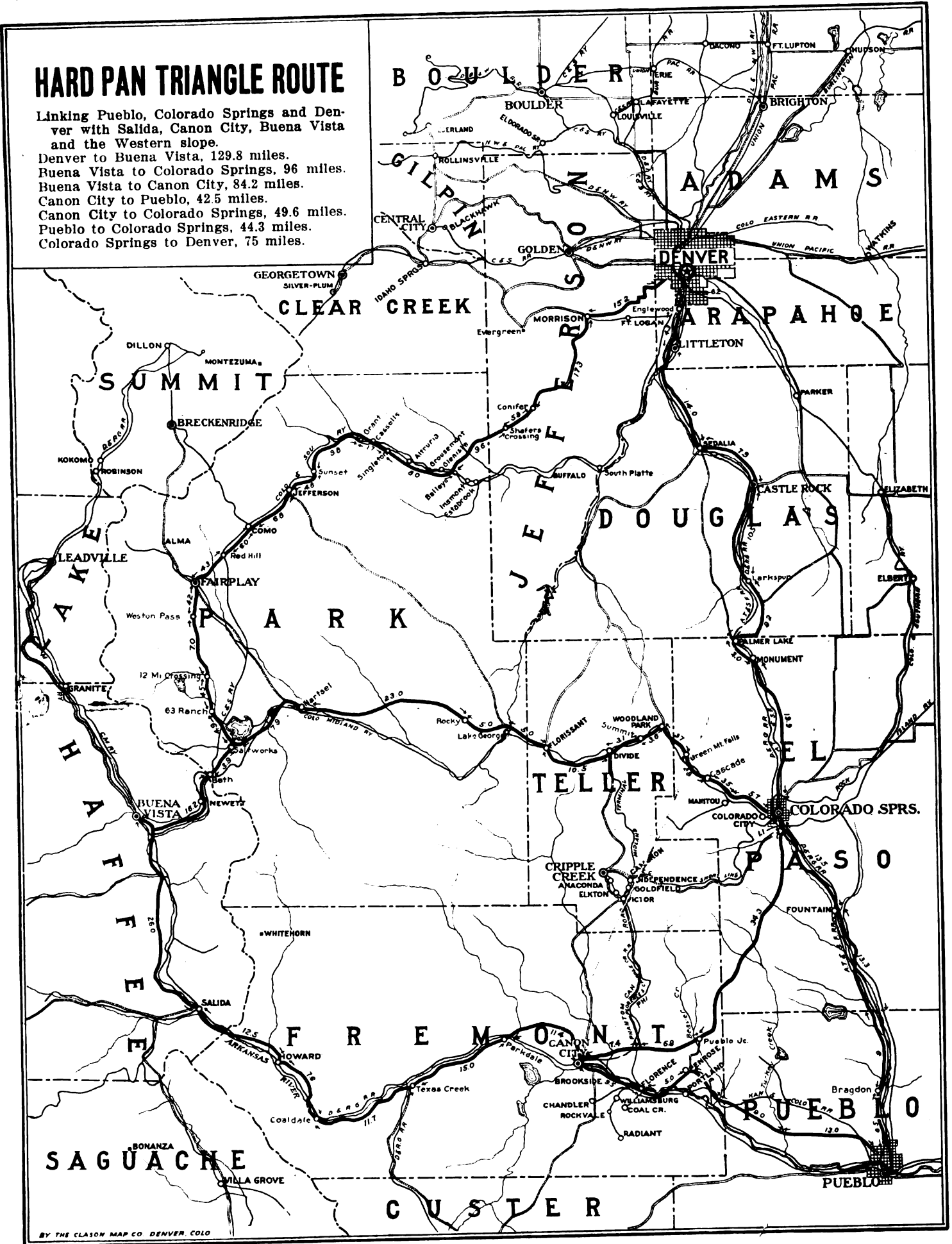
YUMA

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

HARD PAN TRIANGLE ROUTE

Linking Pueblo, Colorado Springs and Denver with Salida, Canon City, Buena Vista and the Western slope.

Denver to Buena Vista, 129.8 miles.
 Buena Vista to Colorado Springs, 96 miles.
 Buena Vista to Canon City, 84.2 miles.
 Canon City to Pueblo, 42.5 miles.
 Canon City to Colorado Springs, 49.6 miles.
 Pueblo to Colorado Springs, 44.3 miles.
 Colorado Springs to Denver, 75 miles.



BY THE CLASON MAP CO. DENVER, COLO.

GIFT
FEB 26 1919

Colorado Highways

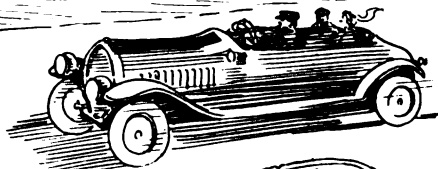
BULLETIN

Issued by the State Highway Department



Old Mount Antero and the Chalk Cliffs Looking Down From the Crest of Chalk Creek Heights Into the Valley and on to the Range From the Rainbow Route Road, Chaffee County.

July, 1918



State's Minimum Auto Tax Lowest in U. S.

COLORADO has the lowest minimum automobile tax in the United States, while but six states in the entire Union have a lower average fee. Twenty-three states collect an average amount per car of more than double Colorado's average while nine states average more than three times as much, according to an exhaustive table on national automobile taxes published in the first issue of the new magazine printed by the U. S. Office of Public Roads and Rural Engineering.

According to the same authority there are now 87,460 machines in this state or one for every 2.2 miles of road and one for every eleven residents. In the United States there are now 4,983,340 cars of all descriptions, or approximately 85 per cent of the total automobile output of the world.

In 1906 the total State registrations were approximately 48,000 cars, or less than 1-100 of the present number, while the revenues collected amounted to about \$193,-

000, only slightly more than 1-200 of the \$37,501,237 collected in 1917. Says the writer in Public Roads:

"At present all or a major portion of the motor vehicle revenues are applied to road work in all states, except Alabama and the District of Columbia. The tendency last year toward placing the expenditure of the motor vehicle revenues in the hands of the State Highway departments was very marked. * * *

"There are still 21 states in which motor trucks are registered at the same rate as pleasure cars. But the past year has shown quite a decided tendency to increase the fees required for heavy motor trucks. This increase is based generally on either the weight of the truck, its carrying capacity, or a combination of its carrying capacity and its horsepower. However, there is no evidence of any well-defined goal toward which this movement is tending."

The table compiled by the U. S. officials showing motor registration, licenses and revenues in 1917, follows:

State.	Automobiles	Total gross revenues	Motor-vehicle revenues		Average return per car	Population per mile of road	cars per mile of road
			Under highway department	Under local authorities			
Alabama	26,952	\$ 217,700.00			\$6.62	72	0.6
Arizona	19,890	117,643.00	\$ 117,643.00		5.91	13	1.6
Arkansas	28,693	205,176.50	191,175.00		7.15	62	.6
California	306,916	2,846,030.00	1,247,268.80	\$1,247,268.80	9.27	10	5.0
Colorado	87,460	296,808.00	136,615.65	136,615.65	3.39	11	2.2
Connecticut	62,723	1,080,757.31	1,080,757.31		14.48	20	4.5
Delaware	10,700	133,883.00	83,883.00		12.51	20	2.9
District of Columbia	15,493	55,928.00			3.61	24	...
Florida ¹	27,000	170,000.00	25,500.00	144,500.00	6.30	34	1.5
Georgia	70,324	229,653.00		143,514.00	3.27	41	.9
Idaho	23,771	412,641.48	103,160.37	309,481.11	16.69	18	1.0
Illinois	340,292	1,588,834.69	1,588,834.69		4.67	18	3.6
Indiana	192,194	1,096,153.08		899,818.07	5.70	15	2.6
Iowa	254,462	2,249,655.19	112,482.76	2,024,689.67	8.84	9	2.4
Kansas ²	159,343	830,878.00		787,619.50	5.21	11	1.4
Kentucky	47,420	287,314.13	257,300.00		6.06	51	.8
Louisiana	28,394	166,834.67		150,151.32	5.88	65	1.2
Maine	38,117	491,696.30	487,873.00		11.84	19	1.8
Maryland	56,787	807,395.45	580,612.69	145,153.17	13.25	23	3.7
Massachusetts	147,310	1,969,994.00	1,731,552.00		11.30	21	9.3
Michigan	226,693	2,471,270.77	1,272,246.66	1,199,024.11	10.00	12	3.3
Minnesota	54,000	100,000.00	50,000.00		1.85	43	.6
Mississippi ³	35,000	250,000.00		175,000.00	6.83	54	.8
Missouri	147,528	617,942.50	572,372.30		4.19	23	1.5
Montana	42,749	290,936.00	130,921.20	130,921.20	6.81	11	1.1
Nebraska	148,101	451,303.00		400,000.00	3.05	9	1.8
Nevada	6,885	31,166.00		31,166.00	4.35	16	.6
New Hampshire	122,267	495,305.09	376,773.63		19.10	20	1.6
New Jersey	134,964	1,923,163.63	1,887,965.21		13.55	21	9.6
New Mexico	14,086	80,843.50	35,739.34	35,739.34	5.74	31	1.2
New York	338,682	4,284,144.00	2,222,130.12	2,061,983.88	10.55	30	5.1
North Carolina	55,950	321,922.63	214,114.41	12,835.92	5.75	43	1.1
North Dakota	62,993	211,536.12	105,707.82	72,164.14	3.36	12	.9
Ohio	346,772	1,766,426.88	1,609,781.02		5.09	15	4.0
Oklahoma	100,199	853,658.91	768,293.02		8.52	23	.9
Oregon	48,632	196,787.50	167,834.34		4.05	18	1.3
Pennsylvania	306,001	3,268,025.50	3,268,025.50		10.05	27	3.6
Rhode Island	30,267	346,117.50	313,350.94		9.34	17	17.1
South Carolina ⁴	38,332	113,556.71	22,157.49	88,629.98	2.96	43	.9
South Dakota	67,158	210,592.00		179,003.20	3.14	11	.7
Tennessee	48,000	322,200.00	289,980.00		6.71	48	1.0
Texas ⁵	192,961	858,978.50	720,119.85		4.45	24	1.5
Utah	21,576	170,707.25	170,707.25		7.09	19	2.4
Vermont	20,367	363,540.93	326,032.00		16.80	17	1.4
Virginia	55,661	518,565.84	492,170.47		9.32	40	1.0
Washington	79,680	519,526.00		435,129.00	5.69	18	2.2
West Virginia ⁶	31,300	359,339.45	276,048.62		11.48	46	1.0
Wisconsin	158,637	861,278.00	198,768.36	596,305.07	5.43	16	2.1
Wyoming	12,523	57,421.00		45,992.80	4.59	15	.8
Total	4,792,205	\$37,501,237.01	\$23,235,897.82	\$11,452,705.93	\$7.62	21	2.0

¹ Does not include 2,750 non-resident and 5,134 exempt cars.
² Includes motor trucks and motor cycles.
³ Approximate; exact data not obtainable.
⁴ Includes only period from July 1 to December 31.

⁵ Registrations during 1917. Total registrations for 3-year period, 192,000.
⁶ Does not include 1,721 non-resident registrations.
⁷ Does not include 2,827 tractors and 854 trailers.

NATION AND STATE JOIN IN ROAD PROJECTS.

WORK has been started on four forestry road projects which will serve to cut down the distance between main line points on four of the state highways. A final conference held between Commissioner T. J. Ehrhart, representing the state; R. E. Pratt, district engineer, U. S. Forest service, and A. E. Palen, senior highway engineer, U. S. Office of Public Roads, cleared up the last points on the triangular agreement and crews are now engaged in preliminary work.

The first project taken under consideration was that relating to the Sedalia-Decker Springs cutoff. This cutoff, which embraces a distance of 18.59 miles, shortens the distance from Denver to Cripple Creek by several miles and the work will be completed this year.

The second project is that over Monarch pass from Maysville on the eastern side of the range to Sergeant on the western. The mileage called for in the contract is 27.1 and work will be completed next year. The road is now in passable condition, but the new contract calls for an elimination of dangerous curves and a general reduction of the grade. The pass cuts 60 miles from the eastern slope to the west.

The Durango-Silverton project is so generally known as to require little comment. The work necessary to make the road traversable is 17¼ miles and when completed the cutoff will furnish a northern outlet for all southwestern Colorado, eliminating a present roundabout route of several hundred miles. The construction involved is of a most difficult nature and construction will hardly be completed before 1819.

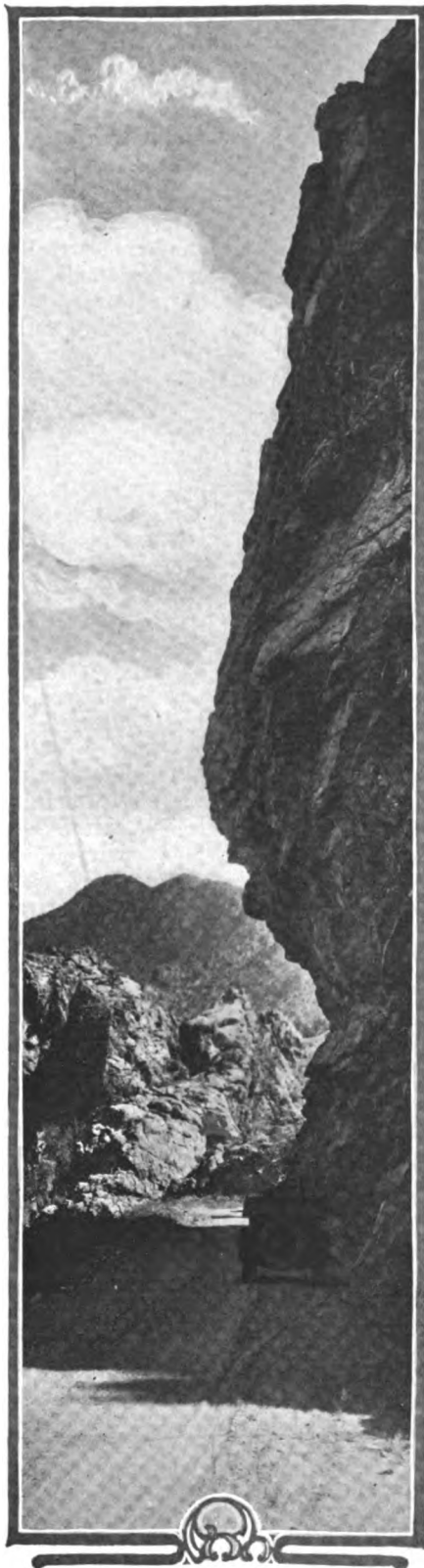
The other project to be undertaken is that on Rabbit's Ear pass between Kremmling and Steamboat Springs, a distance of 20.75 miles.

The road is now in use but the work will improve it greatly and will make traffic conditions in that section of the state much easier.

CAST IRON ROADS PROPOSED.

The enormous growth in motor truck transportation has resulted in a serious proposal from New York's secretary of state that strips of cast iron, eighteen inches wide be laid on highways to bear the weight of the heavy tonnage now found on eastern roads.

Porthos Gate



A View on the Upper Arkansas River Valley Road in Fremont County Close to the Rock Tunnel. This Highway is One of the Finest in the State. It Was Built Under Severe Handicaps.

BARDINE-REDSTONE ROAD APPROVED BY U. S.

AUTHORITY for entrance into a co-operative agreement and for construction work on the Bardine-Redstone project, perhaps better known as the McClure Pass project, has been received by the local branch of the U. S. Forest Service thru Forester H. S. Graves, from Secretary of Agriculture Houston. The project calls for the construction of some 35 miles of road and when completed will cut more than 100 miles off the route from Hotchkiss, Paonia and Western slope points to Aspen. Taken in conjunction with the work now being done on the Bardine-Crested Butte project by the state, the new highway will also serve to decrease the distance from the Western slope to Gunnison and points east.

An estimate of the cost of the McClure pass work, places the figure at \$180,000, of which the state will pay \$90,000 and the national government a similar amount.

The project is not one of those included in the 1918 budget of the state highway department, hence its approval by the state must wait upon the next meeting of the highway commission at which time the project will be taken under consideration. In view of the fact that Federal Aid and Forestry projects now undertaken by state and nation will consume a very considerable portion of the state funds in the next five years, the new project will add a considerable burden, but state officials are desirous of taking advantage of the government aid, if possible.

The U. S. Forest Service officials will go ahead this year with location of the road, specification plans, etc., so that all will be in readiness for actual work on the road with the first touch of spring next year.

The proposed project will traverse the Muddy Creek drainage, opening up agricultural lands which it is estimated will be sufficient for 200 families. From that point it will cross Huntsmen's Hills in a general northerly direction toward Redstone and Aspen. The road will serve to link up Hotchkiss and Paonia. the coal camps of Somerset and Bowie and in general the stock ranches, agricultural and fruit lands and coal camps of the district.

The Bardine-Crested Butte link, on which the state is now working, runs in an easterly direction from Bardine, linking up with the main highway at Gunnison.

The History of Road Building in Colorado

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

ALL the early histories of the mountain and plains region of the Rocky Mountains are strangely silent regarding the building of the first roads, and such information as I have is mostly gleaned from the old settlers.

The first wheeled vehicles came over the Santa Fe Trail in 1828 en route for Santa Fe, New Mexico, just touching the extreme southeast corner of our state, following the Cimarron river. A few years later, about 1852, the trail was changed and went by the way of Fort Bent and down Timpas Creek, with a branch running up the Arkansas River to Canon City for the purpose of reaching the trapping stations located along the river.

For twenty years great wagon trains, often numbering as high as 400 teams passed over this great natural highway, each caravan doing its own road work as the case demanded, which was just sufficient to get them through. Five thousand pounds of freight was about the limit for eight mules or three yokes of oxen. There were no bridges and it often required 40 to 50 head of mules to pull one wagon across the river beds, while at flood times the caravans simply had to camp and wait. For a long time the lowest going rate for freight from Independence, Missouri, to Santa Fe was 10 cents per pound.

The first overland stage and mail line was started from Independence on July 1st, 1849. These stage coaches were elegantly built and beautifully painted, designed to carry eight passengers, with a guard of eight men on the outside fully armed. They were built water-tight in order to use them for ferries when the streams were too high for fording. The fare per passenger was \$240 each way, 40 pounds of baggage being allowed, any excess being at the rate of 50 cents per pound. The trip was made in two weeks when the Indians were not too thick and the weather was fairly good.

There are many places to be seen even at this late day on the old trail, showing the deep ruts made by the old coaches, covering sometimes a space 200 feet in width.

Meantime, along between 1850 and 1858 two other trails were laid out, one from Leavenworth, called the "Smokey Hill" Trail, headed towards Denver, the other from Atchison along the Platte River towards Colorado and Utah, called the "Overland Trail."

The first real stage line to Colorado was the Leavenworth and Pike's Peak Express Line, which made its first trip starting March 27th, 1859, reaching Denver June 7th, a trip of 71 days; this was mainly over a new and untraveled route, the stage company having to build the road as they progressed. A short time afterwards Horace Greeley was a passenger over this line and helped out with the shovel and pick.

The route followed was along the divide between the Solomon and Republican River, thence northwest to the south side of the Republican to its source, thence southwest to the headwaters of the Beaver, Bijou and Kiowa Creeks, thence along the pine ridge to Cherry Creek, thence along the high ridge on the north side of Cherry Creek to Denver. The route was laid out by B. D. Williams, our first territorial delegate to the Congress of the United States, who certainly knew his business as he kept on high, dry ground all the way. The total distance was 687 miles; afterwards the distance was reduced to 600 miles, and the average time each way reduced to 10 or 12 days.

About 1860 the line was reorganized and called the Central Overland California and Pike's Peak Express Company, a survey was completed over Berthoud Pass and along the Green River to Utah, and the road was partially completed, but after spending enormous sums of money the company went broke and the line was abandoned for the time being.

In 1861 Ben Holliday had bought up many of the old stage

lines and then controlled 3,300 miles of stage routes. Between 1861 and 1865 the Government was paying Holliday \$1,000,000 yearly for carrying a daily mail from the Missouri River to Placerville, California, a distance of about 2,000 miles over the Overland Route.

D. A. Butterfield was running a line from Leavenworth via the Smokey Hill Route to Denver and Salt Lake, while Holliday was sending a branch line from the Overland Trail into Denver via Julesburg and Fort Morgan. There was much rivalry and many record runs were made. Holliday made the trip himself for a test from Atchison, Kansas, to Placerville, California, 2,000 miles in 12 days. Albert Richardson made the run from Atchison to Denver in 4½ days, and Butterfield was advertising regular trips from the Missouri River to Denver in 8 days and often made them in 6 days.

Very little change has been made in the old Santa Fe Trail. The Smokey Hill Route followed what is now known as the "Golden Belt" Route, as far as Oakley, Kansas, thence followed directly west to Cheyenne Wells, Hugo, Limon, Deertrail and Bennett to Denver. It is exactly the Kansas Pacific Railroad route, or the Union Pacific Railroad of the present day. The old Leavenworth and Pike's Peak stage route is now practically extinct. The Overland Trail has been changed somewhat; it now starts from Omaha and is partly on the north side of the Platte, while in the stage-coach days it ran from Atchison and kept on the south side of the river through Julesburg to a point near Greeley, thence to La Porte near Fort Collins, thence to Virginia Dale, thence to Rock Springs, Wyoming. Three branches connected the Overland Trail with Denver, one across the plains to a point near Fort Morgan, another connecting at Latham near Greeley, another connecting at La Porte near Fort Collins; these old roads are practically the same as our present roads.

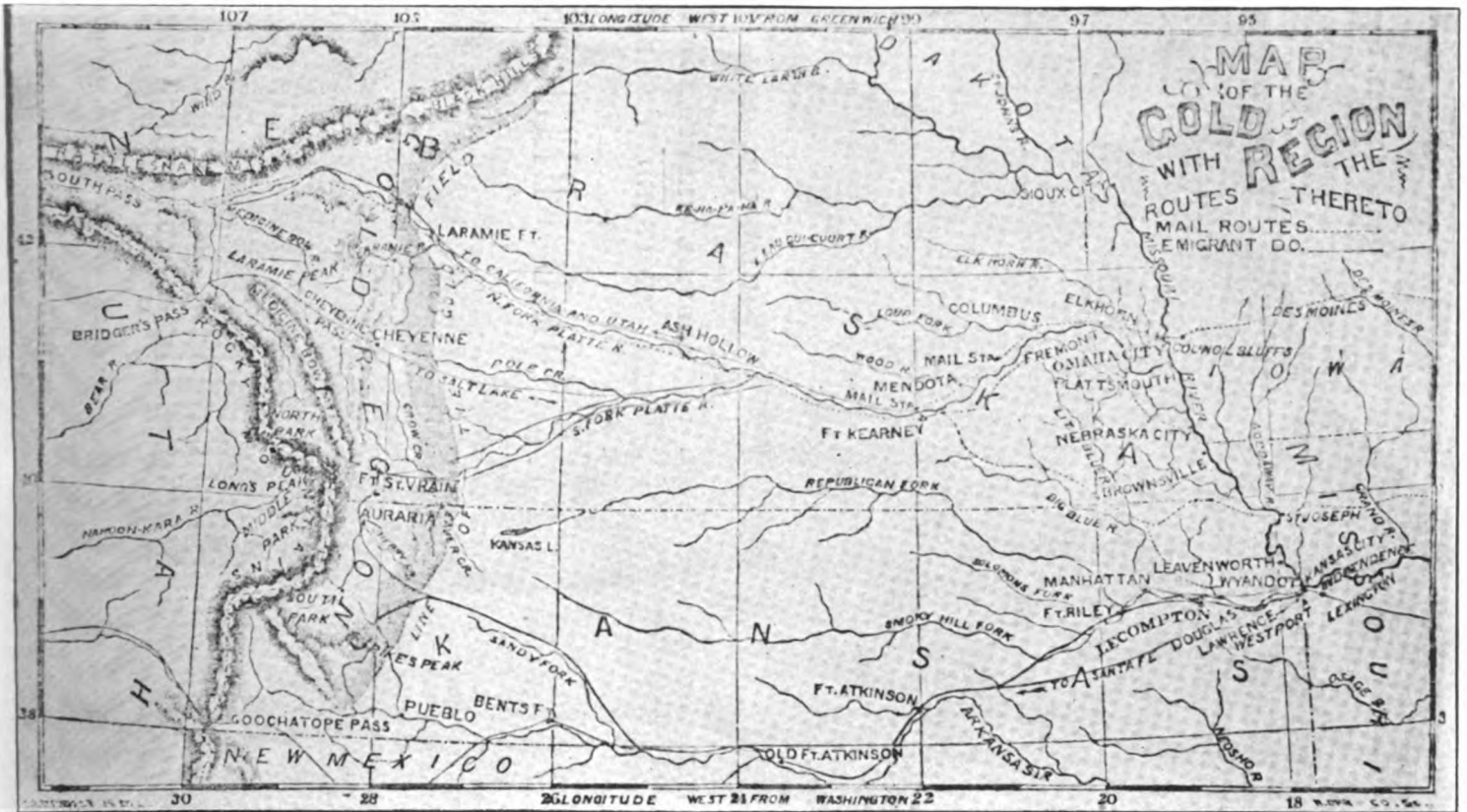
Thus it will be observed that the present Lincoln Highway does not follow the Old Overland Trail, had it done so we should have had nearly 200 miles of it traversing Colorado, instead of being side-tracked on an alternative loop as is now the case. I have been much interested in statements of the old timers that in the stage-coach days the roads did not become muddy even around Denver; where we now have after a slight rain very muddy roads, it is stated that in old times such was not the case. The reason given for this is that the top soil undisturbed for millions of years had become covered with a layer of sand, which packed hard under the wide tires of the freight wagons and stage coaches and became impervious to water.

At all events they were careful not to disturb the natural road bed and their only complaint was of sand. The Overland roads were so good that in 1860 a man by the name of Fortune built a steam wagon 20 feet long with driving wheels 8 feet in diameter intended to run between Atchison and Denver. It worked well on its trial trips, making 8 miles per hour. Its first trip to Denver was scheduled for July 4th, 1860. Then, just as in modern times, something went wrong with the steering gear and the excited driver in attempting to get out of town ran it through a building, wrecking both the building and the wagon. The disgusted Mr. Fortune concluded his name was "misfortune," and abandoned the scheme. Except for this, we might have had the automobile forced upon us 40 years earlier, thus advancing our prosperity in a tremendous degree.

Now comes a period from 1862 to 1870 when many stage lines were built. The first stage line was built between Denver and Pueblo in 1862, then followed the famous Barlow and Sanderson Lines, which were built throughout Colorado wherever there seemed to be a demand.

(To Be Continued.)

When Denver Was Auraria and Cheyenne Was in Nebraska—An Old Map



The Map From Which This Reproduction Was Made Was Published in the First Issue of The Rocky Mountain News in 1859 and as Far as is Known it is the First Road Map Ever Printed in the State. Note the Outline of the Range as Travelers of Those Days Thought It Was.

Rigid Standards Needed in Good Bridge Construction

THOUSANDS of dollars will be lost to the state this year as a result of the faulty construction of bridges in the past. The abnormally high waters of the Arkansas, Gunnison and Grand Rivers have swept out many bridges which must be replaced without delay and in many instances the loss is due to economy in construction where the expenditure of comparatively small additional sums would have served to obviate danger of washouts.

Ordinarily the structures so built might have lasted for many years but bridge construction can not be handled with an eye to normal conditions. The unusual heat of the early days of June caused a rapid melting of snow on the peaks which in turn flooded the creeks. In all cases such possibilities as this should be taken into account and sufficient sums should be set aside to insure structures capable of withstanding the enormous strain of high waters.

The present condition demonstrates forcibly the absolute need of greater care in the location and construction of bridges on all state and county roads.

No bridge should be built without well designed plans and specifications approved by the very best engineering authorities.

Careful consideration should be given to the location, the drainage area and the foundation. Ample water ways, wings of sufficient length to protect the approaches and construction adequate to carry a much heavier load than the bridges of the past, are important factors in the work.

It is poor economy to build a bridge which is inadequate in any of these respects and we should have a law requiring that all bridges and culverts should be built in conformity to a rigid standard design with plans and specifications to fit each location.

These standards should be approved by the best engineering advice obtainable and the construction work proper should only be done under competent and thorough inspection.

The subject is one deserving the most serious consideration of all county commissioners.

Good Roads Vital to Farming Communities

By E. D. Foster, Commissioner, Colorado State Board of Immigration

IN the settlement of new counties and the development of those in which settlement already has commenced the gasoline engine has solved old problems, but in their stead have come new problems, no less serious but vastly less difficult to solve. The automobile and the motor truck have annihilated space, but with equal force they have made poor roads no longer to be tolerated.

Until a few years ago there was a general hallucination to the effect that any kind of a road was good enough and that money spent on roads for any purpose other than making them merely passable in ordinary weather was wasted, but it is now recognized that there never has been a time or a circumstance in which poor roads were anything but poor economy. The necessities of pioneering and lack of funds for public purposes often has made poor roads an economic loss which it is difficult to estimate.

In the mind of the intelligent farmer who looks to Colorado for his new home one of the first questions which presents itself is that of transportation. Can he get his supplies from the railroad to his farm and transport his crop from the farm to the railroad at a reasonable cost, or is he to be financially handicapped and from the standpoints of time by poor roads, over which neither wagon nor motor truck can haul heavy loads or make good time? He knows that a farm with five miles of mud road between it and the railroad is frequently as thoroughly isolated as a farm 25 miles from the railroad with a connecting highway which is passable with reasonable loads under all ordinary conditions. Consequently when he applies for information as to his prospective home one of his first questions is, "How are the roads in that country?"

Some years ago Secretary Houston of the United States department of agriculture made some estimates as to the relative cost of transportation by railroad and over ordinary roads by wagon, finding that the cost of the latter means was from 35 to 45 times greater per ton-mile than the cost of shipping by railroad. The cost for railroad freight at that time was approximately four mills per ton-mile, making the cost of transportation by wagon road at that time, at his lowest estimate, 14 cents per ton-mile. Assuming that the average farm haul in Colorado to the nearest point is five miles, which probably is not as great as the actual average, the cost per ton by wagon over average roads was 70 cents, while the charge for transporting the same load an equal distance by railroad was two cents—an excess of 68 cents per ton for the five-mile haul by wagon.

At the same time the interstate commerce commission estimated the total annual tonnage of farm products and livestock moved over the railroads of the country at 200,000,000. On that basis the cost of a five-mile haul of the entire total by wagon road was \$126,000,000 more than the

cost of hauling the same total an equal distance by rail. Other figures prepared in other quarters at about the same time increased the total tonnage hauled to the railroads considerably but the commission's estimates are used here because of their conservative character.

It is probably true that the cost of hauling by motor truck over public roads can never be brought to as low a level as the cost of hauling over rails, but it certainly is true that the tremendous difference between the two cents at the present time can be lowered appreciably. The intelligent farmer of today knows that his problem is two-fold, including the question of producing a big crop and the equally important question of getting it to the nearest market with the least possible expense, and that is why he is concerned with the problem of good roads and is using every effort to induce the improvement of the highways and the construction of new ones along the line which he must take to reach the market from which he buys and to which he sells.

Since 1910 the population of Colorado has increased from 779,024 to 1,022,639, according to conservative lists this year. The average density of population has increased in the same period from 7.7 persons per square mile to 9.86, an increase of nearly 30 per cent. By far the greater portion of this increase is in what the census authorities classify as rural districts—those in which no large cities are located.

The inference is obvious and is borne out by other comparisons. The farming communities of the state are increasing in population at an unprecedented rate. Farm products for the entire state in 1916 were valued at \$91,152,770, compared with \$145,562,450 in 1917, the increase being due in part to the general advance in prices and in part to the fact that more land was cultivated in Colorado last year than at any one time in prior years. The United States census report for 1910 showed a total of 2,574,954 acres under cultivation, while a careful survey in 1917 showed a total of 4,073,250 acres under cultivation, an increase of more than 50 percent.

The present rate of increase in lands being put under cultivation is probably greater than the rate in any other state in the union. This alone furnishes proof that Colorado is feeling the effect of the westward tide of immigration more than any other state and is in itself the strongest argument for extensive road construction and improvement. Immigration and settlement halt abruptly at the edge of any district which is not fairly well supplied with adequate highway facilities, for poor roads are more discouraging to the prospective settler than is remoteness from railroads.

At present Colorado cannot anticipate any consid-

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Where a Glacier Once Slept—Snow Lake, in the Rocky Mountain Park



One of the Beauty Spots Along the Fall River Route in Estes Park, Larimer County.—Picture from Tourist Bureau.

Truck Users Urged to Send Data to State Council

A QUICKENING of the motor truck transport service in Colorado which will result in a very material decrease in waste of power and labor, is now under consideration by the Highways Transport committee of the State Council of Defense.

Broadly speaking the plan is to send out questionnaires to automobile dealers, motor truck owners and shippers generally throughout the state. In these the motor truck owner is asked how many trucks he has, what their style and capacity is, condition of roads, cost of operation and whether he could expand his service, if profitable.

The shipper is asked what he ships, what means he used to ship, the cost, etc.,

The purposes may be briefly stated. Use of motor truck transportation lines, will allow the farmer to retain his laborers on the farm all the time instead of diverting them to haul pro-

duce. Back door, immediate delivery will be secured, thus obviating the delays and congestion at rail points as well as freight charges from shipper to depot and from depot to consignee.

Danger of waste crops will be eliminated through co-operation with the U. S. Bureau of Markets.

From the motor truck owner's standpoint, the wasteful one-way haul will be eliminated, thus releasing both power and labor, the business will be standardized on an accurate accounting basis, and opportunities for increased business will be opened up as the farmer begins to realize the benefits from this service.

As a patriotic issue, motor truck owners and shippers are urged to answer questionnaires without delay and where they fail to receive one, write in to the State Council anyway.

The movement is expected to quicken interest in good roads and to result in more adequate funds for this important phase of transportation.

"World's Playground" to be Shown on Screen

Orpheum Theaters of Country Adopt Patriotic Policy of Advertising America First

THE world's playgrounds—Western America—are to be shown to 1,500,000 people a week for thirty weeks throughout the United States this fall and winter, as the result of an engagement made by C. E. Bray, of the Orpheum theatre circuit, largely brought about through the efforts of the Denver Tourist Bureau.

Mr. Bray declared that he had traveled through Continental Europe, the Orient, including Asia, China, Japan, the Philippines, and Africa, and that he had found scenery in western America that surpassed any that he had found in 200,000 feet of film taken in foreign countries.

"Nowhere in the world have I found such a magnificent opportunity to exploit unparalleled scenery as exists in the scenic West," said Mr. Bray. "No one has had the time to travel far enough to uncover the scenic treasures of this western country but I have been persuaded after visiting Denver to undertake to show in our travel weekly the scenic spots of western America."

Mr. Bray decided, partly as a matter of patriotic service, to replace the showing of scenes abroad in the Orpheum travel weekly with views of western United States. He started his campaign for movie films in the scenic West but it was not until he connected with the Denver Tourist Bureau that he found effective co-operation. Mr. Bray recently spent two or three days in Denver during which time he visited the Denver Mountain park system and the Rocky Mountain National-Estes Park. Contrary to the fixed policy of not showing city views in these pictures, Mr. Bray has consented to portray Denver, largely because of the fact that it is the gateway to twelve national parks and thirty-two national monuments, and Colorado Springs because of its being the hub of the scenery in the Pikes Peak region.

Coupled with emphatic recognition of the fact that the Denver Tourist Bureau is recognized as a leading factor in inducing travel to not only Colorado and the entire scenic West, Herbert Cuthbert, executive secretary of the Pacific Northwest Tourist Association, declared, while in Denver last week, that effective co-operation of the entire West was necessary to bring about the fullest development of western America in a tourist way as well as in the development of permanent settlers.

"There must be a cohesive organized effort to place our goods before the eyes of the world," said Mr. Cuthbert. "Our stock in trade is scenery and the scenic lure is only preliminary to attracting a permanent expanding population. It would be folly indeed to expend \$300,000 or \$400,000 in the creation of such a magnificent attraction as the Denver mountain park system and not follow it up with continued, persistent, effective publicity."

Mr. Cuthbert fills a unique field in that he is publicity manager for a community effort to exploit the scenic attractions of Vancouver, British Columbia, Washington and Oregon, in which effort he is backed by large legislative appropriations from the states named.

The annual summer drive of tourists to Colorado is under way with a large railroad travel, induced by the widespread publicity given the reduced railroad rates by the Denver Tourist Bureau, together with an unprecedented automobile travel. Check for three days at the Rocky Mountain National Park showed 1,804 automobiles from twelve states, with a largely increased number of visitors at the Mesa Verde National Park and other recuperation centers in the state over last year.

The Tourist Bureau scored a widely noticed hit by announcing to the entire country the western tourist rates in advance of information received by the railroads themselves. The active advertising campaign by the Bureau has placed Colorado practically alone among 5,000 summer rest places before the recuperation seeking public. A flood of letter and telegraph inquiries and the confusion created in railroad circles by war conditions has resulted in the establishment of a rate service department by the Tourist Bureau for the purpose of furnishing information concerning rates from all parts of the country to Colorado. The branch bureaus at Chicago, St. Louis and Colorado Springs have opened and are caring for a rush of inquiries.

700 ACCOUNTS KEPT BY DEPARTMENT.

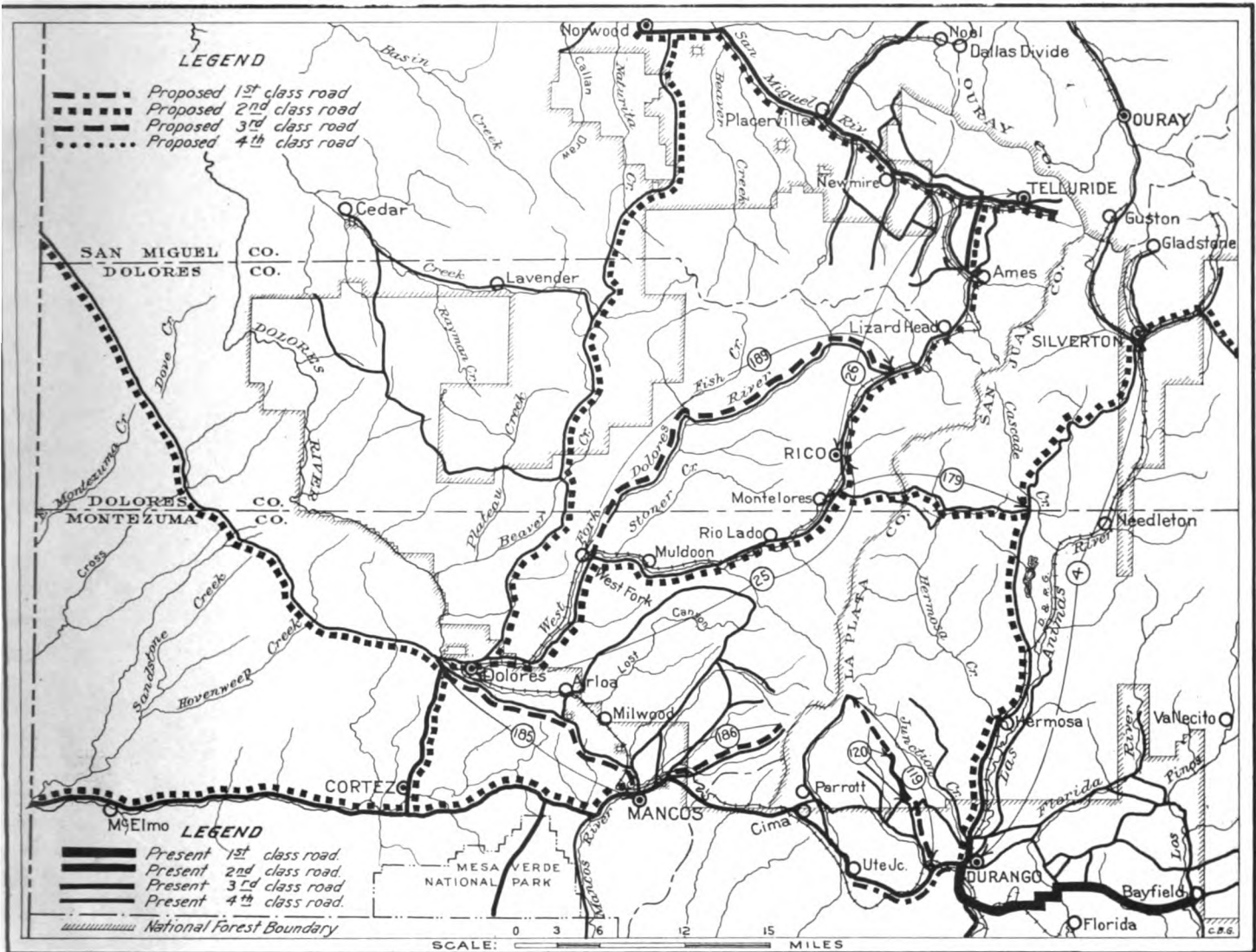
There are 700 accounts in the intricate bookkeeping necessary to the maintenance, construction and improvement of the state highway department. These include accounts with 62 counties, which are in turn sub-divided into as many as four accounts for each road in each county. In addition accounts are kept with the Public roads, Forestry and Federal aid departments of the U. S. government, and the various departments of the state government. Other branches of the work include office and field accounts within the department and accounts devoted to relations with private individuals, as the case of the purchase of materials and supplies incident to the work of the department.

Standard bookkeeping sheets are furnished to each of the counties for their accounts with the state and the imperative need of complete reports is indicated by the number of accounts, all of which inter-lock to some extent and none of which can be made accurate unless the information furnished is comprehensive in detail.

AUTOMOBILE LICENSES INCREASE.

More automobile licenses had been taken out in City and County of Denver up to June 11, than had been applied for in the entire year of 1917. Secretary of State James R. Noland reported 17,505 licenses issued at that time as against 17,088 during 1917.

U. S. Forest Service Plan for Development of Roads in Montezuma Forest



This Map Prepared by U. S. Forest Service Officials Sets Forth in Detail the Plan of Improvement of the Roads Leading to Mesa Verde Park, and Connecting All Main Points in the Forest. The Same Careful Scheme of Construction Has Been Worked Out for Each of the 17 National Forests in Colorado.

Comprehensive Plan Prepared for Roads in U.S. Forests

ACTING upon the belief that no road work should be done save upon a definite, pre-conceived plan, the engineers of the U. S. Forest Service have evolved a painstaking, thoro outline for the development of highways in the national forests which will, ultimately, throw open vast recreational areas of unsurpassed attractions to visitors in Colorado.

While much of the work remains far in the future unless larger appropriations are made by the U. S. government, a little is being done each year and because of careful plans which have been made, that little will all have its part in the final completion of the work.

Thousands upon thousands of acres of land in the national forests of Colorado are today practically inacces-

sible to the tourist. Included in them are some of the finest game and fishing preserves in the country, scenic wonders that eclipse many of those now known throughout the world and every conceivable attraction to the lover of out door life.

The area is embraced in seventeen national forests in this state and in each of them some work is now being done to open up the hidden beauties. The map which accompanies this article gives a graphic idea of the plan in Montezuma forest.

Here, in co-operation with the state, the U. S. service is pushing roads along the plan outlined in the map upon the theory long since adopted by the state highway depart-

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Auto Thieves Ltd. and Subsidiary Companies

By William J. Barker, President Denver Motor Club

THERE is no record at the Secretary of State's office of the above parent company and its subsidiaries ever having applied for a charter; nor are these companies incorporated or their operations in any sense "Limited" as the title would indicate.

In 1917 there were 740 cars stolen in Denver, 123 of which were never recovered.

From January 1st to June 4th of the present year there have been 464 cars stolen in this city, 73 of which were still "out" on the last mentioned date.

Inasmuch as the above named thriving companies operate at their fullest capacities during June, July and August, it may be readily seen that this year's record bids to far outstrip that of 1917. Estimating the value of cars stolen at an average of \$750.00 apiece, the thieves in Denver have to date made away with \$350,000.00 worth of property, and, with 73 cars unrecovered, \$33,872 worth of property is still in their possession or has been sold to innocent purchasers. Added to these amounts are thousand of dollars paid out by the insurance companies for reimbursements in the case of total loss and for repairs and damages, in most cases, where cars are recovered.

How to stop this wholesale thievery is a question puzzling not only to the Police Department and Courts of this State but to those of every other city and state in the Union.

Some cities have already adopted what is known as a locking ordinance that requires owners to lock their cars when leaving them alone. Such an ordinance the Denver Motor Club will shortly endeavor to have passed by the City Council. Still other communities require a man to show a deed and abstract of title when selling a car, very similar to that which accompanies the transfer of land.

Much has been said and written about the automobile thieving business and how to handle the thieves when caught. In the first place, comparatively few arrests are made, owing to the fact that cars are abandoned by those who steal them. Where a thief is caught it has been the history of such cases, in Denver at least, that in 75 per cent of the cases the thieves go scott free or with a reprimand. The reasons for this are several: first, the cars that are stolen by "Joy Riders" are generally taken by boys under 21 years of age,—in many cases the sons of more or less prominent families. Their fathers or relatives appear; offer to make good the amount of damage done; plead with you that Johnny has never done anything of the kind before; that the reform school would make a confirmed criminal of him; and finally you, Mr. Car Owner, consent to withdraw the charges, especially if the car has been put in as good or better condition than it was before the theft, by the parents or insurance companies. Denver's Police Court record shows comparatively few convictions where

thieves have been caught in this city. The District Attorney complains that the owners will not stand back of him for prosecution. The Police Department claims that a conviction is almost impossible where the car is not stolen with the intent to sell again; and not unfrequently of late the comment has been heard that the only way to handle the "Joy Riders" or "Professional Thieves" is with the old effective method used in handling horse and cattle rustlers in the days when Colorado was young.

The activity of the "car rustlers" is not confined to Denver-owned by any means. Of late the thieves have been especially attentive to the cars bearing license numbers above twenty thousand, or "State Cars." Twenty-eight cars from Colorado cities other than Denver, were stolen between Jan. 1, 1918, and June 4, 1918, and up to the latter date only seven were reported as recovered.

It behooves "out of town cars" to seek a garage while visiting the capital city and their owners to take the precaution of removing the distributor brush or installing some lock more effective than that on the ignition.

FOOTING FOR UNCLE SAM'S PACK MULES.

THE war is teaching us what can be done with automobiles, and this whole country is going ahead to put better roads under their tires. If present plans are carried out, 1918 will see over \$250,000,000 spent on our highways, a total more than 80 per cent above the previous high mark. Despite the war scarcity of capital, Texas is going to put \$25,000,000 into improved roads this year, as compared with \$5,000,000 last year. Arkansas has gone up from \$4,000,000 to \$12,000,000. In Oklahoma, Tulsa county (the center of the oil region) is spending \$1,750,000 on weatherproof highways. Iowa is duplicating last year's investment of \$15,000,000. Iowa can certainly afford it, the way the price of corn keeps soaring, and thirty millions of real money ought to take the slithers and sludges out of some of the main trails through the corn belt at least. The rest of the country is not lagging very far behind the Middle West in this matter, for railway blockades and embargoes on needed freight have convinced most of us that transportation is not a luxury even when gasoline is burned to obtain it. Uncle Sam has to get in and out of his cantonments, shipyards, training camps, arsenals, and warehouses, and is putting up his share of the costs. Of course there are some belated brothers who cannot see the sense of such improvement, as witness that odd bill introduced in the New York Legislature to forbid five-ton government trucks from using certain state highways; but these curios only illustrate the general progress. Most of us know that the automobile can pull its share of the load in our war and are willing to give it a chance. The Kaiser is about the only one who really wants bad roads in our U. S. A.—Collier's Magazine.

COLORADO AUTOMOBILE RECEIPTS, 1917.

During the year 1917 the sum of \$305,391 was collected from automobile licenses by the state. Of this amount \$137,558.61 was given to the counties and a like sum to the state highway department for use in road work, the remainder, \$30,273.78, being expended in the cost of collection.

Over the Spanish Trails to Mesa Verde Park

FAR off on the southwestern edge of the state stands Treasure Mountain. Crowned by dazzling layers of snow the year round, the old peak looks down upon the tip of the San Juan basin to the west, while to the east its waters tumble into the fertile San Luis.

Far back in the sixteenth century bands of Spaniards, ever searching for the fabulous golden cities of Colorado and the northern country, worked their way thru the valleys along the San Juan and on around the foot of Treasure mountain to the San Luis. No trace of the golden loot was discovered yet, instead, gold and silver were lodged in the mountains while the valleys offered endless wealth to those who cared to till the soil.

At the southern side of the mountain were the healing waters (Pagosa Springs). Here the Utes assembled yearly to bathe in the warm waters and cure their ills.

White men visited these springs and heard tales of wonderful cures; Mexicans carried the stories to the missions in New Mexico, yet so stirred was the imagination of the adventurers of that age that nothing save virgin gold could catch their attention.

Years later Lieutenant Pike and his expedition penetrated thru into the country but playing their part in the Burr conspiracy (as historians tell us) they gave little heed to the wonders resting about them, and it was not until comparatively recent times that actual settlement of the fertile regions began.

Then again it was gold that brought about the rush; this time, however, the gold of the hill. Del Norte at the foot of Treasure Mountain on the east was settled as distributing point for the San Juan mining camps; Pagosa Springs came to life as the home of huge lumber camps and later as a cattle and farm country; Mexicans entered the country in droves to take up farms and to go into the stock business.

As the country became more settled railroad loops were built and with the teaming business quieting down, Del Norte and Pagosa settled down to the business of farming.

Now the cycle has moved around again, good roads have opened up direct routes, the famous Wolfe Creek pass highway has been completed across the range and once more these towns are on the direct route of travel and destined soon to become famous among globe trotters as terminal points of the great pass.

Today travelers in ever increasing numbers are going over the pass entering the state from New Mexico on the south, from California on the west, going to the pass via Pueblo from the east and from Saguache on the west. The Mesa Verde with its historic ruins is one objective, the entire state may be the other. The trip today is one of the finest Colorado affords. Another year when the Durango-

Silverton link is completed, it will be the world's greatest, on the authority of noted travelers.

The Coloradoan who desires to see this country must enter it from one of two points today—La Veta pass which lies to the west of Walsenburg and south of Pueblo, and Saguache, to which point the traveler may come from Pueblo or Colorado Springs via Canon City and Salida, from Denver and points north, or from the Gunnison and the western slope.

Most automobilists prefer to take circle trips and it will be from this standpoint that the trip will be here described.

The main line point first reached on the route whether the traveler comes from the east or the north is Pueblo on the main north and south highway.

Traveling over the finest roads the state affords, the automobilist cuts straight to the south to Walsenburg, traveling for first block along fine farms in sight of the Greenhorn range with the Spanish peaks far to the southwest. At Greenhorn crossing where stands an old well that was used by the early freighters to water their stock, a first glimpse of the back range, the famed Sangre de Christo mountains, is obtained and as the traveler goes on, he swings into the mesa country where lies Huerfano county, so called because of the Orphan Butte which stands alone on the plateau giving county and creek their names, and long ago used as a landmark by the pioneers.

Over the hills and down in the valley is found Walsenburg where are some of the largest coal mines in the state. Here the automobilist leaves the main highway and turns on the Spanish Trail to the south toward La Veta. Sage brush marks the way with here and there stock grazing on the hills and the Spanish Peaks towering up to the left.

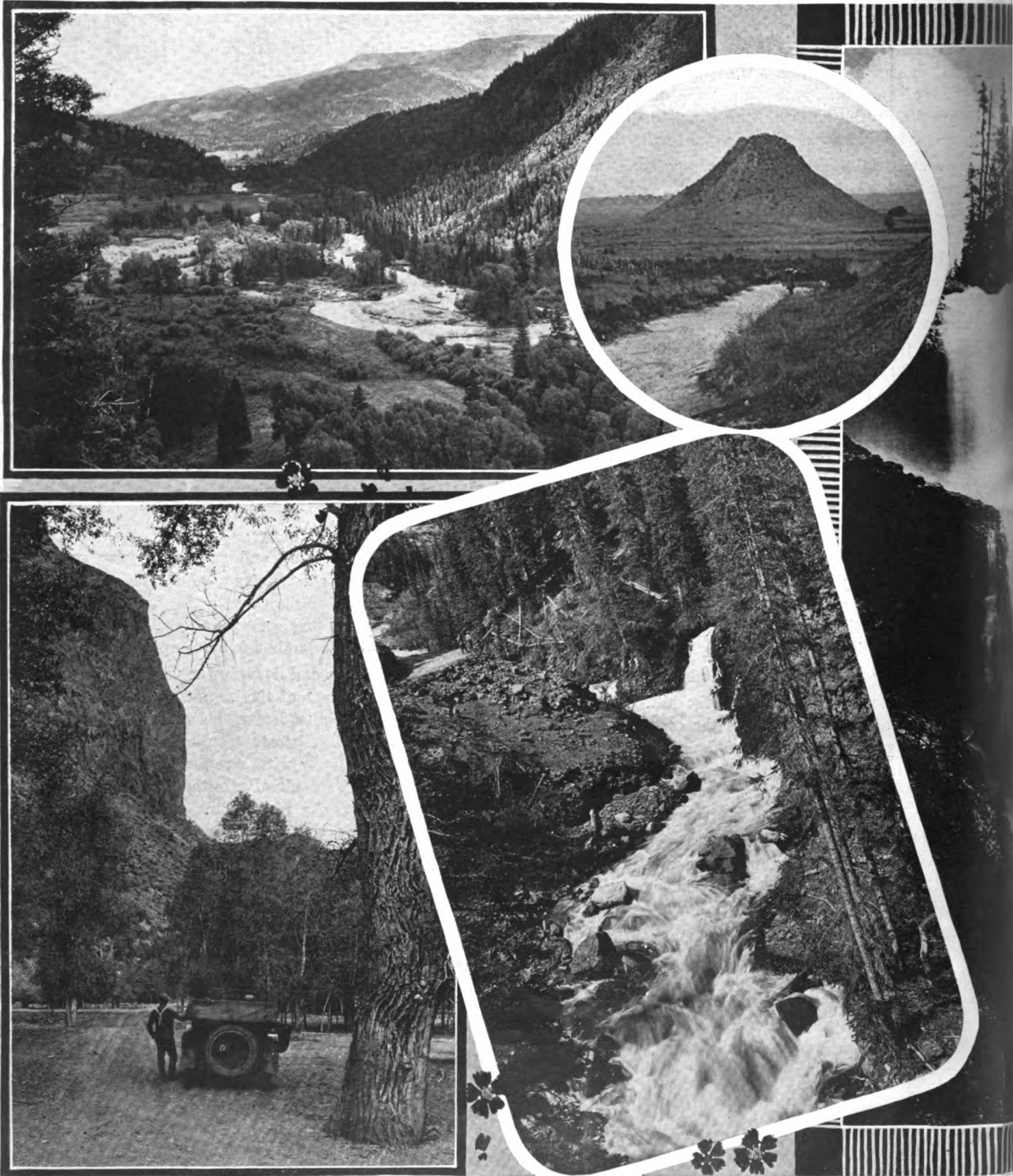
La Veta, along which runs the Cucháras creek, is reached and with it the gateway to La Veta pass, one of the most accessible and most easily traversed of all Colorado's highways over the divide.

Old Baldy mountain greets the traveler as he enters the pass and driving along a way lined with scrub oak, he goes over the abandoned narrow gauge railroad around Muleshoe bend over South Abeta creek to the heights beyond, where clusters of fine pine trees and groves of beautiful quaking asp everywhere meet the eye. Snow roads have been built out along the road to accommodate the winter traveler, but in summer the nearest drifts are several hundred feet above the road, dense vegetation everywhere mantling the hills.

Far in the distance appears Sierra Blanca with its striking rock effects and from this point on the great old mountain is never lost to sight. The junction of broad and narrow gauge railroads is met and for miles the highway skirts along the edge of the Trichera estate, one of the old

(Continued on page 14.)

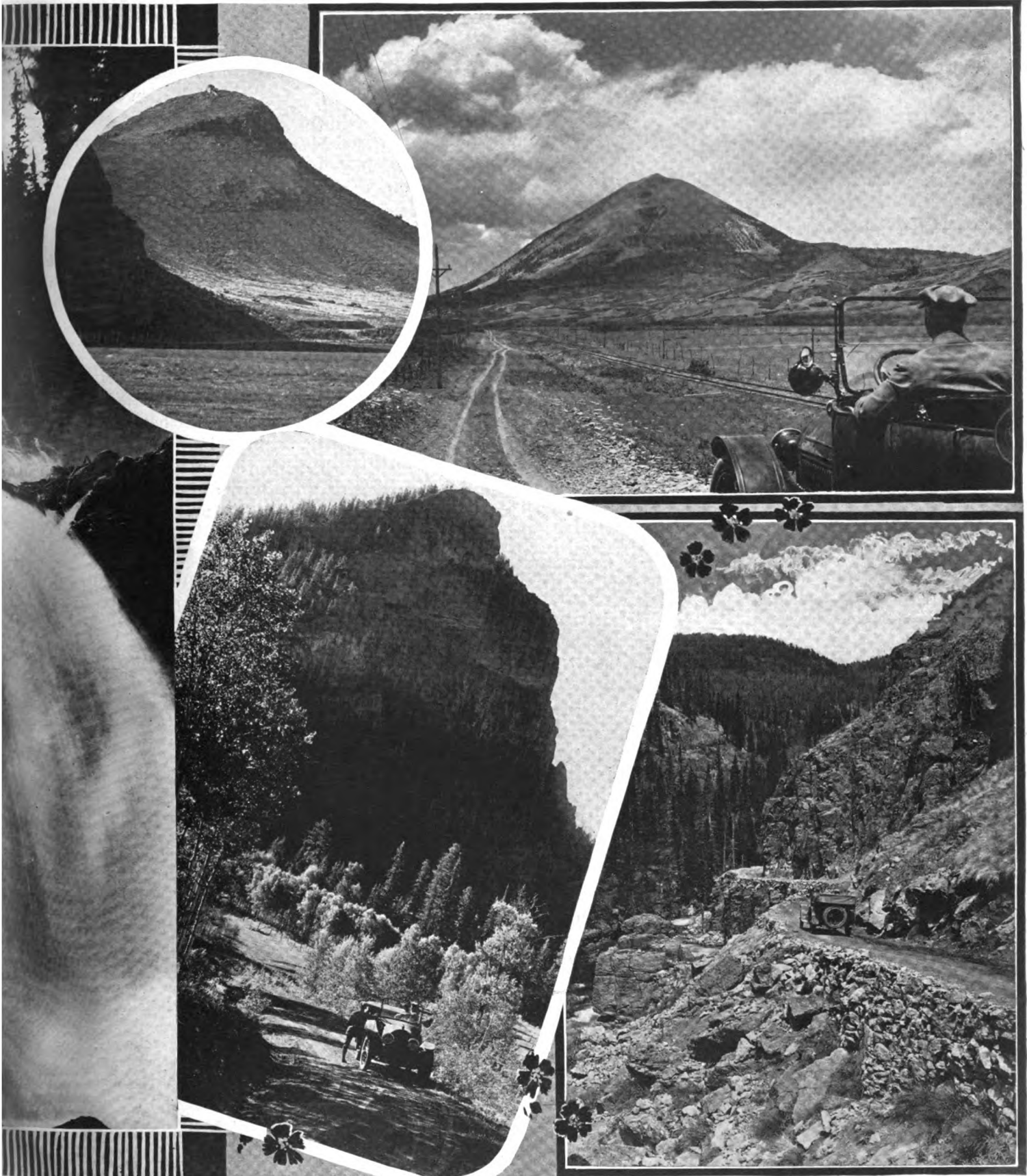
Rushing Streams Fresh From the Snow Lands Greet the Traveler



Striking views along the Spanish Trails highway leading from Pueblo across the state via the La Veta and Wolf Creek passes. The highway traverses the fertile valleys of the San Luis and the San Juan. At the top, left, is shown a scene on the Wolf Creek pass in Rio

Grande county. At the right appears a view of La Veta peak at the entrance to the pass. The huge waterfall in the center is on Wolf Creek, while the circles are views of the Orphan Butte which Huerfano county takes its name, a famous old land

Makes His Way Along the Spanish Trail Over Wolf Creek Pass



...days and (right) the old observatory of the College of the South-
 which sets on the heights above Del Norte. The views at the
 om are, left to right; Wagon Wheel Gap, where Lieut. Pike once
 ed in Mineral county; A typical scene in Wolf Creek pass, show-

ing stream, road and peaks; Indian Head cliff near Pago Springs,
 Archuleta county, marking the western entrance to Wolf Creek pass;
 and a view of the shelf road over the pass. Photographs taken June,
 1918, by K. P. Howe, staff photographer for Colorado Highways.

A Trip That Will Delight Every Traveler

(Continued from page 11.)

Spanish land grants now used as a game preserve where may be seen buffalo, deer, elk, and other wild animals roaming about at their leisure behind heavy wired fences.

The San Luis Valley lies before the western entrance to the pass and for miles the car speeds on its way between bountifully irrigated farms, thru Garland where stood the old fort of Indian days, thru Blanca and on across to Alamosa and the Rio Grande river.

Here the traveler may make a diversion if he sees fit, along the road to New Mexico to Taos and Santa Fe. This was the route that De Vesca and his band are assumed to have traveled in 1528 and the district is rich in stories of those early days, as it is rich today in sheep, cattle and farm produce.

Leaving Alamosa, still in a westerly course, the Spanish Trail traveler proceeds across the valley to Monte Vista, on one side of him the beautiful rugged lines of the Crestone peaks with Blanca in the background, in front of him in the far distance La Garita range to the right, and the Hog Back mesa and the San Juan range to the left. Monte Vista with its miles upon miles of irrigated farm lands is passed and Del Norte comes into view and with it the entrance to the back range.

The road enters the Rio Grande forest and at the south fork of the Rio Grande the machine turns to the left to begin the ascent of Wolf Creek Pass, one of the most remarkable road engineering feats of modern times as well as one of the most beautiful of all Colorado's passes.

High cliffs tinted with brilliant reds and vivid greens guard the entrance to the pass and as the traveler passes them his car begins to climb along a narrow shelf road high up on the hill sides. Far below the creek winds and bends along and while the roadbed is solid and perfectly safe, the automobilist bending over is treated to a decided thrill.

Thru a way lined by stately Douglas firs and Western yellow pines, past Engleman spruce the road goes, bending and turning in fantastic contortions that a moderate grade may be maintained. Again the creek forks and still the car climbs. The rush of waters increases and water falls are seen on all sides dropping from ice caps and fields of snow to the creek bed. Everywhere trees and flowers are in abundance and the heavy snows confined by them make the pass one which for water effect cannot be equaled in the West.

The summit of the pass is attained at an elevation of 10,800 feet and here the traveler may step out into snow drifts carefully swept from the road to register his name with those of travelers from all parts of the United States.

The South Fork source is reached and from this point on to the foot of the pass it is Wolf Creek which keeps the traveler company on his way. The western side of the slope is somewhat the steeper and surpassing views are to

be had as cliff after cliff of striking color comes to view. Sheep mountain guards the Western entrance and with it Indian Head, a remarkably life-like reproduction of a warrior's face. The San Juan river is crossed, cattle are seen grazing along the road, the lumber mills come into view, then Pagosa Springs with its hot springs.

Here the traveler may go on to Durango and the Mesa Verde (to be described in a later issue) or he may divert thru Cumbres pass to Chama and New Mexico.

On his return if he seeks eastern Colorado he must retrace his steps over Wolf Creek to Del Norte from which point he may take the foothills route to Saguache or go on to Monte Vista there to take the Gun Barrel road to Saguache or go on back direct to Pueblo via La Veta.

If he goes to Saguache (the Gun Barrel is being repaired now) he will find a delightful town situated at the foot of the Cochetopa hills. Turning northeast, he may speed along one of the finest roads in the state in the shadow of the range whence a view of unusual beauty is had all the way. Thru Villa Grove and on up to Poncha Pass the highway takes him into Salida where the College Peaks come into full view. Few trips are the equal of this drive anywhere.

From Salida the Hard Pan Triangle trip may be made direct to Pueblo via Canon City, to Pueblo via Ute Pass and Colorado Springs, to Denver via the Turkey Creek, or to Leadville and points beyond via the Holy Cross way. In any instance fine roads, fine scenery and comfortable travel await the traveler.

TRAFFIC POLICE IN MOUNTAIN PARKS.

The day of the mountain park speeder and automobile road-hog is done, according to an announcement from James R. Noland, secretary of state. While the city owns and maintains the mountain park drives, its officers have no jurisdiction there in the way of arresting violators of the automobile laws. The secretary of state maintained inspectors there last summer, but they were without police power. They accomplished good results, but as they could not make arrests these results were not permanent.

Under an arrangement just agreed upon between Mayor Mills and Superintendent Adams of the state constabulary, members of the state police are to be stationed on the mountain drives with due authority to arrest all violators of the automobile laws.

Mayor Mills, Superintendent Adams and Secretary Noland will work in harmony with the view to so regulating traffic that a drive through the mountain parks will be a real pleasure.

CITY PROVIDES NEW CAMP.

Forty tents have been placed in Genesee park by the city for use by automobile tourists. An electric line has been run to the camp and free water and light will be furnished all tourists. Use of the camp is free in its entirety for a two-week period.

West Needs Interstate Military Highway

By W. H. Emmons, Secretary Rocky Mountain Military Highway Association

THE good roads enthusiast, who a few years ago was looked upon by his fellow men as more or less of a dreamer, is today regarded as the pioneer in the preparedness movement. This has been proven in France and the countries of Europe where the good, permanent roads have proven a great factor in the military operations of the last three years.

Those men now back of the movement to build a national military highway from Montana to Texas, thru the states of Wyoming, Colorado and New Mexico are the ones who have been talking and urging good roads in their respective states for many years. Today the movement which they have been so consistently urging all these years, is assuming a far greater importance than ever before.

The Rocky Mountain National Military Highway Association was organized in Denver just a year ago. At the preliminary meeting delegates were present from all the states interested, and a temporary organization was then formed. Until within the last six weeks it was not felt that the time had arrived for active work. Now such a time has come. The railroads of the country have proven inadequate to the handling of the great amount of traffic which must be moved on account of war conditions. Already in some sections of the country the motor truck is regarded as a permanent means of moving freight, and in order to move this freight quickly and cheaply, good roads are needed.

There is no section of the country that offers the resources that does that territory included in the states mentioned. The government has today in each one of these states, great army posts, headquarters depots as well as other great industries, all of which have their part in the successful conclusion of the war. A great highway run-

ning from the Canadian border on the north to the Mexican border on the south would not only connect these army posts and kindred points, but also permit of the quick transportation of troops, supplies, etc., in addition to opening up an immense territory from which grain, cattle, iron and in fact almost everything needed can be drawn in almost unlimited quantities.

Already the attention of Congress has been called to the importance of these military highways, and it is the aim of the Rocky Mountain Military Highway Association to first enlist the support of every state thru which this proposed road passes in the construction of this highway. One of the first steps to bring about this will be the holding of meetings in Montana, Wyoming and New Mexico, and in Colorado, probably at Ft. Collins and at Trinidad in order that local organizations may be formed which will aid the larger body.

The second step will be to enlist thru the support derived from the cities and towns of these states, the support of the members of Congress from the states in order that the government may first of all send a commission here to look into the necessity of this route, and have engineers map out the line. If this can be accomplished we believe that the results sought, viz., the construction of a permanent road north and south, will be secured.

The Association has already prepared some maps and other data which show the proposed route, the territories to be reached, the resources which will then be quickly available for government needs, and copies of these will be sent to any one interested on application either to T. J. Ehrhart, State Highway Commissioner, Capitol Building, Denver, or to the Secretary at 415 Chamber of Commerce Building, Denver.



At the Foot of the Quaking Asps on the Wolf Creek Pass Road in Rio Grande County.

COLORADO HIGHWAYS BULLETIN

Published Monthly
by the



Colorado Highway
Department

Denver, Colorado.

With the approval of the Colorado State Auditing Board.

Address all communications to Colorado Highway Department, attention Pyke Johnson, editor, Colorado Highways Bulletin.

Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up provided only that orders are sent in before type is re-distributed.

Vol. I.

July, 1918

No. 2

TRANSPORTATION COSTS.

NO road is of economic value to the community unless the reduced cost in transportation resulting from its construction is sufficient to equal a fair return on the investment year by year. In other words road accounting must be placed on the same basis as that of railroad construction in which an account called operating income shows the reduction in costs year by year as income produced by the improvements.

The enormous increase in highway transportation has so outstripped the bookkeeping department that there is today no known system which accurately shows the economic value of a highway.

As a result the evident fallacy of confining estimates of costs of transportation to overhead and depreciation charges of the vehicle driven, has become general, yet ultimately the cost of road construction and maintenance falls back directly upon the traveler in his capacity as a taxpayer as well as upon the ultimate consumer of goods carried over the highway.

No table of highways transportation costs can be complete unless this very important item is taken into consideration. And when it is the statistician will find that his estimate of road appropriations has not only been inadequate, but that its inadequacy annually costs the community loss in transportation costs of surprisingly large sums.

THE COUNTY COMMISSIONERS.

High up in the mountains, far out on the fringe of the eastern wheat fields, in the fruit districts and where the miner's tools ring out against coal and precious metal ores, the county commissioners of Colorado are doing their "bit" to keep the highways open for travel.

Ofttimes the passing automobilist encounters them at the head of road crews grimed by the dust of the road. Again they are to be found wrestling with knotty problems of construction or engaged in hot debate with property owner who fails to recognize the value of a highway thru his land.

These are the men who are the backbone of the good-road movement in the state and too often, the citizen "lying upon a silver bed, dreaming dreams of gold," forgets the progress made by them in the brief span of years which separates the era of good highways from that of cow trails and wagon ruts.

The heritage of good roads which they leave, will be their monument.

ROAD METAL.

One of the most expensive items entering into the cost of road construction is that of the road metal or surfacing material. Where hauls of any length are required, the figure for this work frequently runs into sums that have a very material effect upon the final expenditure.

Generally speaking, Colorado has less difficulty in this regard than most of the other states of the Union. Good gravel abounds, but sometimes test pits are not sunk to as great a depth as they should be before the trial is given up.

In other instances it is cheaper to purchase an abutting piece of land outright where the owner objects to use of his gravel, than to attempt hauls of any distance.

Consideration of these two facts by contractors will sometimes keep their costs down, give them better metal and enable them to proceed more promptly in their work.

SPEED "FIENDS."

The day of the foolhardy who delight in testing the speed of their automobiles on mountain roads, should be ended. The man who endangers his own life might be permitted to do so were it not that he jeopardizes those of other and saner individuals.

Colorado needs a stringent law which will place a heavy penalty on all who offend and the statute should be in effect when the 1919 season begins.

"PERMANENT" ROADS.

There are no permanent roads. Truck traffic demolishes the heaviest concrete highway within a year while a day of continuous travel of heavily-loaded, narrow-tired wagons, plays havoc with a graveled surface. The most lasting form of surfacing known today is vitrified brick and haulage costs makes use of this prohibitive in most sections. Continuous and thoro maintenance is the only way in which a main thoroughfare can be kept up to standard, regardless of the kind of metal used in its construction.

\$322,239 Awarded to Roads Near Denver

THE sum of \$322,239.42 will be expended by the county, state and national governments on roads adjacent to Denver during the present season according to estimates made by officials of the state highway department. The figure includes the special state project known as the Fall River road, which will give travelers a round trip through the Grand Lake-Estes Park country from Denver, on which \$24,000 will be spent; the Denver-Littleton Federal Aid concrete road which will require \$84,196.42; and Sedalia-Decker Springs cut-off to Cripple Creek from Denver which, it is estimated, will cost \$24,418.

Of the total amount \$49,407.49 will be contributed from the U. S. Public Roads and Forestry funds; \$242,581.93 will be furnished from the state highway fund; and the remainder, \$30,250 will be supplied by Adams, Arapahoe and Jefferson counties.

The total revenue from the half mill levy from Denver, Adams, Jefferson and Arapahoe counties is \$183,035, hence the total expenditure is about 90 per cent in excess of funds supplied by this section. The expenditure by the state alone is \$59,546.93 in excess of the levy from these counties.

The entire appropriation with the exception of the special projects mentioned, will be devoted to the betterment of main highways out of Denver, including grading, maintenance, elimination of curves and construction of concrete culverts and bridges.

The report in detail is as follows:

ADAMS COUNTY—On Road 2 from the city limits on Boulevard F north to Broomfield, \$35,400 has been apportioned. This sum was set aside to defray part of the expense incident to the re-grading, draining, and applying of Tarvia on a three and one-mile stretch. Of this sum a balance of \$11,700 will be expended on concrete approaches to the new bridge across Clear Creek and to re-grading and re-surfacing of the highway from the end of the Tarvia stretch to Broomfield, as well as for the second application of Tarvia. All told four applications of Tarvia will be necessary to complete the road, one of which has already been placed, while the other three are to be applied at one-year intervals.

From Bennett north to Watkins on Road 7, \$4,440 has been set aside for graveling.

The sum of \$23,660 has been apportioned for use in re-grading and putting down concrete on a stretch of 1.7 miles commencing at the subway and going north on the Brighton road, No. 49.

Maintenance on all state highways in Adams, Arapahoe, Jefferson and Douglas counties will be taken care of from an appropriation of \$33,000 set aside for equipment and operation on roads adjacent to Denver.

ARAPAHOE COUNTY—On Road 7 near Watkins, \$1,375 has been set aside for graveling.

On Road 31, between Strassburg and Limon the sum of \$4,500 has been set aside for graveling.

On Road 3, \$750 has been set aside for maintenance on the road from Denver to Wolhurst.

The further sum of \$46,997.93 will be expended by the state on laying concrete on the stretch between Denver and Littleton under the Federal Aid act.

JEFFERSON COUNTY—On the South Golden road, state route No. 62, \$32,834 has been set aside for the completion of the grade, putting in of bridges and culverts and laying of concrete, to complete the hard surface road from Denver to Golden.

On the North Golden road route No. 1, \$4,004 will be used for scarifying and re-surfacing.

On Road 27, \$10,260 has been set aside for the purpose of eliminating curves and leveling up the grades from Denver to Morrison.

On Road 35, \$2,000 has been set aside for improving the grade from Morrison to Conifer through Turkey Creek.

The further sum of \$2,052 has been set aside for maintenance of roads 21 and 27, included in the mountain parks system.

MISCELLANY—The sum of \$24,000 has been set for the special state project known as the Fall River road. This provides for construction of three miles of road at the head of the Fall river to the Poudre river and is in addition to two other contracts for stretches of road on this highway, now in force.

The sum of \$12,209 will be expended by the state on the Federal Aid project from Sedalia to Decker Springs.

A concrete bridge has been constructed at Morrison at a cost of \$4,500 during the year.

ANCIENT ROAD BUILDERS.

When or where the first road was built is not known. Herodotus speaks of a great Egyptian road on which King Cheops employed 100,000 men for a period of ten years. According to the historian, this road was built of massive stone blocks, 10 feet deep, lined on both sides with temples, mausoleums, porticoes and statues. The streets of Babylon are said to have been paved as early as 2,000 B. C., and several well surfaced roads radiated to the neighboring cities. Carthage, before its fall, was the center of a highly developed road system. The ancient Peruvians had a wonderful system of national roads connecting all the principal parts of their empire.

Bridges were also built by the ancients at a very early date. The Euphrates, at Babylon, was crossed by a stone bridge prior to 2000 B. C., and it is known that the Chinese built bridges as public works as early as 2900 B. C.—Good Roads Year Book.

DO NOT LEAVE DIRT ON CROSSINGS.

Carelessness in leaving dirt and stones on railroad crossings has caused serious alarm of maintenance of way departments of the railroads, says the Iowa Highways Bulletin. The dirt and stones fall between the planking and dirt and in the end a situation arises which might easily cause the derailment of a train.

Highway Department Rules on Expenditures

Adopted at Meeting of Dec. 17, 18, 19 and 20, 1917, under authority of Sec. 5, Article II, of the Highway Law, Approved April 20, 1917.

1. **DEFINITIONS.** In work on State Highways and State Routes, "Construction" includes the cost of all labor, materials and supplies used in the original building of the roadway and its appurtenances, including clearing, grading, ditching, fencing, bridges, culverts, retaining and protecting walls and other structures forming a part of, or appurtenant to, the roadway, and surfacing the roadway, and also the cost of rights of way, legal services, supervision and other necessary overhead expenses connected with such work.

"Construction" also includes the cost of all labor and materials used in adding to the original value, when new, of the roadway and its appurtenances, in the form of betterments and improvements.

"Maintenance" includes the cost of all labor, materials and supplies used for restoring, or tending to restore, the roadway and its appurtenances to their original condition or value, when new, including dragging, grading, resurfacing and repairs to bridges, culverts, walls and other structures, and all overhead expenses involved in such work.

The cost of replacements of roadways, bridges, culverts and other structures appurtenant to the same, is included in Construction or Maintenance, according as such replacements add to the value, when new, of the roadway and its appurtenances, or merely restore, or tend to restore, the same to their original condition or value.

When replacements add to the original value, the part of the cost representing merely restoration of original value is chargeable to Maintenance and the balance to Construction; as, for example, when a wooden bridge is replaced with a more expensive and more valuable concrete bridge, the part of the cost represented by replacement of a wooden bridge of the original type is chargeable to Maintenance, and the balance of the cost to Construction.

"Equipment" includes all machines, tools, horses and other animals, tents, apparatus and appliances owned by the Department and used for work on State Highways and State Routes. The use of such Equipment, including the cost of operating the same and a reasonable allowance for interest, depreciation and wear and tear, is chargeable to Construction and Maintenance, in proportion to its use for each of the same.

2. **FUNDS.** All funds appropriated by the State Highway Commission, for the construction, improvement and maintenance of Highways shall be expended under the direction and supervision of the State Highway Commissioner.

3. **CONTRACTS.** All contracts for work upon State Routes or State Highways which is paid for entirely from the State Highway Fund shall be advertised and awarded by the State Highway Commissioner at the office of the State Highway Commission in Denver, or the work may be done by day labor under the immediate direction of the State Highway Commissioner, if the Commission shall so direct.

4. **ADVERTISEMENTS.** All work upon State Routes or State Highways the estimated cost of which shall exceed \$3,000.00 shall be advertised for contract by the Board of County Commissioners of the County in which the work is located, if the County contributes to the payment, or by the State Highway Commissioner, if the State pays the entire cost of the work.

Such advertisement shall be placed in one paper published daily in the City of Denver and shall run for fourteen issues prior to the letting of the contract, and the advertisement may also be placed in one paper published at the County seat of the County in which the work is to be done, for two issues, one each week prior to the letting of the contract, if so ordered by the Commission, or the Highway Commissioner.

5. **BIDS and CONTRACTS.** If the bids received do not exceed the estimated cost by more than ten per cent. (10%) the contract shall be let to the lowest responsible bidder.

If the bids exceed the estimated cost by more than ten per cent. (10%) all the bids shall be rejected, and the work may be readvertised, or it may be done by day labor, or by convict labor, or the Highway Commission may contract with the County to do the work, as the State Highway Commissioner and the Board of County Commissioners shall decide. In case of any disagreement as to the method to be adopted, the work must be readvertised, and let by contract, except as noted in Rule 3.

6. **APPROPRIATIONS.** Appropriations by the State Highway Commission are made in specified amounts to certain designated State Routes or State Highways, or sections thereof, and the amounts so appropriated together with the amount pledged by the County must be expended upon that particular piece of work and cannot be used elsewhere, unless the State Highway Commission shall give its approval in writing to such change in the expenditure of the appropriation, but no such approval shall be given which involves a departure from the terms of the State Highway Budget then in force until a proper amendment is made in the Budget.

7. **BUDGETS.** Appropriations are made by the State Highway Commission in accordance with the budget for each year, adopted in pursuance of Article V of the Highway Law, and it is necessary for the Counties to have their budgets for work upon State Routes and State Highways in the office of the Highway Department on or before November 15th of the preceding year, in order to obtain consideration in the making of the State Budget.

8. **PAYMENTS.** Where work is done by the Counties under the terms of the appropriations made by the State Highway Commission and of agreements entered into by the Counties, the County shall pay for the total cost of the work by voucher and warrant, and the County Clerk shall file with the Department his certified statement each month in duplicate, following the forms prescribed by the Commission, giving the date, voucher number, name, service rendered or material furnished and amount of voucher. A voucher for the State's portion will be made out and the amount forwarded to the County Treasurer by the State Auditor, as soon as practicable after receipt of the Clerk's statement.

9. Payments by the State Highway Commission to the Counties will be made only upon certified statements in duplicate, under signature and seal of the County Clerk, and the County Clerk shall furnish the State Highway Commissioner copies of any original bill or voucher when called for.

10. **BRIDGES.** No payment will be made by the Department on any bridge unless the plans and specifications for the same have been approved by the State Highway Commissioner before the letting of the contract is advertised.

The type of bridge must be decided upon before asking for bids, and proposals must not be received upon more than one plan if any payment from the State Highway Fund is expected.

11. **SEAL OF COMMISSION.** The seal used by the former State Highway Commission, with the change approved by the Commission, and now in the office, is hereby declared to be the official seal of the Department, and is to be affixed to all contracts and agreements entered into by this Department.

Extract from the minutes of a meeting of the State Highway Commission held on Tuesday and Wednesday, May 15th and 16th, 1917:

"In accordance with paragraph 1 of Section 5 of Article II of the Highway Law, the regular meetings of the State Highway Commission shall be held at the office of the State Highway Department in Denver, on the second Mondays of the months of January, April, August and November of each year at 10 o'clock in the forenoon."

District Engineer R. E. Pratt of the U. S. Forest Service, has been active in preliminary work on roads in the national forests. Recently he made a trip to Wyoming to take up work on forests in that state.

Engineers from the U. S. Office of Public Roads have been in the field a good part of the month in this state and in others under the immediate jurisdiction of the Denver branch.

MILES OF ROAD IN COLORADO.

The total mileage of all highways in Colorado is 40,067. Of these 7,083.49 miles are state highways.

FEDERAL AID PROJECTS.

Six state road stretches have been approved by the U. S. government under the Federal Aid Road act, while others are now under consideration.

Road Work and Road Builders the State Over

COMMISSIONERS Borzago, McKay and Hughes of Gilpin county and residents along the Coal Creek highway have been in conference with Commissioner Ehrhart over a survey and estimate furnished by Engineer Boles of Boulder county, calling for the completion of a link of four miles which would make the entire road available for traffic from Denver thru to Rollinsville and Nederland. Plans for making the road trable this year were discussed.

Commissioner Burns Will of Boulder, was in Denver recently discussing elaborate plans for road betterment which he and Commissioner Miller have undertaken this year. Graveling of the north and south highway from Broomfield to Lafayette is included in the work, the improvement to follow work now under way from the Tarvia stretch to Broomfield.

Commissioner Bob Young of Huerfano, has the road to the top of La Veta pass in first-class condition for travel.

Lewis R. Glenn, son of Commissioner Glenn of Chaffee, has been summoned to Mare Island for naval service. Mr. Glenn now has two boys in the service.

Chief Engineer James E. Maloney, who suffered from a severe attack of erysipelas following his trip to the southern part of the state, is again at his desk.

Road Superintendent Froelick of Lincoln county, was in Denver recently to take up plans for road improvement in his county.

George S. Clason, who returned recently from a trip thru the east, says that highway conditions generally in the east are serious owing to the heavy motor travel, which has torn up the roads generally.

Commissioners Headlee, Wallrich and Lake of Alamosa, have purchased a new truck for road work.

The diagonal mile and a half of road on the Morrison highway has been graveled by the Arapahoe commissioners. Work is also being done on the road from Petersburg to Ft. Logan, and on the highway near Byers.

Commissioner Philbin has finished work on the temporary bridge across the Arkansas at Salida. Work on the permanent structure has been interfered with somewhat by high water, but is now being rushed thru.

The commissioners of Conejos are improving the road from Alamosa south. They are also interested in seeing work started on the Cumbres pass road, preliminary surveys of which were run last year.

Pueblo and Crowley county commissioners are pushing the establishment of the road on the north side of the Arkansas river from Ordway to Pueblo.

The LaVeta pass road thru to Fort Garland has occupied the attention of the Costilla County board.

Commissioners Kettle, Beck and Barton of Custer, are working on the Hardscrabble road from Silver Cliff to Florence.

The road to Grand Lake and that over Rabbit Ear's Pass are holding the attention of the Grand County commissioners.

Work covering a mile of the road between Lake City and Creede is now under way by the Hinsdale board.

The Mineral commissioners are working on their road from Rio Grande county to Creede and will soon have a standard highway there.

The Ouray commissioners expect to have the bridge recently washed out on the road from Ouray to Ironton, replaced shortly.

The Pitkin board is just beginning work on the Independence pass road. The point of construction is well up to the top of the pass and weather conditions have been exceedingly unfavorable for work.

Routt county is working on the road from Steamboat Springs west to Craig and from Steamboat south to State Bridge.

Commissioners Scott and Young of Las Animas and Huerfano counties were in conference in Trinidad last month looking over the surveys for the new Federal Aid road between Walsenburg and the state line.

State Road Inspector W. R. Allred has been out on a trip looking over work of reconstruction of bridges recently destroyed in Perry park.

State Engineer Roy Randall has been supervising bridge work at Boyero in Lincoln county.

Numerous letters from road workers, professional and otherwise, have been received by the department since the appearance of the first issue of Colorado Highways. Readers of the magazine are urged to send in road data, personals, pictures, and anything that will be of interest to the men of the road.

Chief Inspector Whitmore has the outfits under his direction working on the Cherry Creek road, the Boulder road just north of Denver, and the North Golden road. Another team outfit is hauling slag from the slag dumps at the old Grant smelter to the Clear Creek bridge, where filling-in work is in progress. Still another team crew is at work between Strassburg and Byers.



Panoramic view of Cold Springs, Gilpin county, with Commissioner Joseph Borzago proffering a drink of water to Editor Stull, while Commissioner Neil McKay takes his from the cup.

News From the Road Gangs in District No. 3

DURING the season of 1917 the State Highway department appropriated the sum of \$97,118.28 for work on the state highways in the eight counties of District No. 3, Pueblo, Crowley, Kiowa, Otero, Bent, Prowers, Las Animas and Baca. The counties added a total of \$76,732.55 to this sum from their budgets, making a total for the year of \$173,850.83.

In addition to this figure it may be conservatively stated that the counties expended close to a similar amount on the improvement, maintenance and construction of county highways.

The figure for 1918 will be about the same amount with an amount of \$260,000 (total construction) added by the U. S. government and the state for work on the Federal rural post route from Pueblo to the New Mexico state line.

How much actual work will be done on the highways in this section is problematical, depending entirely upon the general labor conditions which are now beginning to cause road builders, the country over, considerable anxiety.

Surveys have been completed for the work on the Federal aid road from Pueblo south and as soon as plans and specifications have been approved, it is planned to begin work on this highway.

The expenditure will be devoted largely to eliminating bad curves, grading and surfacing. When finished the highway will form the last link of an improved road all the way from Cheyenne on the north to New Mexico on the south, following the course of the proposed military highway.

Incidentally it will furnish travelers a splendid outlet to the state from north north and south tapping all of the main state highways on the east and west en route.

The Santa Fe Trail east from Pueblo county thru Crowley, Otero, Bent and Prowers county to the state line is in excellent condition for travel and the tourist traffic has been growing steadily on it during the past month. The route forms one of the most attractive gateways into Colorado from the east.

Work is progressing steadily on the Phantom canon route into Cripple Creek and commissioners expect to have the highway ready for travel this summer. The route follows the old road-bed of the Florence and Cripple Creek railroad going thru a canon replete with magnificent views. The highway will cut down the distance between the points and will undoubtedly lure many travelers.

The El Paso county commissioners have lined the entrance to Ute pass with a heavy rock wall at the most dangerous point of the climb. The highway is today a boulevard and one of the most popular routes in the state.

County improvement is being carried on steadily in Pueblo county where the lime shale furnishes a road metal which is scarcely outrivalled by any found anywhere.

The Hardscrabble road from Texas Creek to West Cliff is in good condition. Travel along the Upper Arkansas river road has been heavy and little of it has been diverted to the Hardscrabble for a side outing.

The Arkansas river reached a higher tide mark during the past month than can be recalled in the history of Salida and other points at the upper end of the stream. Two bridges were carried away.

The road from Buena Vista to Colorado Springs via Trout Creek and Ute passes is in excellent condition. The junction of the highway with Turkey Creek is made at the Salt Works

and from that point on to Colorado Springs travel is increasing each day as the summer season gets into swing.

The highway from Walsenburg over La Veta pass is in excellent condition now. The only bad stretch is from Baldy to Washington Springs on the road to Alamosa, a distance of 5.6 miles. An outfit of 18 teams and 30 men are engaged in surfacing this piece and the road should be brought up to standard in 60 days. In the meantime the highway is passable. This will furnish an excellent outlet to the San Luis valley with a maximum grade of 4 per cent. over the pass.

GOOD ROADS AID FARMER

(Continued from page 6.)

erable extension of its railroad facilities, so the problem admits but one answer—the construction of highways which shall make the present railroads accessible from every part of the state. That and the proven economy of transporting over good roads, compared with transporting over poor roads, constitute irrefutable arguments for the assertion that the work of road improvement must be considered only in its infancy.

As good roads tap the rich lands which are remote from railroads and as yet unoccupied they will become thickly settled and intensively farmed. In this age of motor transportation they will be made as easily accessible from railroad points as are the now thickly settled communities more conveniently located. The modern farmer judges his distance from town not in miles but by the time it requires to make the trip and by the loads he can haul. Improved roads eliminate distance and poor roads magnify it.

There are few considerations as vital to the future of the development of the agriculture communities as is the question of highways. The present program of the state in this direction will determine largely the immediate future of the immigration question. A constructive policy will promote settlement mightily and an ultra-conservative policy will retard it for years to come.

U. S. FOREST ROAD PLAN

(Continued from page 9.)

ment that a trail is better than no road and that once an area is opened up, that improvement will follow as a matter of course when traffic develops.

In each case the service first charted the state highways and roads already entering the forest area and then proceeded to use them in their scheme of main highways.

The general plans are outlined in the office of District Forester R. Smith Riley by District Engineer R. E. Pratt and the plans and specifications which have been made up include estimates on cost of the work down to the last detail, giving the Service a fund of information which will enable them to expand and complete the work without delay, once funds are available.

The Blue Lodge of Colorado Road Builders

"BOB" HIGGINS.

In State Treasurer Robert Higgins, Colorado Highways introduces to the public the man who holds all world records for automobile riding without using his own car. On his own word "Bob" Higgins has traveled 140,000 miles in Colorado and in all the distance he has not driven 100 miles himself.



"Bob" Higgins.

Mr. Higgins first became interested in good roads in 1904 and he has been going strong ever since. With Charles R. McLain, Carl Johnson, Judge Dean, J. Y. Munson of Berthoud and others, he was instrumental in the organization of the Colorado Good Roads Association and he was elected president of that body in 1911. That convention was attended by 1,184 delegates,

all of whom paid their own expenses, and as Mr. Higgins expressed it, it was the beginning of the real movement for good roads. Everybody went home fighting mad and all started building roads right away.

With "Jake" Thompson Mr. Higgins secured the extension of the Santa Fe trail from Hudson, Kans., to Pueblo, and later he worked with Charles R. McLain in securing the Rainbow route, Holy Cross Way, Northern Gateways, the Golden Belt and numerous other road projects now realities.

He was president of the state association of county commissioners for five straight years and is today vice-president in numerous roads associations.

He retires from office this fall and thereafter is going to devote his time to "whittling, chewing tobacco and promoting more good roads."

H. L. JENNESS.

When the time comes for the advance to Berlin, Lisle Jenness, engineer, expects to be one of the men who survey the route for the troops. And if it so happens that there is some fighting along the way, Lisle will feel that he has a perfect piece of work on hand.



H. L. Jenness.

Jenness was one of the boys called in the last draft and the word found him ready and eager to go. Fighting has not been in his line in the past, but he is going into it with the same painstaking thoroughness as that which has featured his work in the highway department.

A graduate of West Denver high school, the new recruit to Uncle Sam, has been in the engineering game for eight years.

His first four years in the work were spent in general surveying after which he became a member of the Rio Grande engineering staff. He has been with the highway department a year and when called was engaged on the plans for the Meeker-Craig Federal Aid project, one of the important jobs the department now has on hand.

Always a careful, conscientious worker, Lisle has won many friends throughout the state and he carries with him to his new work the best wishes of the entire highway department.

CHARLES R. McLAIN.

The successful road builder is more than a practical diagnostician of the ails and woes of pit-runs, sub-bases and whatnot. He must be a man of vision, able to imagine the roads of the future, and capable then of making others see as he sees.

Such a type is Mr. Charles R. McLain, to whose foresight Colorado today owes some of its finest bits of road work, tasks which appeared impossible to many when he first suggested them, but which stand completed, as enduring monuments to him.



Charles R. McLain.

The Upper Arkansas river road from Canon City to Salida is one of the bits of construction which many laughed at when Mr. McLain first suggested it. It was necessary to survey that road by dropping surveyors with ropes over the sides of cliffs and tons of dynamite were used in the actual building, but the result was a superb piece of highway which is one of the most traveled in the state today.

The sky line which links the peaks above Canon City, the Gorge trip which climbs to a height of 3,000 feet above the Arkansas river were two of his projects, and the road from the Springs to Canon City another.

Mr. McLain projected these roads then stepped back and did the grubbing for the money while others constructed them. Incidentally he was fighting all the time for better highway laws and played a large part in securing the present statute.

He is on the firing line today, as alert as ever, and always in the front rank of the men who are seeking to develop Colorado's resources.

RALPH W. SMITH.

Others have built roads, but Mr. Ralph W. Smith, first president of the Denver Motor Club, had a task which was greater. He built sentiment. Ten years ago or so, Mr. Smith decided that it was time that the people of Colorado should be brought to an appreciation of what good roads meant.

There was only one way to teach them — by traveling among them. Road tours were organized and the farmer was treated to a series of discussions of road work. The Midland trail and the north and south highways were Mr. Smith's hobbies, but he gave to good road work generally service of incalculable value. Mr. Smith served two terms as Motor Club president and later served in the same capacity in The Colorado State Automobile association.



Ralph W. Smith.

He is today the oldest executive save one in point of service in the A. A. A., of which he has been vice-president nine years. While now engrossed in war work for the government, Mr. Smith retains an active interest in good roads, and like other pioneers in the work he is always ready to give freely of his time for the cause.

"Good roads add directly to the value of property, lets have more of them," is his slogan.

Road Notes From Crews in Districts 4 and 5

THE road from Meeker to Craig is in the best shape it has been in. There are a few rough spots from Meeker to Axle, but from Axle to Craig the highway is in first class condition. The contract calling for a reduction of the grade and a widening of the road on Wise hill has just been completed. The road is now 20 feet wide with a grade of 5.8 per cent. at this point.

From the top of Wise hill to within a mile and one-half of Craig, crews are now grading the new location of the road, which eliminates several hills, and widens the highway. This contract is now two-thirds completed. One and one fifth miles of the road are finished, but not yet open to travel. The work will cost \$5,000.

Surveys have been made from the foot of Wise hill to the Moffat-Rio Blanca county line, which will eliminate hills and generally better the road which is travelable, but is only eight feet wide.

From the Rio Blanca line to Meeker the road is in excellent condition over Nine Mile hill. The entire highway will probably come under the Federal Aid act of 1919, when all of the dangerously narrow stretches will be eliminated. The highway is the most important in the northwestern section of the state and the improvements already made will serve to greatly facilitate traffic in this district.

The highway between Montrose and Grand Junction is in good shape and is being used constantly in the delivery of produce and other freight materials.

Engineer J. H. Bertholf, of the State Highway department, has just completed surveys for a Federal Aid road which will extend from Norwood through Naturita to Paradox, beginning at the south line of Montrose county about two miles west of Norwood and ending at Dry Creek, a distance of 26 miles. This survey will supplement the Federal aid project from Placerville to Norwood, a distance of 15,770 feet.

This highway, work on which will probably begin in 1919, is already passable, but is a dirt road and subject to the most severe traffic conditions of any dirt highway in the United States. The road is used for the transportation of heavy ores from the famous carnotite fields in the southwestern part of the state and the heaviest type of motor trucks are used on it. The result has been that the road has been torn to pieces and funds donated by the chemical companies using the ore, have been necessary to supplement state and county funds to keep the road open.

The proposed government project will greatly improve the highway, bringing it up to standard and opening the section to general travel.

The road beyond Placerville to Telluride in San Miguel county is in top condition.

Surveys have just been completed and construction will start at once on the Burns Cliff highway, which when completed will open the road between Lizard Head and Rico. This is on the main highway from Montrose to Dolores and when finished the work will open up the entire section to the southwestern boundary of the state, including the famous Mesa Verde national park. Tourists will then be able to go from any point on the eastern slope to Grand Junction and thence via this highway into the Cliff Dwellers' ruins. Cars cannot pass Ophir at this time.

In addition to the work at Lizard Head, there is an uncompleted section from Ophir to Lizard Head for which contracts have been asked. This is difficult rock work on the side of the hill and in the canon. Under favorable conditions it should be possible to complete the work this year, but labor scarcity may extend the construction into 1919.

Work contemplated by county commissioners of Dolores this season includes two and one-half miles of grading and two bridges, one of which will cross the Dolores, the other over Horse Creek.

In Montezuma county a contract has been let for grading and a bridge near Montelores on the same highway. The grading calls for a section one and three-fourths miles long near Montelores.

A new steel and concrete bridge is now being put in near Cedar Creek across the Cimarron river on the Montrose-Gunnison highway half way between the two points.

The road from Alamosa up the San Luis valley to Poncha Pass is in very good condition, with the exception of a few miles where the road is built along a drainage canal, which is a little rough. The highway on from Poncha Pass down the Arkansas is in first class shape for travel.

The convict crew working in the Grand Canon above Glenwood Springs is progressing slowly but surely through difficult construction. They will be on this work until next year. The road is now passable but is being widened and the grades reduced.

EASTERN COLORADO ROAD NOTES

The road from Fort Lupton through Hudson to Wiggins and Fort Morgan has been graded and partially surfaced in Weld and Morgan counties. Weld has also opened up the road from Greeley to the northeast toward Sterling, giving a new outlet to that fertile country. Work will be in progress this year.

The convict camp which has been in this section for the past few seasons is still at work and rendering very satisfactory service in the grading and surfacing of the highways.

In Morgan county the Platte river road has been graveled from the Weld county line through Fort Morgan to Brush and to the Washington county line. This road is now in excellent condition. The road has also been improved from Brush south to Geary and through Washington and Yuma counties east to the state line.

The county superintendent of roads in Morgan county, Glenn White, has operated his truck and grading outfit very successfully these last two seasons, and the roads in this county are in excellent shape.

In Logan county the Platte river road has been graded and graveled throughout the entire county and will be maintained and kept in good condition during the coming season. Logan county has also worked up the road from Sterling east to Greeley and will do considerable grading upon that stretch. They are also opening a road from Sterling north to the state line to accommodate the settlers in the northern end of the county.

The road from Sterling east over the Platte river has been surfaced through the sandhills and has been put into good condition by Logan and Phillips counties clear through to the state line.

The Platte river road through Sedgwick county has been graveled and permanent bridges constructed and put in good condition to the state line.

TESTS OF ROAD MATERIAL.

Tests of surfacing material used in construction of Colorado highways are made at the road material testing laboratory of the University of Colorado at Boulder, by the department of civil engineering in charge of Professor Milo S. Ketchum, C.E. and Assistant Professor H. E. Phelps, C.E. Fifty-pound lots are used.

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. EHRIHART, 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.
John L. Howell, 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. Manchego, Garcia.
W. R. Morris, Ft. Garland.

CROWLEY

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

CONJOS

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. Altvaer, Highway Commissioner.

DOLORES

G. L. Garren, Rico.
Charles Engle, Rico.
H. M. Knight, Rico.

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. Hodgin, Canon City.
Jas. Belknap, Hillside.

GARFIELD

W. F. Adams, 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. Marvin, 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, Guinare.
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, Palsade.
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.

MONTESUMA

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

MONTESEO

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.
Jas. W. McClain, 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. Gerbax, 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.

ROUTT

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

SAGUACHE

Geo. Woodward, Saguache.
A. V. Shipper, 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

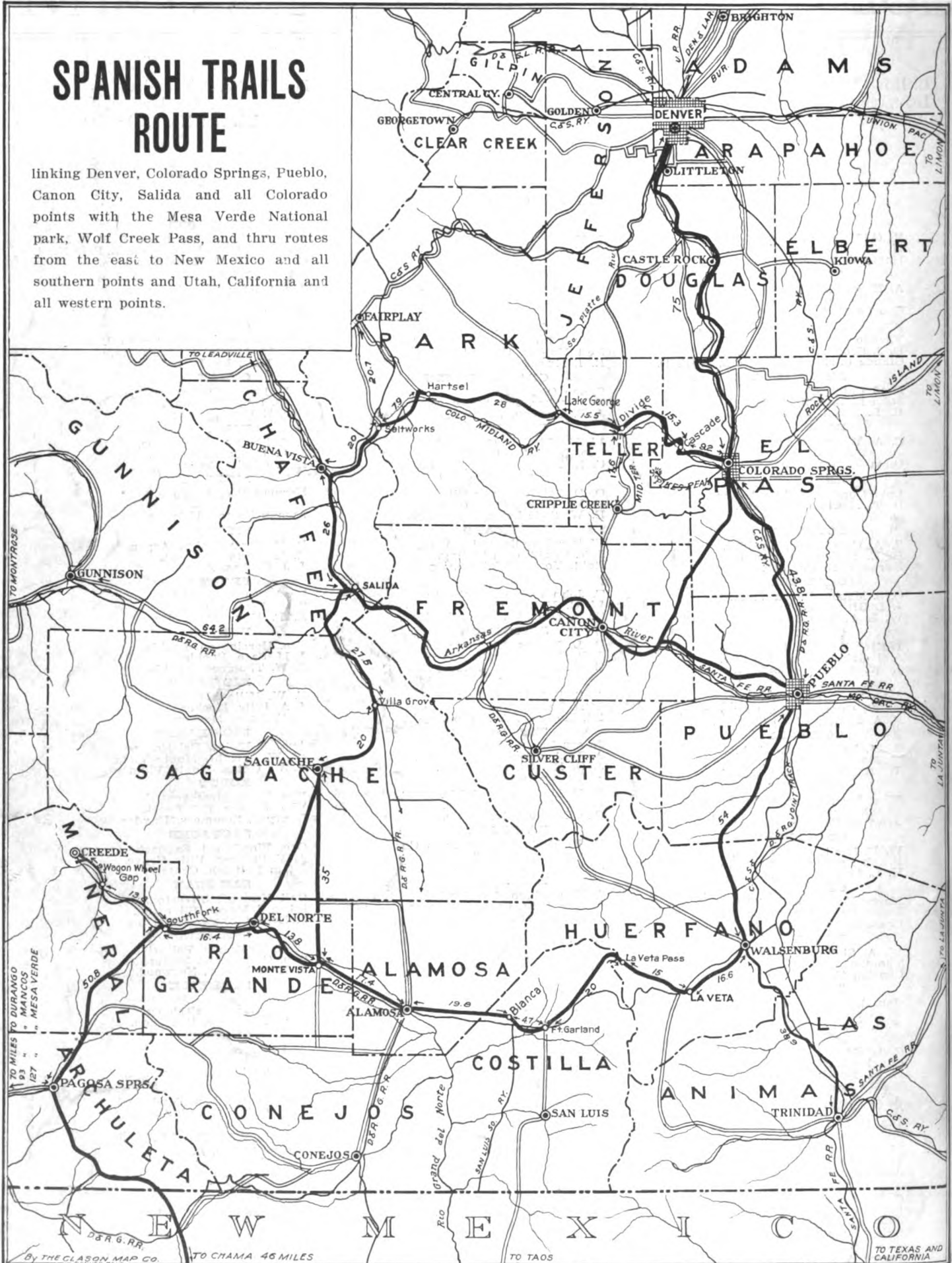
W. C. Lewis, Greeley.
T. Elmer Howe, Greeley.
J. W. Birkle, Platteville.

YUMA

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

SPANISH TRAILS ROUTE

linking Denver, Colorado Springs, Pueblo, Canon City, Salida and all Colorado points with the Mesa Verde National park, Wolf Creek Pass, and thru routes from the east to New Mexico and all southern points and Utah, California and all western points.



GIFT
FEB 26 1919

Colorado Highways

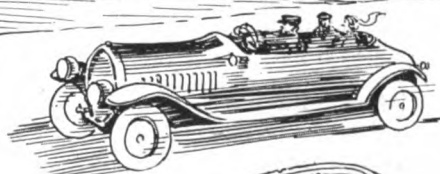
BULLETIN

Issued by the State Highway Department



The Giant Gates in Bear Creek Canon, Jefferson County, Above Morrison on the Main Highway Leading Thru the Mountain Parks of Denver.

August, 1918



Good Roads and Their Effect on Land Values

By Ralph Smith, First President of the Denver Motor Club

WITH the enormous development of the passenger automobile it has become the fashion in late years to consider good roads simply as a means to pleasure. There is a tendency on the part of the taxpayer who lacks a machine to shift the burden of road taxation to the automobile owner and to argue that since it is the pleasure driver who gets the benefit of the good road that he should be the one to pay for it.

The facts disclosed by careful research on the part of the United States government show that not only is this opinion incorrect in its conclusions but further that the comparative maintenance of highways has a direct and serious effect upon the economic life of every community.

Good roads are today one of the few factors in taxation which return an immediate and profitable interest to the taxpayer. Not only do they increase the value of farm lands thru which they pass by as much as 300 per cent. in some instances, never less than 50 per cent., but the lowered cost of transportation over them not only cuts thousands of dollars from the shipping costs annually but lessens the cost of all kinds of goods to the ultimate consumer. Finally, good roads make school houses accessible, widen the marketing area and in general make life more worth while by bringing all matters of educational matters to the door of the community.

Fortunately there is exact data on hand to support these statements.

In Bulletin 303, U. S. Department of Agriculture, a book devoted to an analysis of findings of the economic survey of county highway improvements, these conclusions are found:

"A study of the increase in the value of farm lands in eight counties reveals the further interesting fact that that following the improvement of the main market roads the increase in the selling price of tillable farm lands served by the roads has amounted to from one to three times the total cost of improvements. * * * The estimates of increase were based for the most part upon the territory within a distance of one mile on each side of the roads improved."

Turning to the matter of transportation, the Bulletin says:

"In dealing with the effect of road improvements upon the hauling of commodities, the method has been adopted of ascertaining the traffic area served by each road in much the same manner as the drainage area of a stream is ascertained.

"After determining such areas the character and amount of production is ascertained and an estimate is made as to the proportion of the tonnage produced which is hauled upon the roads. A further investigation is made as to shipments by rail in and out of the county and information is obtained from United States census reports and

from merchants and producers to verify the results obtained from the traffic-area calculations and the freight-tonnage inquiry. In some cases an actual count or census is taken to determine the tonnage hauled on the road.

"It is a comparatively easy matter to determine the average length of haul in each case and the prevailing wage for men and teams. With these factors the total tonnage, the total ton-mileage and the cost per ton-mile before and after the improvement of roads are computed. The saving to traffic represented by the road improvement is thus expressed in dollars. * * *

"Considering the eight counties in the aggregate the gross annual saving in hauling costs due to their good roads system affords the rather impressive total of \$627,409 for a traffic of 3,489,652 ton miles. The average gross saving per ton-mile is 17.8 cents, this being indicated by an average rate of 33.5 cents before the roads were improved."

Showing the effect of road improvement upon school attendance the report shows that before improvement average attendance was 66 pupils out of 100 enrolled, after improvement 76. Thus ten pupils to each school were enabled to gain an education thru betterment of roads, thereby adding very considerably to the economic wealth of each community.

There is but one conclusion to be reached from these facts. Good roads mean elimination of waste, increased profits, better living. They are essential to every community. Yet we of Colorado have not sufficiently realized these facts to provide funds adequate to our ever increasing demands.

From the mere standpoint of selfish welfare we should as tax payers, **insist** upon appropriations which will open every district in Colorado to travel over well maintained highways.

MILLION RUSSIANS ON HUN ROADS

It has been stated that practically every German motor car is at the front today. If motor cars are transferred from one front to the other they usually are sent on railroad trains as the shortage of coal is less pressing than that of gasoline. In the case of whole armies being shifted, however, the vehicles supplement the work of the railways.

In any case, the empire has found it desirable to perfect its system of roads and has been able to do so by the work of military prisoners, especially Russians, of whom there are over 1,000,000 in Germany. The cost of such labor is very small and these men can be worked harder than organized German workmen.

Of course, German labor organizations have had very little to say against such practices, which really amounts to the using of coolie work for national purposes. Attempts of the government to use the prisoners in the mines, however, have met with prompt resistance on the part of labor, insisting that this well-paid work must be reserved for natives, tho the government intention was to pay the Russians little, if anything.—Road Maker.

WAR POLICY FORMULATED FOR HIGHWAYS.

A GENERAL war policy which will confine highway work thru-
out the United States to the develop-
ment of roads which are vital from
an economic standpoint has been for-
mulated by the council of national
defense. The statement sent out by
the Council of National Defense is as
follows:

"The Council of National Defense
has transmitted to the State councils
of defense a letter from the Secretary
of Agriculture defining the attitude
and policies toward road construc-
tion and maintenance of the Federal
agencies dealing with this problem.
Fully recognizing the vital military
and economic importance of the high-
ways of the country, the council has
emphasized certain important poli-
cies set forth therein, and urged the
State councils to co-operate with the
State highway departments to the
end that consideration be given to the
following in all road construction.

"1. All plans for road construc-
tion and maintenance should be
viewed in the light of war conditions,
and expenditure of labor and mater-
ials should be directed only to those
roads which are of prime importance
for economic and military purposes.

"2. It is desirable to avoid offering
to the market issues of bonds which
are not urgent from the view of aid-
ing the Nation in winning the war.

"3. As far as practical important
highways already constructed should
be maintained, and only those should
be constructed which are of vital im-
portance because of their bearing on
the war situation. These may be sum-
marized as follows:

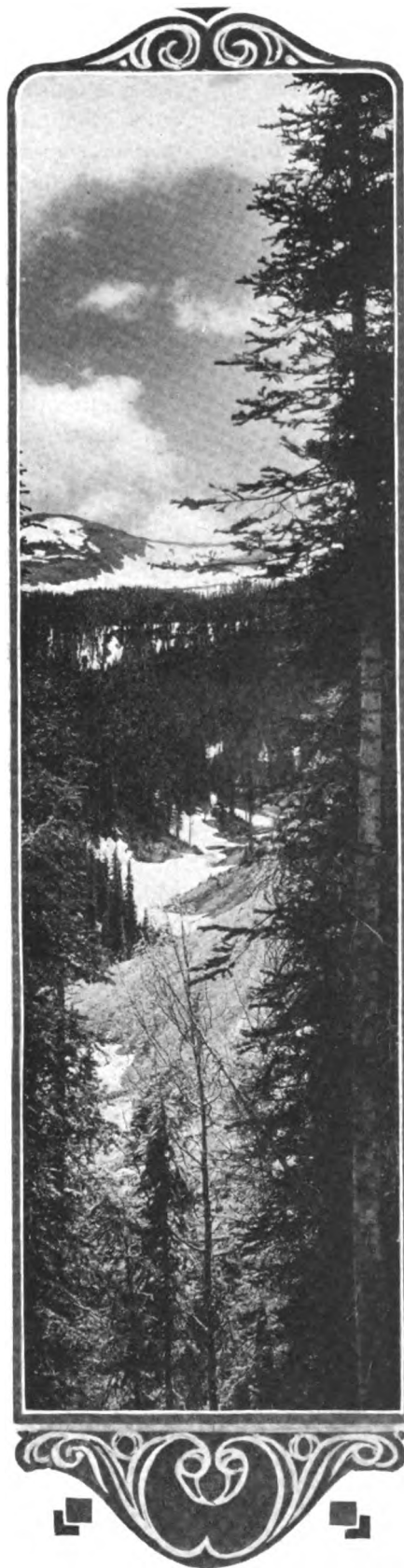
"a. Those which are utilized or will
be utilized by the Military Establish-
ment.

"b. Those which carry consider-
able volume of material and supplies
essential to war industries.

"c. Those which have a bearing on
the production and distribution of
food supplies, connecting population
and shipping centers with surround-
ing agricultural areas.

"4. It is especially desirable to use
local road materials.

Treasure Mountain



A View of the Old Landmark Taken
From the Summit of Wolf Creek Pass,
Mineral County. Snow Crowns the
Crest of This Peak the Year
Around.

COLORADO-TO-GULF ROAD TO BE ADVERTISED.

WITH the definite completion
of its alignment thru to the
Gulf of Mexico, the Colorado-to-Gulf
Highway takes its place among the
great highways of the United States.
Formal ratification of the organiza-
tion of the Gulf Division from Fort
Worth thru Hillsboro, Waco, Marlin,
Bryan and Houston to Galveston was
made at the sixth annual convention
of the association held July 9 and 10
at Dalhart, Texas, and attended by
representative delegations from Colo-
rado, New Mexico and Texas. The
executive committee was also given
authority to complete the organiza-
tion of a "Military Division" from
Waco south thru Austin, San Antonio
and Corpus Christi to Brownsville.

Steps are to be taken immediately
to mark the highway from Galveston
its entire length of 1200 miles to Den-
ver. This work was placed in the
hands of the retiring president, D. P.
Talley of Wichita Falls with full
power to act; and he is already mak-
ing plans to have a painting crew
travel the highway and do a complete
job of pole-marking. Full plans also
were made for a new log, covering
all divisions of the highway, to be
published in attractive log-book form
early in 1919. More intensive organ-
ization work will be carried on, and
co-operation will be given in county
bond issue campaigns.

Judge W. G. Cross of Childress
was elected president; J. D. Parnell,
of Vernon, re-elected secretary-treas-
urer; Mayor Charles E. Thomas of
Colorado Springs, vice president for
the mountain division; C. H. Walker
of Dalhart, vice president for the
Panhandle Division; A. H. Hudgins
of Itasca, Texas, vice president for
the Gulf Division; F. P. Wood, of
Trinidad, vice president for Colo-
rado; C. G. Granville of Clayton,
vice president for New Mexico; and
M. R. Leonard, of Bowie, vice presi-
dent for Texas. Clayton, N. M., was
awarded the 1919 convention.

The Gulf Division will hold a meet-
ing at Hillsboro in August, and the
Mountain Division will meet some
time this fall at Trinidad.

The Highway to the Summit of Mt. Evans

By Edgar C. MacMechen, Editor of Municipal Facts, Denver

IT is one of the enigmas in the scenic development of the West that so little is known of Mt. Evans, tenth highest peak in Colorado. Located only thirty-three miles by airline from Denver, it is fully as interesting as Longs Peak in the Rocky Mountain National park, and higher than either Longs or Pikes peaks.

Perhaps it is because of the romantic interest that early attached to the latter peaks; to Pikes because of the rush of gold seekers to the Cripple Creek region, and to Longs because this was the home of the Earl of Dunraven, and the haunt of English nobility during the pioneer era. Perhaps it is because of the fact that Mt. Evans, tho not a difficult peak to climb, is more inaccessible than either of its more famous mountains in the Front Range.

Within the last two years Denver citizens have come to appreciate the possibilities in recreation and scenic interest that attaches to Mt. Evans and the colossal consorts that surround it. A bill is now pending in the National Congress for the creation from this region of the Denver National Park, while the United States Forestry Service has done much toward popularizing it by the construction of trails and shelter houses with the idea of converting this portion of the Pike National Forest into a model recreation area.

Several years ago a forestry service engineer made a survey for an automobile road to the summit of the peak. The project was so daring and brilliant that it attracted immediate attention. The city administration of Denver at once appreciated the opportunity and laid plans for construction of a connecting link between the boundaries of the Pike National Forest, where the government survey started, and Bergen Mountain Park, the closest point to the survey in the Denver Mountain Park system. Work has been in progress on this link for about one year and it is expected that the coming September will see its completion.

The government survey for the Mt. Evans Drive begins at Squaw Mountain, above Idaho Springs. From Denver to Bergen Park is thirty miles by automobile highway. From Bergen Park to Squaw Pass the distance is nine miles, while the remainder of the drive to the summit of Evans would be twenty-seven miles, making a total drive from the city to the peak of sixty-six miles. In these days a motorist might leave Denver in the morning, climb among the clouds in dizzying spirals and return to the city for his evening meal without any considerable effort.

The city now has fifty men and twelve teams at work on the Bergen-Squaw Pass road and already has passed thru the most difficult construction in the link. The forestry service, according to information furnished park officials, is only waiting until the road has been roughed out to the Pass before beginning construction of a three mile

extension leading from the Pass to the southern shoulder of Squaw Mountain where it will end upon the summit of a precipice. From this point an awe-inspiring view of Mt. Evans and the beautifully wooded Bear Creek valley is obtainable.

From Squaw Pass the government survey runs along the north sides of Squaw, Papoose and Chief Mountains, between solid banks of the stately Engelmann Spruce, the Rocky Mountain counterpart of the graceful Lombardy poplar as a landscape decorative feature.

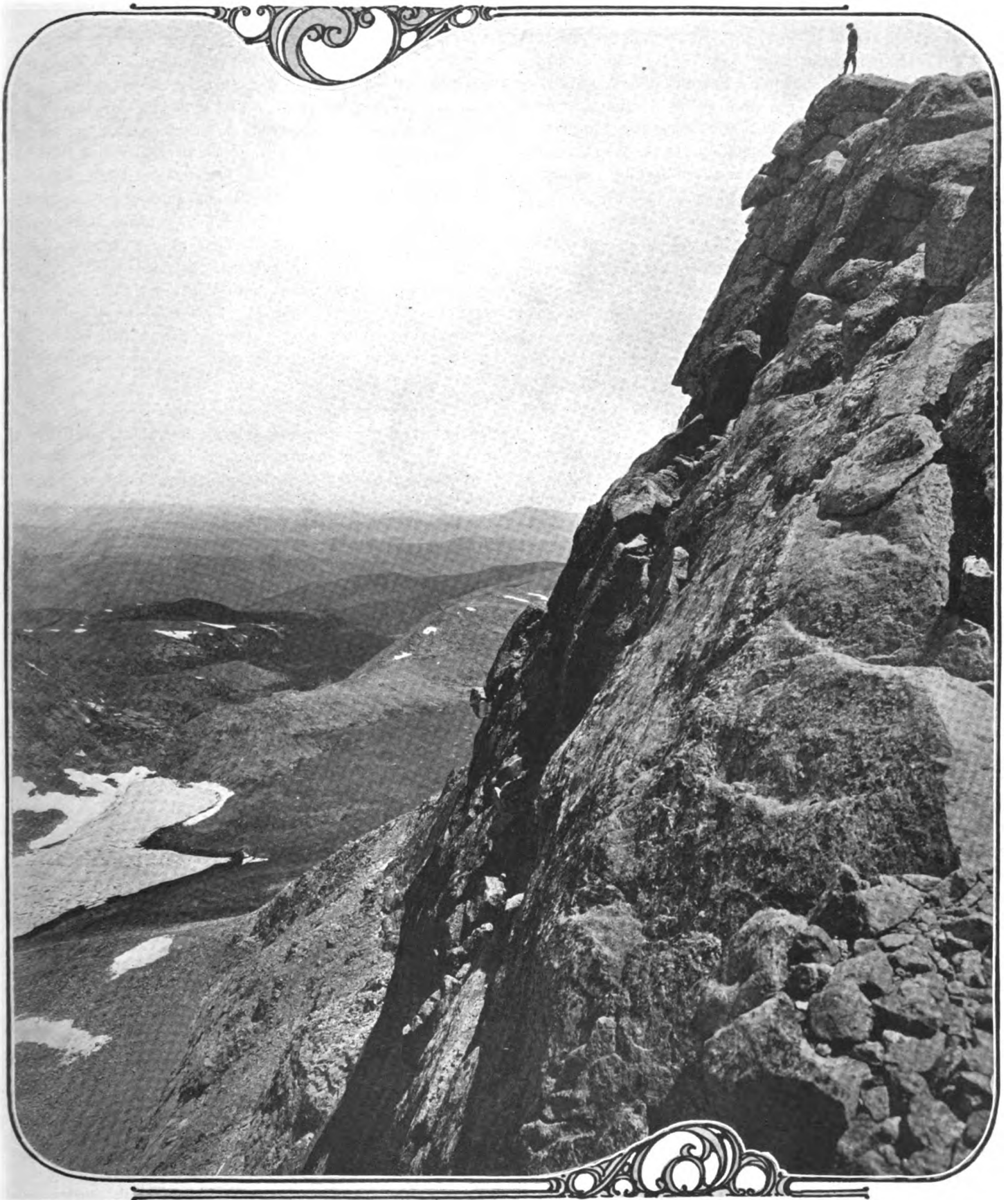
The line then dips to Echo Lake, 10,600 feet in elevation, following the descending slope of Devil's Nose. It circles this gemlike lake and ascends Goliath Peak, near the summit of which it passes above timberline. From this point on to the summit the proposed drive remains constantly above 12,000 feet. From a high pass between Goliath and Mt. Rogers one may look down upon Lincoln Lake or, as it is known to the residents of the region, Lost Lake.

The survey then crosses to the Chicago Lake side of the peak. The views from the cliffs above these lakes are endless and overwhelming. Two thousand feet below Lower Chicago lake reflects from its inky surface the towering horseshoe of cliffs that caused local inhabitants to apply to this great sink on the north side of Evans the descriptive title, "Frying Pan Basin." Four hundred feet above Lower Chicago Lake, and separated from it by low cliffs, is Upper Chicago Lake, at an elevation of 11,800. Another cliff arises above the latter lake, and just over its brim is Summit Lake, 12,740 feet in elevation, which will be encircled by the road when the Mt. Evans Drive shall have been accomplished. Evans rises 1,600 feet above Summit Lake, almost in a perpendicular step, while on the west the lake is hemmed in by Mt. Warren and the lofty ridge that connects the two peaks.

Emerging from the cup in which Summit Lake rests the survey passed around the slope of Mt. Evans to the south and there, by a series of hairpin turns, climbs to the summit, 14,260 feet in elevation.

The City of Denver has volunteered to pay half of the cost of constructing the road to the summit provided that Congress will declare the 150 square mile area surrounding the peak a national park. It is estimated that this twenty-seven mile road would cost \$400,000. When the project is completed, and there is little room to doubt that the drive will be built in some way, the Mt. Evans region will become the most accessible and popular of any mountain park project in the country. Then visitors will come by the hundreds of thousand and overflow from Denver to the Rocky Mountain National Park, the Mesa Verde, the national monuments, the silver peaks and fishing streams throughout Colorado, along the state highways that now reach like arteries into every section.

One of Nature's Masterpieces Viewed From The Summit of Mt. Evans



Looking to the East From a Pinnacle on Mt. Evans With Summit Lake, a Mass of Solid Ice Below. The New Road Will Wind Around the Lake, Hairpinning From That Point to the Crest of the Peak. The Peak is 14,260 Feet High.

National Forest Road Construction Plans

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

THE July issue of The Highway Bulletin carried a cut on page 9 showing a graphic plan for highway development on the Montezuma National Forest. Such a map is indispensable in working out a comprehensive road scheme but it can be made to tell only part of the story. There is other information equally important which can scarcely be shown graphically and which should be compiled in a form readily available for use.

To fill this need, there has been prepared for each of the National Forests in the United States, which includes seventeen in Colorado, a tabulation showing additional information relative to each project indicated on the road plan map of the Forest. The fictional sheet accompanying this article shows the character of information it was that necessary to compile. While the data on the map and in the tabulation is not complete by any means, considered collectively, the salient points are covered.

With the information thus accumulated, one may ascertain almost instantly the existing and proposed type of road, the mileage, the estimated cost, the termini, the county and Forest in which road is located, its importance as compared with other projects, and the character of connecting highways. Cross references between the tabulation and the map are facilitated by the small numbers enclosed in circles.

The preparation of a plan of this kind calls for considerable research and study, and the question naturally arises as to whether the use will justify the labor and expense involved. The chief reason which commend the preparation of a comprehensive road plan, are as follows:

First, it invoices and classifies our existing roads. It is good business to cast up our account and strike a balance to find out how much we have spent as nearly as may be, and to determine what we have bought with our money. Well nigh imperative isn't it, if our road work is to be on a business basis?

Second, it serves as a medium thru which the varied ideas of the Federal government, the State, the counties and other interested road organizations may become crystallized, and when adopted by all of the agencies above enumerated, it works toward a unified effort for a common result. What we are all trying to secure is a system of highways which will adequately serve the State of Colorado.

Perhaps our ideas of just what roads will best accomplish this end are at variance and no doubt we have different views as to width and grade, but won't we get there a whole lot sooner if we reconcile our differences now, and pull together on a unified plan? If each dollar of money, Federal, State, County or private, is spent in accordance with a preconceived plan, the period of accomplishment will be materially increased.

The third main reason for the adoption of a plan of this kind is that it is absolutely essential to working out a sound financial schedule. The necessity for this is becoming increasingly apparent as additional funds in the form of increased taxes, bond issues, Federal aid funds, etc., are becoming and will become available. Among the essentials in preparing a financial plan are a knowledge of what we now have, what we want to have, what it will cost, and when we want it. Such a plan will be found of great value in determining tax levies needed, the amount and period of bond issues, and will provide information for both State and National legislative bodies should such be needed in considering future highway legislation. A working plan of the character above outlined furnishes information of this kind.

The preparation of a comprehensive road plan does not necessarily presuppose a large initial expenditure of money for location surveys, engineering investigations, etc. The plan can be started with the information now at hand. It is surprising the amount of data which has been secured by the various counties, the State Highway Department, the Federal Government and private engineers. While it is true that it means considerable effort to bring this information together, the outlay is insignificant as compared with the cost of a complete engineering and economic investigation. The important thing is to make a start by preparing a tentative plan, by assembling the information that is readily available as additional data is collected. The plan can be expanded and perfected gradually with little effort or expense. The plan thus becomes a repository where pertinent information from all sources is assembled and arranged in a convenient form for ready reference.

It should be realized that it is impossible to arrive immediately at any plan which will be absolutely final and complete. Conditions change and be the information never so painstakingly complete, revisions must from time to time be incorporated, to meet situations which can not be foreseen. This is not an argument against a plan of this kind, quite the contrary. The plan not only furnishes a record of changing conditions, but enables one to get a broader perspective and to marshal all the facts for careful consideration before inaugurating a change.

The National Forest road plan is not a new thing. A tentative plan has been developing for several years, but it is still in a formative stage. Recently our road plan has been revised and somewhat changed in form. It is now being sent out to all Forest Supervisors for future study in the field during the next few months before being compiled in more permanent fashion. Each Supervisor is being requested to consult and advise with the County Commissioners, road organizations and local engineers

NATIONAL FOREST ROAD DEVELOPMENT
 ROADS UPON WHICH CONSTRUCTION NECESSARY TO PROVIDE COMPREHENSIVE ROAD SYSTEM
 STATE OF COLORADO -- DISTRICT 2
 PIKE NATIONAL FOREST

Reference Number	Order of Importance	Name of Project	Termini	Number on State Road Map	Classification Present & Proposed	County	Forest	Length in Miles	Estimated Cost		Status and Plans for Construction	Remarks	Date of Entry
									Amount	Basic estimate			
72	1	Bowstring	Bowstring - Little Cutfoot Lake	40	4 2	Jackson	Pike	4	7,800	County Engineer	Location Survey completed. Construction in cooperation with Jackson Co. 1918.	Improvement of old road	1-1-18
53	2	Burns Lake	Burns Lake - Willow Creek	98	4 3	Cook	Pike	5.5	8,000	State Highway Com.	50% completed in 1919. Completion of construction 1918.	50% cooperation by State Highway Commission and Cook County.	1-1-18
40	3	Piney River	Piney River - Muddy Creek	68	4 3	Cherry	Pike	11	12,000	Reconnaissance Office Public Roads.	Location Survey 1918. Construction 1919 & 1920	Construction of 6 miles; reconstruction of 5 miles. 50% cooperation by Cherry Co.	1-1-18
107	4	Diamond Bar	Sauke River - Diamond Bar Ranch	12	4 2	Thomas	Pike	27.8	68,000	Reconn. by County Engr.	Location Survey 1919. Constr. in 1920, 1921, 1922.	Improvement of 13.8 miles of old road. Construction of 14 miles new road.	1-1-18
55	5	Battle Creek	Goose Creek - Panrose Park	62	4 3	Johnson	Pike	9.5	15,000	State Highway Com.	No Location survey or immediate plans for construction.	Reconstruction of old road.	1-1-18
95	6	Sandstone	Sandstone Postoffice Battle Creek Road	73	4 2	Johnson Cherry	Pike	8.4	25,000	Office estimate Forest Service	No reconnaissance survey, location survey or immediate plans for construction.	4.4 miles Johnson Co. \$14,000. 4 miles Cherry Co. \$11,000.00.	1-1-18
32	7	Horse Creek	Teepee Creek - Evans Ranch	25	4 3	Cook	Pike	17.2	28,000	Office estimate Forest Service.	No survey or immediate plans for construction.	Wagon trail exists; can be traveled only with light wagon.	1-1-18
45	8	Mill Creek	Gold Hill Barrett	16	4 3	Johnson	Pike	12	18,000	Office estimate Public Roads.	No reconnaissance or location survey.	Reconstruction old road.	1-1-18

This Chart is a Tabulation Showing the Character of Information Which is Being Accumulated by the U. S. Forest Service, Supplementing the Graphic Plan Illustrated in the July Issue of The Bulletin.

with a view of synchronizing the ideas of all interested agencies as far as possible. The plan thus revised will be returned to the Denver office of the Forest Service about November 1, when it will be reviewed and presented at the earliest practicable date to the State Highway Department for consideration. When all adjustments have been made, the plan including both the tabulation and the map will be compiled.

It is hoped that the county commissioner is convinced that the development of such a plan is worthy of his cooperation. If you are so convinced and a National Forest is partly within your county, it is hoped that you will go to the Forest Supervisor or call at the office of the District Forester, if you are in Denver, and go over the plan for the county in detail. We wish just so far as is humanly possible to make this a composite plan, a representative plan, and one which will incorporate the ideas of all those who are interested in the future development of the roads within and adjacent to the National Forests.

When compiled, a copy of the plan for the Forest will be filed in the office of each Forest Supervisor, as well as in the Washington and Denver office of the Forest Service.

These plans are here for your use as well as for ours. It is hoped that county commissioners will as far as possible incorporate the information thus jointly accumulated in their county plans for road development, and from time to time as additional information comes to their attention notify the Supervisor in order that the Forest Service plan may be kept up to date. He will gladly return the favor and assist you in any way should a similar plan be compiled by the Board of County Commissioners. Annually about January 1, the Forest Service road plan will be brought up to date, at which time such information as has been accumulated by the Supervisors in cooperation with the counties and local road organizations will be posted.

The plan above described has been discussed with Mr. Ehrhart who has endorsed it heartily. It is hoped that it will also meet with equal approval by the county commissioners of the State, as well as State and local road associations. With your cooperation, we hope to formulate a working plan of construction designed to meet not only our present needs but which when carried thru to completion will constitute the ultimate system of highways in the National Forests of Colorado.

Push the Interstate Military Highway Now!

By T. J. Ehrhart, Highway Commissioner of Colorado

THERE exists today a positive economic and military need for a great highway piercing the West from Canada on the north to Mexico on the south. Plans for such a highway to be known as the Interstate Military highway have been prepared, actual construction has been completed on several hundred miles of the route, other mileage is under course of construction. All that is needed to make the entire highway a fact is the aid of the United States government thru Congress.

The proposed highway can be constructed of solid concrete all the way for a cost of approximately \$30,000,000. Congress is today awakened to the imperative need of good highways as never before, and the time to strike for this western roadway is at hand. Concerted action on the part of the authorities of Montana, Wyoming, Colorado and New Mexico can obtain a hearing for this highway and united effort can secure passage of an appropriation authorizing its construction.

There are those who may hold that the highway is not needed now and that its construction should be delayed until after the close of the war. The facts in the case support opinion to the contrary. The West needs this

In the past the railroad systems of the West handled this product, but they are no longer equal to the task. Everywhere the cry has arisen to relieve the railroads as much as possible in order to leave them free to handle war cargoes and yet the congestion remains.

The Interstate Military highway would pave the way for immense motor transportation systems. Goods shipped from Montana could be handled quickly and cheaply via this route all the way to the seaboard. Short hauls thru middle western sections now necessary because there is no highway which will withstand the pounding of heavy motor trucks, would be eliminated.

From point to point all along the road farmers would be relieved of wasteful hauls to market, man power would be saved and the whole West geared to a higher war time efficiency at an actual saving in cost far in excess of the cost of construction.

Finally the thousands of acres of incalculable wealth now rusting in undeveloped districts of the West, would be brought into the game for the Nation. Feeding lines would spring into existence the minute work on the road

SAYS THE PRESIDENT:

My interest in good roads is not merely an interest in the pleasure of riding in motor cars; it is not merely an interest in the very much more important matter of affording the farmers of this country and the residents in villages the means of ready access to such neighborhood markets as they need for economic benefit, but it is also the interest in weaving as complicated and elaborate a net of neighborhood and state and national opinions together as it is possible to weave. I believe that the development of great systems of roads is, psychologically and physically speaking, a task of statesmanship. I believe that it is the proper study of the statesman to bind communities together and open their intercourse so that it will flow with absolute freedom and facility.

WOODROW WILSON.

highway and the needs of the West are reflected in those of the East, the North and the South. The construction of this highway is an immediate war-time necessity and as such the plan should be given the immediate, complete support of all who live in this section.

No other highway in the United States cuts thru as rich and as diversified lands as does the proposed Interstate highway.

Montana is rich among states in copper and zinc. Its farm lands supply oats, wheat, corn and other cereals. Its grazing lands maintain huge herds of cattle and sheep.

Wyoming has enormous oil fields, thousands of acres of land devoted to sheep raising, and other thousands used for grains, for cattle and for horses.

Colorado supplies the world with rare and precious metals, with beef and mutton, with cereals and fruits. Its steel plants and smelters reduce the ores of other states. Sugar is here in abundance, cement and other necessities.

New Mexico is among the chief sheep raising states, has rich copper mines and is gradually increasing the yield of its varied crops.

was commenced and in its entirety the highway would serve to do a pioneer work for the West which would speed its development by years, if not decades.

In the meantime possible need for troop movements from middle western points either to Canada for trans-Pacific ports, to the Mexican border for uprisings, or to Gulf for trans-Atlantic shipment would be facilitated without use of rails.

The report of Fourth Assistant Postmaster General Blakslee is a positive, definite war time recommendation based upon proven statistics, of just such routes as the Interstate Military highway. Resolutions approving construction of just such highways east of the Mississippi at estimated costs of \$150,000,000 are now before both the U. S. Senate and the House of Representatives.

The Interstate Military highway will be assured the same recognition in the West if every chamber of commerce, every newspaper, every industry, every congressional delegation in the four states, will get into the harness.

DO IT NOW!

Post Office Official Urges Huge Road Budget

Expenditure of \$150,000,000 Recommended in Congressional Resolution

THE first step looking toward federalization of thousands of miles of highways all over the United States was taken June 3rd, when a joint resolution was introduced before the committee on Postoffice and Post roads, which, if passed, would authorize the postmaster general to expend not more than 50 per cent. of the gross earnings of motor truck parcel post routes for the construction and maintenance of the highways on which the service is or may be established.

A statement made by fourth assistant postmaster general Blakslee recommends the expenditure of \$150,000,000 on 7,500 miles of concrete highways in the district east of the Mississippi river. "It is assumed," continues Mr. Blakslee, "that a similar mileage would be necessary west of the Mississippi river, altho no definite survey has as yet been completed."

The recommendation of the postoffice department is based on conclusive figures obtained from operation of motor truck lines on highways now in existence which prove beyond reasonable doubt that first class highways have not only vastly increased the earnings of the postoffice department but that they have increased production thru direct communication between producer and consumer, have permitted the producer to confine his attention to maximum production, and have offset the loss of man power diverted from the farm to engage directly and indirectly in the prosecution of the war.

A vastly improved collection and delivery of mail is also noted. Numerous handlings have been eliminated and direct facilities from postoffice to postoffice provided, thereby advancing delivery of mail to patrons many hours. Says Mr. Blakslee:

"The construction of the proposed thru or connecting

route highways would in nowise displace or otherwise interfere with the existing system of construction whereby the states in conjunction with the Federal government are building many lines of excellent road and the completion of the feeder lines to the national highway under the Federal aid plan already effective is undoubtedly essential to National prosperity and welfare.

"But this line is as valuable in its availability as an item in the system of national defense as it is an avenue of commerce and therefore of direct national importance and will unquestionably demonstrate its value more and more as the increasing necessities for the use of highways as a means of transportation appear."

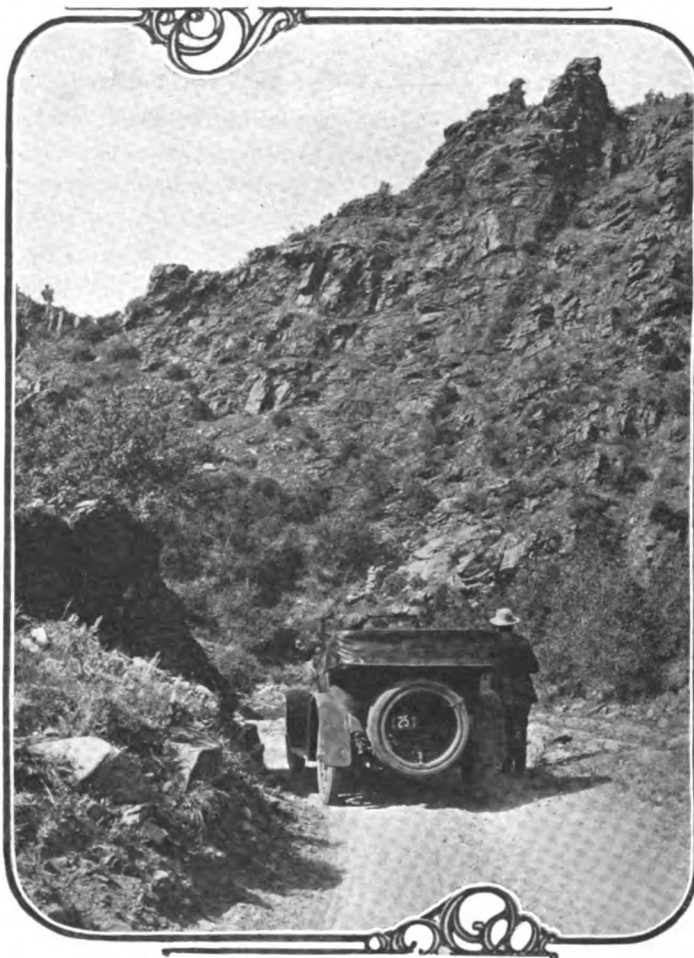
The cost of construction of the system is estimated at \$20,000 per mile using every available economical form of construction including prisoners of war and convicts in doing the work and local road material.

The type of construction contemplated is a concrete or brick paved road, not less than sixteen feet wide, not less than nine inches top depth with heavy grouted under foundation thoroly underdrained for the entire distance thereby making for a permanent road with extremely limited after-maintenance.

The Highways Industry association is endeavoring to co-operate with General Blakslee and the Com-

mittee on Postoffice and Post Roads, in every way possible in the adoption of this resolution as amended.

Booklets have been sent out to motor vehicle manufacturers and distributors for the purpose of awakening them to their own responsibility in highway development and the association has taken the position that as regularity and efficiency are necessary to the conduct of these truck lines, that greater interest must be taken in roads.



The Golden Gateway. Entrance to the Highway to Black Hawk and Central City, 1.5 Miles North of Golden, Jefferson County.

Traffic Demand Exceeds Strength of Roads

Highways No Longer Adequate, Says U. S. Office of Public Roads

APPARENTLY the point has been reached where the demands of traffic have exceeded the strength of the average road to meet them," says Public Roads, the official organ of the U. S. Office of Public Roads. "Highways designated to withstand the pounding of ordinary loads, that have stood up under imposts they were intended to sustain, no longer appear to be adequate to meet the present day conditions.

"Congestion on our railways, possibly more acute in some sections than in others, has put upon our roads a transportation burden never expected and consequently not provided for by the engineers who designed the highway systems of the States. Roads have been designed with the same care as given to other structures and with the same regard for the purposes for which they were constructed and the burdens they were called upon to bear.

"Widespread failure is demonstrative of the fact that the roads cannot carry unlimited loading. Their capacity is limited. If it is exceeded habitually and constantly, then they cannot survive.

"The products of our farms and our factories must be moved. The wants of our urban dwellers must be met. But the needs of our country involved in this great conflict are paramount to the needs of single communities, and thus when avalanches of freight destined to fill the greater necessity made imperative the partial closing of our vast system of rail transportation to the smaller, relief appeared to be in the motor truck and the highway. Single light units expanded into heavier units, that in turn, developed into long trains. From horse drawn vehicles with concentrated loads of probably 3 tons at most, traveling at the rate of 4 miles an hour, sprung overnight the heavier motor truck with a concentrated load of from 8 to 12 tons, thundering along at a speed of 20 miles an hour.

"The result? The worn and broken threads that bond our communities together. The solution? That is the problem that confronts the men who will be called upon to meet the ever-growing demands upon our highways and to devise regulations fair to those who pay for their construction and to those who pay for their use."

State highway commissioners were asked by Public Roads to suggest means of relief and their suggestions are here epitomized.

New York—"A reasonable limit upon the total load must be placed and we must at the same time require a proper distribution thereof or the rapid destruction of our roads will be the result. A substantial but not prohibitive tax of heavy vehicles is also recommended."

Maryland—"Size of motor trucks should be regulated to such size as improved roads built in the best manner

which local conditions will permit, are able to withstand. The cost of maintaining these roads should be paid by the traffic using them as near as possible a proportion to the damage which they do. This state now charges \$500 fee for 7 ton trucks."

Massachusetts—"Smaller trucks should be used and much higher fees charged unless the U. S. government is going to put very large sums into roads. The one-ton truck which makes 60 miles a day costs for the upkeep of the road 60 cents a day and for 300 days a year it would be \$180 a year. A 5 ton truck does probably five times as much damage, or even more, as many roads which would carry a one-ton truck reasonably well have not a strong enough foundation to carry the 5 ton truck."

Connecticut—"Loads on four wheels are restricted to 25,000 pounds, except in special instances which may be designated by the highway commissioner, heavier loads are allowed. License fees are out of proportion, as truck weights increase, which tends to discourage the purchase of extremely heavy truck units and to provide for the purchase of additional trucks or the use of rubber-tired trailers. On the other hand, the State Highway department has been working along definite lines, looking toward the strengthening of its road system so that little if any damage will be done the roads providing the above restrictions are carried out."

Delaware—"In order to prevent great economic loss the loads on the single truck should be limited and any load over a certain amount should be carried on trailers. Heavy trucks should pay the larger part of the road taxes. The width of the truck should be restricted to a certain extent."

New Jersey—"A varying scale of fees based upon tonnage, the highest amount being \$67 per vehicle has been imposed and a maximum load set at from 29,000 to 30,000 pounds. Rebuilding of roads planned to offset destruction."

ROAD ENGINEERS HELPING TO WIN WAR.

The experienced road builder of executive ability has found his place in this war. The roads back of the English army are being built and cared for under the direction of General H. P. Maybury, who was one of the English county engineers and was afterward one of the engineers on the road board in England. Under him are experienced men of varying ranks.

This engineer has had charge of the roads for two years in France and has had from 10,000 to 25,000 men working on them constantly. Twenty-five or thirty per cent of these have been German prisoners.

In order to keep the roads merely passable it has been necessary to use 2,000 tons of metal a day. Broken stone costs \$7.50 a ton.

It isn't a question of cost, however. It's a question of keeping the traffic going.—The Highway Magazine.

Along the South St. Vrain to Estes Park

NINE or ten million years ago when dinosaurs, ammonites and flying reptiles made Colorado their summer home, the earth staged a revolution. Out of its rumblings, mountains appeared pushing their tips up from the seas and strange forces made themselves felt. Came the agents of erosion, wind and rain and the streams, and in the course of a geologic decade, the ranges were reduced to mere foothills. Again the earth erupted, this time with a Herculean force beyond the immediate power of erosion and today the sprawling chain of Titan peaks which comprise the Continental Divide, remain as survivors of the struggle.

Gravity and the heat of the sun have been ever at work, however, and the bottomless chasms, the abyssmal lakes of ever-changing hue, the beauties of field and valley which are Estes Park and the Rocky Mountain National Park, are today evidences of the slowly changing topography of the western country.

Nowhere in the world, perhaps, are the actions of the two contradictory forces of Nature as evident as they are in this region of geologic, botanical and zoological wonders, and even the most casual visitor can today mark the battlefields of these giants among Nature's troops. Glaciers and moraines stand in panoply of war and day and night the flux goes on.

Words become inadequate, expressionless things when the exquisite beauty, the sublime heights, the never-ending wonders of these parks are revealed to the traveler. The keen eye of the camera fails to disclose the subtler colors, the delicate artistry of Nature which is theirs. No painter's brush has yet caught the soft tones of the Arctic flowers, the prismatic colors of the setting sun, the evanescent traceries of deep, cool lakes, the warmer shadings of light falling upon the velvet mantle of hills and valley.

"There are operas unsung.

There are pictures unhung"

wrote Clem Yore in his "Colorado" inspired by Estes Park, and as he found it, so have all others who have attempted to tell of this bit of modern fairyland. It must be seen to be appreciated and once seen, the traveler must go again and again to view its ceaselessly changing masterpieces.

The first historical reference to this section was made, so Willis T. Lee, U. S. Geologist tells us, by Lieut. Pike, who first noted it in November 1806, calling Longs Peak, the Great Peak. Later an exploring party under Col. S. H. Long found the peak in 1819 when it was formally named Longs in honor of their leader.

The first settler came in 1860. He was Joel Estes, and the broad valley afterward took his name. In 1872 Earl Dunraven attempted to buy the entire location as a hunting preserve but his claims proved invalid. In 1874 Albert Bierstadt the famous painter was guest of the Earl and as his famous paintings of the district became known, they

attracted many tourists. Since then the flood of annual pilgrims to the shrine of Longs peak has been by thousands and on January 26, 1915, the U. S. government took official steps to preserve the beauties of the park forever, by creating the district, the Rocky Mountain National Park.

Today the park may be reached by anyone of three notable highways, and in another year, Estes Park will mark the eastern terminal of one of the world's most wonderful mountain trips, the Fall River road. This highway now twists and bends from Horseshoe lake almost to the crest of the Mummy range, past tumbling mountain streams, thru groves of stately pine, on into the regions of perpetual snows and ice where Iceberg lake and all the beauties of the sky ranges stretch out before the traveler.

Two miles of construction blasted from solid granite and torn from the dead timber of ages, remains before the road shall reach the crest and road gangs are now at the work both on the eastern side and on the western slope.

Once finished this highway will link Estes with Grand Lake and will make available a round trip for the traveler which will carry him thru the surpassing glories of the Continental Divide in sight of mighty Longs and the half hundred peaks of more than 10,000 feet in altitude which guard the Divide, on thru to the less magnificent but finer colorings of the West. Denver as a main terminus for this trip whether taken from east to west or west to east, will see travelers departing annually to make the circle by the hundreds of thousands and the wonders of Switzerland will no longer be the test of a globe-trotter's experience.

Working with this prospect always in mind the State Highway department is gradually but thoroly developing all of the gateways to the park. Today the traveler can enter Estes from the north via the beautiful Middle Boulder canon, Ward and the South St. Vrain and he can return thru the towering cliffs with cathedral pinnacles which mark the Big Thompson canon way or via the North St. Vrain with its shelf road and hills of pine, cedar and spruce.

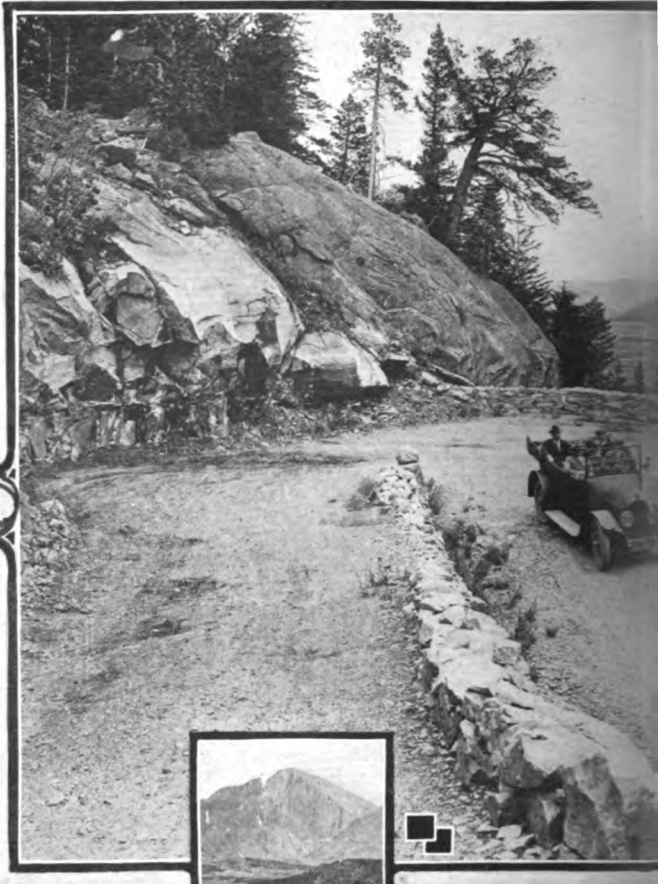
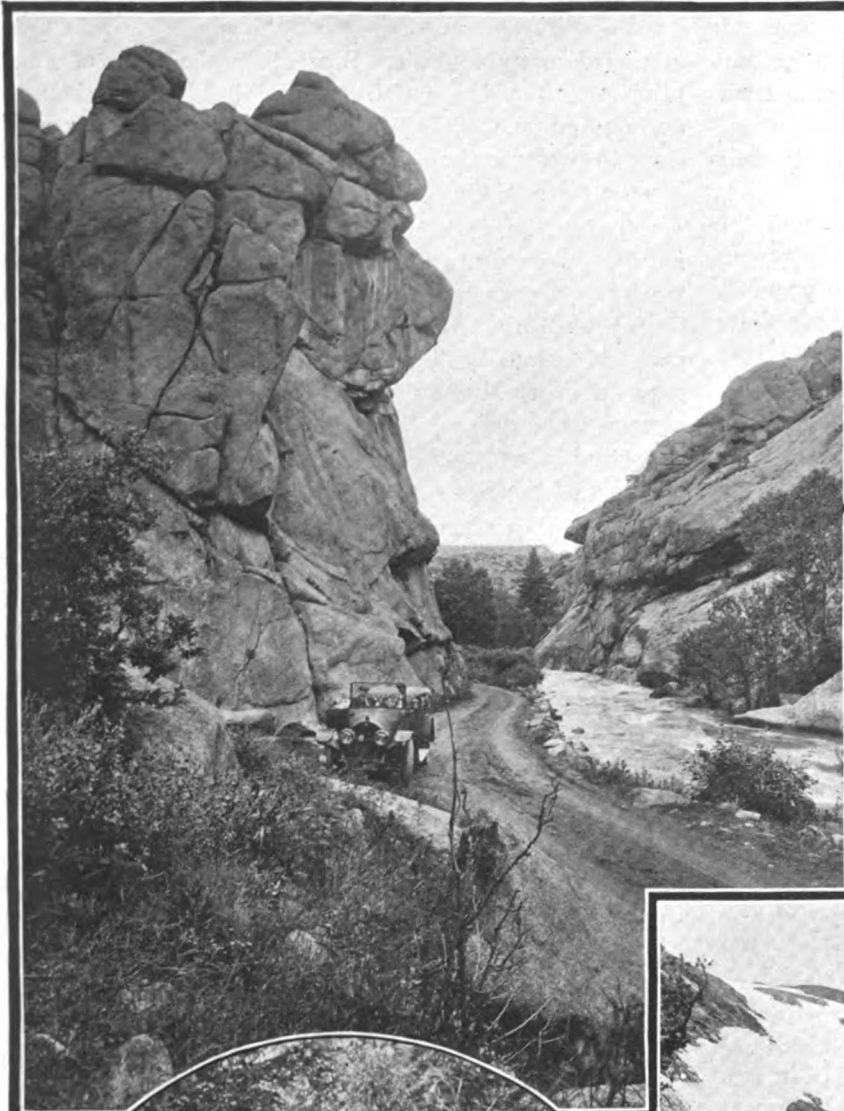
Or, if he chooses he can go up the Big Thompson and down the North or South St. Vrain, his own inclination settling the choice, since all of the roads, while some are narrow at points, are in excellent condition for travel. Another few years and all will be standard mountain boulevards but there is today nothing which need worry the most conservative of drivers about any of these trips.

The wonders of the Big Thompson canon have been related by many. The North St. Vrain is traveled annually by thousands. It is the South St. Vrain which is the least known and which will therefore be given the greater space in this article since it too, is well worthy the time of the traveler.

Assuming that the traveler is starting from Denver, he has his choice of innumerable routes. He may take the

(Continued on page 14.)

Fine Farms, Rich Orchards, Striking Mountain Scenes and Timberline



For variety of scenery there are few trips anywhere which are equal to that which takes the traveler from Denver via Boulder, Loveland or Longmont up the canons to Estes Park and thence on to timberline via the great Fall River route. Good roads are to be found practically all the way and travel to this district is growing year by

year to immense proportions. At the top from left to right, the view shown here are the Indian Head which guards the narrows in South Vrain, Boulder county, a huge rock on which may be traced a number of faces. A striking hairpin turn on the Fall River road, Larimer county, which has been blasted a large part of the way from solid granite

Views Mark the Road From Denver to Estes Park and the Divide



A field of waving grain on the main highway in Adams county, and a group of Rocky Mountain Sheep caught at the Salt Lick on the Fall River road, Larimer county. The inset is a view of Longs Peak snapped from the South St. Vrain, Larimer county. At the bottom from left to right appear a picnic group feasting in the shadow of a

huge cliff in Middle Boulder canon, Boulder county. A scene on the North St. Vrain highway to Estes, Boulder county, and the Boulder Falls, in Middle Boulder canon, Boulder county.—Photographs taken by K. P. Howe, official staff photographer, Colorado Highways Bulletin, July 14, 15, 16, 1918.

A Circle Trip in the Shadow of Longs Peak

(Continued from page 11.)

main highway which leads from Longmont to Lyons or if he has the time for a somewhat longer but less traveled highway, he will go to Boulder. From this point he may proceed up the thoroly standardized highway along Middle Boulder canon amid the beauties of fortress cliffs, stopping at the Boulder Falls for a moment, then passing on the giant dam at Nederland where will be found the greatest tungsten mining camp in the world.

But this will be a diversion (tho one worth taking) and if it is the thru route which is sought the road leading from the canon at Four Mile will be taken. From this point the highway climbs on to Salina and over Gold Hill to Ward whence the road leads directly north to a point below Allen's park where it links up with the South St. Vrain.

Four other optional routes leading to the same junction and the St. Vrain may be noted before the latter is taken up.

One of these takes the road out of Boulder via the sanatorium to Sunshine where the high line, then the left hand creek to Ward is followed.

Another goes two miles north of Boulder to Lee Hill. The road downstream leads to Jimtown thence to Overland hill to Ward.

Taking the road upstream the traveler also reaches Ward but by another route.

Finally the traveler may go six miles north of Boulder, then take the left hand canon to Jimtown and from that point go on over Overland Hill to Ward. The hardest trip of the group is that over Overland which requires a steady pull of four miles but the road is not dangerous and is in good condition most of the time.

The direct route to the South St. Vrain is the one which goes north from Boulder to Lyons, skirting the foot-hills all the way. This highway is in excellent condition and as travel is not as heavy as that along the Lincoln highway it affords a pleasant diversion.

From Lyons the traveler takes the southern route and after a brief journey along a way bordered by heavily laden fruit trees the car plunges into the South St. Vrain canon.

From the moment of entrance, fantastic cliffs and rocks border the way and as the car proceeds it comes to the Middle Narrows where the gateways of massive granite overhang the highway on both sides.

Comes next the Big Narrows and beyond them the Giant Bowl, a natural amphitheater with huge mountains for its sides, the creek running thru the little valley which is the floor of the arena.

Wending its way on past strips of farming land cut from the sides of the range, thru groves of fir and cedar, past fields of fragrant wild flowers where brilliantly hued birds, gaudy butterflies and sober chipmunks make their

abode, the highway comes to the junction of the road from Ward at the foot of the hill and together machines from both points climb the hill to Allen's Park.

Here the Continental Divide with all of its innumerable beauties comes to view and as Copeland lodge is passed the machines point steadily toward the range. Longs Peak with its giant slabs of solid rock carved by Nature's master masons, the lazy clouds of a summer morning drifting about its crest, is the landmark for the road but the highway cuts into a forest of lodgepole pines and for a time the range is lost sight of. The border of the Rocky Mountain National park is reached and at the junction of the road to Longs Peak each car is registered by U. S. officials intent upon a census of visitors to the park.

From this point the highway cuts thru to the north to the home of Enos Mills, famous as the father of the park project and for notable works on the wonders of this region, thence in an easterly direction down the hill past unique hotels and inns to the main highway which leads into the town of Estes Park.

Here the traveler who has the time may prepare to devote a summer to sight-seeing, hiking and outdoor pleasures in Estes Park, climbing to icy glaciers where the Arctic ptarmigan and the rose finch have their homes, along heights where Rocky Mountain sheep may be seen leaping along precipices which have defied the hardest human, thru mountain groves where wild elk and deer munch at their daily meals. He may fish in wild mountain streams, travel by saddle to primitive mountain spots, climb along shaggy cliffs by his fingernails over lakes of ice and banks of deep snows. Or if he chooses, the less strenuous pleasures of golf, motoring and whatnot are his.

An infinite variety is that of Estes Park and the Rocky Mountain National park, one which never grows stale to the sportsman or those who seek health and recreation.

And in the not far distant future the thousands who have already explored its charms will be engulfed by a new wave of travelers who will flood every point within the region as the highways are pushed to their ultimate limits.

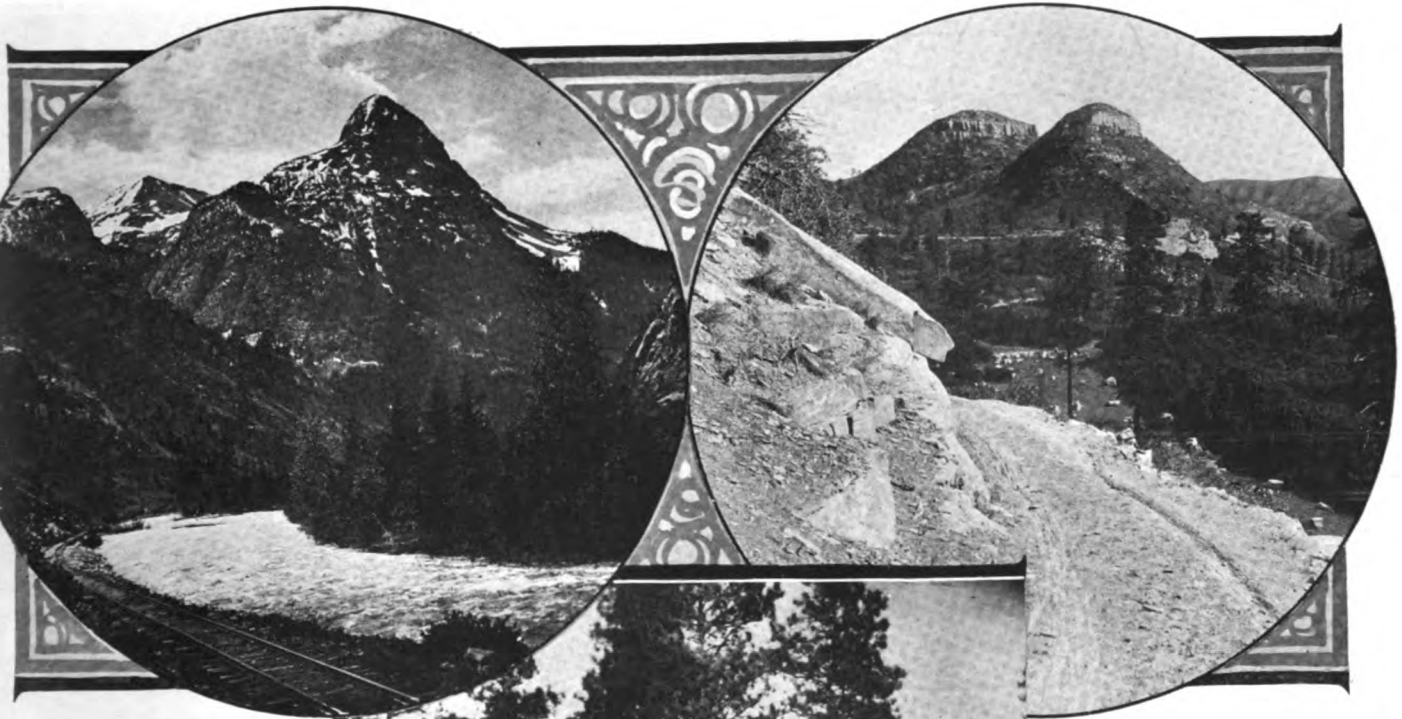
ESTES PARK TRAVELERS.

Reports received by the Denver Tourist bureau show a total of 970 automobiles into the Rocky Mountain National-Estes Park, carrying 4,051 passengers during the week ending July 14. The total for the period starting June 15 to July 14 is 3,723 cars or a total of 15,180 passengers. There were 22 cars from Nebraska, 26 from Kansas, 7 from Illinois, 19 from Wyoming, 14 from Iowa, 15 from Missouri, 9 from Oklahoma, 10 from Texas, 1 from South Dakota, 1 each from Michigan, Indiana, Massachusetts, New Mexico and Ohio.

DENVER ROAD EQUIPMENT FUND.

The sum of \$33,000 will be expended by the state highway department this year for the purchase of road machinery and operation of the same on the roads adjacent to Denver.

Striking Views Found on the Spanish Trail Near City of Durango



Top, left to right: Scene on the Durango Hesperus Road and the Needle Mountains Where the Durango-Silverton Highway is Now Under Course of Construction.

Bottom: A View on the Durango-Animas Valley Highway.

—Photographs from Durango Exchange.

LAST month The Bulletin described the trip from Pueblo west over Wolf Creek Pass to Pagosa Springs. The automobilist who goes on from this point to Mesa Verde and Durango travels thru some of the finest country in the state.

The first stretch from Pagosa on to Piedra is thru a heavily timbered section which has been freely cut in the past by lumber mills. This land is exceptionally productive and is now being used for farming purposes. Stock raising is carried on on a large scale, and from Piedra on to Durango the section is dotted by fine farms, ranches and small but prosperous towns among them Bayfield, Florita, Falfa and Bocea.

Durango is the commercial center of the district and one of the most prosperous cities in Colorado. To the north of it lies Ani-

mas valley with its fertile fruit orchards and the San Juan mountains, rich in all their minerals and among the most beautiful of Colorado's ranges, as well as the most rugged.

South of the city rests a rich farming district and west of it is found Mesa Verde Park, with its archaeological wonders of a bygone age. Here the tourist may spend days exploring the ruins of the cliff dwellers, a race of people predating historical knowledge.

Trimble Springs near Durango is a summer resort of exceptional merit while among the many points of interest in the city, is its smelting industry, center for the entire mining region of the San Juan.

The traveler who goes on west of Durango strikes thru Montezuma on the main highway.

COLORADO HIGHWAYS BULLETIN

Published Monthly
by the



Colorado Highway
Department

Denver, Colorado.

With the approval of the Colorado State Auditing Board.

Address all communications to Colorado Highway Department, attention Pyke Johnson, editor, Colorado Highways Bulletin.

Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up provided only that orders are sent in before type is re-distributed.

Vol. I.

August, 1918

No. 3

CITY FUNDS AND STATE HIGHWAYS.

Frequently the complaint is heard that city apportionments from taxation should be used on city highways instead of on roads outside of the city limits. The answer to this statement is most forcibly put in Bulletin 136, U. S. Department of Agriculture in which the road problem in its entirety is thoroughly analyzed and discussed by noted experts. We quote:

"The fact that cities and larger towns are frequently taxed for bond issues to build highways outside of their own limits is sometimes made a point of debate. It is argued that because a large part of the county wealth is within the corporate limit of such cities and towns, highway bond money should also be used to construct their streets. It is even urged that the expenditure should be made proportionate to the assessed valuation within the city limits.

"If the proceeds of the highway bond issues were distributed in this way their purposes in many cases would be defeated. The primary object of the county highway bond issue is to build county market roads and not to improve city streets, altho a high percentage of the assessed valuation may be city property. It is now known that the expenditure of city taxes on country roads is a sound principle and that it is one of the best features of state aid.

"In Massachusetts the city of Boston pays possibly 40 per cent. of the total state highway fund, but not a mile of state-aid highway has been built within its limits. New York City also pays about 60 per cent. of the cost of the state highway bonds. Some state laws prohibit the expenditure of proceeds of state highway bonds within corporate limits of cities or towns.

"The improvement of market roads results in improved marketing conditions which benefit the city. Most cities are essentially dependent upon the surrounding country for their prosperity and development. The development of suburban property for residence purposes is also de-

pendent upon highway conditions and it is becoming evident yearly that whatever makes for an increase in rural population must be encouraged. Since the introduction of motor traffic county highways have been used to an increasing extent by city residents. In fact, the cost of maintaining many country highways has been greatly increased by the presence of city owned motor vehicles. The general advance in the facilities for doing country business from town headquarters when roads are improved is no inconsiderable factor in the commercial life of the community."

MOTOR TRUCK REGULATION.

Elsewhere in this issue will be found an article from Public Roads in which are discussed solutions for the ever-growing motor truck traffic which is today menacing every main highway in the East, no matter what its construction.

The problem is one of the most difficult which has confronted road-builders. Obviously the motor truck has come to stay but just as obviously some means must be found to overcome the enormous damage which it is doing to road beds.

Officials of the State Highway department have been making a close study of the question and have arrived at the conclusion that four legal steps must be taken at once unless Colorado's roads are to go the way of the main highways in the East.

First, a limit must be placed upon the load carried by each vehicle, the amount to be restricted according to the character of the road traveled.

Second, the width of tires should be regulated according to the load carried to prevent maximum haulage on vehicles equipped only with sharp, thin tires.

Third, a speed limit should be put into effect which will prevent heavily loaded vehicles from tearing up the road bed.

Fourth, trucks should be placed under a graduated tax increasing with the load carried yet at no time reaching a prohibitive figure.

It is the opinion of the department that only by action of this character can the roads be saved as there is not a highway in the United States today which is equal to the strain imposed by a heavily loaded truck with narrow tires, proceeding at a rapid rate of travel.

The graduated tax is necessary since one truck does more damage to a highway in one trip than all of the passenger travel will do in a month.

FREE CAMPING SITES.

Everywhere along the mountain roads there should be strips of land which will be forever left open for camping sites. Ten years from today unless this property is set aside now, the highways thru the chief mountain passes will be fenced off by private owners and there will be left no place where the traveler may camp out over night.

County commissioners should be empowered by legislative act at the next session to purchase these plots.

Grades Limiting Factor in Road Haulage

By James C. Maloney, Chief Engineer State Highway Department

THE question of grades upon highways, particularly upon main routes, is one of the most important factors to be considered in the determination of the efficiency of any road.

It is important that judgment be used in the selection of grades in new roads, and in the improvement of existing highways.

A selection of a maximum grade must be made and should, of course, be made by someone competent to judge, who may arrive at his conclusion by using his own experience and knowledge as well as that of others as the basis for his decision. However, in many of the existing roads it is evident that but little thought and no judgment has been used.

As the maximum grade adopted is the limiting factor of a load that a team or engine can haul over the road the subject is one worthy of considerable study and that as much so for highways as for railroads.

Consideration of the resistance due to grade may be taken as entirely separate from the resistance due to the character of the road surface. The grade resistance is practically equal to the total weight multiplied by the grade when the grade is considered as a percentage of the horizontal distance. The horizontal distance is generally taken as a 100 feet and the grade as the rise in feet in that distance. Assume P as expressing the tractive force which, due to the grade, is the force necessary to prevent the load (W) from rolling down the slope.

Therefore if P equals the tractive force, W equals the load, b. c. equals the rise per 100 feet and a. c. equals the slope distance, then

$$P = \frac{W \cdot b. c.}{a. c.}$$

For all ordinary cases of small inclinations the horizontal distance a. b. is approximately equal to the slope distance a. c., and therefore we may take $P = \frac{W \cdot b. c.}{a. b.}$ or the tractive force

necessary to overcome any grade equals the load multiplied by the percentage of grade.

On a grade of 2, 3 or 5 per cent., the power necessary to haul any weight would be the weight multiplied by 2, 3 or 5, as illustrated graphically in the accompanying chart. This shows the increased number of teams necessary to pull the same load up the several grades.

The maximum grade adopted by the State Highway Commission is 6 per cent. This maximum has been generally, but

not rigidly, adhered to. For short distances of from 200 to 400 feet grades of from 7 to 7½ per cent. have been used in some cases to avoid very expensive construction but when these limiting grades are found necessary it is very desirable that they be used on a straight piece of road of good material or surfacing.

This brings up the point that it is helpful to have the grades on all turns as low as possible particularly on curves of small radius. Most of our state roads crossing the continental divide have been kept close to the 6 per cent. maximum grade adopted. A few of the proposed improvements will, for short distances, exceed this limit.

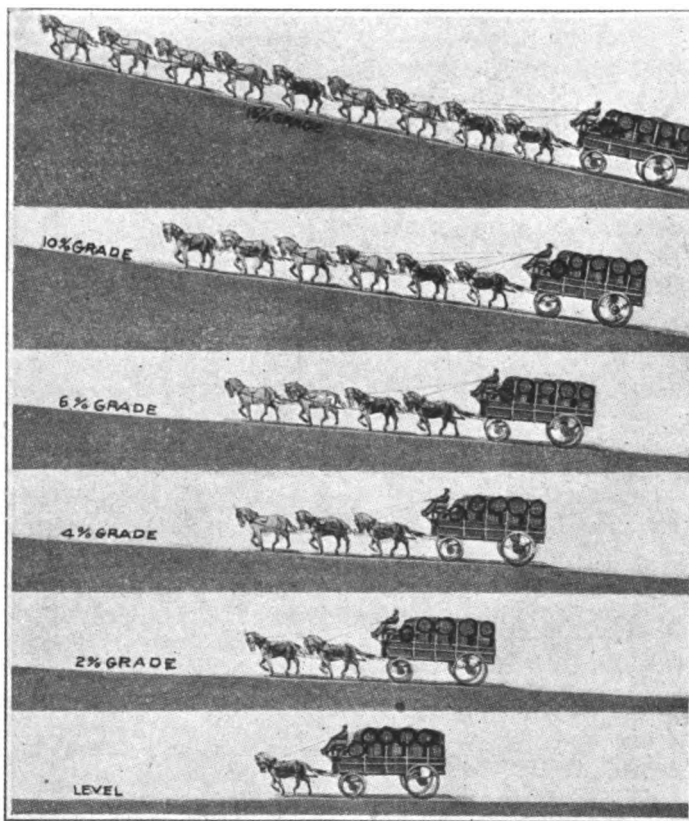
Spaulding, in his text book on Highways, makes the following statement concerning the work that a horse can do:

"It may be assumed that a horse working ten hours per day will put forth a tractive effort of 80 pounds at a speed of 250 feet per minute on an ordinary level road surface."

Mr. Spaulding has prepared the following table of pullage based on this estimate:

Level,	3,000 lbs.;	1%,
2,400 lbs.;	2%,	2,000 lbs.;
3%,	1,600 lbs.;	4%,
1,400 lbs.;	5%,	1,200 lbs.;
10%,	800 lbs.	

This table expresses the comparative resistance due to grade and the comparative values of the tractive resistance will of course apply to motor vehicles as well as to horses, the higher grade requiring use of more oil and gasoline, as well as increasing the rate of depreciation of the engine and power. It is, therefore, desirable to keep all grades as low as possible and not to exceed 6 per cent. It is also desirable to avoid any strictly level section, it being better to use one-half or one per cent. grade as it will be found that drainage is better.



A Graphic Demonstration of the Power Cost of Heavy Grades. The Same Proportions as Those Here Indicated for Horse Drawn Vehicles Apply in the Case of Motor Trucks. —Courtesy Scientific American.

ENGLAND FINDS ROADS VITALLY IMPORTANT.

It is significant that England, with her tremendous network of railroads and small area, has found that her roads, especially trunk lines, are of vital importance. With all the tremendous additional expenditures made necessary by the war, and with undoubtedly a large number of the uninformed public saying that she must save every dollar possible—why not stop some of the expenditures on roads—she has not only not stopped these expenditures, but has actually increased them in many places.—The Highway Magazine.

Work has been completed on the Limon highway and the road is today in the best condition it has ever been in.

The History of Road Building in Colorado

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

(Continued from last month.)

The first toll road in the state was built in 1863 from Bijou Creek near Fort Morgan by the way of Living Springs, Bennett and Watkins to Denver. It was called the "cut off." In 1866, Uncle Dick Wooton built a toll road over Raton Pass and took toll there for several years.

In 1867 the Union Pacific Railroad reached Julesburg, and in June 1870, the Denver Pacific Railroad was completed from Denver to Cheyenne, connecting with the Union Pacific, thus practically ending Overland Staging. Stage coach roads, however, continued to be built in Colorado for many years. They were built jointly by the stage companies and the settlers.

Before leaving the stage-coach period, it is fitting to refer to the famous old "Pony Express." The Pony Express was started April 9th, 1860, from St. Joe, Missouri, to run to Sacramento, California. It was the outcome of a fight amongst the Overland stage lines for mail contracts. It was backed by W. H. Russell, who advertised in advance to make the trip in 9 days and carry letters for 50 cents each. The first trip was made in 8 days and 4 hours. A little later a branch of this pony express ran through Denver to Salt Lake City. These facts are interesting because today, 54 years later, one could hardly make the trip of 1,913 miles from the Missouri River to the Pacific Coast in the best automobile in the time made by the Pony Express, in fact could not greatly better the time of the stage coaches which were making the trip in 21 to 23 days time.

During the territorial period, from 1861 to 1876, there is no evidence that there was any systematic effort made to build roads. Some special appropriations were made but the roads were mainly built by the miners and the stage companies. Old timers do not speak highly of the roads at this period. One could get over them in dry weather if one had a stout wagon and was blessed with good luck and a pair of mules that understood cuss words.

Now comes a period between 1876 and 1886 when many roads had to be built to reach the mining camps and farming sections, which were developing with great rapidity. The railroad building period was also with us so that the state and counties were unable to raise road funds fast enough to keep up with the demand, consequently many toll roads were built, all of which I believe have now become free roads.

In fact, it may be said that the great road building period of the state was during the time between 1876 and 1886. This was the period in which our great path-finder Otto Mears was at his best, indeed it is due to his energy and perseverance that we have many of our present day roads.

Between 1880 and 1902 came what may be called "the permanent bridge-building period," due mainly to the fact that the state was able to supply the counties with a certain yearly road and bridge fund from the Internal Income Fund, which amounted from a few thousands yearly up to \$341,000 in 1889. This fund, appropriated by the Legislature and divided amongst the counties, creating no little scandal and dissension, was involved in politics and soon became known as the "Pork Barrel Fund."

Meantime, along about 1900 the automobile appeared on the scene, and in the fall of 1902, 42 gentlemen who owned automobiles in Denver got together and formed the Colorado Automobile Club with D. W. Brunton, President and F. L. Bartlett, Vice-President, the purposes being to start a campaign for better roads; later, clubs were formed at Colorado Springs and other cities and worked together jointly with the Colorado Club and good roads meetings began to be held.

Early in 1905, as President of the Colorado Auto Club, I received a communication from Col. W. H. Moore of St. Louis,

under the high sounding title of President of the National Good Roads Association, offering for the sum of \$750 to come to Colorado and assist us in holding a State Good Roads meeting, bringing speakers, organizers, etc.

I took up the matter with the Denver Chamber of Commerce and with their assistance the money was raised, and Governor Jesse F. McDonald issued the call for a State Convention to be held at Denver July 27th-28th, 1905. Each city and county was asked to send accredited delegates. Only 65 delegates were present, but there was a goodly attendance of local people and many good speakers, and the convention was a pronounced success.

It was at this meeting that the Colorado Good Roads Association was formed, with J. A. Hayes of Colorado Springs, as President, and F. L. Bartlett of Denver, Vice-President, Henry R. Wray, Colorado Springs, Secretary. County vice-presidents were elected and committees were appointed and arrangements made at this convention to call another one shortly, and formulate much needed road legislation.

Accordingly the next convention was set for December 4-5-6, 1906, at the Chamber of Commerce in Denver. The late Thomas F. Walsh took active part in this and contributed \$500 towards the expenses, while the Chamber of Commerce shouldered the balance of the expense, amounting to a total of over \$1,500.

William R. Rathvon of Boulder was elected Chairman. Many notable good roads speakers were present, amongst them was the late Sam Houston, Road Commissioner of Ohio. The meeting opened and proceeded with great enthusiasm. Among those who took active parts were our former Governor Ammons and Highway Commissioner Ehrhart.

The bill for a State Highway Commission was drawn up and adopted by the convention and committees were appointed to get it through the legislature, headed by S. A. Osborn of Denver. A strong fight was made in the legislature, but the "Pork Barrel" contingent was too strong, and the bill failed even to be considered on the floors of either the House or Senate.

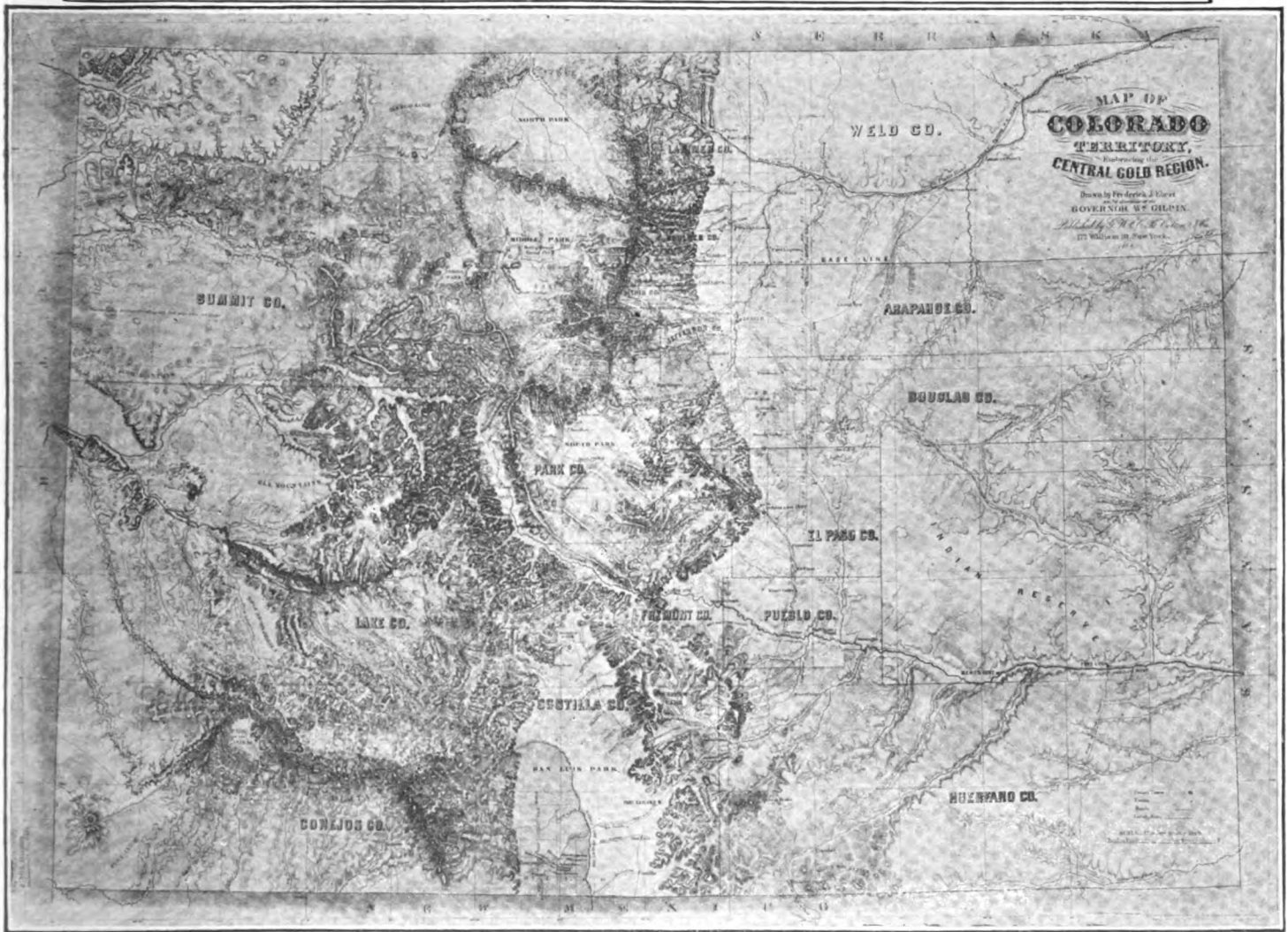
Not discouraged, the Good Roads Association immediately lined up for a campaign of education all over the state. They were ably seconded by the Rocky Mountain Highway Association formed early in the Spring of 1908, incorporated by Charles A. Johnson, Harold Kountze and Gerald Hughes of Denver, with C. A. Johnson as President, F. L. Bartlett, Vice-President and W. H. Emmons, Secretary.

In order to gain strength for the legislative fight, the Colorado Good Roads Association and the Colorado Auto Club, with all its affiliated clubs, were in the fall of 1908 consolidated into the Rocky Mountain Highway Association, and the Highway Bill was finally pushed through and became a law in 1909, but with no adequate appropriation for effective work. C. F. Allen, William M. Wiley and Thomas Tully were appointed State Highway Commissioners. During 1909-1910 State Roads were mapped and laid out and considerable preliminary work was accomplished, but no funds were available for anything more than a beginning of the work.

In January, 1911, under the auspices of the Rocky Mountain Highway Association and the Denver Chamber of Commerce another good roads conference was called in Denver for the purpose of making another attempt to secure funds for the Highway Commission. Charles A. Johnson was made Chairman (afterwards made President), and W. H. Emmons Secretary.

(To be concluded next month.)

Original Counties and Highways of Colorado,—Map Published in 1866



D. C. D. Delegates Vote Money for Road Publicity

DELEGATES to the second annual convention of the Dallas-Canadian-Denver highway association, put the climax on a stirring meeting held at Lamar, July 17 and 18, when they voted to subscribe \$5,000 to maintenance work along the right of way, and decided to employ a general secretary and manager whose business it will be to travel along the highway, keep in touch with all of the organizations of the association, and advertise the route in every possible way.

The meeting was one of the best of its kind which has been held in the state. There were present 167 registered delegates and only bad weather at the last moment checked a large number of southern delegates who had set out for the meeting but who were delayed by the rains.

All of the Colorado towns along the route were represented as well as various other road associations.

D. J. Young of Canadian, Texas, was elected president; W. A. Palmer of the same city was again made secretary,

while O. T. Nicholson, of Shamrock, Texas, remains as treasurer.

The convention occupied two day's time. The formal address opening the meeting was made by President Young and the invocation given by Rev. J. W. Boyd, of Lamar. The Hon. Granby Hillyer made the address of welcome for the state while Mayor C. Ray Strain of Lamar, did the honors for the city.

C. H. Wooden spoke for the Young Men's Business association and responses were made by Hon. N. P. Willis of Canadian, Texas, Thomas McLain, of Lawton, Texas and Hon. W. C. Washburn of Elkhart, Kansas.

At the afternoon session Col. A. Sugg of the Oklahoma State Highway commission spoke on the need of good roads and was followed by Hon. C. A. Middaugh of Elkhart, Kansas, who spoke on "Good Roads Everywhere."

The activities of the state of Oklahoma in the way of road building were outlined by Senator J. Elmer Thomas

(Continued on page 20.)

Highway News and Notes on Work in Field

THE Cripple Creek Short line and the Colorado Midland from Divide thru to Newcastle are to be junked and the road beds turned over to the State Highway commission for highways, according to reports published during the past month in Denver Newspapers.

The commission has received no direct word of the action and attempts to reach Mr. Carleton, chief stockholder in the two systems failed because of his absence in the East.

Court action permitting the dissolution of the systems was obtained from District Judge Sheafor in Colorado Springs following the action of the U. S. government in turning back the two railroads to their owners and lesser stockholders have stated positively that the roads will be junked.

Meanwhile the Public Utilities commission is investigating the situation and it is reported that Senator Shafroth has lodged a protest against the dissolution with U. S. officials in the East.

In the event that the road beds are turned over to the commission, the Cripple Creek Short line can be made into one of the greatest highways in the world, traversing as it does a section remarkable for its scenic attractions and thrills.

In the case of the Midland, use of the roadbed could be made from Lake George to Hartsel and from Granite to Malta at least. In the later instance the road would supplant plans now approved for a Federal Aid Project out of Granite and the money so saved used in widening the railroad bed and making it fit for automobile travel.

The numerous high bridges on the Midland make general use of the railroad right of way impractical for highway purposes.

The commission is holding up advertising of the Granite project pending some definite information from the railroad and other officials interested.

Superintendent Mueller who has been appointed to take charge of the construction of the Durango-Silverton road by the U. S. Office of Public Roads, is on the ground and has established his construction camps at both ends of the work. Senior Highway engineer A. E. Palen of the Office of Public Roads is engineer in charge.

The plan calls for the use of 150 men at each end and Navajo Indians will be used. Some twenty teams have been contracted for use in grading and clearing.

Highway officials are hopeful that the work will now be pushed thru to its completion.

Construction work is well under way on the Sedalia-Decker Springs forestry project. Crews are working from both ends of the job and it is thought that work will be completed this season.

At least twenty-five bridges were swept out by the high water which prevailed in all of the creeks and streams thru the front range last month. Pitkin county alone reported the loss of thirteen bridges, while Chaffee county was a heavy sufferer from the Upper Arkansas and Lake Creek. Gunnison lost a bridge on the main highway while one side of the road up the eastern slope of Independence pass was converted into a water bed. The Big Thompson canon was badly washed by cloudbursts and there were other sections all over the state which suffered.

Completion of the concrete highway from Denver to Golden was prevented last month by a difference of opinion which arose between the highway department and the Denver Tramway company over the course taken by the road. The highway follows the old city survey in a straight line crossing the inter-urban tracks out of Golden. The Tramway officials held that

an S should be placed in the road to force automobilists to slow down. The department contended that kinks in the road would simply intensify the danger since cars would still have to cross the tracks after making the narrow turns which are generally recognized as very dangerous. Inasmuch as the highway will be one of the most heavily traveled in the West, the department further contended that westbound tramway cars should come to a stop and that signals should be placed, thus reducing danger to a minimum.

An informal hearing was held before the Public Utilities commission at which their engineer favored the tramway plan. The highway department and the Jefferson county commissioners both opposed it and the outcome was that the highway department decided to gravel the crossing and leave it for the present. The change will not be made by the department unless an order is issued by the Utilities commission. This has not been forthcoming as yet.

Ten miles of the Cherry Creek route have been thoroly graded and brought to standard by the state outfit working under Chief Inspector Whitmore. The stretch covered runs from the Russell ranch to the Greenland junction and the road is now recommended for travel from Denver to Irvine. The same outfit has also been working on the stretch from Cherry Creek junction toward Elizabeth for a distance of about 3½ miles, which places this highway also in the best of condition.

Reports received from all sections of the state give evidence that the travel is again very heavy this year despite unfavorable conditions. Numerous cars from the western points while those from the south will be found in the byways as well as on the highways. Road conditions generally are good and travelers say that Colorado's system today is far superior to those in any of the plains' states.

The north and south highway north of Denver continues to occupy much of the time of the department. The rough spots in the road have now been leveled and a second treatment of Tarvia has been put in. North of the Tarvia stretch on into Broomfield the Adams county commissioners and the state department have graveled the highway and a decided improvement will be noted in this sector of the road.

D. C. D. HIGHWAY TO BE ADVERTISED.

(Continued from Page 19.)

of Medicine Park, Oklahoma, and the meeting then adjourned for a drive thru the irrigation and dairy districts adjacent to Lamar. In the evening the delegates were the guests of the Young Men's association at a big entertainment.

A band concert opened the second day's program following which an address was made by Warden Thomas Tynan of the State Prison. The Hon. R. B. Morford brought a message from Oklahoma to the delegates.

The final meeting was devoted to the election of officers, the hearing of committee reports and recommendations and to discussion of plans for the future of the association.

At the conclusion of the meeting a large number of the delegates set out for Denver and for mountain points, most of them having made their vacation arrangements coincide with the time of the meeting of the association.

The Blue Lodge of Colorado Road Builders

IN the summer of 1867 Otto Mears set out for Saguache with a load of wheat for the grist mill on Chalk Creek, in Lake county. He made his way to the head of Poncha Pass and there found he could go no farther.

He had no picks or other road tools but he was determined to get thru, so he set up a camp and started out to build a road with axes and shovels.

While he was roughing out a trail from the banks, Governor Gilpin happened along on horseback. Seeing what Mears was doing, he pulled up and listened to Mears make what was probably one of the first criticisms of roads in Colorado or rather the lack of them.

When Mears had finished the governor asked him why he didn't take out a charter for toll roads and set about building highways himself. Upon hearing that toll road charters were Greek or its equivalent to the road builder, the executive explained that it would cost \$5 and that with that charter Mears could set out and build all the roads he wanted to, charging traffic for the use of them.

The proposition sounded good and from that conversation eventually came forth 383 miles of toll road built thru-out the mountain country by Mr. Mears and used today in a large measure as the basis for continental highways thru the state.

Probably no other man has played as large a part in the development of Colorado's highways as has Mr. Mears. Born in Courland, Russia, 79 years ago he came here in 1865 when there were no highways, just trails, in the state.

The part he has played in road work may be summarized by a list of the highways he has constructed.

Seven miles of road along Poncha Pass toward Salida.

The highway from Saguache to Silverton which runs via Cochetopa Pass to Beaver Pass down to the Hot Springs at White Earth on to Lake Fork and Gunnison, thence to Lake City and to Animas Forks via Burris Park, whence it drops down to Silverton.

The road from Lake Fork to Montrose built in 1877.

The road from Ouray to Red Mountain, thence to Silverton and Animas Forks built in 1883.

The road from Ridgway to Telluride built about the same time.

Bought the toll road owned by Munn out of Ouray down the canon and made a first class highway out of it.

Bought the road from Animas City to Fort Lewis and made it a first class highway.

Constructed railroad over Marshall Pass and sold it to Denver & Rio Grande.

Constructed all of 180 miles of Rio Grande Southern, the Silverton Northern, and the Silverton and Red Mountain railroads, of which he now owns the last two, together with the Gladstone.

Few men have been more closely identified with the actual building of the state than has Mr. Mears and a full story of his adventures would fill a good sized book. Later The Bulletin hopes to relate some of these but for the present a few of the more important may be summarized.

He carried the first mail into Ouray by sledge and dogs when post-office officials said it couldn't be done.

He was peace commissioner in 1878 and after making a treaty with the Ouray Indians concluded one with the Southern Utes which resulted in the removal of both tribes.

He built the first telegraph line used in Colorado, a wire on iron posts from Ft. Garland to the old cantonment above Montrose in 1879.

He built the head of the famous San Luis irrigating ditch later selling it to the present company for \$36,000.

He put in the first crop of wheat at Saguache and was the first treasurer when that county was created by Governor Cummins.

He is the sole survivor of the group of men who built the state capitol in Denver.

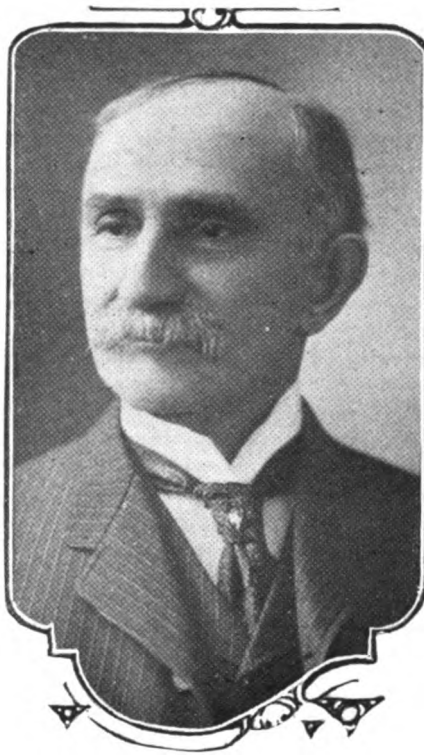
He served three years with the First California regiment in the Civil

War and took part in the famous hike of that regiment from Los Angeles across the desert to El Paso.

And, finally, he is today at 79 as alert and vigorous as most men years his junior. Most of the men he worked with in the early days have passed but he can recall all of them together with dates and stirring episodes of Colorado history without difficulty.

He is the grand past master of the Blue Lodge of Colorado Road Builders and one of the great old pioneers of Colorado. As such his name will go down in the annals of road work in the West.

Master Pathfinder



Otto Mears

Road Work and Road Builders the State Over

RAYMOND S. Waggoner, formerly foreman of the construction department in the state highway department, has been promoted to sergeant in the Evacuation Hospital Corps, No. 16 at Fort Meade, Maryland.

John Maloney, son of Chief Engineer James A. Maloney of the state highway department has been appointed to the naval training school at Annapolis thru competitive examination. Only 100 men out of 2,400 applicants were awarded appointments and Maloney was high in the restricted list. Previous to taking the examination the Colorado boy served 14 months as seaman, part of the time in the submarine service. While doing this he was promoted to quartermaster's mate and now gets his chance to win an officer's commission.

Clifford J. Laube, editor of the Rico Item, drifted into the highway department to report that the people of Dolores are keenly interested in the construction of the Telluride-Dolores highway. Work is going forward now at Burns Cliff and Mr. Laube is hopeful that the link will be open for travel in the fall.

Dr. Davis, of Waunita Springs, has petitioned the commissioner to obtain action on the strip of road from the foot of Monarch pass to the resort. The main highway as approved by the U. S. engineers will run by Sargeant, but the doctor is anxious to have the other road named as a state highway.

County Superintendent W. S. Parrish of Costilla has formulated plans for the improvement of the Spanish Trails highway thru his county. Mr. Parrish has been handicapped by a limited fund but is working toward standard roads thruout his county, in conjunction with the commissioners.

Commissioner August Weiss of Rio Grande has written the commission that road improvement has begun on the Spanish Trail out of Del Norte and work will be pushed thru.

Mr. Fred Catchpole of Pagosa Springs has ordered a complete set of the fine photographs obtained of Wolf Creek pass by The Bulletin, while Mr. Charles E. Hall of the Durango Exchange ordered 1,000 extra copies of the July issue to put into circulation from Durango.

The panoramic photograph of the Gorge taken by Mr. Howe for The Bulletin and published in The Rocky Mountain News and The Pueblo Chieftain has excited widespread attention. Copies have been ordered by Mr. Wadleigh of the Rio Grande and others.

Mr. Logan of the Chaffee County Democrat writes that Buena Vista is preparing to issue 5,000 copies of a pamphlet using the Hard Pan Triangle map and description printed in the June issue of The Bulletin.

Commissioner Philbin of Chaffee county has had his hands full repairing damages caused to bridges by high waters on the Upper Arkansas river.

Commissioner Row of Weld county reports good progress on the bridge over the Platte river. A force of men is employed on the road from Buckingham to the Wyoming line.

James G. Edwards, surveyor for Larimer county has recommended the construction of a concrete bridge over Spring Gulch on the Big Thompson canon route to Estes park and Commissioner Ehrhart ordered work to proceed.

The city of Colorado Springs, El Paso county, the state highway department and the owners of Broadmoor hotel have under consideration a paved highway thru the city to Broadmoor hotel.

Denver is pushing construction on the road to Mt. Evans which will eventually be one of the great scenic trips of the West. E. C. MacMechen of Municipal Facts made the trip recently with a photographer to secure data for future publicity on the highway.

George L. L. Gann of Pueblo was a visitor on his way back to Pueblo from a trip in the hills. Mr. Gann says that work is progressing rapidly on the hard surfacing of the Old Trails association and 1,200 miles are now in concrete.

John P. Dods, vice-president of the Automobile Blue Book, has been in Denver to obtain data on changes and improvements in roads in this state. Mr. Dods says that despite the war, their business shows an increase of 17 per cent. which may be taken as a fair indication of the growth of the automobile travel nationally. He forecasts a new type of road, 30 feet wide, with ways for fast and slow travel and expects to see the national government take a large part in the road building of the not far distant future. Eastern highways he found in bad shape, while Colorado's system met with his endorsement.

Professor Morrison of the chair of highway engineering at the Texas A. & M. college called upon the department recently. He has been making a survey of roads in the western states and while here made the Lookout trip with Commissioner Ehrhart. His verdict was that this is the grandest trip he has taken

and he was most enthusiastic about good roads in Colorado. Texas is expending \$25,000,000 and Prof. Morrison said that in his county alone a \$200,000 bond issue was voted by a heavy majority to build 65 miles of roads, in addition to the levy of 1½ mills.

The annual meeting of the Spanish Trails association will be held in Durango August 5th. The Durango exchange has prepared an elaborate plan of entertainment. Visitors will be taken to Mesa Verde Park and later will be given a trout dinner and a dance, and taken on other outings. A large and enthusiastic attendance is anticipated as the highway is attracting more and more tourists every day.

Mr. Leonard Curtis of the Highway commission has returned from California where he was called by illness in his family.

Tony Monnell of Montrose county reported to the department that washouts along the San Miguel had caused the commissioners much trouble on the Naturita highway. Lack of funds is seriously hampering the county in its maintenance.

James W. McClain

James W. McClain, Otero county commissioner, was instantly killed by a cave-in, June 29th. McClain was supervising the work of a road gang on the Apishapa river when a bank caved in, some ten tons of earth falling on him. McClain came to Colorado when a young man and had been a resident of Manzanola for some 40 years. He was 63 years old and is survived by his widow, a daughter and a son who is now in the army. Mr. McClain first became interested in road work while engaged in the cattle business and he was known throughout the valley as one of the most persistent and faithful of the old guard of good road campaigners. The service loses a valued member in his death.

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.

ARAPAHO

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

ARCHULETA

Fred Catchpole, Pagosa Springs.
John L. Howell, 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.

CONJOS

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. Altvater, 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. Hodgins, 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, Selbert.

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.

MONTEFUMA

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, Holyoke.
Lyman Foster, Holyoke.

PITKIN

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

ROUTT

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

SAGUACHE

Geo. Woodward, Saguache.
A. V. Shipper, 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

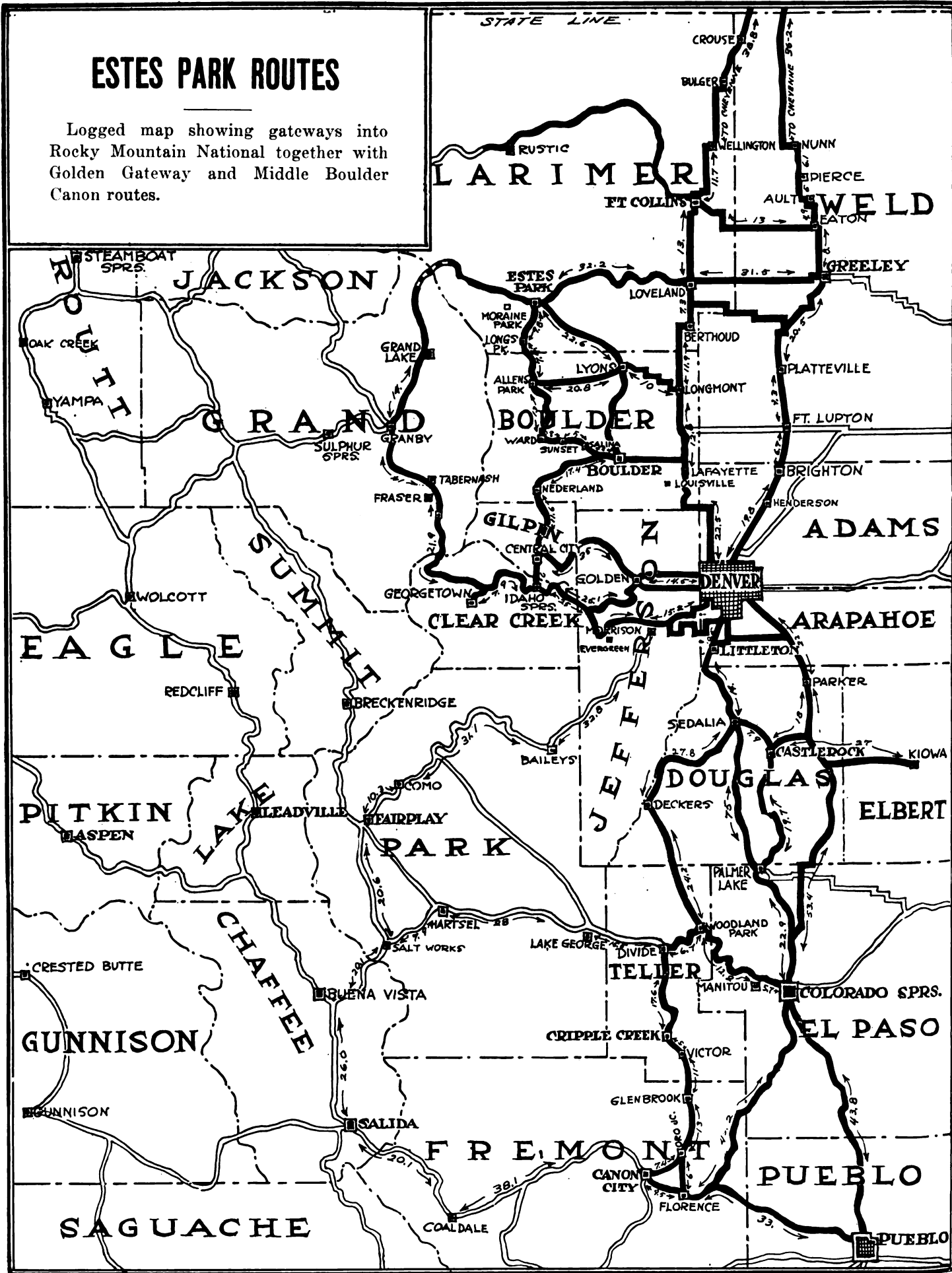
W. C. Lewis, Greeley.
T. Elmer Rowe, Greeley.
J. W. Birkle, Platteville.

YUMA

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

ESTES PARK ROUTES

Logged map showing gateways into Rocky Mountain National together with Golden Gateway and Middle Boulder Canon routes.



GIFT
FEB 26 1919

Colorado Highways

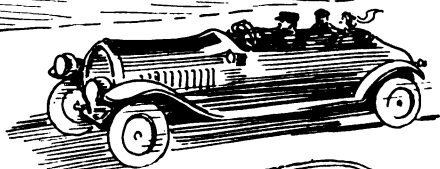
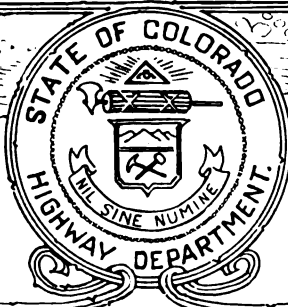
BULLETIN

Issued by the State Highway Department



One of Nature's Masterpieces Framed by a Tunnel's Wall, on the Cache la Poudre Highway Out of Fort Collins in Larimer County. The Road Plunges Straight Thru the Heart of a Granite Cliff at this Point.

September, 1918



Roads Necessary to State's Development

By Charles H. Leckenby, Auditor of State of Colorado

THE progressive spirit of Colorado has never been exemplified in a more striking and effective way than in its determination some half dozen years ago to place its road building upon a scientific basis. Since then rapid and substantial progress has been made and the system and policy so thoroughly established that it assures a continued advance until the highways of the state will be noted throughout the land.

This guarantees to those who want to settle in Colorado, be they farmers, miners or manufacturers, a more economical and speedy distribution of their products. It promises easy and pleasant access to the beautiful scenic attractions of the state.

The world is in a state of transition and changes come rapidly. It is difficult to realize that only a few years ago the \$100,000 annual road fund derived from the sale and rental of state lands was at the mercy of political "log rolling." It was "pork barrel" methods in its worst form and led to many scandals. A legislator was gauged by the number of road and bridge bills he could get through the legislature and the contracts often went to political favorites who were more interested in getting their hands on the money than in providing the state with a good highway.

With the establishment of the Colorado Highway commission with a limited authority over the distribution and expenditure as between counties of the Internal Improvement Fund, real progress was made, and the people showed their confidence in the new system by largely increasing the amount of money available for highways. A half-mill road levy was adopted by the people by an overwhelming majority. This year the levy will bring in \$650,000. The internal improvement fund will add \$100,000 more, while the motor vehicle tax, in 1917 amounting to \$134,982 and very considerably increased this year, will bring the aggregate of state road funds well along toward the \$900,000 mark. With Colorado's rapid increase in population and wealth it will not be long until the million mark will be reached annually. The United States government also is assisting very materially in the work, while the counties are required in a majority of instances to put up dollar for dollar, which brings the total which Colorado is expending for good roads into a class with the most advanced states in the Union.

While it is not to be expected that Colorado, little more than forty years old, should have a road system that will compare with the nations of the old world, or of the old settled states of this country, yet this state is rapidly developing such a system. Its highway department has mapped out a comprehensive system and keeps steadily and consistently to roadways leading to points of greatest attraction and importance. It is building over passes,

blasting roadways from solid granite walls, seeking out the paths of beauty over the mountain tops.

Switzerland, with one-sixth the area of Colorado, has 9,000 miles of road that is highly improved, and every mile is of great commercial value by reason of the tourists. The Swiss government expends \$1,500,000 a year on the repair and maintenance of the highway system. It is estimated that Switzerland in peace times derives an annual income of \$15,000,000 from tourist travel.

Colorado has forty-one mountain peaks above 14,000 feet; Switzerland has eight. Colorado has 125 peaks above 10,000 feet; Switzerland less than one-fifth that number.

The one point in which the older country excels is in good highways and, as stated, this handicap is being lessened rapidly. In the last few years Colorado has more than doubled its mileage of state roads to scenic points, so that hundreds of miles of panoramic views unfold before the ever-wondering eyes of the automobilist as he twists about through forests and valleys, makes turns about wild granite crags and reads, as from a book, the story of silver peaks, rugged canons, sheer cliffs and gorges thousands of feet deep. Colorado's roads now offer pleasant rides through jeweled orchards, along lazy rivers, or skyline drives over the tops of the mountains with hundred-mile vistas of the Rockies and the plains on every side.

We want to lure people to Colorado by the beauty of our scenery and the magnificence of our highways for we believe a large percentage of them will join their fortunes with the Centennial state and become permanent residents.

The remarkable character of the soil, the unexcelled climatic conditions, the proximity to the great Rocky Mountain chain, the marvelous diversity of resources, the lure of grassy parks and sparkling streams, the character of the people, the wide-spread and unique movement for the upbuilding of a great and magnificent empire—these are the outstanding things that make up Colorado. Progress—splendid and enduring progress—permeates the very air we breathe, and even though one might be blind and deaf he could feel the promise, the optimism, that is characteristic of Colorado.

A mighty, irresistible movement is under way for the development of this state. We who live in Colorado believe it is the best part of the world. We believe its future is so brilliant, so evident, so fascinating, that soon it will be the center of the greatest industrial activity in the West. Her snow-clad mountains, her verdure, her rivers and her smiling valleys with untold wealth, all inspire an affection that will keep the tourist as a permanent resident when once he is induced to come. And the lure that will bring him quickest and in greatest numbers are the splendid highways that are beginning to ribbon mountain and plain and valley in every portion of the state.

“East Is East and West Is West” But the Twain Meet On Berthoud Pass



View Taken On Summit of Pass, 11,300 Feet Above Sea Level, Clear Creek County, August 5th, 1918.

Good Roads Men Urge Increase In Highway Funds

EMERGENCY legislation which will serve to relieve the present financial stringency in highway work coupled with the initial steps looking forward to a vast system of road development in Colorado, will be asked of the legislature this fall by the Colorado State Good Roads association. Three major changes will be requested in highway statutes as follows:

1. An increase in the automobile tax which will bring this charge up to an average with that now levied by the other states of the Union.
2. Transference of the inheritance tax from the general to the state highway fund.
3. Passage of an enabling act which will pave the way for a vote by the people of the state upon a highway bond issue either two or four years hence.

In addition changes in traffic rules and regulations which will permit regulation of the weight of loads carried by motor trucks, the speed of travel and the width of tire used, will be asked in order that the rapid deterioration of the present roads of the state, may be checked to some extent.

The program was decided upon at a meeting of the executive committee of the Good Roads association and of the legislative committee of the State association of County Commissioners held in Denver last month.

It was pointed out by President Charles R. McLain in his introductory speech that \$500,000 damage has been caused by abnormal water fall in the state this year, the amount exceeding the funds on hand in the state department by close to \$450,000.

It was further stated that of the \$850,000 now appropriated to the state highway department, \$400,000 must be set aside annually to meet the dollar for dollar aid given the state on post roads by the U. S. government. The fund is further cut in half by the increase in cost of labor and of material and this in turn cut into by the decrease in efficiency of such labor as it is possible to secure.

The entire state fund under the most favorable conditions only amount to \$80 per mile for maintenance, improvement and construction, whereas the lowest maintenance costs now reach more than \$100 per mile.

In the meantime a large program of actual construction together with imperative need of improvement, awaits funds in all sections of the state.

In view of the war conditions it was thought unwise to ask for an increase in the levy but the changes asked will net the department approximately \$350,000, or almost enough to take care of Federal aid projects all over the state, leaving free most of the present fund for work on main arteries of travel and construction.

Commercial associations thruout the state, the newspapers the highways transport committee of the State Council of Defense, automobile clubs and similar bodies will be asked to co-operate in the preliminary campaign.

It was the keynote of the meeting that the increase should be asked as a wartime necessity since it is imperative that roads be kept open for motor truck travel in order that foodstuffs and other essentials may be transported rapidly and efficiently.

Keeping the Highways Open In War Times

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

IN these times it is extremely important that the highways be properly maintained, in order that the products of the farms may be hauled to the railroads, and also to have the roads always ready to transport troops, guns and munitions over them.

How to keep our roadways, bridges and culverts in a good, travelable condition, at a reasonable cost per mile, is one of the important problems connected with highway work.

Methods of construction affect the maintenance. Temporary types of culverts and bridges are very expensive to maintain, and it is economy to build such structures of the more permanent types, when possible, even if the roadway is not to be surfaced.

Maintenance means the keeping of the road in the condition in which it was when construction was completed, involving such repairs and resurfacing as are necessary for that purpose.

Under ordinary conditions we have depended for the maintenance of our roads upon hiring for a few days such men and teams as were required to make the necessary repairs; and for dragging and grader work, we have depended upon contracts with residents mainly along the road. At any time, both of these methods are open to very serious objections; and at this time particularly we are not able to rely upon them.

In this state the immediate supervision of the work is by the Board of County Commissioners, and the State co-operates with the county in the maintenance of the State Roads and Highways. The State also takes up the maintenance of State Roads when the county is unable or neglects to do the work.

In the last two years it has been impossible to secure such men and teams at the time they were needed for special work and for general construction work it has become increasingly difficult to get the labor needed.

In the dragging the situation was not satisfactory, as the residents had so much work of their own to do that they neglected the road work.

To remedy this condition, a great many of the counties have provided themselves with tractors which will pull the graders, and drag or plow and wagon, and with a crew of two or three men do the necessary work. Some counties have in addition purchased five-ton trucks for hauling material and doing light dragging.

In fact the tendency is to put in a machine wherever it seems practicable to do so, to take the place of teams and labor.

The State has undertaken the maintenance of some of the roads in the vicinity of Denver in the counties of Adams, Arapahoe, Jefferson and Douglas, and is using the following equipment:

One Caterpillar gas tractor of 40 horsepower, drawbar capacity, weight 28,000 pounds, costing \$6,000.00; one grader with scarifier and blade attachment, costing \$800.00; and two light drags; two trucks, 5-ton capacity, costing \$6,000.00 each; sand elevator, screen and loader, costing \$1,500.00.

In operating this outfit, the tractor, grader and one drag are generally used together and can be operated by two men. If the work is simply dragging, or smoothing with the grader, a distance of twenty miles might be covered, that is if one round trip is made they would cover ten miles of road; if two round trips were necessary, then five miles of road would be covered. This might be taken as an average in all kinds of materials for the dragging, say five miles of road per day.

In many places it is necessary to scarify the surface in order to reshape it and remove the chuck holes and waves. On work of this latter class the tractor and grader is used very successfully, except on macadam or very solid gravel roads,

where it is found that the scarifier is too light and it is necessary to use the heavy-toothed scarifier. On scarifying and reshaping it has been found that about one-half mile per day would be an average day's work.

We have taken \$50.00 per day as the cost of the operation of this particular outfit. Our figures are obtained as follows: Caterpillar Tractor, expense per day:

Gas and oil	\$17.00	
Maintenance	9.50	
Operator	5.00	
*Depreciation	8.50	
		\$40.00

*Note: Depreciation is based upon the assumption of a life of 4 years for the engine and 180 working days in each year.

Grader and Scarifier—Expense per day:

Maintenance	\$3.00	
Labor	4.50	
*Depreciation	2.50	
		\$10.00
Total		\$50.00

*Based on 180 working days per year.

Our experience with this tractor so far this season confirms the figures given above.

Some unsatisfactory features should be noted: The tractor is very heavy and an unsafe load on many of the old bridges. It is unwieldy, requiring a cross road intersection or a full width road for turning. The lighter size tractor of 25 horsepower at the drawbar is free from these objections, and will do most of the work that can be done with the larger size.

The two trucks and screening and loading plant have been used in resurfacing some pieces of road with sand and gravel, and the trucks have used the drags occasionally. The use of the trucks on anything but the lighter forms of drags has not been entirely satisfactory, so we are employing them largely on hauling and spreading materials for repairs of surfacing. The trucks are both of the dumping and spreading type and are working satisfactorily.

In charging up the work to the various roads the following has been adopted:

Cost of Truck, \$6,000.00.	
Expense for the year:	
Operator, 10 months, at \$100	\$1,000.00
Maintenance, oil and gas	2,000.00
Depreciation, 25 per cent of cost ...	1,500.00
Overhead and incidental	900.00

Total

For 180 working days this equals \$30.00 per day, charge the road upon which the truck is operating \$30.00 per day.

Screen and Loader—Cost, \$1,500.00.

Operator, 180 days, \$3.50	\$ 630.00
Gas and oil, 180 days, \$1.50	270.00
Repairs and Maintenance	450.00
Depreciation, 20 per cent of cost	300.00
Overhead, labor, teams and incidentals.	2,850.00

Total

For 180 working days this equals \$25.00 per day, and this rate is to be charged to the road upon which the work is being done.

Some of the 600 Delegates Who Enjoyed the Spanish Trail Trout Feast



Spanish Trail--Mesa Verde Holds Great Convention

THE Spanish Trail highway association convention, which was held in Durango, Colorado, on August 5, 6, 7, 1918, was one of the largest good roads meetings ever held in Colorado, and probably more enthusiasm was manifested than at any previous good roads meet ever held in the State. It was attended by delegates from nearly every community of southern Colorado, and northwestern New Mexico, on a line from Pueblo to Gallup, and demonstrated beyond any doubt that two of the leading sections of Colorado—the San Juan basin and the San Luis Valley—were unmistakably committed to a program of aggressive, permanent road construction. The towns of Monte Vista and Del Norte sent over more than 150 enthusiasts, while numerous other communities were well represented.

The convention opened in Durango's new auditorium at 1:30 in the afternoon, and the program took up the entire time until nearly six o'clock. Over 600 people listened to the full program, which consisted of excellent addresses and a number of very fine musical selections, both vocal and instrumental. Mayor Harry Jackson happily tendered the keys of the city to the visitors, and introduced Hon. L. B. Sylvester, of Monte Vista, the association president, who briefly stated the purposes of the meeting and interestingly talked on good roads, and their necessity in upbuilding this wonderful southwestern Colorado country.

A number of recommendations were presented by the committee on resolutions, all of which were unanimously acted upon by the delegates present. The first of importance was one recommending the changing of the name of the Spanish Trails association, to the Spanish Trail-Mesa Verde Highway association. The addition of the words "Mesa Verde" immediately places the location of the Spanish Trail-Mesa Verde route in the mind of the stranger, and the convention no doubt acted wisely in making the change.

Another resolution embodied the request that the State highway commission expend the sum of \$50,000 on the Spanish Trail-Mesa Verde route, declaring that the major portion should be expended on the Wolf Creek pass portion of this highway. It seemed to be the unanimous opinion of all delegates that the Spanish Trail-Mesa Verde route was destined to become one of the most heavily traveled highways in the country and that it should receive every financial assistance possible until it was made a perfect highway. It is generally regarded as one of

the very important assets of southwestern Colorado, for it has opened to auto traffic an immense area with an aggregate acreage in excess of 20,000,000 acres, permitting the tourist to get into the very heart of some of the most attractive scenery in the Rocky mountain region. The convention further favorably acted upon a resolution, providing for the employment of Federal prisoners on the roads of Colorado and other States. It was stated that more than 14,000 prisoners were in the Leavenworth penitentiary alone, 80 per cent. of whom could be used in profitable road construction in various sections of the country.

Probably the most important business transacted by the convention was the acceptance of a proposition made by the National Old Trails Road Association to this association, wherein the former offered to place upon its maps and in its road guide, the route of the Spanish Trail-Mesa Verde highway, and to declare it the summer route for all transcontinental automobile traffic between New York and Los Angeles along their national line. The Old Trail route touches the Spanish Trail-Mesa Verde route at Pueblo, where the latter begins, and instead of passing down thru New Mexico, would traverse the La Veta Pass, the San Luis valley, Wolf Creek Pass and the San Juan basin, again touching its former line at Gallup, New Mexico.

Life memberships in the Old Trails were offered at \$5.00 each, and since the date of the convention in Durango, the membership campaign has been vigorously pushed, and 1,000 members will be secured during the present month. Thru this action, the Spanish Trail-Mesa Verde route will have as additional backing, the influence of one of the strongest good roads associations in the United States, and it is expected that the time is not far distant when the entire route will be hard surfaced, and become a part of a great transcontinental route, leading from New York to Los Angeles.

The election of officers for the ensuing year resulted in the re-election of President Sylvester, while the Secretaryship went to L. A. Ruark, of Del Norte. An aggressive administration is sure to result from these selections.

Not the least attraction of the big meeting was a free fish dinner given the visitors at beautiful Brookside Park in Durango. Six hundred plates were piled high with good things to eat, and six hundred people thoroly enjoyed an excellent meal, while the Monte Vista and Durango bands rendered blood-tingling

(Continued on Page 22.)

Highway Maintenance and Repair Problems

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

PERHAPS the biggest road problem which the Counties, the State and the Forest Service is facing in the mountain sections of Colorado today is this: "How shall we keep up our existing roads under increased traffic conditions, during the period that adequate highways are being constructed?"

With increased traffic, high mileage and increased cost of labor and materials and insufficient funds, all highway agencies of the State are finding it increasingly difficult to finance new construction work of standard character because the greater portion of available funds are being expended in the maintenance and repair of our existing roads. Our highways must be reconstructed and improved to meet modern traffic conditions, but since travel cannot wait, it is necessary first of all that present needs be satisfied.

What is the answer? Two remedies suggest themselves: First, increased appropriations. These will come in time, there is no doubt of that, but our problem is immediate. The second and only available remedy is increased efficiency. The writer wishes in this article to describe briefly the effort being made this year in cooperation with the Board of County Commissioners of Park county to demonstrate the economy of the light tractor, grader and wagon outfit in the maintenance and repair of roads under average mountain conditions.

The large tractor and heavy grader outfits being used so successfully on plains maintenance and construction work for many reasons do not lend themselves readily to average mountain conditions. After considerable study of the special conditions under which the outfit would be used, a Wallace Cub, Jr. tractor and a Russell Junior grader, with offset engine hitch, were purchased. This outfit is light, can turn in a small radius, and yet possesses sufficient power and strength for the purpose. It has been clearly shown that one of the largest leaks incident to the periodic system of road maintenance and repair is the cost of going to and from the job. To obviate this a trail wagon was added to the outfit, thus enabling the crew to carry their camp equipment with them and to camp at points most convenient to the work. The wagon is stoutly constructed and is also used to advantage in transporting materials needed on the work, such as rock, culverts, lumber and the like.

The outfit left Denver May 10, and since that time has been in the field continuously. Our original plan for the season contemplated the maintenance and repair of about 150 miles of road, with the idea of covering it thoroughly three times during the travel season. Later, on account of some much needed construction and repair work in the vicinity of Lake George, it was decided to cover this mileage only twice.

It is still too early to forecast accurately the costs

for the season's work. These will be tabulated at the close of the season and if practicable published in the Bulletin. Data are being accumulated which will show clearly the work accomplished as well as a fairly detailed analysis of costs.

Operations up to the end of July indicate a season's cost of about \$15 per season mile. Considering that a large percentage of the mileage is on roads not of standard construction, and therefore with excessive grades, poor alignment and inadequate drainage, also that there has been an exceptionally heavy rainfall this season resulting in bad washouts, and several lost bridges causing delays to the crew, the cost so far is encouraging.

Each mile of road is covered from three to six times depending on conditions. In addition to smoothing the road and bringing it to its proper section, considerable work has been done in assisting in placing culverts and repairing bridges. Ditches are also cleaned and all roads where side drainage has been installed, and considerable hand work has been done at times in repairing washed shoulders and removing rocks from the road.

During the greater portion of time, two men have been employed on the crew, one for the tractor and one for the grader. Three men, however, also make a very economical crew, since a certain amount of hand work is necessary and the additional man enables the tractor to proceed with fewer interruptions. The choice between the two and three man crew depends on local conditions. While work done has greatly improved the standard of a considerable portion of the mileage covered, and has kept it in a reasonably good condition, it is realized that one outfit of this kind cannot properly maintain 150 miles of highway, subject to heavy travel.

The roads covered this season, notwithstanding this season's heavy rains, are, generally speaking, better than in former years, but on the heavier traveled sections, however, additional maintenance work has been done by Park county.

In general it is believed that an outfit of this kind with three men can properly maintain from 50 to 75 miles of standard double-tracked earth road in good material under reasonably heavy traveled conditions at a cost of from \$25 to \$40 per season mile, allowance for depreciation of equipment being included.

As above mentioned, in addition to the maintenance and repair work, the outfit has been tried out to a certain extent on construction work, at the request of Park county. About 11½ miles of State highway was constructed. This work was done in accordance with the relocation made by Park county. Culverts were installed by the County, the tractor being used for grading. The road is 24 feet wide, ditch to ditch, and includes one 6-ft. fill, about 75 ft. long, one 4-ft. fill of the same length and



one 4-ft. fill about 40 feet long. The work was completed in nine effective crew days.

Since a yardage estimate is not available nor exact expenditures yet determined, no unit cost can be stated. The cost of the job, however, was less than \$200. After the completion of this short stretch of road, the tractor was employed on the reconstruction and repair of the road northward from Florissant toward West Creek, where it is now working.

The conclusions drawn from approximately 3 months use of the tractor outfit are as follows:

- (1) That a light outfit is needed for mountain work.
- (2) That such an outfit is adapted not only to the maintenance of constructed roads, but is exceptionally efficient in general repair work on average mountain roads not of standard construction.
- (3) That it is more economical than horse drawn equipment.
- (4) That whenever necessary, it can be used for grading, grubbing, hauling material, and filling wheel scrapers on construction work.

The writer believes that the use of light tractors and graders of standard manufacture on the maintenance and repair of mountain roads will not only greatly decrease the cost of the work, but will give us better results than we have been securing in the past with less efficient methods and equipment. If this is true, is it not then the answer to the maintenance and repair question? Increased appropriations may assist later, but in meeting the problem of immediate traffic needs the methods briefly described are believed to be worth considering.

1. Surface and Soil Conditions Where Crew Has Started Work, Park County. 2. Camp of Crew, Pike N. F. 3. A Stretch of Road, Shoshone N. F., Wyoming. 4. A Type of Region in Which Tractor Crew Started Work May 16. 5. Tractor Pulling Trees from Right of Way. 6. Road Maintenance Crew Equipped With Tractor Instead of Team.—Photos by Smith Riley, U. S. Forest Service.

Texans Support Interstate Military Highway

By T. W. Ross, of the Colorado to Gulf Highway Association

THE organization of a "military division," extending from Waco, Tex., south through Austin, San Antonio, Corpus Christi and Brownsville, and connecting many of the important cantonments, aviation fields and other military establishments of the United States army in Texas, which was accomplished at the recent annual meeting of the Colorado to Gulf Highway association, held in Dalhart, Tex., is considered by D. P. Talley of Wichita Falls, the new president of the association, as the first real step taken in the creation of an interstate military highway running from the Canadian border, down along the eastern range of the Rockies south to the Gulf. Active work on the details of this military branch now is being done by committees of prominent Texas road enthusiasts. This branch, which will bring the various Texas military establishments together on a highway that is to be logged and marked, will be of great benefit to the government, according to Mr. Talley.

Plans for the marking of the entire Colorado-to-the-Gulf road from Denver to Galveston are being made by Mr. Talley, who is spending his vacation in Colorado Springs. The recent convention authorized this work and painting crews will be on the highway this fall to complete the job.

A new log, covering all divisions of the highway, is to be published early in 1919 for the touring season of next year. Traffic over the Colorado to Gulf highway this season has broken all past records, according to towns enroute. The sweltering heat of July and early August has driven hundreds of car owners to Colorado's cool resorts and the Texas and New Mexico license tag is a familiar sight on the streets of Colorado Springs or Denver and on the many fine mountain boulevards in the state.

Further action on the military highway project was taken at a meeting of the Gulf division held in Hillsboro, Tex., during the week of August 25, while the Mountain division will hold a meeting for similar discussion at Trinidad, Colo., in October.

The divisions of the Colorado to the Gulf are as follows:

Gulf division, Galveston to Fort Worth, 355 miles.

Panhandle division, Fort Worth to Texline, 495 miles.

Mountain division, Texline to Denver, 118 miles in New Mexico and 227 miles in Colorado, making a total for the division of 345 miles. The total mileage of the highway is 1,200 miles.

The Mountain division of the Colorado-to-the-Gulf, connecting Colorado's principal cities, leading into the wonderland of scenic attractions, fishing streams and fine mountain boulevards, is, of course, a portion of other highways, such as the Santa Fe trail, the Spanish Trail, the

D. C. D. highway, the Park-to-Park highway, as well as the still proposed Rocky Mountain Military highway.

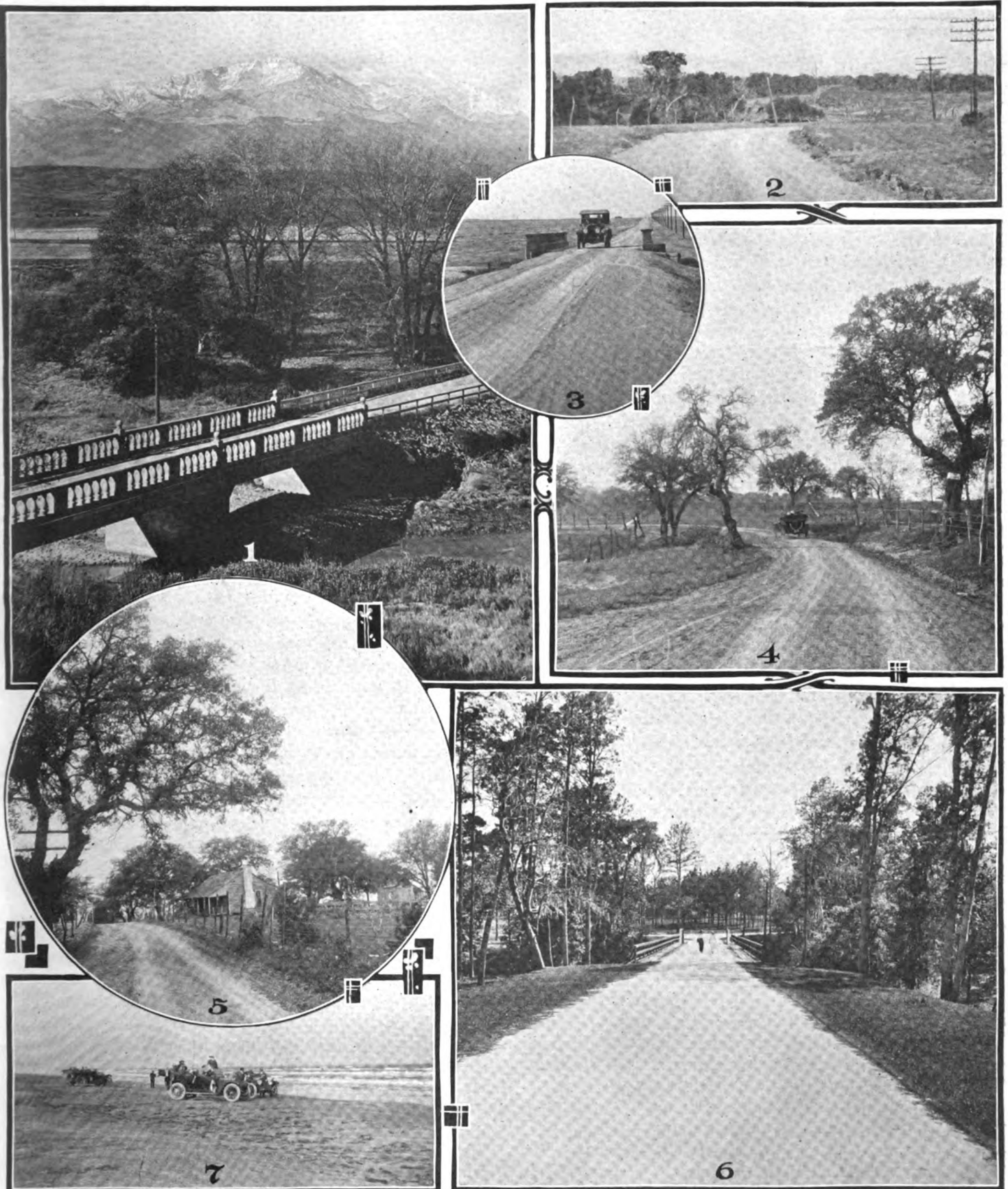
Colorado's road authorities have constantly been improving this tremendously important link within the last six years. At least 75 per cent. of the mileage of 227 miles is graded and graveled, with permanent concrete bridges and culverts and with a surface that permits of comfortable travel in all kinds of weather. Work is now being done on the remaining 20 per cent.

Notable development work has been done in every one of the counties: Las Animas, Huerfano, Pueblo, El Paso, Douglas, Arapahoe and Denver, but probably none has excelled the work done in Pueblo county, where the road extends for miles on a straight stretch and has been called the finest highway in the state. Parts of the highway cross counties of small population and low assessed valuation with little interest in or benefit from through travel. For these sections the state highway commission has made special appropriations, recognizing the necessity of connected, improved highways. The work in progress near Littleton of hard surfacing the road, is the first of its kind undertaken in Colorado and is expected to lead to greater projects of this kind. It is proposed to add hard surface units to the highway from year to year, as rapidly as county, state and federal funds justify. The good condition of this road is attested to by the hundreds of motorists who make trips over it daily and beat train time in many instances.

It is easy to draw a line on a map, name a route and paint poles along the way. The real test comes when the acid of common sense and public opinion is applied. And when that is done the logic of the alignment of the Colorado-to-the-Gulf, as a section of the interstate military route, becomes increasingly apparent. Great systems of transportation are not those that connect communities of like interests and resources but those which make possible the exchange of products and the intermingling of peoples of different climes. Think of a road that connects the metropolis of the vast trans-Mississippi region with some of the world's greatest seaports, stretching like a ribbon from the snow-capped peaks of the Rockies, thru great fruit orchards, past coal mines and steel works, across the wide plains with their great herds of cattle, sheep, and their successful dry farms, thru cotton fields, large oil-producing sections, thru regions that produce richly of wheat and rice and other foodstuffs to the very shores of the Gulf of Mexico.

A highway fit for interstate travel is better fitted for local hauling, motor trucks are replacing railroad transportation and the future demands of war and industry will increase this use. The Colorado-to-the-Gulf is a practical route for military purposes to connect the heart of the west.

From Mountain Breezes to Wind-Swept Coasts of Southern Texas



Scenes on the Colorado-to-Gulf Highway. 1. A View of Pike's Peak Near Colorado Springs, El Paso County. 2. A Portion of the Road Between Colorado Springs and Pueblo. 3. A Twenty-Mile Straightaway North of Pueblo. 4. A Pretty Stretch in Southern Texas. 5. Live Oaks and Farm House Near Amarilla, Texas. 6. One of the Many Beautiful Shell Roads Entering Houston, Texas. 7. At the Gulf.

Finances Chief Topic At Commission Meeting

CONFRONTED by an unparalleled call for assistance from the counties of the state coupled with an almost exhausted contingent fund, the members of the State Highway Commission assembled in quarterly meeting, August 12 and 13, voted to rate all requests for aid in the order of their importance and to make appropriations payable in the order of priority so established, as and when the money becomes available in the contingent fund.

Abnormal water fall in the eastern counties, and an unusually protracted hot spell in the mountain districts early in the summer, have resulted this year in high waters which have caused close to \$500,000 damage on the roads, bridges and culverts of the state highways. The contingent fund for the year is only slightly more than \$50,000 while most of the counties have exhausted their road funds in extra maintenance demands. As a result much of the meeting was devoted to a discussion of the needs of the counties.

Presented in tabloid form, the time of the commission was devoted to the following discussions and resolutions:

A petition from the commissioners of El Paso county in regard to the definite location of State Route No. 76, was adopted.

A resolution that the proposed re-location of the Main North and South highway, approved by commissioner Ehrhart and Engineer Maloney, be made near Husted and that the county commissioners of El Paso be requested to proceed by condemnation proceedings to secure the required right of way (such proceedings to be included in cost of construction and maintenance) was carried.

The petition from Larimer and Boulder counties that the road from Lyons, via the South St. Vrain be declared a State route, was carried.

The North River road between Pueblo and the junction of State Route No. 33 in Crowley county was declared a state route on petition from Pueblo and Crowley counties, subject only to definite location approved by the commissioner and state engineer and the securing of right of way by the counties referred to.

The road from Leadville via Fremont Pass to Dillon in Summit county was declared a State route.

The amount of \$300 was appropriated to Lincoln county for building a bridge over Horse Creek on State Route No. 33 provided the county will appropriate \$200.

A transfer of funds from State Route running thru El Paso county to other state routes within the same district, requested by the El Paso board, was granted.

After a conference with R. E. Pratt, district engineer, U. S. Forest Service, it was resolved that the commissioner should be authorized to execute a co-operative

agreement with the Secretary of Agriculture on behalf of this department for the survey and construction of the Bardine-Redstone project with the understanding that only a section of six miles, needed for hauling farm produce, be constructed at this time.

The board requested definite estimates from the commissioner and engineer on the cost of construction of a bridge just south of Castle Rock to replace the present structure, represented as in bad and unsafe condition by Douglas county commissioners. Definite action will follow these estimates.

The commissioner was instructed to obtain a full report from Kiowa county commissioners on their request for \$6,000 for a bridge on Route No. 33 and to report further on this to the commission.

The sum of \$2,400 was appropriated for maintenance of the convict crew on State Route No. 51 on petition of Larimer county commissioners with the proviso that the county contribute a similar amount.

A request for the transference of funds from certain state roads to others within Las Animas county by the board of commissioners was granted. A request also received from Las Animas for \$4,000 aid on bridges now under way could not be granted at this time because of shortage of funds.

The State routes included in Federal Aid projects No. 2 and No. 7 were approved, as well as resolutions authorizing the commissioner to sign the usual agreements.

The sum of \$2,005.05 was set aside to meet the State's proportionate increase in the final estimate of Project No. 7, the sum to be paid out of revenues of 1919. Similar action was taken on Federal project No. 2.

Upon the statement of District Engineer R. E. Pratt of the U. S. Forest Service, that owing to the difficulty of obtaining men and teams his department would probably have to discontinue work on Monarch pass for the year, it was voted to consent to the postponement and the commissioner was instructed to place funds so released in the contingent fund upon definite notice of stoppage of work by the Forest service.

The commissioner called the attention of the board to the matter of the Sidney bridge in Routt county, which county commissioners desire to have replaced. The commissioner was instructed to get more details about this.

It was voted that publication of The Colorado Highways Bulletin should be continued indefinitely.

Gilpin county commissioners requested \$1,500 aid on State route No. 54 expressing willingness to appropriate \$2,500 on the road from their fund. Placed in priority budget.

Petition from County commissioners of Boulder that State route be declared from connection with State route No. 11 S, up lefthand creek to Jamestown, thence up Jim Creek to Ward, denied.

Where the Big Game Has Its Rendevous

THE day of the hunter of big game has almost passed in the United States. Stories of the big kills with which sportsmen were wont to thrill their hearers in the past are now heard only as echoes from an age of pioneers and in most sections of the country the wild animal is known to the present generation only as a curiosity to be viewed from the vantage point of heavily barred cages.

Yet among the other attractions which Colorado has to offer to the visitor there still remains a big game country and those who know the keen zest of tracking the bear to his lair, of trailing the swiftly moving deer, can testify to the rare sport which may be had in the wilder sections of the northwestern end of the state.

Not a great many years ago the northwestern end of the state was a desert as far as most of the people were concerned. Inaccessible, off of all of the main lines of travel, little was known about it and the stories of big hunts only tended to confirm the opinion that the country was unfitted for anything else.

With the advent of the railroad and a subsequent opening up of the highways that opinion vanished. Fortunes were made in coal in the district, the stock grown there is as fat and fine as any found in the United States, while the crops of hay, barley, vegetables that are raised in this district will astound the traveler who has been accustomed to think of high-altitude, short season lands as devoid of value from an agricultural standpoint.

Northwestern Colorado presents a mighty empire of vast and varied resources and only partially developed as the country is today, it is yet a region of tremendous production of all kinds.

There are three or four different ways in which the country may be reached, but from the standpoint of the traveler, the best is probably the circle which takes the route via Berthoud pass, thru the Middle Park, over Parshall pass, thru the Grand Valley, along the Rabbit Ears pass, which is one of the finest highways in the state, down into the Yampa and so on to Steamboat, Craig and Meeker.

From Denver the highway leads out thru Golden on over the famous Lookout mountain highway, down Floyd Hill with its bends and turns to Idaho Springs, home of the oldest mining camp in the state and today famed for its curative springs and mineral waters.

Beyond Idaho Springs the road takes its way to Empire and thence to Berthoud pass where the first stiff climb into the range begins.

Berthoud pass is one of the most rugged roadways over the mountains in the state, but it is negotiated daily by an ever-growing stream of machines without difficulty. The road climbs at a steady grade thru the heart of the mountains, first plunging into long lanes of pines and spruce, next fringing the edge of a hill as it bends on its

way to the higher altitudes. The summit is reached at 11,306 feet and from this point a striking view of the Continental range may be obtained in all directions, famous old "Jim" and the Arapahoe Peaks appearing in clear relief against the blue of the Colorado sky.

Once in the Middle Park fast time can be made across the flat lands to Frazer and so on to Tabernash, fertile farm lands bordering the way with the smoke of the lumber mills rising in the background.

Beyond Tabernash the highway bends around following the river course to Granby over a road of gumbo. In dry weather the stretch is of the best, in wet successful passage over it requires chains and caution since the bed becomes a slithering, slipping mass of mud which affords little hold for the traction.

At Granby the junction is made with the Grand Lake highway and with the western terminal of the famous Fall River pass road. The diversion is one which is worth the time of every traveler and the trip to Grand Lake today is one of the finest in the state. There may be found the immense blue body of water on which motor boats may be seen speeding along or yachts careening under a heavy sail.

Behind Grand Lake stretch the peaks of the Continental divide and twelve miles into the range begins the actual construction work now under way of the western side of the Fall river pass. Here Contractor McQueary and Engineer Frank Huntington may be found perched high on the mountain sides with crews of road men who have spent the summer months blasting a road from the hill sides. The most difficult part of the work has now been completed and broad turns and a solid road bed on easy grade up the mountain side will make this highway one of the most famous in the world once the connecting links are completed.

Like the eastern slope the western presents countless views. Rich meadowlands are linked in with heavily mantled hills and beautiful bodies of water. At points glimpses of the jagged corners of the range appear. Trails run in every direction from the road to the innumerable scenes of interest in the range and another decade will unquestionably see this one of the most famous trips in the world.

Today, however, the road from Grand Lake to the construction work, a distance of twelve miles, is only a trail and it is not recommended to travel.

Returning to Granby the road from that point leads on to Hot Sulphur Springs with its fine water and beyond the highway makes the climb over Parshall hill. From the crest and for a distance of miles as the car speeds on its way to Parshall the great hills of the range are constantly in view and there are few rides more pleasant than this one. At Parshall the highway dips down into

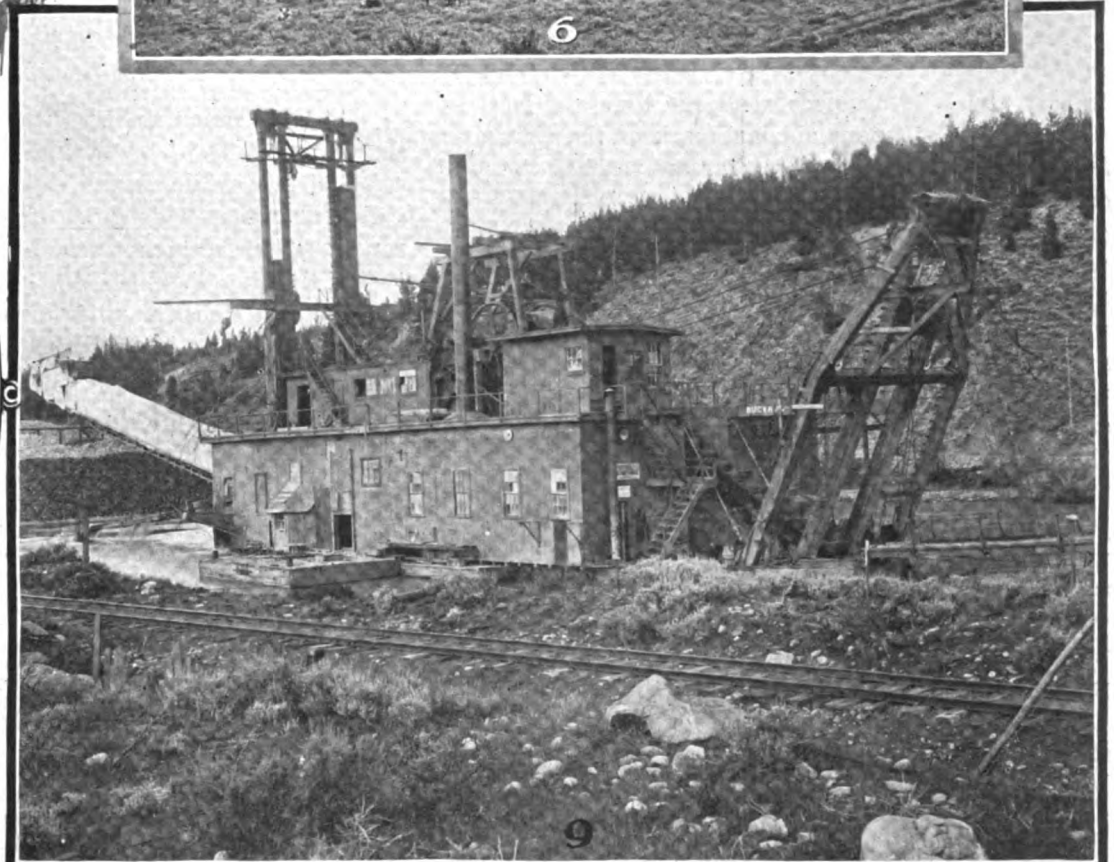
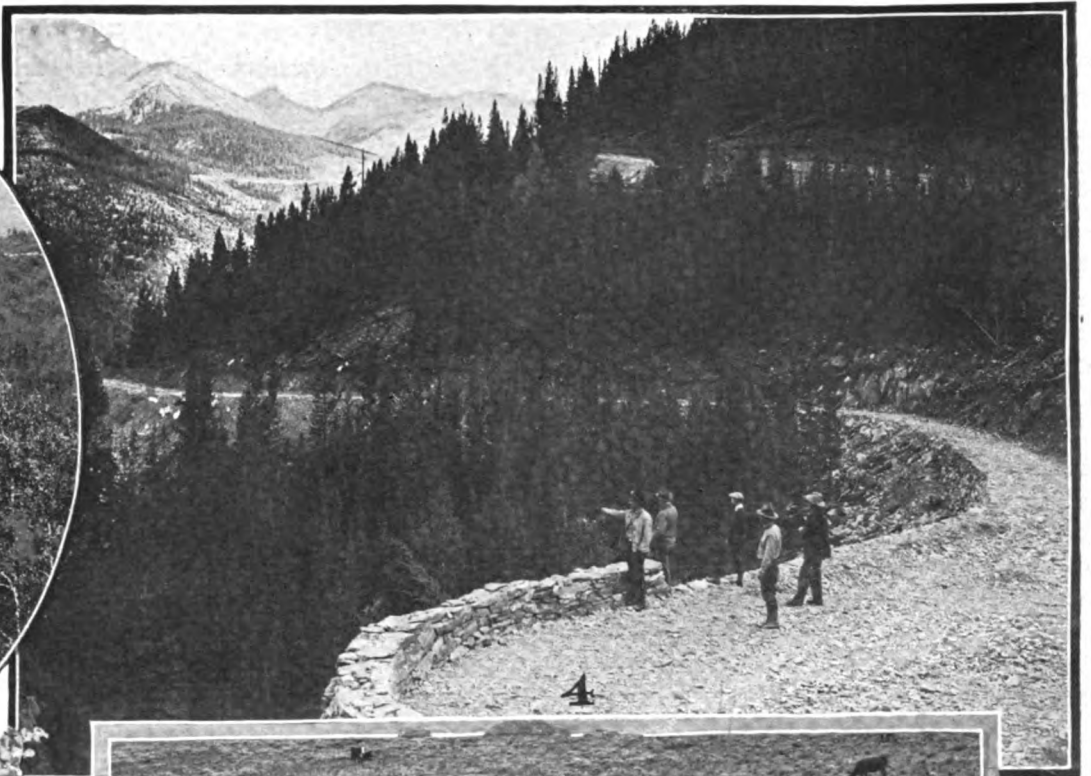
(Continued on page 14.)

Rugged Mountains Cutting Into the Skies O'ershadow Fertile Va



Scenes which will catch the gaze of the most blasé traveler as he wends his way thru the northwestern section of the state. 1. Waist-deep in one of the rich wheat fields of the Yampa valley in Routt county. 2. The famous Rabbit Ears which guard the pass thru Grand county. 3. Looking out to the Continental Range from the crest of Hoosier pass, Summit county. 4. A section of the western slope

Ribboned by Crystal Streams Throuout Northwestern Colorado



4. River pass road, Grand county. 5. Tonopas (finger) Rock, a Routt county landmark. 6. Cattle grazing in Eagle county in the road on Floyd hill, Clear Creek county. 8. The Trough,

Grand county. 9. Dredging scow in operation in Summit county, where millions of dollars in gold have been taken out.—Photos by Bruce Wiswall, August, 1918.

A Circle Trip Thru Northwestern Colorado

(Continued from page 11.)

the valley and for a considerable distance travels along the waters of the Grand river where may be met fishermen testing their luck in the waters heavily laden with fish.

Again there is a sweep upward and the sharp points of the Saw Tooth range come into view with the Blue Ridge in softer relief before them. To the west the corners of Gore canon may be seen and then the town of Kremmling, yearly a shipping point for immense herds of cattle.

Beyond and now to the northwest, evading the Gore cliffs, the road strikes on to the Kremmling flats which present one of the knottiest problems with which the state highway engineers have yet to wrestle. The flats are adobe, cut and distorted by arroyas and the highway climbs and dips, twists and turns in all directions to make its destination. For several miles the stretch provides its problems for the traveler, too, in wet weather and how a highway is to be provided which will avoid these factors is yet unseen on account of the topography of the country.

As the Rabbit Ears loom into sight, however, a firmer road bed is found and fast time can be made thru the valley and on to the Route National Forest, where the government work begins over the pass.

This portion of the trip rapidly dispels any gloom caused by the stretch before. Aligned on an easy grade with easy turns and superb road the highway goes up the hills with the famous old landmark of the Ears ever in front as a goal. Just before they are reached the road swerves sharply to the West, the summit is reached and the slope down begins again. If the eastern side has caught the fancy of the traveler, the western will even more hold his eye. There is nothing rugged about the scenery. The undergrowth is of the heaviest and often one is reminded of scenes in some eastern section of the country. Black-eyed Susans nod their heads from the roadways, grove upon grove of aspens bend down the sides of the hill and behind them battalions of pines stand in silent array.

The road is well kept and fast time can be made, but every traveler will want to slow down as he reaches the eastern heights for there spread before the eye lies the checkered valley of the Yampa far below with its fine farms and grazing lands, its streams and prosperous towns.

Steamboat Springs is quickly made and the traveler finds himself in a well-kept city which serves as the distributing point for a huge country which is rapidly adding materially to the wealth of the state.

From this point the machine may go due West to Craig where it may divert north to Wyoming, continue on to Utah or go south to Glenwood Springs.

For the present article, however, Steamboat will be

the terminus. Retracing the road for four miles, the turn is made at the Yampa road junction and after a trip along the river, the car noses its way into the mountain and up the Yellow Jacket pass. Beyond this the roadway enters the coal district, one junction taking the traveler to Oak Creek, the other proceeding over a rolling country thru Phippsburg and on to Yampa. The Tonopas (finger) rocks loom up as the car leaves this point and the highway cuts across mesquite flats to the crooked course of the Rock Creek, which travels some five miles to attain a distance of one.

As the contour of the country changes there is a perceptible rise in the thermometer and the highway makes its way thru red lands covered with sage bush, with little ranches here and there in gulch pockets and the raucous cry of the magpie as the only note penetrating the silence.

The highway over the hills follows a tortuous course which finally brings the road down to the Grand river at the old State Bridge where connection can be made with the main east and west highway via Wolcott.

The Midland Trail follows the river, however, proceeding along a narrow shelf road, crossing the stream and working back into the hills traveling northwest toward Gore canon. The ascent is a long one, the road narrow most of the distance and much of the time proceeding along points which look far down into the valley.

At Gore canon a sheer view downward of some 1,000 feet is obtained which will take the breath of even the seasoned driver while to the right appears The Trough, a valley or rather wide gulch extending to the top of the range. The road climbs steadily at this point to the very crest. Dipping down a fine view may be had of the range and the road goes for miles thru the hills meeting an occasional ranch until the Kremmling junction to Breckenridge is reached.

From this point the road cuts across the flats into Summit county. From there on to Breckenridge the highway runs a major part of the distance on a series of old railroad grades along the Blue river. Fine views, superb road bed, and the bracing air from the hills make this trip a delightful one and the change from farm lands to the huge dredging fields of the mining camp, will interest all who make the trip. Taken as a link in a three-day trip Denver to Kremmling to Breckenridge to Denver, the journey should be made by all who have not time for the more extended trip.

From Breckenridge the highway climbs thru Hoosier pass, one of the most famous gateways thru the range as well as one of the best, thence dropping down the placer mining district to Fairplay and so on back to Denver via the Hard Pan Triangle route or on to Buena Vista as the traveler may decide.

D. C. D. One of Best Highways Into State

A Description of the Route, by F. R. Jamison

THE D. C. D. Highway Association, which recently held its annual meeting in Lamar, Colorado, bears out the statement made for it "That it was born in earnestness and conceived in mature deliberations."

In November of 1916, following the completion of a highway bridge over the Canadian River at the city which bears its name, a meeting was called at Shamrock, Texas, for the purpose of opening a highway south from Canadian to an intersection with the Gulf to Colorado Highway. So much enthusiasm was expressed at this meeting that upon return to Canadian, its Chamber of Commerce advanced the idea of an intersection on the north with the Santa Fe Trail, thus linking the southeast with the northwest by a highway leading through a country beset by the least resistance to land transportation and at the same time, wonderful in its teachings of history and nature and yet more wonderful in its revelations to the human eye.

To go to the mountains over a plains road is a task worthy of accomplishment and few indeed are the inclines along the D. C. D. that cannot be negotiated on high gear. As the details of the early ambitions of the organizers began to unfold, the field of usefulness spread offering territory heretofore undiscovered by a south or north road. Accordingly, after an expedition had been made to the south and to the north, the towns between Childress, Texas, and Lamar, Colorado, assembled in Canadian, February 9, 1917, to induct the Dallas-Canadian Denver Highway into existence and to discuss its further extension and final territory.

Briefly told, this is the history of this organization and upon this foundation has been built the superstructure which now touches Oklahoma City, Okla., on the east, Dallas, and through its Henry Exall connection, Galveston on the south, and Denver, Colorado, on the north, coming via Lamar, Pueblo and Colorado Springs.

This entire territory maintains a local D. C. D. organization in each community, composed of a vice-president, a local secretary and three committeemen. This system, original with this organization, has formed one of the most successful co-operative associations that ever existed. In addition to this, each state has a vice-president-in-chief which, together with the president and general manager, constitute an executive body.

The diversification of industry and climate and types of civilization along this route surpasses any other highway for the same or far excessive mileage. Did you ever stand upon the great seawall at Galveston, that wonderful governmental project that keeps the state of Texas from slipping into the sea? That is where this highway begins and by courteous in-

itation of the Henry Exall Association has use of that memorial highway to Dallas. As you withdraw from the gulf coast on a splendidly constructed road, you behold the greatest cotton fields in America. On through the classic city of Dallas and on north through the marvelous agricultural region of north Texas, the richest natural farming country under the canopy of Heaven. Crossing into Oklahoma at once brings to view the red man, the first inhabitant of America. You will find him there in his blanket and you will see his various steps of advancement from that condition to a stock farmer, college professor, lawyer and politician. You will observe some of the richest oil fields

in existence and visit some cities that are matchless in their development and enterprise.

Camp Doniphan is located at Lawton, which affords an exposition surpassing any attempt ever made by our country at spectacular feats to interest her people. Just above this cantonment is Medicine Park, where you can find rest and quiet tucked securely in the midst of the Wichita mountains.

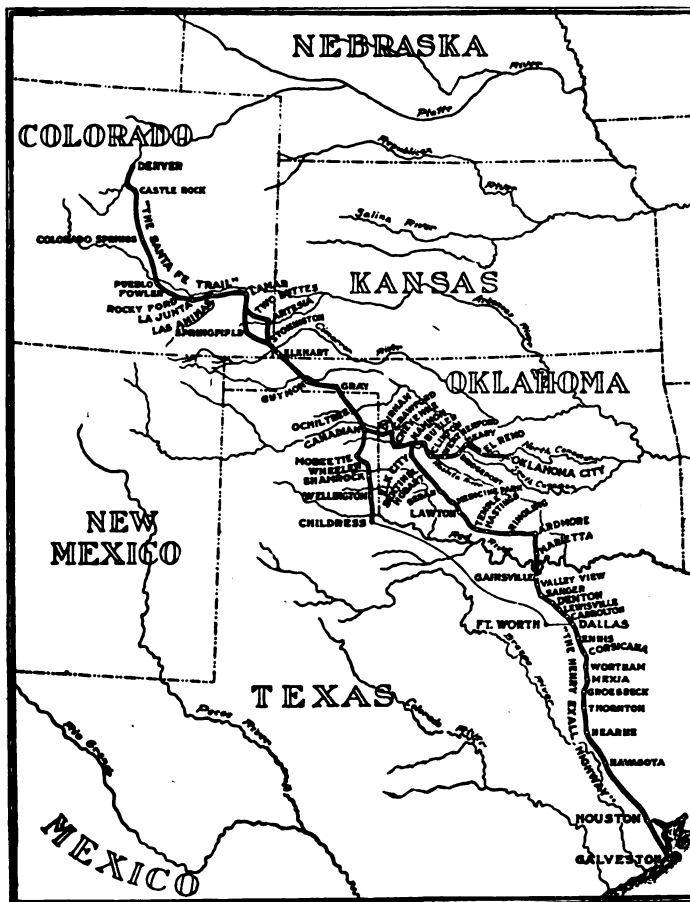
Learn the history of the Yampa Thiraska Pass, and the snake-eating tribe of Indians from which it obtains its name, as you proceed toward the Panhandle of Texas again. Come back into the state of Texas about 25 miles east of Canadian and cross this land of cattle and large ranches and people with ideas extended far and wide. Take another whirl at Oklahoma in what was once known as "No Man's Land." Visit Elkhart in the corner of Kansas as we nip at the Sunflower state and then enter into Colorado in the southeastern part of Baca county, where roams the countless herds over the splendid grass land.

At Lamar the traveler comes into the valley of the Arkansas, rich with its lanes of shade and

sweet perfume. Interesting in its ingenuity and superior citizenship, and you follow the D. C. D., which goes over the Santa Fe Trail to Denver.

All this and a thousand other things equally as good may be said of the D. C. D. and its organization. But with a string of co-operative organizations extending for more than a thousand miles on the lookout for the interest of the tourist, he is insured a pleasure no other system or organization can give. The character of people along this route makes the journey a pleasure. The absence of mountains takes away the drudgery of the trip. The signs keep you on the road continually, you save many miles and are continually in the hands of your friends. Every town along the line is interested and enthusiastic over the highway. It is not perfect, not by any means, but improvement is going on all the time.

(Continued on Page 18.)



Map of D. C. D. Highway, Which Cuts South Thru Prowers and Baca Counties.

COLORADO HIGHWAYS BULLETIN

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Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up provided only that orders are sent in before type is re-distributed.

Vol. I.

September, 1918

No. 4

GOVERNMENT CONTROL OF HIGHWAYS.

Many road authorities are of the opinion that the problem of maintenance of highways is one which is too big for the states to cope with as separate bodies. Good roads require huge sums for their construction and development and of late there has been an insistent demand for greater national aid. Federal control over main highways with the consequent national expenditures would free state funds for the development of "feeder" highways and would assist very materially in the progression toward a far spread network of roads.

Sooner or later the nation will take its part in road building on a large scale and the more quickly the day arrives, the more quickly will the country's resources be put to their full use.

MOTOR TRUCKS AND TAXATION.

The post office department of the United States has recommended the expenditure of \$150,000,000 in the construction of 7,500 miles of highway east of the Mississippi river with a probable similar amount to be awarded to highways in the West at a later date.

In the argument for this resolution before a congressional committee, Mr. Blakslee, fourth assistant postmaster general, stated that the department could afford to expend 50 per cent of its gross earning from motor truck parcel post in this manner since the increased business resulting therefrom would more than offset the expenditure. In urging the appropriation, he says:

"The use of the highways by the government without compensation to the states is neither equitable or just and consequently the Federal government may be under a moral obligation to reimburse the state in some substantial manner and it is believed that this can be done with benefit to the states and at the same time further increase the profitable possibilities to the Federal government."

In effect this statement acknowledges that since the government is proposing to make a profit from the use of highways that it should pay for the maintenance of them.

If this point in equity holds good in the case of the government, how much more true is it in the case of the private individual operating his motor trucks for the sole purpose of gain.

The heavy truck operated at maximum capacity does more damage to the road than all of the rest of the traffic put together.

It is unjust to ask taxpayers to bear the full burden of maintenance so forced upon them and a reasonable tax should be placed upon motor truck traffic that it may bear some part of the costs of the road so incurred.

TOURISTS AND SETTLERS.

That the tourist of today is the settler of tomorrow is a statement which has become axiomatic in the history of travel in Colorado. Fully 30 per cent of the travelers who come to this state each year are in search of land, mining claims or business opportunities of one kind or another.

Of the other 70 per cent a large proportion buy or build summer homes here and come back to the state each year. The sums expended annually by them reach staggering figures.

Colorado's prosperity is bound up in the traveler to a very appreciable extent and every possible effort should be made by local and state authorities to make his stay here a pleasant one, for business reasons if for no other.

One way to insure permanent growth in travel in the state is the purchase of camping sites along every highway in Colorado to be held forever open free of all charge to the visitor.

Legislative action empowering county commissioners to take these steps should be taken at the coming session

COUNTY ROAD SUPERINTENDENTS.

Under the present system of road building in Colorado, counties are often divided into three districts, each one under the supervision of one of the three commissioners. These districts are in turn sub-divided into as many as fifteen or sixteen sub-districts, each in charge of an overseer who has complete authority in his district under his commissioner.

As a result the county fund is distributed piecemeal and as each man has his own system a uniform result is not obtained.

The more modern plan entails the appointment of a county superintendent in charge of all roads under the three commissioners. The plan makes for greater flexibility and greater efficiency as those counties have found which have tried it.

County commissioners frequently have no time for thorough inspection of road work and centralized authority has achieved remarkable results where competent superintendents have been employed.

Denver Mountain Parks to Be Extended

By J. A. Burnett, Manager of Improvements and Parks, City and County of Denver

THE enormous increase in traffic to the Denver Mountain Parks during the last three or four years has convinced all that have been connected with the administration of these parks that further development must be systematized along two lines: an increase in the number of entrances to the parks, and in the number of spurs or detours leading to points now inaccessible to the average mountain park visitor.

During the first four years of mountain park development an area approximately four miles wide and nine miles long, lying between Clear Creek on the north and Bear Creek on the south, was opened to the automobilists, camper and picnicker. This region, which constitutes the keystone of all future mountain park development, may be divided into two sections. The Morrison gateway leads into the land of the picnicker and camper, for Bear Creek combines all the attractions of rugged mountain scenery with plentiful shade and water. The Golden gateway, leading up to the Lariat trail through Genesee and Filius parks to Bergen park, carries more of a scenic appeal.

It is realized that this circle trip from Golden to Morrison by way of Bergen and Evergreen is approaching the stage where little further development in the way of added picnic grounds can be made. The City plans to acquire two or three small tracts between Corwina Park and Evergreen and has instituted condemnation suits for the purpose of acquiring these lands.

It has also newly completed a trail system starting at Beaver Brook on Clear Creek and running from there to Genesee Peak on the south and Colorow point on the east. The season of 1917 and 1918 showed that these main highways into the mountains were becoming crowded on Saturdays and Sundays to a point where it often causes inconvenience to the picnickers and campers themselves.

During the last two years a plan of expansion has been adopted that will relieve the traffic on the Golden-Morrison circle trip and, at the same time, give picnickers and campers access to more remote lands and to now what are practically unexplored creeks. Aside from the natural entrances into the front range at Golden and Morrison there are three additional canon mouths which may be utilized to draw people into the hills.

The first of these, Mount Vernon Creek, midway between Golden and Morrison, is nothing more than a subsidiary road or short cut to Genesee park. There is nothing in Mount Vernon canon that would attract the picnicker or camper. Throughout almost its entire length, from its mouth to the point where it

joins the main Genesee Park road, the canon is denuded of trees, while the creek has no water of consequence in it during the hot summer months.

About four miles south of Morrison is the entrance to Turkey Creek canon. This could be developed into a mountain park gateway almost as popular as the Bear Creek gateway itself. Just beyond the west end of Corwina Park in Bear Creek the Parmalee gulch road branches off to the south, touches the corner of Dixie Mountain Park and connects with Turkey Creek.

Some three years ago the City began construction of a road up Myers Gulch to what are known as the Bear Mountain Tracks. These consist of two parks, Dixie and Bell park, lying on the slopes of Bear Mountain, which have never been developed by the City. Work was stopped on this branch road because title had not been acquired to the right of way, but the park authorities eventually expect to make this connection with Turkey Creek by way of Parmalee gulch and, at the same time, open for camping purposes these two unknown tracts south of Bear Creek.

Eight and one-half miles south of Morrison is the entrance to Little Deer Creek, a most attractive stream, well wooded and containing the finest waterfall within the Denver Mountain Park region. Within the last month Denver purchased forty acres at the mouth of Little Deer Creek, including some fine red rock formations. This purchase was made with the idea of development up Deer Creek and an eventual connection with Turkey Creek. Several more tracts of land in Little Deer Creek are under option by the City and will be acquired within a short time. County Commissioners of Jefferson county for some time have had under consideration the advisability of constructing a road

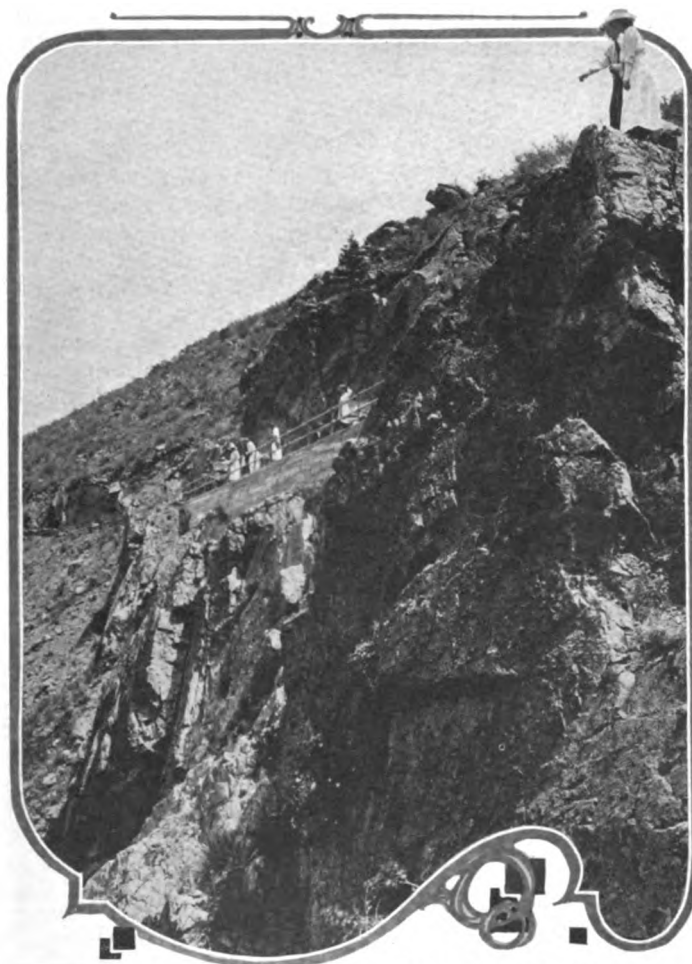
up this creek, having been deterred by the problem of passing the waterfalls without too steep a grade.

Development of the Turkey and Little Deer Creek sections will open to the motorist some of the most beautiful scenery in the mountain park area and, at the same time, afford camp sites well supplied with shade and water.

While Clear Creek on the north will always remain the main railroad entrance into the Rocky Mountains west of Denver, so precipitous and continuous are the cliffs from Golden to Idaho Springs that development of this gateway for automobile or wagon traffic is entirely out of the question.

A second development work of prime importance is the construction of the road from Bergen Park to Squaw Pass or, as it

(Continued on Page 20.)



Scene on Lookout Mountain Road, Jefferson County

Road Work and Road Builders the State Over

CAPTAIN Robinson of the Australian overseas contingent was in Denver last month and made an inspection of the mountain park system. He is going back to Australia to engage in road work and said before leaving that the roads here were surprisingly good.

L. M. Markham, county clerk of Prowers, was in Denver to attend the meeting of the legislative committee of the State association of county commissioners. Among others here at that time were R. G. Webster and H. G. Tiffany of Adams, S. H. Stream, G. F. B. Hood and James P. McInroy of Douglas, B. A. Banta of Colorado Springs, Robert Young of Huerfano, J. M. Graham, Harris Akin and C. M. Garret of Larimer, J. W. Thompson of Pueblo, and T. Elmer Rowe of Greeley.

A committee from the Civic and Commercial association of Denver waited upon Commissioner Ehrhart to discuss the construction of the Fall River road.

The August issue of Public Roads, the official organ of the U. S. Office of Public Roads, has a view of Mt. Hope, Colorado, as its frontispiece, together with a full page photograph of Turkey Creek on an inside page and an article on Maintenance, by Commissioner Ehrhart.

G. V. Hodgin of Fremont county, was in Denver recently, to confer with state highway department officials about plans for the opening of the Phantom Trail road August 30. Commissioners of Fremont county look upon this road as their masterpiece and are planning a great celebration for the formal opening.

Commissioner Lindstrom of Summit, was in Denver in regard to work on the roads in Summit county. The board is interested in improving the road from Dillon to Climax to take care of heavy ore shipments, while the Lake county commissioners are planning to improve the highway from Leadville to Climax.

Mr. Leonard E. Curtis of the Highway Commission, estimates that damage amounting to \$50,000 has been done on the roads of El Paso county by heavy rains during the past few months.

James E. Maloney, chief engineer of the state highway department, made a trip of inspection on the roads of southern Colorado during the month.

Major Boyner of the Bureau of Military Information of the War Department, was in Denver recently to see Commissioner Ehrhart regarding war information which the department is collecting.

Plans for a branch extension of the Holy Cross way from Leadville to the mining camp of Climax have been taken up with the department by B. H. Martin, county commissioner from Lake. The heavy increase in molybdenum shipments for war purposes has made necessary improvement in the highway. The road will eventually be made a connecting link between Leadville and Breckenridge.

Road Superintendent F. S. Williams, representing Hinsdale county commissioners, was in conference with the commissioners during the past month to see about opening up the road from Creede to Lake City. It is estimated that \$3,600 will make this highway travelable. The stretch referred to is a connecting link from Creed thru to Gunnison and would furnish the entire southwest with a northern outlet.

Commissioner Robert Young of Huerfano, is making arrangements for the widening of the road beyond La Veta toward Ojo. He is also working out plans for a better gateway into the town of La Veta from the west.

Thomas S. Reavis has been appointed county commissioner of Archuleta to succeed John L. Dowell, who died in July.

Boulder county commissioners have been kept busy making improvement on the main north and south highway during the past month. The road was badly cut by heavy rains.

Alfred Ogle of this department has accepted a position in the U. S. Reclamation service.

Chief Inspector W. W. Whitmore is recovering from an injury sustained when his machine was forced off the road by a fast moving car near Morrison.

A joint celebration commemorating the opening of the Grand Mesa roads was held at Alexander Lakes, August 24. The road extends from the junction with the Midland Trail at the Atwell bridge over Plateau creek to the junction with the Rainbow route at Delta.

The scenic attractions of this route are considered superior to those of Yellowstone park, and those who have motored from Maine to California are agreed that for an outing it is unexcelled by anything that they have seen along the entire route. While only a small portion of the remarkable scenery of the Grand Mesa, dotted with more than a hundred lakes stocked with mountain and rainbow trout, can be seen, it is contemplated that a circle route may be constructed in the future making a skyline drive that will have few equals in the world, skirting the edge of the Grand Mesa and bringing into full view the Grand Valley in its entirety.

The program was in charge of the Delta and Mesa county commissioners and there was a large turnout.

Judge Carpenter of Montezuma county, was in to talk over contracts and finances concerning roads in his county.

Gus Johnson of Jefferson, has taken up the question of the surfacing of the North Golden road and the grading of the road north of Arvada.

H. A. Edmonds, a leading member of the Good Roads association of Ft. Collins and Larimer county, and O. J. Watrous of the Fort Collins Commercial Club, are making arrangements for a Labor Day picnic in the Cache La Poudre canon, at which Governor Gunter will speak on the subject of "Highways." Members of the highway department have also been invited to attend.

The Road Maker of Chicago used the photograph of Mt. Evans printed in the August issue of The Bulletin, as their first page illustration last month.

Requests have been received from many trade publications for photographs and publicity matter about Colorado roads. These will be furnished gratis by the publicity department.

Route of the D. C. D. Highway

(Continued from Page 15.)

The recent meeting at Lamar decided to put its secretary and manager in the field for a year, starting August 1st, and for the purpose of giving out D. C. D. propaganda in the coming year a fund of \$5,000.00 will be provided.

Mr. D. J. Young, president of the First National Bank of Canadian, Texas, is president of this association.

Mr. W. A. Palmer, lawyer, secretary of the Canadian Chamber of Commerce, was made secretary-promoter at the first organization meeting, the title being changed to secretary-general manager at the recent Lamar meeting. The president and secretary, together with Mr. R. A. Singletary of Oklahoma City, are now on this highway looking after its interests.

Road Program Far Exceeds Appropriations

Highways Must Be Lifted From Mind, Says Highways Industries Association

THE total public road mileage of the United States as shown by Bulletin No. 390, Department of Agriculture, January 1, 1915, was 2,445,760 miles; in 1909, 2,199,645 miles; an increase in five years of 246,115 miles, or an average increase of approximately 50,000 per annum. Taking the increase as uniform, which is not probable, the total mileage by January 1, 1919, will be 2,645,760 miles, or more likely 2,750,000 miles. There had been surfaced at the end of 1909, 190,476 miles, and at the end of 1914, 257,291 miles. Approximately 67,000 miles in five years or 15,000 miles per annum. This clearly shows that we are opening up new roads each year the mileage of which is three times greater than the mileage surfaced, and without making any provision for 2,500,000 miles of roads heretofore opened up and yet to be improved.

To improve the present road mileage and allowing for no increase, at the rate of construction as shown from 1909 to 1915, would require 166 $\frac{2}{3}$ years.

Granting that there are many miles in the total given that are not of a sufficient recreational or commercial value to justify a considerable expenditure for their improvement, no one can contradict that at least 20 per cent of the total mileage should be improved. At the rate per annum heretofore made, it would take 33 years to complete this 20 per cent. not providing for the improvement of the inevitable increase in mileage daily coming into importance, the improvement of which would so greatly affect the material welfare of our people.

Those who are interested in highway promotion improvement, and the use thereof, can profitably give some thought and time to this important subject which is the foundation of all successful highway industry.

Our highways must be lifted "*out of the mud,*" and we must be up and doing and add at least three times as much fuel as heretofore has been used to the smoldering embers.

The following is a copy of a resolution that was adopted at a meeting called by the Virginia Council of National Defense at which were present citizens from 24 counties and nine cities:

"RESOLVED, That this meeting hereby recommends the adoption by 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."

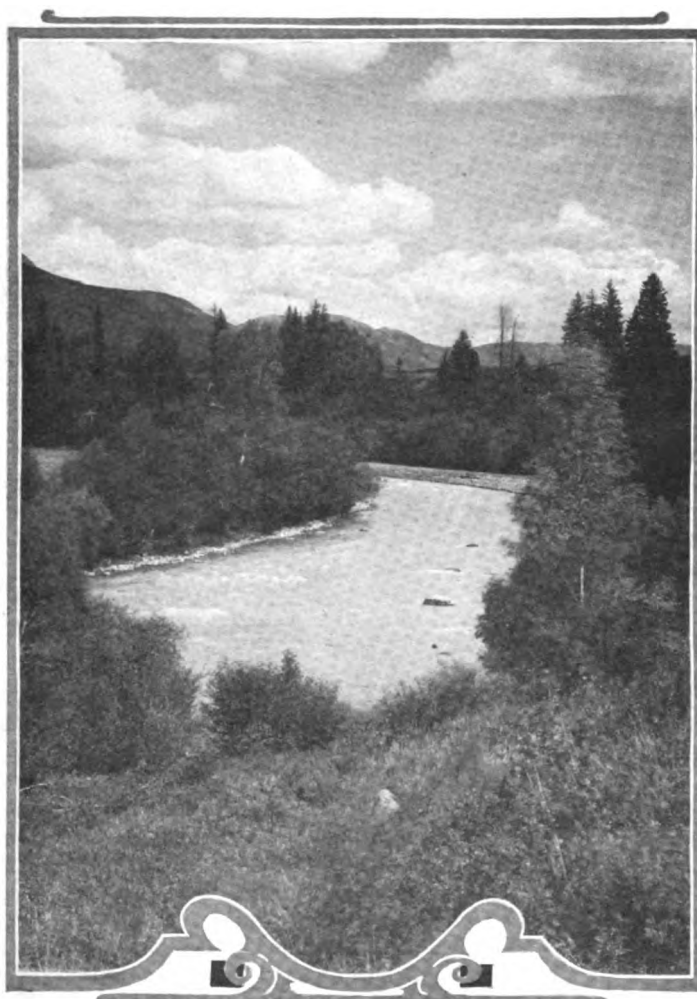
Below is a copy of a resolution adopted by the National Real Estate Board at their Eleventh Annual Convention held in St. Louis in June, 1918:

"WHEREAS, adequate and permanent highways are essential to the Nation, both in times of peace and in times of war;

"BE IT RESOLVED, That this Convention does strongly recommend the construction of one or more government built and government inspected trans-continental highways, from coast to coast, with adequate lateral highways, from the northern to the southern boundary of this country;

"BE IT FURTHER RESOLVED, That we recommend to the government the creation of a permanent Highway Commission, for the purpose of preparing plans for the construction of a National Highway System immediately after the termination of the world conflict, and

"BE IT FURTHER RESOLVED, That we hereby tender the service of the Realtors of America in assisting such National Highway Commission."



The Blue River, Summit County.

The History of Road Building in Colorado

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

(Continued from last month)

At this convention four road bills were drawn and presented to the legislature, the two most important ones being for a ten million bond issue and the turning over the Internal Improvement Fund to the Highway Commission. The ten million bond issue passed and was referred to a vote of the people, and was lost. The Highway appropriation bill was amended and after the Legislature had made 93 special pork barrel appropriations from the Internal Improvement Fund, the remainder of the fund was turned over to the Highway Commission under the well known Bill No. 200. Governor Shafroth vetoed the 93 special road bills, thus turning over the entire Internal Improvements fund to the Highway Commission. Immediately the validity of the bill was assailed and the bill was fought through the courts and finally pronounced invalid by the Supreme Court on a minor technicality. Thus again the State Highway Commission was left without funds and the money then amounting to over \$800,000 was left in the banks. Bill No. 200 was then initiated and referred to a vote of the people and lost by only a few votes.

Meantime, the Good Roads Association of Colorado, having become a permanent association took up and by its various committees succeeded in finally securing in 1913 adequate road legislation, thus ending a fight which was waged for eight years by a mere handful of good road enthusiasts.

This history would not be complete without some reference to the convict labor question, which while it did not originate in this state, was worked out by us to completeness which is now an object lesson and an example for all other states to follow. I don't suppose that it is generally known that our present Highway Commissioner, T. J. Ehrhart, is responsible for the first bill for convict labor on our roads. This bill was passed in 1899 through his exertions, for a convict built state road between Pueblo and Leadville. Considerable work was done on the road by the convicts from the State Penitentiary and from the Reformatory at Buena Vista.

In the same legislature Senator Ed. Taylor got a similar bill through for a state road between Denver and Grand Junction. No work, I believe, was done under the Taylor Bill. In 1905, Senator Lewis from Fremont County got another bill through for convict work, and in 1907 Senator Barela got another one through for a convict built state road extending from the New Mexico State line south to the Wyoming state line north.

The Lewis Bill, however, with some amendments is the one under which our convicts are now successfully working. Work began under the Lewis Bill in the summer of 1905, on the famous "Sky Line" drive at Canon City, and to Warden John Cleghorn belongs the credit of developing the system of working convicts without gun guards. I quote from his letter dated September 18th, 1906, read at the Denver Good Roads Convention, of that year:

"We have been working on an average of seventy-five convicts on the roads in this county (Fremont), under the provisions of the Lewis road law, for more than a year, without gun guard or other protection aside from the overseers in charge of the work. Not one attempt to escape has been made by any member of these road gangs during this period, and it seems to be the ambition of a large percentage of the inmates to attain a place on the road gang. In accordance with the terms of the Lewis law the penitentiary commissioners adopted rules allowing additional good time to each prisoner employed on the roads, and this fact, together with the change from prison conditions afforded by the outside work, seems to serve as a great incentive both for faithful service and good conduct."

Work on the "sky line" was followed by work on the state road between Trinidad and the New Mexico State Line in 1908, and today the camps are employed in five counties, the commissioners paying the expenses of the men while on the roads.

(This installment concludes Dr. Bartlett's interesting history. Next month, however, The Bulletin will print a supplementary article now in course of preparation by Dr. Bartlett, on "Road Work Under the Highway Commission.")

Mountain Parks of Denver to Be Extended In Future

(Continued from Page 17.)

is more commonly known, the Mount Evans road. In reality the Mt. Evans drive will not commence until Squaw Mountain has been passed, but the importance of this road lies in the fact that it will constitute the connection between the City Mountain Park system and the proposed Denver National Park, when Congress shall have created it by law.

The City has acquired the right of way along this road and proposes to buy from the government one or more tracts for the accommodation of campers and picnickers.

At present there is a rough mountain road running from Idaho Springs to Squaw Pass. From there it descends to Bear Creek by way of Vance Creek. While this road is frequently traveled by motorists it is not advisable to attempt the trip unless the driver is an experienced mountain traveler. Between Idaho Springs and Squaw Pass the road, in places, reaches grades of twenty-two percent, and it requires a skilled motorist with a cool head to negotiate this cutoff.

The City has completed a survey from Squaw Pass to some very picturesque cliff formations on one of the shoulders of Squaw mountain, at an approximate altitude of 10,300 feet. This spur, when constructed, will be three and one-half miles

long and will give the traveler a more impressive mountain view than any that may now be found on the present mountain park roads. The United States Forestry Service has a tentative agreement with the City to construct this spur from the point where the Pike National Forest boundary line crosses the survey and, unless the war prevents the construction of any roads devoted to scenic purposes, the spur will probably be built next year.

The Colorado Highways Bulletin already has given an insight into what is meant by the Mt. Evans Drive. The construction of this, of course, is dependent upon whether the National Government will create from the Mt. Evans region the proposed Denver National Park. As the Denver Mountain Parks system is superior in scenic beauty and inspiring vistas to the city parks, so is the Mt. Evans area superior to the Denver Mountain parks. The construction of the Mt. Evans drive, however, is a project upon which one only may speculate.

The plan is well matured and, if the war is brought to a speedy conclusion, the next few years will see a development and an increased use of the mountain parks system that will fulfill the inspired dreams of those who originated the mountain park amendment.

The Blue Lodge of Colorado Road Builders

WHENEVER mention is made of a road project thru solid rock today, engineers begin to sharpen their pencils to a point which will enable them to bear up under the strain of hundreds of thousands of dollars. Tell them that you know of a nine-teen mile stretch of road, most of it thru heavy rocks, all of it difficult, which was built for a total cost of \$21,000 and you are likely to find your auditors registering incredulity, not to say some fear for their safety in your presence.

Yet there is today a stretch of road of just that character and length in the State of Colorado, which was constructed for precisely \$21,000 down to the payment of the last water-carrier who worked on the job. And if you desire further particulars the Bulletin respectfully refers you to T. W. Monnell, sometimes and more popularly known as "Tony," under whose supervision and authority that piece of road was constructed. Further, as Mr. Monnell will tell you, the sum remains as the undoubted, undisputed world's record for cheap construction in road work.

The road project from Montrose to Gunnison was first conceived by Mr. Monnell, Nicolaus Crome, Newt Davis, and John W. Lamb of Montrose county. At that time the insurmountable feature of the work appeared to be Blue canon because of its precipitous walls, and while Gunnison county officials were in favor of the project they were divided as to its feasibility.

Montrose was settled in its conviction, however, so a crew was organized, a camp started and the work was begun with Mr. Crome in charge of construction and Monnell handling the commissary. Popular subscriptions netted the cost of the road from the Montrose line to the Blue canon and so well was the work done that Gunnison asked the same officials to continue in charge and to push the work thru.

Inspired by a desire to be connected with the outside world, the county went to it. A majority of the men in the crew lived in Montrose or Gunnison with their families and they worked untiringly for long hours. Stockmen furnished meat for them at cost and farmers did the same for them with grain and produce. A car-load of powder was used, the 19 miles were pushed thru and the road opened. Today it is in superb condition and today, were it to be duplicated, the cost would be something like \$21,000 per mile.

Work on this road is only a part of the effort Mr. Monnell has given in his lifetime to roads.

He has been county clerk and recorder of Montrose county for 20 years as well as secretary-treasurer of the Colorado State association of County Commissioners. He was one of the leaders in the movement for a highway law and has always been to the forefront where road laws were under discussion.

Aside from his work on the Gunnison road he turned another almost impassable stretch into a highway from Paradox valley over the divide to La Salle creek, whence the highway joins the Utah state thru connections at a point now used for some thru travel which will be greatly increased as soon as the Utah end of the highway is placed in better shape.

He has made a beginning on the road from Naturita down the San Miguel river. This road will follow water grade into Paradox valley and on to Utah, escaping a 16-mile stretch of sand and opening up vast fields of carnotite ore. This highway is today used for hauling the product of 500 miners out and as 90 per cent. of the uranium used in the airplane industry comes from that point, the route may well be designated as one of the arteries of Uncle Sam's war industries.

Financial and labor conditions have been such as to make inadvisable final work on the road, but it will be pushed to completion once normal conditions are restored. Sixteen miles remain to be built and when finished they will open up one of the scenic wonders of the world. It was on this work, incidentally, that Nicolaus Crome lost his

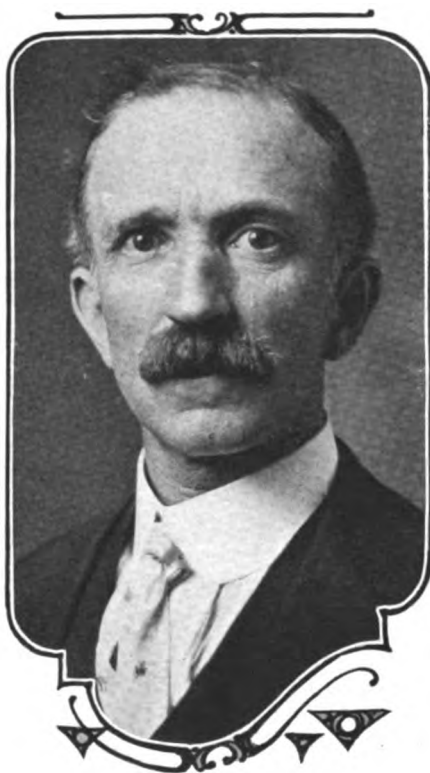
life, September, 1916, and a monument now marks the place where he was killed.

Finally, in 1917, when the heavy fall traffic of crops made the road from Montrose to Olathe impassable he secured funds for a heavy coating of gravel which was laid as the frost was coming out.

In all of these projects the funds of state and county alike were far from adequate and it was necessary to raise the funds for the work by subscription.

Mr. Monnell is a firm believer in the policy of no county lines in road work and in all of his activities has kept in mind the need of an uniform development of the entire western section of the state.

How well he has worked is best evidenced in the story of his accomplishments.



T. W. Monnell

Highway News and Notes on Work in Field

CONTRACTS for a stretch of hard-surfaced road on the Brighton highway and three miles of improvement on the D. C. D. highway between Lamar and Springfield were let by the state highway department during the past month. A third job of approximately \$60,000 was advertised, but not a single bid was received.

The Brighton road improvement consists of an 18-foot concrete pavement beginning at the Burlington subway and ending at the roadhouse, a distance of 1.71 miles. The road will have four-foot gravel shoulders on either side and the contract also calls for the repair of the Sand Creek bridge. The job was awarded to Arthur Hewitt, whose unit bid, amounting to a total cost of approximately \$39,000, was several thousand dollars below the next bid.

The Lamar-Springfield contract is listed as Federal Aid project No. 6. It covers a stretch of road $3\frac{1}{4}$ miles long and includes grading, culverts, bridges and surfacing. The contract was let to Ford and Filoon, who were the only bidders for the work. Their price was within the engineers' estimates.

The other contract was for Federal Aid project No. 3 and consisted of the grading of $11\frac{1}{2}$ miles of road between Granite and Twin Lakes. The work included culverts, two bridges and about 8,000 yards of concentrated rock work. Under normal conditions there would be some ten or fifteen bids for the job. Today not a contractor wants the work because of unsettled labor and cost conditions.

No further effort will be made to handle the stretch pending a court decision in the junking of the Colorado-Midland railroad. Should it be decided that the right of way shall be abandoned it will be possible for the highway department to utilize a section of the road, which will save practically all of the rock work now contemplated.

Interest in the work on the Fall river road has been revived during the month by trips made up the Pass by representatives of the Civic and Commercial association of Denver, Governor Gunter, and others.

At the present time contractors on the eastern slope have roughed out the road to a point two miles from the summit. On the Western side Contractor McQueary has completed the more difficult three miles of his stretch of $5\frac{1}{2}$ miles, and there still remains to be completed a stretch of six miles from this point (Milner pass at Poudre lakes) to Chapin creek.

Coincident with these trips, there has been a revival of the old discussion as to which route is the better, the so-called lower pass or Huntington line, or the upper or Tufts survey. The matter was thoroly investigated before final surveys for the road were made last year and at that time the lower pass was decided upon. Work is already under way on the lower pass road and any change made now would involve the loss of money, labor, and time expended on the work.

The lower line was decided upon for three reasons: (1) It is open for travel for a much longer period each year than the upper and is much freer from snow and electrical disturbances; (2) The cost is about \$60,000 less; (3) Connections can be made from the lower pass with the Poudre valley road.

Work on the road could be completed this year if labor could be obtained, but to date neither contractor has been able to get anywhere near a full complement of men.

Total cost of the highway from Grand Lake to Estes Park is estimated at about \$182,000, which includes the twelve-mile stretch from Grand Lake to the foot of the Western pass.

The concrete crew on the Denevr to Littleton road is now well beyond the Fort Logan junction and working ahead rapidly when weather conditions are favorable.

A new entrance to Rabbit Ears pass is being made by the

U. S. Forest service. The road will eliminate a steep approach to the pass from the Western slope and will carry the traveler out on the front hills of the range, giving him a splendid view of the valley all the way to the crest.

The highway department has been asked to pass upon all requests for transportation of road materials whether in cities, towns or counties in the state, by the oil administration of the United States. No permits will be issued by the government for transportation of such materials without the "O K" of this department.

Contractor McDonald has completed 150 feet of concrete work on the new 600-foot concrete bridge across the Platte river out of Greeley. Work will be pushed as soon as needed steel shipments are received.

Bids will have been opened before the publication of this issue of The Bulletin for the 21-mile stretch of the road from Rifle to Meeker, which comes under the Federal Aid act. Engineering estimates are placed at \$78,000.

Federal Aid project No. 5 on the San Miguel between Placer ville and Norwood has been withdrawn as the road has been completed by state and county. Surveys have been completed and the state is now ready to submit plans and specifications for final approval on the road from Norwood to Naturita, a continuation of the other project.

Final plans and specifications have been submitted to the U. S. Office of Public Roads for approval on the Federal aid project from the Pueblo county line to the New Mexico border, a distance of 70 miles on the main highway.

The Phantom Trail canon, one of the finest roads in the country, is open for travel and as this issue goes to press the date for formal opening was set for August 30. The highway passes over 45 bridges in 20 miles on railroad grade. A complete account of it will be published in the October Bulletin.

Heavy rains kept road men busy in all sections of the state last month. All of the main arteries were cut up, but effective maintenance has kept the way open for traffic everywhere.

Spanish Trail--Mesa Verde Meeting

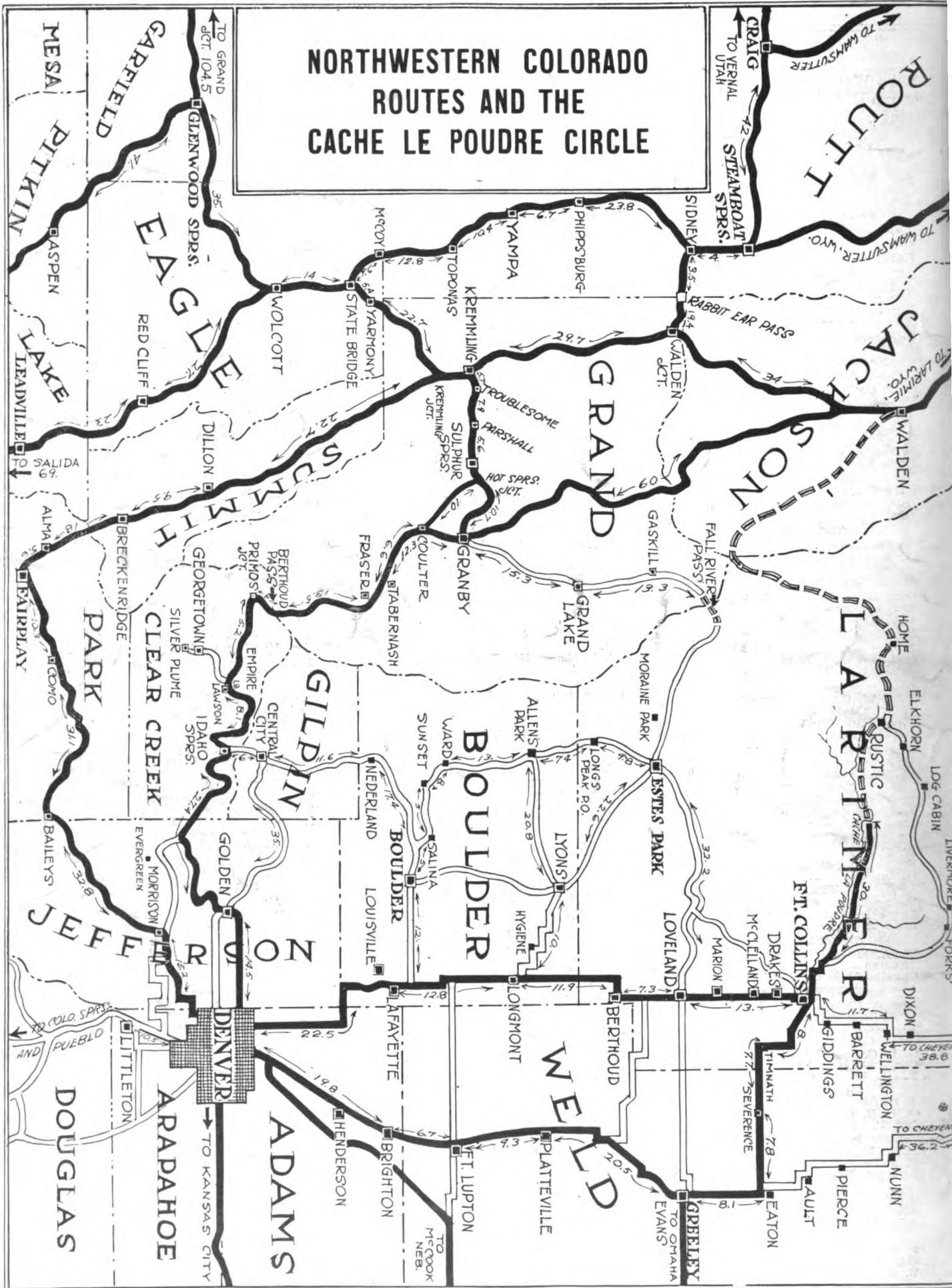
(Continued from Page 5.)

music. After dinner, the entire party motored 9 miles to Trimble Hot Springs, where dancing was indulged in until past midnight. Durango did herself proud in the entertainment of her visitors, while the visitors were all appreciative.

The next day, nearly every visitor and a large number of local people motored to the Mesa Verde National Park, the ancient dwelling place of the most famous of all pre-historic Cliff Dwellers, each year the mecca for thousands of interested sight-seers. Returning, a considerable number journeyed to Electra Lake, on the new Durango-Silverton highway (now under construction) and enjoyed fishing and motor boating on Colorado's largest body of artificial water.

Both Secretary Chas. E. Hall of the Durango Exchange, and Secretary E. P. Wilson, of the San Juan Motor Club, the organizations under which the program and entertainment were staged, in speaking of the convention, stated that the follow-up results of this splendid meeting were certain to be the most far reaching of any similar meeting ever held in southwestern Colorado, for it brought together the virile forces of two aggressive sections of the southwest, each willing to assist the other in a comprehensive scheme of mutual community advancement, and those forces are certain to materially assist in bringing deserved recognition to this region.

The next annual convention will be held in Monte Vista.



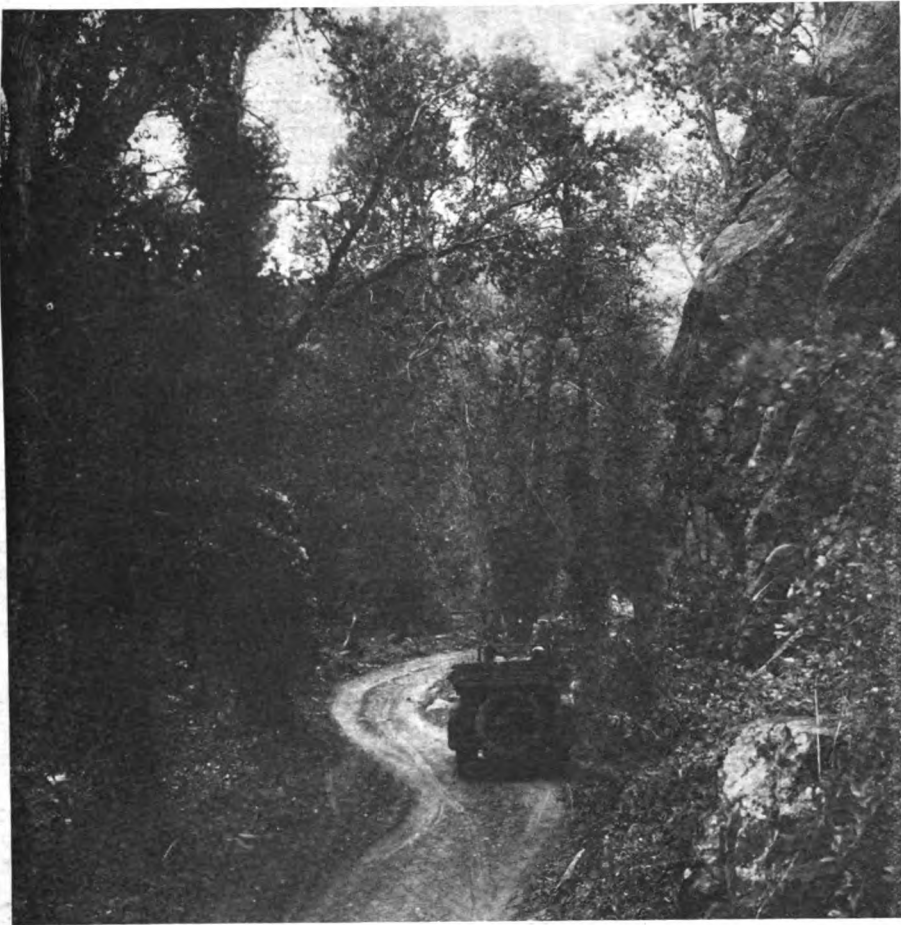
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Colorado Highways

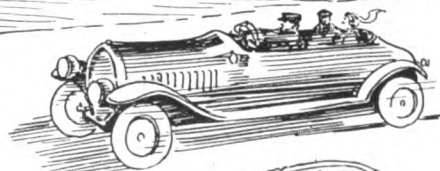
BULLETIN

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 material 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 material 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 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

RECOGNIZING 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:

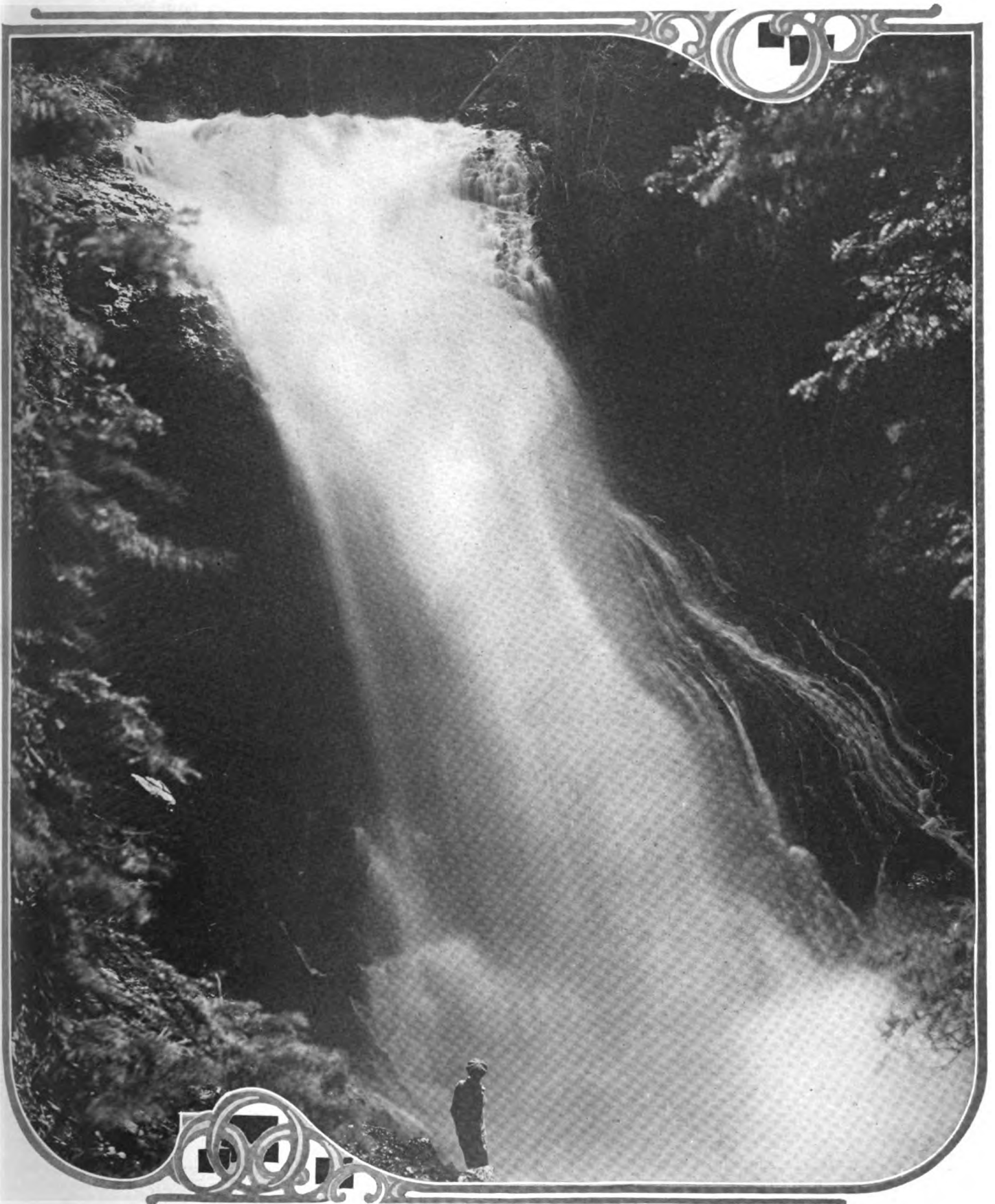
1. The traffic, its character and amount, limits of loading, wear and tear—cost of operation.

(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		} Mountain Road
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	¼	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	

“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 Cedar-edge 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 Cedar-edge, 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.

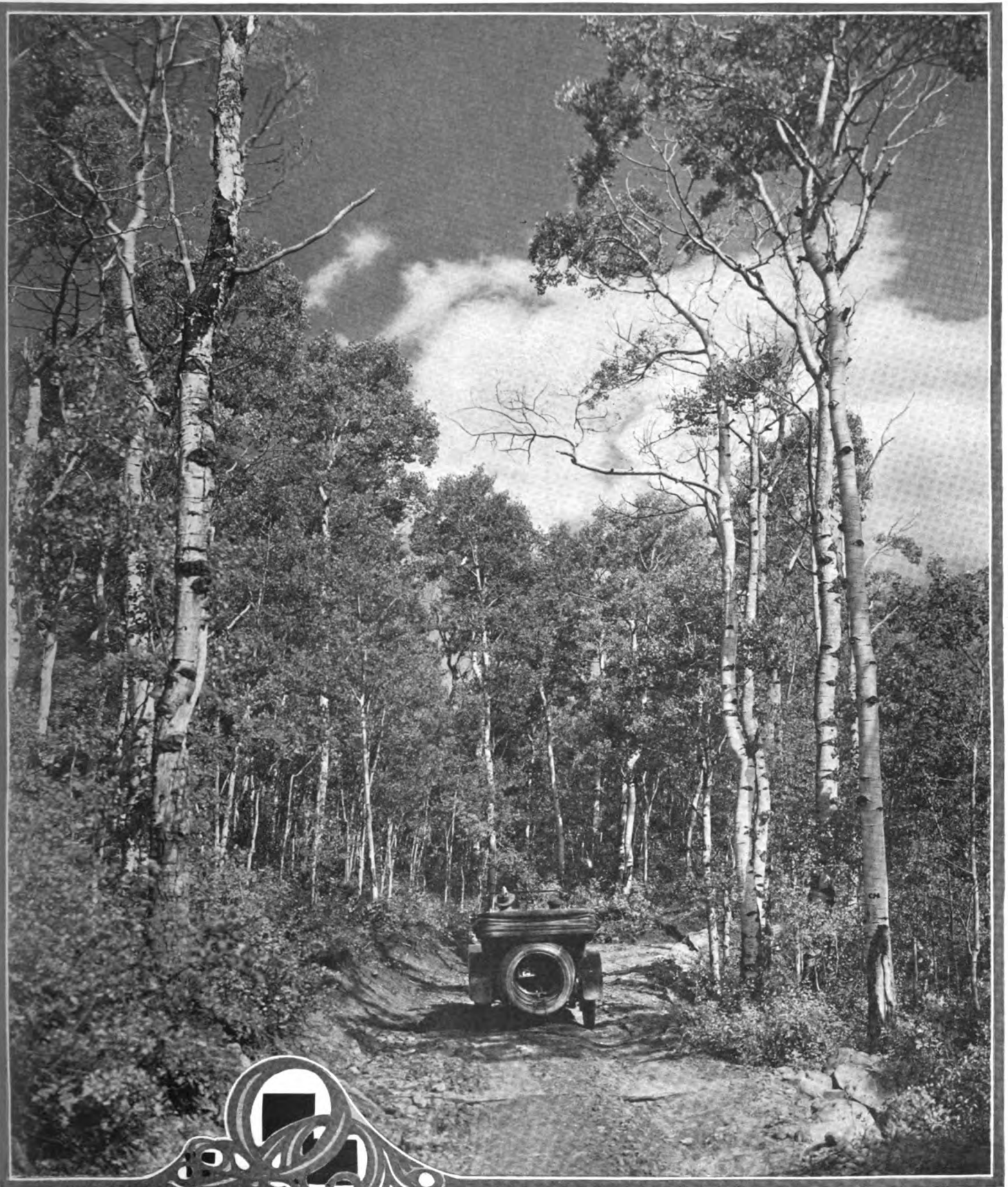
Descending through the oak the Plateau Valley lies below, the cultivated mesas being a series of terraces planted to hay and grain, one below another until the Plateau Creek is reached at Collbran. The road then follows the course of Plateau Creek down a sandstone canyon that becomes steadily deeper 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.

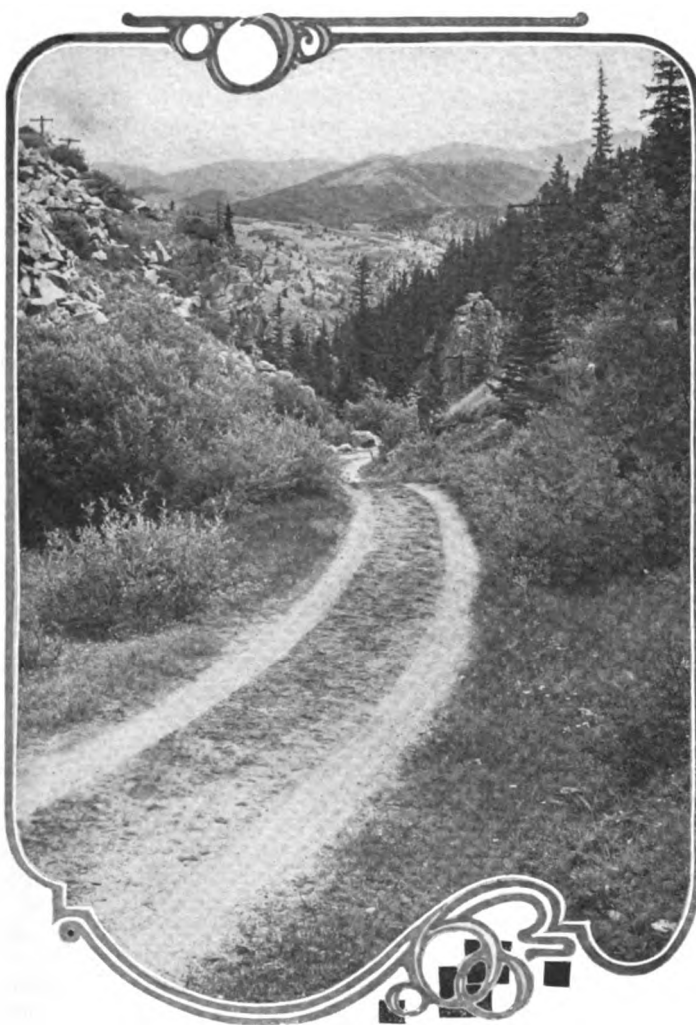
It was not yet 11 o'clock when we reached the head of the canyon and plunged down a hill to the old postoffice of Conifer, which used to be at the junction of the road that came up through Bear Creek Canyon and across from Evergreen. In the early days, there were a number of buildings at this point and 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 trusting'y 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.

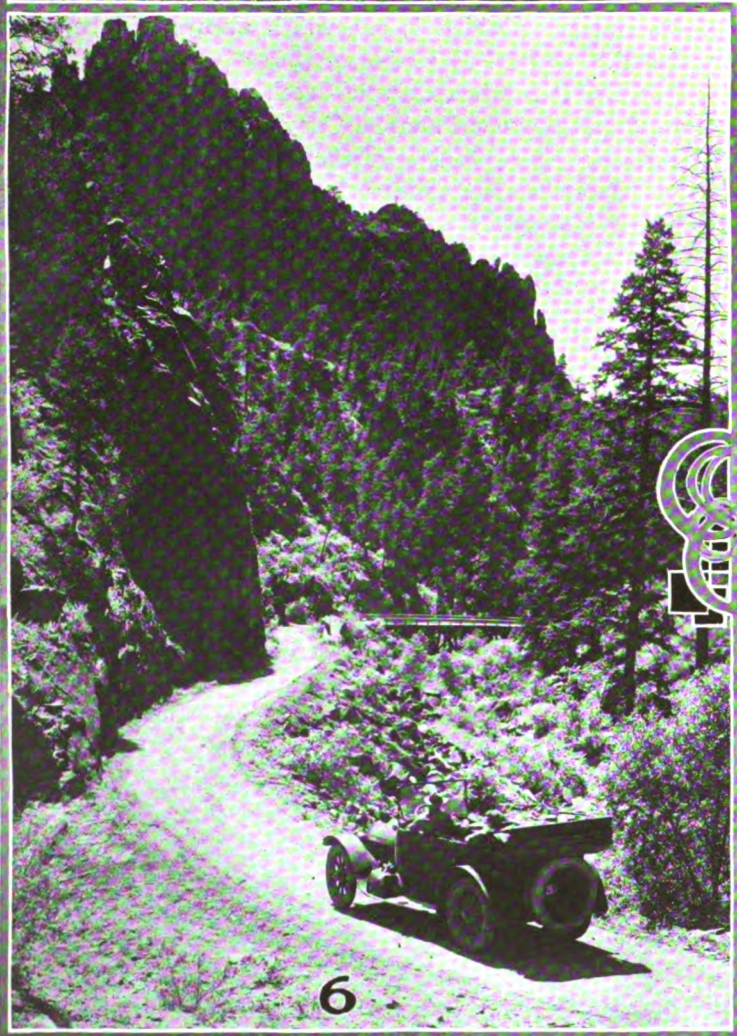
The view is at all times a magnificent one, with the stern outlines of Pike's Peak at the head of the canyon and jagged corners facing the traveler all the way down, but the final word which makes the trip worth while in all of its aspects is the road, safe, wide, solidly constructed at all points.

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.)

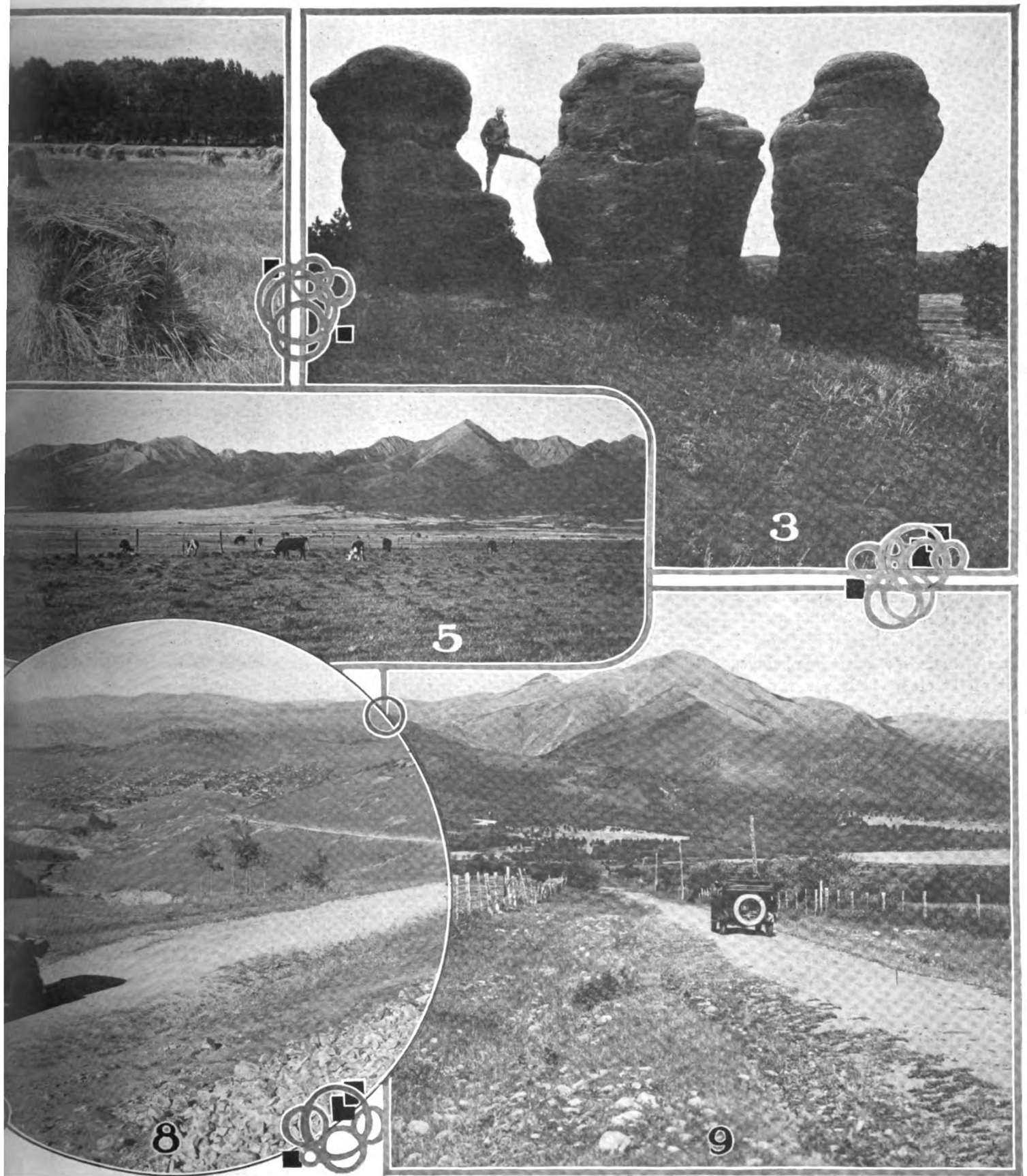
On the Foothill Road From the Banks of the Platte to the Sangre



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 or picturesque scenery than does this as the views indicate. 1. Cripple Creek to the Platte river, Douglas county. 2. A rich wheat field just out of Florence, Fremont county. 3. Picturesque red rocks

isto Range via the New Phantom Canyon Railroad Bed Highway



park, Teller county. 3. A rugged cliff scene in Phantom Canyon, Fremont county. 5. Cattle grazing in the shadow of Sangre de Cristo Range, Custer county. 6. Approaching one of the 45 bridges in Phantom Canyon, Fremont county. 7. The famous old Bassic mine, near Querida, Custer county. 8. On the heights above Cripple Creek, center of Colorado's great gold district, Teller county. 9. 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.

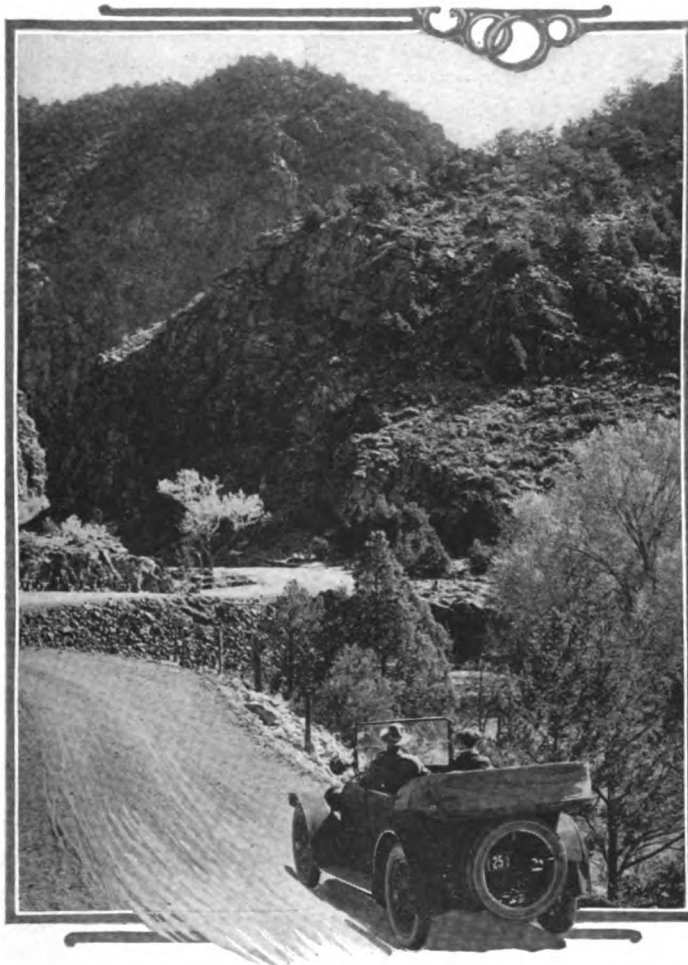
The state highway fund is not adequate to meet the situation, but it will be employed to the utmost value of every dollar. The legislature will also be requested to pass upon emergency measures which will aid the situation, yet these at the best will not serve to do more than supplement the efforts of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

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Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up. Subscription Price, \$1.20 per year.

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.

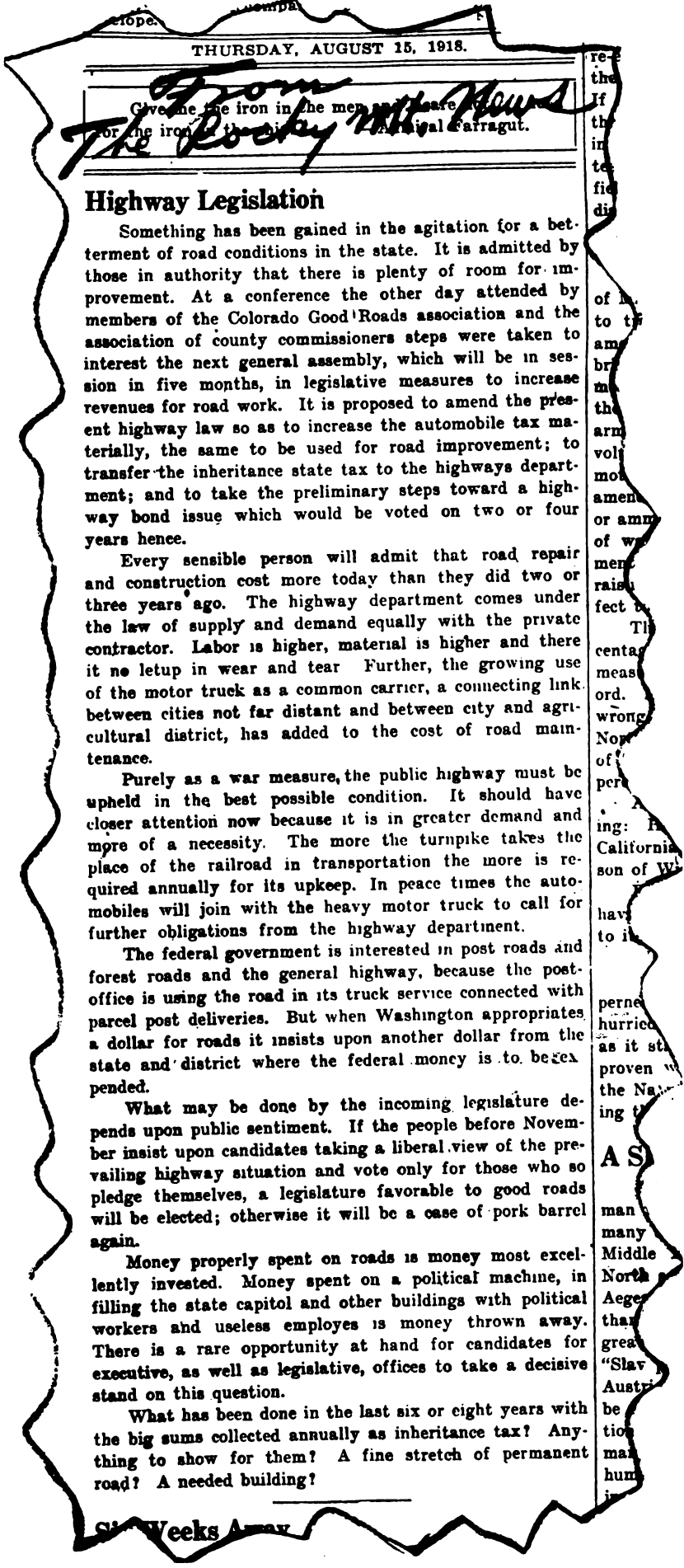
"No road is better than its worst mud-hole," said Mr. Norton the other day, "and we must eliminate poor highways if we are to carry on our work efficiently.

"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 use it for the iron of the state.
— 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 is 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.

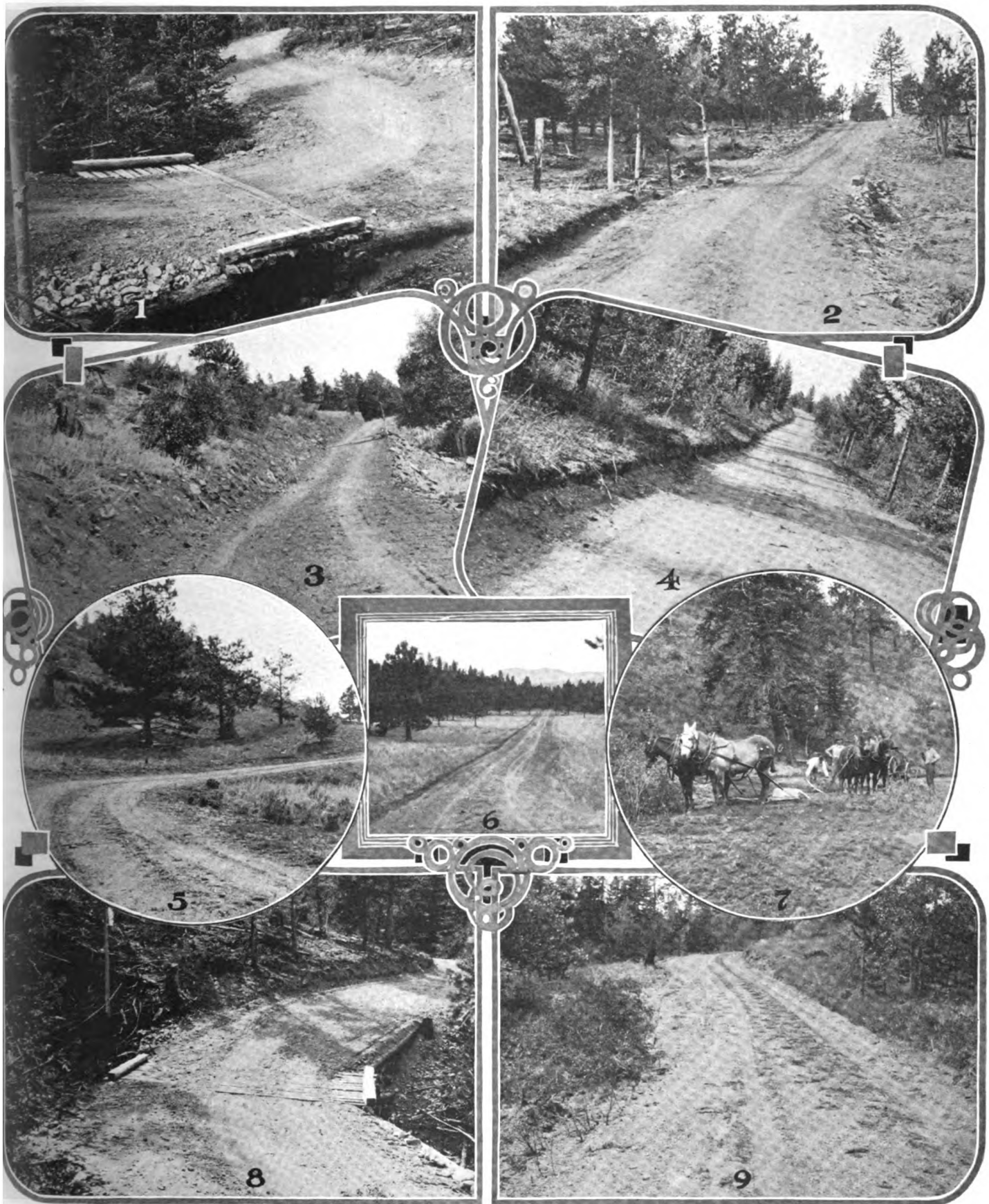
The answer to this argument is best expressed in a truism whose author escapes me:

“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. Bapta 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 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

MANY 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.

THE 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.

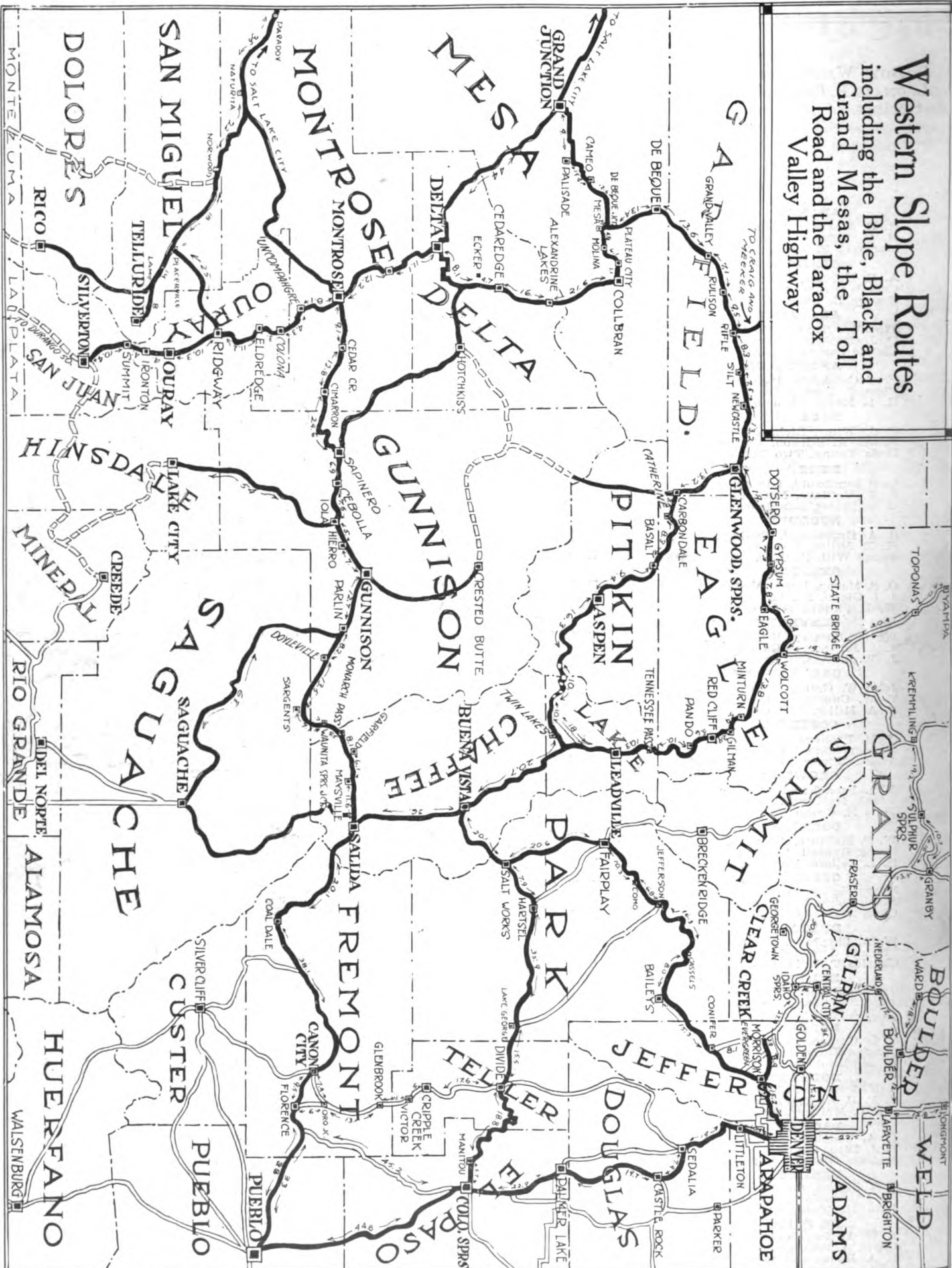
The U. S. Forest Service has obtained an additional sum of \$12,000 for the work upon recommendation by R. E. Pratt, district engineer, and if possible, the state highway department, will raise a corresponding sum by dipping into the appropriation for 1919.

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.

Western Slope Routes
including the Blue, Black and
Grand Mesas, the Toll
Road and the Paradox
Valley Highway



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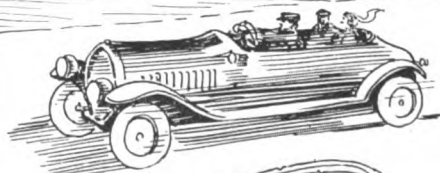
Colorado Highways BULLETIN

Issued by the State Highway Department



Jack Frost Paints the Hills of the Range a Dazzling White. Scene Taken on the Mt. Lookout Road in Jefferson County, Which Gives a Typical Illustration of Highway Conditions in the Mountains in Winter Time.

December, 1918



Good Roads and Development of Colorado

By Cass E. Herrington, President Colorado Development Association

ARE there those in Colorado who would attempt honestly to debate the proposition that good roads do not go hand in hand with the development of a community, commonwealth or nation?

It would seem so, for I have been requested to state here what seems to me a truth so plain that it cries out for action instead of dispute,—namely, the fact that good roads for Colorado mean a quicker realization of the great program of the Colorado Development Federation, which has undertaken as a patriotic and timely duty the crying of Colorado's wares before the government and nation, with a view to enhancing the natural and potential resources of this state, in mining, agricultural and industrial. It is therefore clear that were there not those who have not given serious attention and thought to the road program of Colorado, there would be no need or place for this article.

However, I prefer to believe that the lethargy regarding better roads in our newly developing state is due primarily to the fact that the mass of people look to those whose assumed duties carry them into intimate knowledge of the weak spots in their program, for their opinions. To those, if there are any, who oppose the expenditure of more money for Colorado roads, I speak especially, and secondly to those who have observed that commerce follows good roads and need only the incentive of a great immediate need for action, I ask your consideration.

Is there a more satisfying piece of handiwork than a road well built? The good ones we pass over with a whirl, our attention centered upon the business or pleasure at its end. But a bad one, well, we are first delayed, and be it farmer, merchant, doctor or who, every delay costs thousands of dollars and perhaps lives every week. And as for disposition, we can never eliminate that quite in the bargaining table of human dealings.

So as the first proof that civic and community pride exist along its way, there is nothing like a good road, for it is the first factor encountered in transit to or from a point. Artists paint them in their pictures for the obvious reason that chuck holes jounce the taste.

But speaking of abstractions about roads, we must consider them from the standpoint of tourists, one of the chief annual crops which spring into being here. And everyone in Colorado is on the receiving end of the tourist business. Economically we will be foolish if we do not encourage the tourist business from a selfish standpoint and from that of sharing our natural pleasures with all the world. But a tourist is usually cramming a lot of sight-seeing into his ten-day vacation and so it is obvious that if he cannot go romping off as he pleases without delays from bad roads in Colorado, he will go to California or Texas to spend his money. Being interested in tourists and knowing his ways, this federation would be slacking in its

duty to Colorado if it did not try to please him after he came. The best way is with better roads.

Now we cannot say "Colorado" without thinking "development." In this great reconstruction period following the great world war the two must be synonymous, or we will find ourselves behind in the broadening trade and commerce movement to come.

The inevitableness, also, of a future vast population is cried from the census reports of every community in Colorado. We are growing, but we have not yet scratched the surface of our state.

First in our mind at this time, of course, is the soldier. What of him and his future? The Colorado Development Federation is laying a program to influence thousands of soldier boys to Colorado, under the plans of Secretary Lane at Washington, but what have we to offer him except cheap land?

The soldier comes with little to start with, perhaps a few hundred dollars. He can hardly buy the developed farms because of the price. But there are thousands and thousands of acres of splendid land in this state that lack only the good roads as arteries of travel to make them valuable. If he is too far from market or on an impassable road, we are offering him a losing proposition from the start. For if the roads from the farm to the town are impassable, what's the use of the town?

To become still more concrete, a great government hospital was secured for Colorado, and forty-eight buildings have been constructed under severest tests of bad roads. How many thousands of dollars more do you think that hospital cost because of the roads which often caused the slacking of business or the doing away with hauling altogether for a period? It would be interesting to know. But certainly it is true that Major W. J. Crane completed that hospital at a greatly increased cost and completed it on time not because of but in spite of the roads. Such great projects handicapped in this manner cost me and me a lot of money in a lifetime in additional expense. And in the end the roads about that hospital will have to be built.

I am reminded of a story told at that hospital at the expense of Colorado's roads. An officer was winding his way over the bogs caused by a recent rain. A hat he recognized as that of the orderly who carried the mail lay in the road. He kicked at a good one and was astonished when from underneath the hat came the ejaculation, "Ouch!" "Well for the love of Mike, is that you Bill?" said the officer. "Yep," was the reply, "I'm on my motorcycle."

The government is now being urged to build one of the great nitrate plants here, which it is proposing to build over the country in six places to make fertilizer. First.

(Continued on Page 6)

Embargo Raised on Road Building in U. S.

WITH the conclusion of the armistice, the Highways Council of the United States has virtually passed out of existence and wires received here on November 14 notified Commission T. J. Ehrhart of the State Highway Department that there would be no further restrictions placed on road-building by that body. Further than that no budgets will be required by the Highways Council, as ordered in the now famous Bulletin H. C. 3, and those cities, towns and counties which have not yet completed their work will not have to proceed further, although the plan is one which is worth while in times of peace from the standpoint of the community.

The releasing order sent out by L. W. Page, chairman of the Highways Council, was first contained in a telegram later supplemented by a letter which is printed herewith in full for the information of all road builders in Colorado:

To the State Highway Department.

I wired you today as follows:

“United States Highway Council announces no further applications need be made to it for approval of highway projects, and that previous disapprovals are revoked, and pending applications require no further action. Procedure in securing materials and transportation should follow normal practices. Removal of restrictions does

not affect highway bond issues which are by law under control of Capital Issues Committee. State Highway Department will not be asked to submit programs for next year’s work.”

Commenting upon his wire, Mr. Page then says:

“This action has been taken as a result of the general release of bituminous road materials by the Fuel Adminis-

tration and the general release of other materials, except steel, by the War Industries Board. The use of steel in highway structures is still under restriction, and it is impracticable at this time to furnish information concerning the future control of the use of this material for road purposes. The suggestion is made that if steel and iron products are required for highway purposes, it may be

practicable to obtain them with minimum difficulty if the dealer from which they are ordered will state that he will not replenish his stock for the remainder of the year, provided he is authorized to fill this order.

“State Highway Departments will please notify all applicants of this decision and not transmit copies of HC-3 to the Highways Council after this.

“L. W. PAGE,
“Chairman.”

Road builders are thus left in exactly the position they were in previous to the restraining order save for the limitation on the use of steel.

No immediate effects will be visible in Colorado as a result of the raising of the embargo as the winter season which is now general will not permit of much construction work.

National, state and county departments are now busy, however, preparing plans and specifications for work which will be undertaken next spring and there is a general belief among the road builders, not only of Colorado but throughout

the country, that when work is resumed it will be undertaken with a co-operation from the nation, never equalled in the past history of the work.

Just what form assistance will be received remains uncertain for the present, but the inclusion of a road plank in President Wilson’s reconstruction platform, together with the attitude assumed by the business men of the country, indicates that America has finally awakened to the economic importance of its highways.



COLORADO GROWN PRODUCTS
One of the Many Workers in the Celery Fields Near Littleton

The New Era of State Development

By the Colorado Department of Immigration

IN the discussion of the tremendous era of development which everyone expects will follow the conclusion of the great world war there is, perhaps, too much said about the benefits which Colorado hopes to derive and too little about the desire of the state to prepare itself so that it can offer the prospective settler real opportunities of a concrete nature rather than glittering but general promises. Honest and intelligent development can not be fostered by a state which does not know itself what it has to develop or the rewards which development will bring.

It is not so much a question of bringing settlers into Colorado as it is of preparing ourselves so that we can treat them fairly and intelligently, aiding them in the selection of the best opportunities and in the development which must follow. It is not to be considered wholly from the selfish point of view, although in a larger sense the broader viewpoint is at once the most profitable and the most selfish, for it will result eventually in greater tides of immigration and vastly broader development of the state's resources than a narrowly selfish program can bring to pass.

Colorado cannot tell the prospective investor or settler what she herself does not know about her resources and her opportunities. To be fairly equipped with the information which the new-comer demands the state must first secure that information, for much of it is now unavailable. Without that preparation, the state is in no position to encourage a flood of immigration nor is it prepared to care for such a flood if it should come without encouragement.

The end of the war caught the United States unprepared. Today peace is practically an accomplished fact and the demobilization of the millions of men from whom Colorado hopes to secure a fair proportion is already under way, but neither the nation nor any state is prepared for prompt action. Congress is still considering legislation which is vital to any extensive program and which will require, at the lowest possible estimate, two years to arrive at a stage approaching fulfillment. In that time many of the problems of reconstruction will have solved themselves and the golden opportunity will have gone.

Like every other state in the Union, Colorado is almost wholly unprepared to participate intelligently in any great development program. A half million men coming out of the army have said explicitly that they want to join the "back to the land" movement and acquire farms of their own, but neither the state nor the nation is prepared to offer those who turn to Colorado anything save the opportunity to file on homestead lands or purchase state lands and take their chances under new conditions, with nothing but the moral support of the government. The need of active, intelligent and substantial assistance from state and federal governments cannot be supplied by moral support, no matter how enthusiastic.

Agriculture, stock growing, manufacturing, mining and the business world all call aloud to the returned soldier and the easterner whose dreams turn to the west. Nowhere else are the opportunities so great or the promises of reward so tempting, but the state has not yet begun to do its part. In the collection of information covering its industries and undeveloped resources it is probable that Colorado has gone as far forward as has any other state, but in no state has there been a sufficient degree of preparation.

Statistical information is available here to a greater degree than in most of the western states, but its preparation has been done largely through the co-operation of volunteers, who have devoted their time and money to a great work which the state must do thoroughly and efficiently if the best and most accurate results are to be obtained. Statistics of past experiences are the groundwork upon which future expansion and development must be built, and to be of the greatest value they must carry a degree of conviction which is impossible unless they are prepared by authority of the state and through governmental agencies.

It is idle to say that we have 3,000,000 acres of state land and 10,000,000 acres of government land awaiting the settler, and that all he must do is to come and make his selection. Where is this land? How much of it is cultivable? How much is good only for pasture? How much can be irrigated? How much is in the high altitudes and how much in the valleys? These and a thousand other questions essentially limit the areas in which reasonably good farm land is available, yet the enthusiast shouts the totals to the world and gives no thought to the fact that if a lone immigrant comes to him and asks him where to go to secure a good farm at little or no cost save that of labor he cannot tell him. The earnest settler, with unbounded energy and confidence but limited means, wants facts, not glittering fairy tales.

Geologists have given wide range to the enthusiasm of the careless. They have told us, for instance, that the oil shale deposits of Colorado will produce 20,000,000,000 barrels of oil, with a by-product of ammonium sulphate amounting to no less than 300,000,000 tons. Wealth beyond the dreams of avarice, but where are these immense deposits? Are they available without tremendous expenditures for development? How is the oil recovered and the sulphate produced? What is the cost of a small plant and what are the chances of success, and the promises of profit? The enthusiast thinks nothing and cares little for these details. The enormous totals are all he has to offer the man who comes to Colorado with a real interest in oil shale.

There are exceptional opportunities for the establishment of dehydrating plants, alfalfa mills, potato flour mills and a hundred other industrial factories, but how much can

(Continued on page 23.)

A "Six-Hoss" Team At Grader Work On Eastern Independence Pass



This Powerful Bit of Horseflesh was Working Throughout the Summer in the High Altitudes on the Road Above Twin Lakes, Lake County.

2,000,000,000 Road Boosters Coming Home

THERE will be a couple of million real 'Road Boosters' back in the United States when the war is over, as I think all of the men over here appreciate how good roads can be made invaluable. In my mind there is no doubt that the good roads of France saved her in two instances."

Col. Robert H. Tyndall, of the 150th Field Artillery, thus writes from "Over There" to a fellow Hoosier, Chairman Carl G. Fisher of the A. A. A. Touring Board. It will be remembered that these two were closely associated several years ago in the transcontinental tour from Indianapolis to San Francisco, at which time much of the route of the Lincoln Highway was decided upon. Col. Tyndall is an inveterate road driver and has covered thousands of miles of good, bad and indifferent American highways. In his letter "home," he goes on to say:

"I have seen movements of troops made in the dark which would have been impossible in any other country than France. Here the roadmakers have scientifically planted trees that absorb drainage on the side and at the same time shelter the highways so as to keep them just moist enough. In some instances you will find a tall poplar standing higher than the rest of the trees bordering the road, at every kilometer, so that you can readily measure distances with the eye.

"One of the great things they do here is to repair a road and even make an entirely new surface without interfering with the stream of traffic. In one campaign we were in, over a thousand trucks passed my regiment, each carry-

ing twenty-two soldiers. This was for re-inforcement on the flank and was done without the slightest confusion. One does not find here the little holes that cause so much trouble remaining in a road. The potted places are immediately filled and drained, right up to the front line almost.

"As far as being able to orient one's self, I think from now on I can drive blindfolded any place in the United States, as most of my driving on the front has been at night, and the roads wind around considerably over here. I don't have lights and neither do the trucks and other vehicles coming in opposite directions. We are not allowed to use the Klaxon horn, as this is the method employed for a gas alarm. Sometimes I really wonder how we get through with it all, but it shows how a person can become accustomed to 'most anything, and we train ourselves to see in the dark."

That a big road plan is near at hand in this country is the opinion of many leading highway advocates. Chairman George C. Diehl of the A. A. A. Good Roads Board summarizes the idea in this manner:

"One hundred million dollars a year appropriated by the Federal Government on a definite, tangible National Highway System will work wonders in the form of from five to ten thousand miles of splendid highway, made up partly of sections already sufficient in quality, partly in sections to repair, partly of sections rebuilt, and partly of entirely new construction. State and local appropriations will be encouraged, and these subdivisions, largely because of Federal Roads, will enormously increase road expenditures."

\$100,000,000 Road Bill Introduced

JUST before the world armistice was declared Senator Chamberlain, one of the strongest good roads advocates in Congress, introduced a bill providing for the expenditure of \$100,000,000 on highways of the United States by the Secretary of War, and for the purpose of creating a national and state system of highways for use in military work and for the general welfare of the people of the United States.

This bill was read twice and was then referred to the Committee on Military Affairs. While it may be said that the immediate need for this legislation has passed from a military standpoint, the need from a public welfare standpoint is greater today than it has ever been and the probabilities of its passage are correspondingly brighter.

The bill in full follows:

A Bill—To provide for the taking over, improvement, relocation, construction and maintenance of a system of national highways and state highways, designed to facilitate the movement of troops, equipment, munitions, and supplies, and to promote the general welfare of the people of the United States.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that in order to meet the extraordinary wear and damage to the public highways by reason of their use by or on behalf of the Federal Government and to guarantee that their condition will be such that a continuous service can be made thereof, the Secretary of War is authorized and directed to take over a comprehensive system of roads throughout the United States, designed primarily with a view of facilitating the movement of military troops, equipment, munitions, and supplies, but at the same time, so far as reasonably compatible with said purposes, with a further view to accommodating the Postal Service, facilitating interstate and foreign commerce, aiding agricultural and manufacturing pursuits, and promoting the general welfare of the people of the United States. To these ends the Secretary of War shall confer with the authorities having in charge the construction of highways in the several states, and in such conferences shall disclose, so far as reasonably practicable, the outlines of his plans for highways designed for military purposes, to the end that unnecessary duplication of highways be avoided, and that highways constructed for other than military purposes may be in a strategic location wherever reasonably possible.

Sec. 2. That said system may be undertaken and completed in such installments or divisions as may seem to the Secretary of War expedient and desirable.

Sec. 3. That the Secretary of War shall forthwith proceed to take over, improve, construct, and maintain such roads of said system of highways as are most necessary to the welfare of the people of the United States.

Sec. 4. That for the purposes of defraying the expenses pertaining to taking over, improving, constructing,

and maintaining of said highway system aforesaid, the sum of \$100,000,000, or so much of said sum as may be needed for said purpose, is hereby appropriated, out of any funds in the Treasury of the United States not otherwise appropriated.

Sec. 5. That the Secretary of War shall make an annual report to Congress showing the manner in which the provisions of this Act have been carried out and expenditures made thereunder.

Sec. 6. That out of the appropriation made by or under this Act, the Secretary of War is authorized to incur such expense as he may deem necessary for carrying out the provisions of this Act.

Sec. 7. That the Secretary of War is authorized to make rules and regulations for carrying out the provisions of this Act.

Sec. 8. That the term "highways" used in this Act shall include bridges and culverts.

Sec. 9. That this Act shall be in force from the date of its passage.

GOOD ROADS AND STATE'S DEVELOPMENT.

(Continued from Page 2)

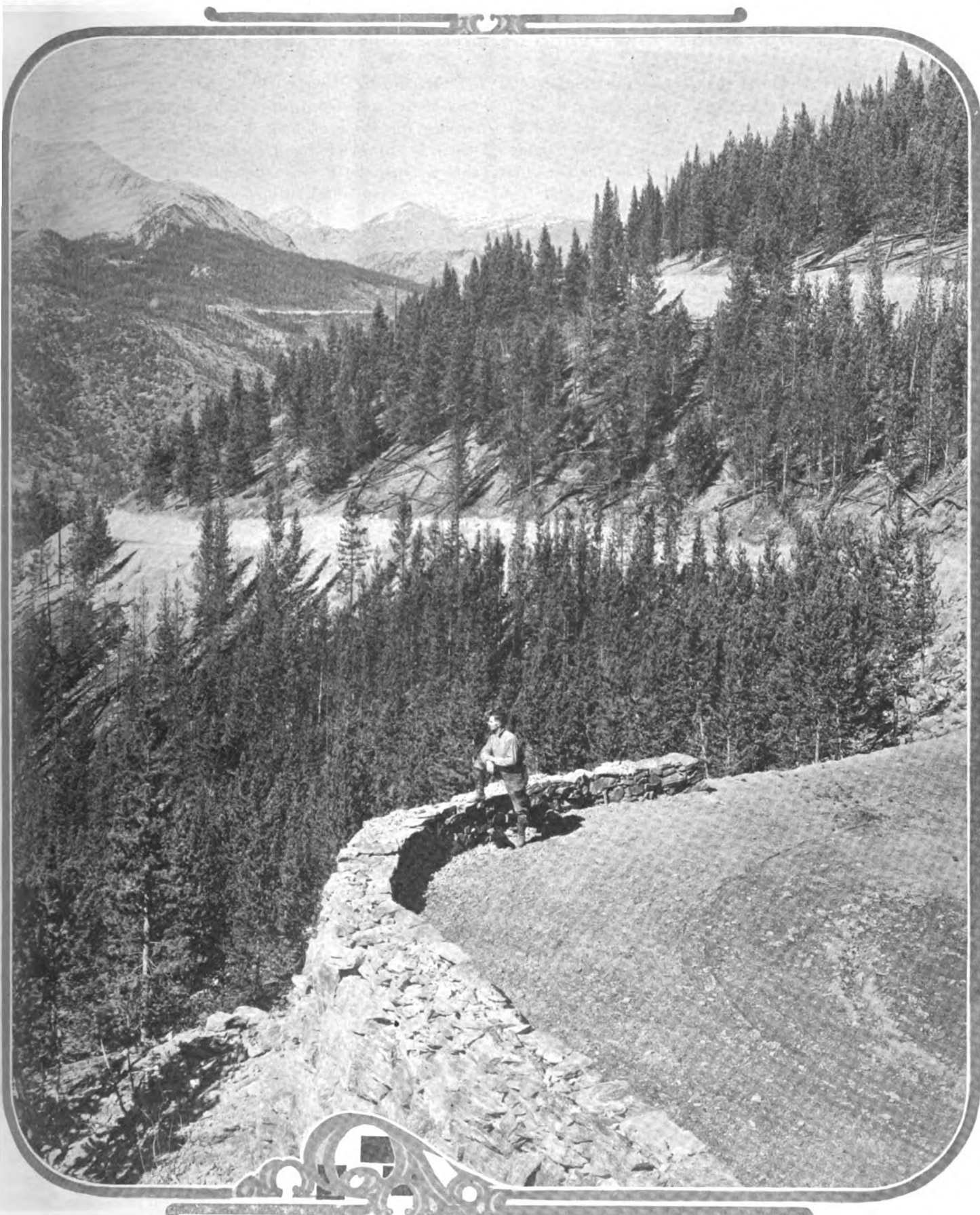
building materials would have to be hauled to the site, secondly, there are thousands of tons of raw materials that must be gathered from all over Colorado to feed the machinery to be placed in the structure, and thirdly, the finished product must be hauled to distributing points. Do you think that government officials will not take into consideration the conditions of the roads in this state?

Last week through this federation the steel working plants of Colorado were given a government contract for \$4,000,000 worth of tractors for the government. There is no one factory large enough to fill the order, consequently the contract must be distributed. Assembling of parts will be necessary by motor truck, and without the best of roads to cut the expense of transportation these men will be handicapped in competing with the big manufacturers of the East.

We are in the center and are the center of the wool production of the United States. Yet we ship our wool to New England to be cleaned. This federation is interested in promoting the wool scouring industry for Colorado. That means competition with the East. Transportation is one of the biggest factors for the wool producer in his profits, since the feeder is usually a long way from market. He must depend upon truck transportation and again he must be dependent upon good roads for speedy profitable delivery.

Colorado is a very vast empire. Because of the size and sparsely settled country the hauls are long. That factor either cuts the profits of the farmer or raises the price to the consumer. Better roads, built to stand the load, will eliminate both evils.

The Western Slope of the Fall River Pass Looking Into the Divide



View taken on the work now being done by Contractor McQueary in Grand County. This road will link up northwestern Colorado with the east.

Proper Care of Machinery Cuts Road Costs

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

THE approach of winter suggests the question of what is to be done with our road machinery and equipment. Are we going to put the tractor and the grader out in the pasture for the winter, and store the plows and slips and fresnos in the fence corner, or shall we first put all of our equipment in first-class condition and then house it in a good dry place until it is needed again next spring?

Before deciding let's hark back to last spring. Do you recall how the old grader expostulated when you tried to induce it to go back onto the job? Do you remember how the rust had accumulated on the slips, and plows, and fresnos? Do you recollect how many delays you experienced before the equipment was fit for use and how much it cost for repairs and parts? Have you forgotten how you had to send in that rush order about July 1, because those graders that had been in use only two years had to be relegated to the scrap heap? If that same condition is not going to recur next spring, now is the time to forestall it if you haven't already done so.

There are two things which demand our attention. First, we must be sure that our machinery is placed in first-class condition, and second, dry storage space should be provided. The Engineering News Record of November 7 carries a timely article by Associate Editor C. S. Hill, which should be carefully read by all who are responsible for the care of road machinery and equipment. The necessity for conserving equipment with the present national shortage of material is brought out and detailed suggestions for putting machinery in shape for storage are given. The desirability of thorough painting and greasing is especially emphasized, and the necessity for careful housing is discussed.

We all realize in a general way that rust is the greatest enemy of machinery, and that if preventive measures are not adopted the life and efficiency of our equipment will be seriously impaired. Most of us, however, have probably not attempted to reduce the proposition to a dollars and cents basis, and until we do this we do not fully appreciate how much we stand to lose if proper precautions are not taken.

Perhaps the following figures will not agree with your local conditions, however, they have been prepared to meet general conditions, and are in accord with the best information the writer has been able to secure.

Let us assume that we have an investment of \$10,000 in new road machinery and equipment. If properly cared for, housed and maintained, this equipment should last five years under average working conditions. This makes a depreciation charge of \$2,000 per year. Adding an interest charge of 5%, we have \$2,500 as the total cost of the equipment per year if the maintenance charge is disregarded.

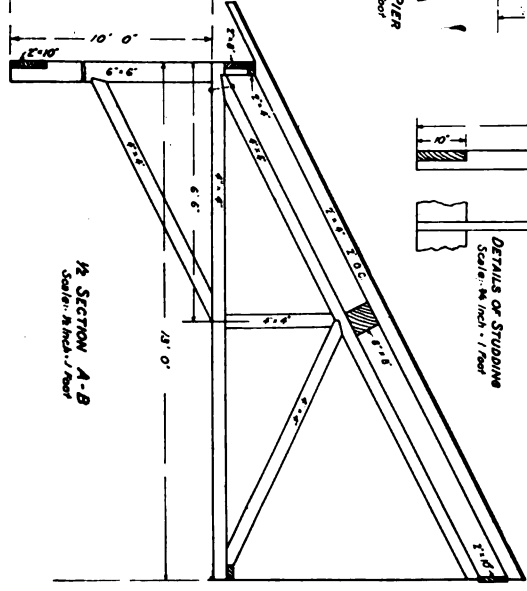
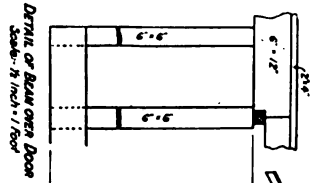
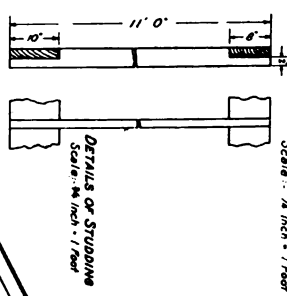
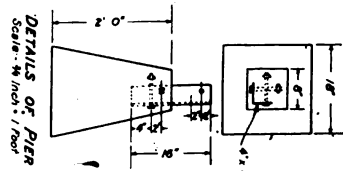
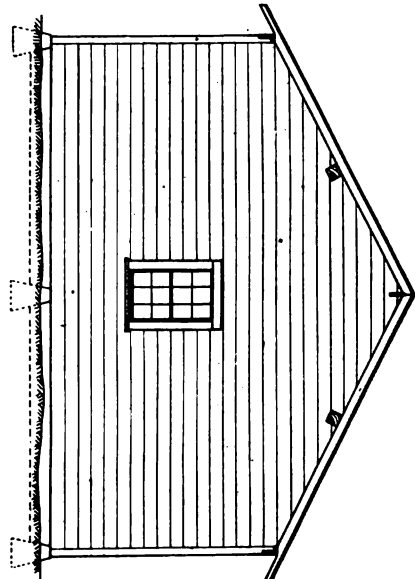
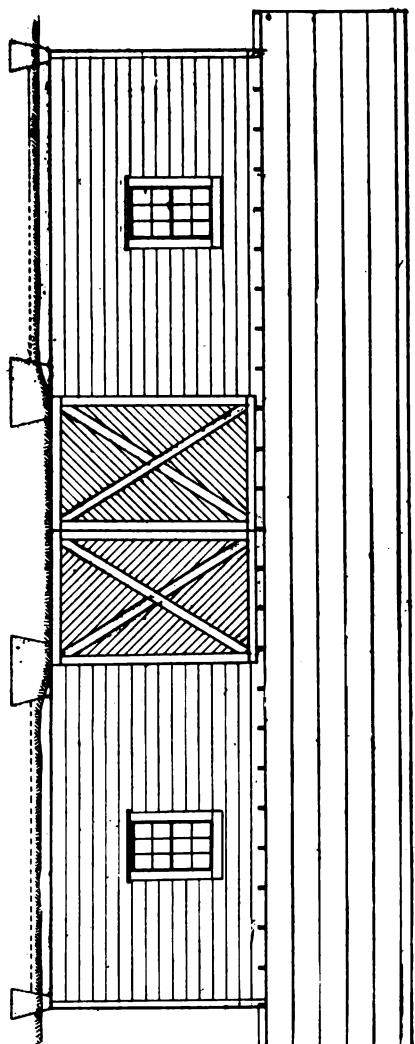
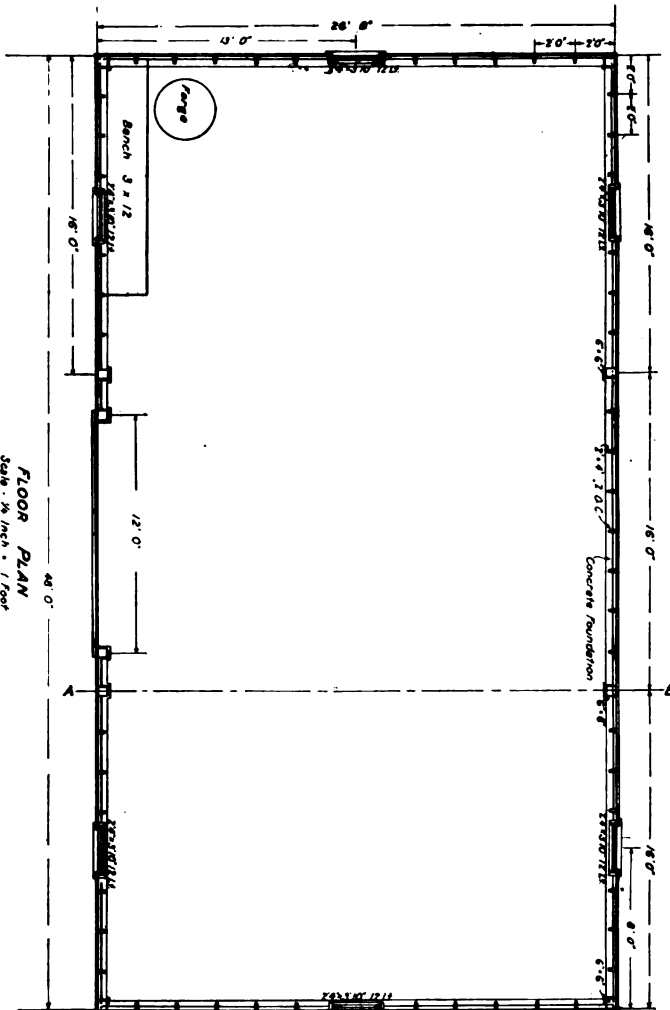
Machinery experts tell us that road equipment properly housed and cared for will on the average give efficient service for twice as long a period as similar machinery which is unprotected and does not receive proper care. If this is true, the average period of efficient usefulness of our equipment, if conditions are otherwise similar, will be reduced from five to two and one-half years. On this basis, we have an annual charge for depreciation of \$4,000 plus an interest charge of \$500, making a total amount of \$4,500 as our equipment charge for the year. The maintenance charge, cost of extra parts, etc., is disregarded in both cases, since it is a necessary charge under either set of conditions and will be very nearly equal.

It is apparent that the annual charge is increased \$2,000, and that our annual loss is this amount minus the cost of housing facilities. There are many types of sheds which can be constructed, but it is certainly fair to assume that a shed adequate for storing this amount of equipment can be constructed for \$2,000. Assuming the life of a well maintained shed as twenty years, interest on the investment at 5%, and an annual maintenance charge of \$100, we have \$300 as the annual cost of storage space for our equipment. This amount taken from \$2,000 leaves \$1,700 as the clear gain per year, or 17% of the total amount of our investment in road machinery and equipment. This is no small saving, especially when considered in the light of our limited road funds.

If the above conclusions are true, it is apparent that a sufficient number of implement sheds or warehouses to adequately store all road equipment when not in use is an investment which will pay a handsome dividend, not only in dollars, but in terms of added efficiency.

The planning of an implement shed is deserving of considerable thought and study. The sizes of the pieces of equipment to be stored should be known so that the storage space which they will occupy may be determined. The construction should be as simple as possible, consistent with sufficient strength to withstand wind and snow loads, and to insure exclusion of the elements. Doors should be amply wide, of the sliding type, and be substantially made. Care should be taken in designing the structure to insure sufficient strength at point doors are hung to prevent sagging.

One feature of the design of buildings of this kind which should also be considered, is the appearance of the finished structure. While utility is the first consideration, the element of beauty need not be entirely neglected. Such a building is an improvement of a permanent character and local pride will dictate that the structure be reasonably attractive. The building should be well painted with not less than two coats of paint. Timbers likely to be subjected to moisture, such as sills, the bottoms of posts, etc., will be rendered more durable if treated with creosote before placing.



ROAD EQUIPMENT SHED

Plans for Machinery Shed Prepared by U. S. Forest Service.

Farm Homes for Returning Soldiers

By the Colorado Department of Immigration

IN the discussion of reconstruction plans to be carried out following the close of the world war, much attention has been given possible methods for providing farm homes for returning soldiers. Secretary Lane of the Department of the Interior has given the subject much thought and has directed careful investigations to determine what lands are available for this purpose in all sections of the country. This work has not all been done on the mere assumption that many of our soldier boys will desire to settle on farms when they are mustered out of service. Actual inquiry among men in service has indicated that perhaps 500,000 of them desire to avail themselves of the opportunity to obtain farms when they return home.

The plans suggested by Secretary Lane contemplate furnishing soldiers with ready-made farms, on which soldiers may begin agricultural operations without delay. It is proposed that the states furnish the land and the federal government the funds for reclamation and equipment. Investigations conducted by the interior department indicate that all the land required will be available, including cut-over timber lands requiring clearing, swamp lands which will require drainage and semi-arid lands in the west, most of which will need irrigation.

But the world war came to an end earlier than most of us even hoped it could be ended. One result was that the plans for furnishing farm homes for soldiers are hardly completed before the soldiers begin to return home. Swamp lands can not be drained, cut-over lands can not be cleared and arid lands can not be irrigated in time for the first soldiers mustered out to be placed upon them. Secretary Lane's plan in full detail has not yet been presented to Congress. It can hardly be enacted into law before the period for introducing bills in the state legislatures meeting this winter has expired. Consequently it apparently will be necessary for many of the states, including Colorado, to take independent action in advance of congressional enactment if they are to participate effectively in the big general scheme for soldier settlements.

There is approximately 10,000,000 acres of government land open to homestead entry in this state, upon which soldiers as well as other qualified entrymen may file. A discussion of the distribution and character of this land appears elsewhere in this magazine. A study of this would indicate that a comparatively small amount of this land will be available for immediate soldier settlement.

There is approximately 3,000,000 acres of state land in Colorado. This, however, will hardly be available for use in any general soldier settlement plan for several reasons. It is offered for sale at public auction, the soldier taking his chance with any other person in purchasing it. It is distributed over the state in comparatively small tracts and for that reason is hardly suitable for the establishment

of large colonies. The general opinion is that the most practicable plan of soldier settlement will be the establishment of colonies of considerable size, where general supervision and aid in agricultural work can be directed by the state or the federal government at the smallest possible expense. The state land of Colorado lies in 57 of the 63 counties, the largest amount in any one county being about 200,000 acres in Pueblo county.

If the state is to co-operate with the federal government in its general settlement plan, as already outlined, it will evidently be necessary for provision to be made by which the state is to acquire land for settlement or to exercise some sort of supervision over privately owned land to be improved by the government. Methods by which this may be done will require careful study by competent attorneys. In some states amendments to state constitutions are necessary to acquire land for such purposes, and a few states are making preparations so to amend their constitutions. Just what shall be done in Colorado along this line will, of course, be governed by the specific character of the plan for co-operation proposed by the federal government.

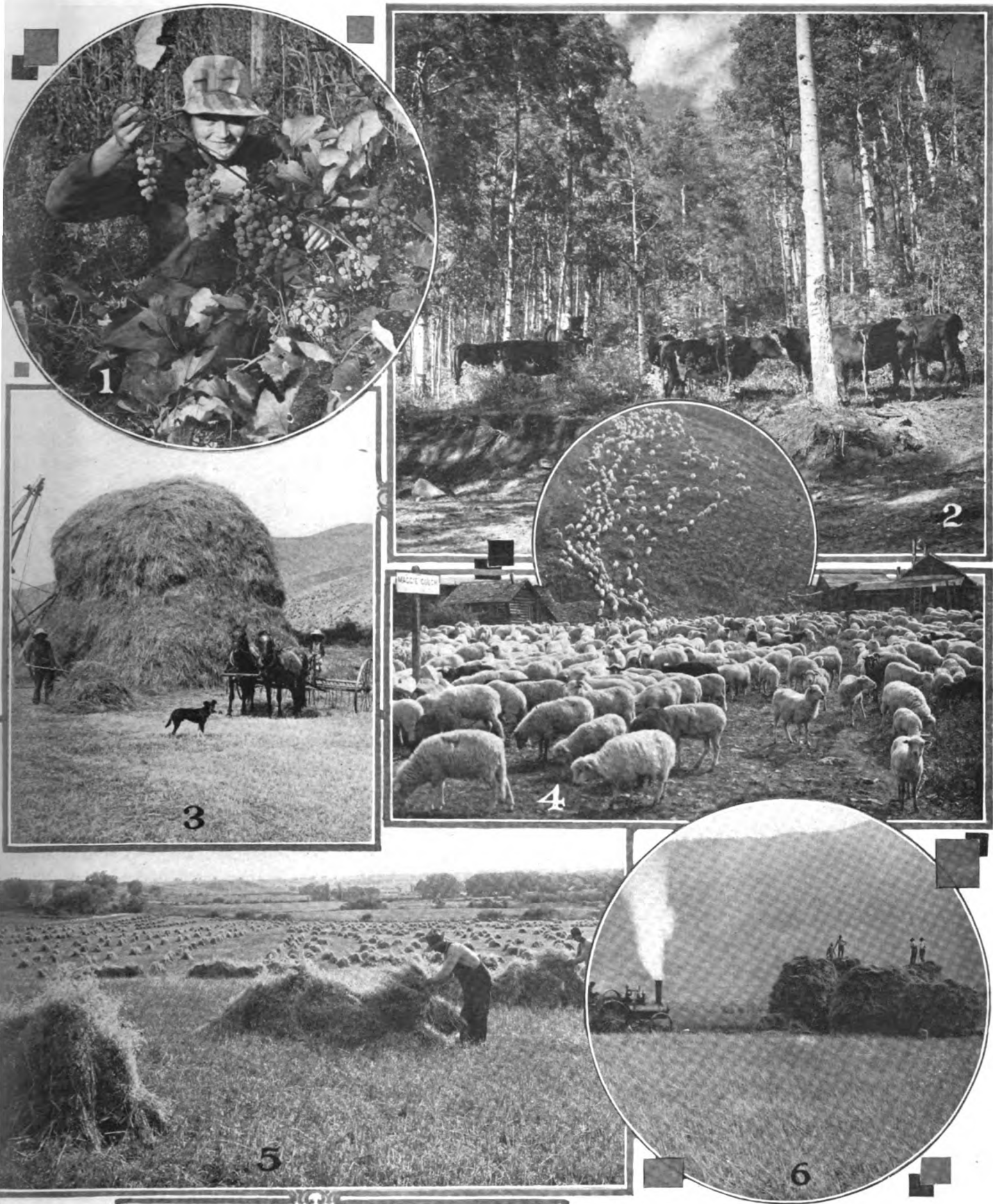
It should be noted that most of our allies in the world war have already taken steps to provide farm homes for their soldiers through the acquisition and improvement of land by state, provincial or national governments. England provided settlements before the war by buying large areas of land in Ireland and selling it to Irish peasants. State land settlement has been a well defined policy in New Zealand and Australia for a long time. One state in Australia has taken over 53,000 acres of land and has made large appropriations to prepare it for the use of returning soldiers. Special provisions for soldier settlements have been made in Canada. England also has provided special legislation along this line.

Most of those who have given any thought to providing homes for returning soldiers are familiar with the California experiment in state land settlement, which is now in successful working operation. This plan was not initiated for the benefit of soldiers. It was thought out before the United States had entered the war and within the narrow limits of its land resources was open to any man of small means who desired to become a farmer and could meet the requirements laid down by the California Land Settlement board.

Elwood Mead, president of the California Land Settlement board, is well known to many Colorado people. He has made a study of state land settlement and colonization for a good many years, particularly in Australia and New Zealand. He is now one of the special advisers to Secretary Lane on the soldier settlement plans being worked out in the Department of the Interior.

(Continued on page 24.)

The Soldier Will Find a Wealth of Productive Farm Land in Colorado



1. Grapes Raised in Montrose. 2. Cattle Grazing on Grand Mesa. 3. Haying Scene, Gunnison. 4. Sheep Feeding, Silverton. 5. Wheat Scene Near Sedalia. 6. Threshing Above Glenwood Springs.

Government Asked to Aid Colorado Roads

WITH an eye to providing at once ways and means for the employment of returning soldiers and also with the purpose in mind of resuming road work at the earliest possible moment, L. W. Page, director of the U. S. Office of Public Roads, recently wrote to T. J. Ehrhart, commissioner of the State Highway department, asking how many men could be used in Colorado on this work. Mr. Page's letter together with that in answer by Commissioner Ehrhart, follow:

Washington, D. C., Nov. 4th, 1918.

Mr. T. J. Ehrhart,
State Highway Commissioner,
Denver, Colo.

Dear Sir:

The Secretary of Agriculture, having in mind the return of our soldiers after the war, and wishing to assist in providing employment for such of them as need it, is anxious to ascertain as early as is practicable, the number of returned soldiers who may be employed to advantage on road repair, construction and maintenance. The co-operation of the State Highway Departments is earnestly sought in the matter.

It is believed, with minor exceptions, the soldiers will naturally desire to return to the localities they came from. Unquestionably, such a wide distribution would result in a more ready absorption into the industries in which they will be needed. It would seem, too, that they should be given the preference by employers.

For the purpose of determining the value of highway work as a field for such labor you are requested to furnish a statement, in letter form, of the approximate number of men your State Department could use in connection with either force account or contract operations. It would be convenient to have the statement indicate separately the number of skilled and unskilled men that could probably be employed, including in the skilled labor, carpenters, masons, stationary engineers, roller-men, quarry bosses, etc., and also the period of the year for which they would be employed.

We, of course, wish to get this information together as soon as practicable, because, although the need may not be immediate, it will be necessary to compile the data and correlate it with similar information obtained for other activities. This will probably take considerable time.

Very truly yours,

L. W. PAGE, Director.

Denver, Colo., Nov. 6th, 1918.

In re file No. J-1

Mr. L. W. Page, Director,
Bureau Public Roads,
Washington, D. C.

Dear Sir:

Referring to your letter of November fourth, will say that in my opinion there will be little difficulty in absorb-

ing into the various industries of Colorado the soldier boys from this state, as they return to their homes.

Colorado will expend on its road system, during the year 1919, approximately \$3,500,000 or about \$90.00 per mile. I believe one of the chief difficulties we will have to meet in this state, will be the re-employment of the labor that has left the state to engage in various governmental employments.

So far as highway construction is concerned and the employment of labor in connection therewith, I believe that Congress should make a large appropriation, special in character, to assist the states during, at least, the coming two years, in the employment of common labor in general road construction. In our own case, if Colorado had to add to its present road fund \$500,000 for each of the years 1919-1920, it would assist in the largest degree, in steadying and maintaining the labor equilibrium so much desired, following peace. Such a Congressional appropriation should be hampered as little as possible by "red tape" regulations and should be used largely in force account work, confined to the main highways of the state.

Colorado's road fund of \$3,500,000 would probably furnish employment to about two thousand men during the six months beginning April first, and about five hundred men for the balance of the year.

During the past year we have had very little trouble in finding the necessary labor to do the road work possible with the funds we have had to expend, because of the advanced cost of materials and labor. Therefore, the most necessary thing, if we expect to extend this work and add to our forces, is additional funds. The people of the state are digging deep into their pockets to provide funds for better roads. The average levy for road purposes in Colorado is approximately two mills on each dollar valuation.

I think the road question has grown beyond state limits, and is now national in character, and that the Government, at this time, through Congress, ought to take steps to assist the states in road work, and at the same time help to take care of the labor that will soon be seeking employment throughout the land.

Very respectfully yours,

T. J. EHRHART,
State Highway Commissioner.

CONVICT LABOR ON MARYLAND ROADS

Application for an injunction against the State Board of Prison Control and the State Roads Commission was recently denied the Jones Hollow Ware Co., the court upholding the constitutionality of the law authorizing the State Roads Commission to take convicts and place them at work on the state roads.

The Jones Company wished to have the state restrained from employing convicts on road work, on the plea that such action was a violation of its contract with the state. The state, through the Attorney General's Department, filed a demurrer which was sustained by the court.

County Commissioners Increase Road Levies

Climbing the Hills to the Blue Mesa

Budgets received from thirteen boards of county commissioners from districts scattered throughout the state indicate that the boards will either maintain their levies at the level of 1918 or that they will increase them.

In the case of Eagle County, for example, the levy has been raised from 3 mills to 4.01, while there has been an appreciable addition to the valuation

Garfield County has lowered the levy from 6.69 to 5 mills, but will have \$13,000 more funds because of the fact that a heavy indebtedness has now been cancelled and there is also an increase in valuation.

Logan has added a mill with an increased valuation of practically \$10,000,000, Montezuma will maintain a 7-mill tax, Yuma has increased from 1.5 to 2.42 with increased valuation, while Adams, Jefferson, Custer and Huerfano have maintained levies with increased valuations.

To date Gilpin and Pitkin counties are the only ones to show a decrease due in these cases to decreased valuations and reductions in taxes made necessary by quiet seasons.

The valuations, as received to date, follow:

County	1917		1918	
	Mill Levy	Valuation	Mill Levy	Valuation
Adams	2.	\$ 26,170,660	2.	\$ 28,470,000
Alamosa	2.	8,290,336	...	...
Arapahoe	1.3	18,598,595	...	...
Archuleta	2.8	4,803,077	...	...
Baca	1.	6,413,119	...	...
Bent	1.75	11,526,440	...	...
Boulder	1.95	42,892,240	...	...
Chaffee	1.75	10,997,225	...	...
Cheyenne	1.5	10,728,544	...	...
Clear Creek	5.5	5,346,050	...	...
Conejos	2.5	8,936,977	...	...
Costilla	3.5	5,477,907	...	...
Crowley	1.1	9,110,705	...	...
Custer	2.5	2,459,849	2.5	2,552,531
Delta	2.6	15,373,800	...	...
Denver	...	330,453,580	...	...
Dolores	2.	1,582,545	...	...
Douglas	2.	11,113,180	...	...
Eagle	3.	7,255,440	4.01	7,597,511
Elbert	2.3	13,722,779	...	...
El Paso	1.6	65,710,060	...	...
Fremont	2.8	18,797,830	...	...
Garfield	6.69	18,310,850	5.	19,318,000
Gilpin	3.5	3,350,678	3.5	3,174,483
Grand	2.53	4,737,555	...	...
Gunnison	2.2	16,025,760	...	...
Hinsdale	4.	984,119	...	...
Huerfano	2.5	12,963,074	2.5	...
Jackson	2.	5,058,955	...	5,645,665
Jefferson	2.49	22,579,930	2.49	23,492,810
Kiowa	.5	9,085,235	...	...
Kit Carson	2.	14,123,033	...	...
Lake	.75	11,508,625	...	...
La Plata	2.623	15,244,340	2.25	15,824,524
Larimer	2.3	40,979,005	...	...
Las Animas	1.5	37,440,456	...	...
Lincoln	1.6	13,678,005	...	...



A Scene on the Road Above Sapinero, Gunnison County, Near the Lake City Junction.

Logan	4.21	27,544,988	5.21	37,821,911
Mesa	2.2	27,408,230	...	...
Mineral	5.	1,470,052	...	...
Moffat	7.	5,714,770	...	...
Montezuma	7.	5,844,653	7.	6,463,107
Montrose	2.7	15,192,880	...	...
Morgan	3.3	21,491,890	...	...
Otero	1.98	27,650,280	...	...
Ouray	3.5	5,194,341	...	...
Park	4.	8,637,650	...	...
Phillips	1.	8,190,356	...	...
Pitkin	3.5	5,385,630	2.5	5,750,400
Prowers	2.006	18,784,420	...	...
Pueblo	1.3	66,064,912	...	...
Rio Blanco	2.75	5,728,420	...	...
Rio Grande	2.	9,906,550	...	...
Routt	5.23	14,247,327	...	...
Saguache	2.	11,948,779	...	...
San Juan	3.5	4,172,220	...	...
San Miguel	3.25	8,845,724	...	...
Sedgwick	1.62	6,888,168	1.391	10,783,181
Summit	3.	6,474,358	...	...
Teller	2.67	13,848,230	...	...
Washington	1.5	17,904,363	...	...
Weld	2.7	82,573,620	...	...
Yuma	1.5	15,233,850	2.42	18,587,200
		1,305,286,409	.....

Commission Hears Petitions From Counties

THE postponed quarterly meeting of the State Highway Commission was held in the offices of the department, Nov. 26. L. E. Curtis and Fred Radford were absent because of illness. Those present were L. B. Walbridge, chairman; Fred Goble, Elmer E. Sommers, newly appointed member, and T. J. Ehrhart, commissioner.

No formal action of any kind was taken by the board. Petitions were heard, however, from representatives of numerous counties who desire aid for road work in 1919. These may be summarized briefly.

Teller County Commissioners reported that the abnormal increase in truck traffic during the past year has necessitated more work on main highways, particularly that from Colorado Springs to the gold district.

Kit Carson representatives are desirous of completing the graveling of the east and west road, Route No. 3, through their boundaries, and to that end would keep an outfit steadily employed on the road.

James Hurley of Morgan reported that his county is not lacking in funds for road work but that assistance is desired in purchasing road machinery. Use of light tractors for dragging purposes has been uniformly successful in this district.

County Attorney Carpenter of Montezuma presented plans for opening the main road through from Dolores to Rico and Telluride. Special stress was laid upon need of aid in what is known as the Stapleton section and on the Montelores hill and bridge.

G. V. Hodgkin and J. C. McCandless of Fremont reported that their county desires to undertake first-class maintenance on all roads and would gravel all highways.

Jacob Beck of Custer said that his district is particularly interested in securing improvement of State Route No. 37, the Oak Creek road, in order that coal may be brought out and supplies carried in the mines.

S. Greenwood and H. E. Miller of Boulder asked aid in the construction of two miles of concrete on the eastern gateway into Boulder and a similar amount on the southern approach to Longmont. Increase in traffic has made this work imperative, say the commissioners.

Thomas A. Forkner and R. S. Hamilton, Moffat County, are interested in the improvement of Route No. 41 from Craig straight through to the western state line.

Walter Shy of Cheyenne County said that his board is desirous of securing a right of way along the railroad near Wild Horse and east of Cheyenne Wells, in order to shorten the course of the through east and west highway.

Lake County commissioners hope to construct four miles of road between Leadville and Dillon in order to provide an outlet for heavy mining traffic.

The commissioners of Grand County hope to improve the Trough road which is a part of the Midland Trail and

also to do a good deal of improvement work on Berthoud Pass.

Harry G. Flanders and H. G. Tiffany presented the need for an extension of the concrete roadway on the Brighton road through Adams County, together with improvement work on the Denver-to-Limon highway and the stretch beyond the Tarvia on the Boulder highway.

W. F. McClure and Frank Russell of Conejos outlined the plan of that county for improvements of two bridges across the Conejos River near Antonito, a third structure across the Alamosa near La Jara, and a fourth across the Rio Grande between La Jara and San Luis. They are also interested in the Cumbres Pass highway.

W. S. Rose of Ouray has made an application for U. S. Forest Service aid on the road from Ouray to Silverton at the point where the highway crosses Red Mountain at the top of the divide.

All of these subjects were taken under advisement by the Commission which will proceed to apportionment of funds when complete data are at hand regarding levies, budgets, etc., for the year 1919.

FIRST PAVED ROAD BETWEEN IOWA CITIES COMPLETED

A highway that is said to be the first surfaced highway to be built in Iowa as a connecting link between two cities has recently been completed in Cerro Gordo County. The road connects Mason City with Clear Lake and is ten miles in length. It is paved with reinforced concrete and cost about \$15,000 a mile.

Work on the road commenced in 1913 when a mile of paving was laid near Mason City. In 1915 a second mile was built between the end of the first mile and the Mason City line. At about the same time Mason City extended the pavement from the city line to the center of the municipality. The portion recently completed is four miles in length and connects the pavement in and near Mason City with the portion in Clear Lake, built later by that city.

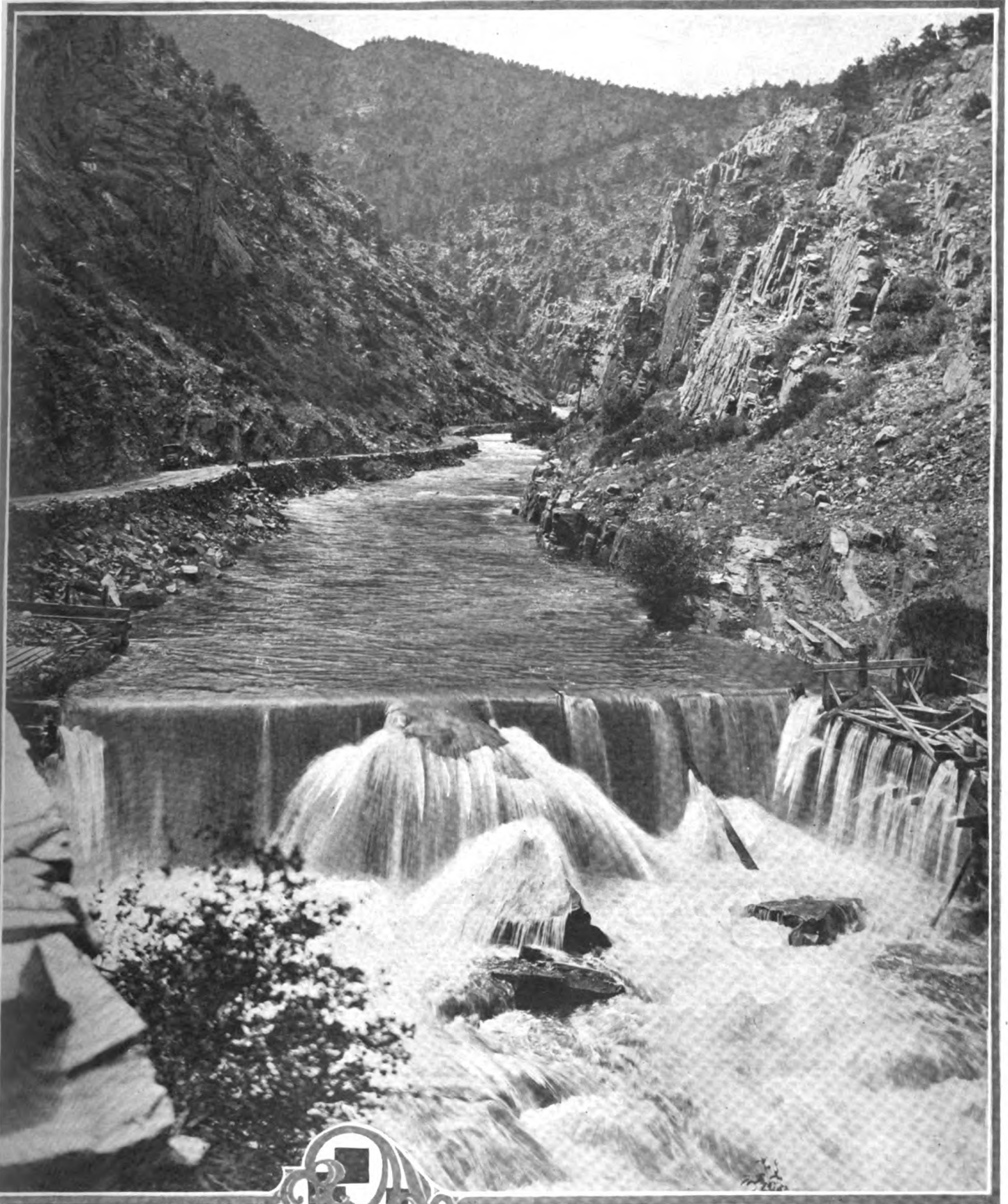
The connecting link was built by the county with state and federal aid, and, incidentally, is the first federal aid project designated and completed in the state. It was started in 1917 and was about half finished when construction was stopped by the winter. Work was started again early last spring, but because of delays due to war conditions was not completed until late in August.

ROAD WORK IN INDIANA AFTER THE WAR

An extensive road building campaign in Indiana after the completion of the war is being planned by Governor Goodrich, according to a report received by a county council of defense. It is said that the state will have accumulated \$2,500,000 by next year and will be entitled to an equal sum in federal aid. It is planned to use this fund and utilize surplus labor from war factories in the building of roads.

Surveys for a Portion of the Lincoln Highway in the Utah Desert were made at night because of the impracticability of working in the dazzling, flickering light during the daytime. The section surveyed in this way is seventeen miles long and crosses a portion of the Utah desert. The work was done by the light of signal fires and construction work is now under way.

Where the Road Begins Its Winding Way Up the Big Thompson Canon



Scene at the Point of the Diversion Dam, at the Entrance to the Estes Park Gateway, Larimer County.

SILVERTON ROAD UNIQUE IN U. S.

The Stern Walls of the Amphithe

Famous Old Highway Cuts Thru Heart of One of Most Rugged Sections in United States; Will Be Link in 1200 Mile Tour.

IN the heart of the San Juan Range, one of the most rugged chains of mountains to be found in the world, rests the City of Silverton. High peaks surround the town on all sides, and in the more severe winters there are periods of from thirty to sixty days when the city is cut off from all communication with the valleys on the other side of the range.

In the summer time and in the fall few cities have a more picturesque setting than this and on the day when the new Durango-Silverton highway is completed, the first thousands of travelers will begin their pilgrimage through this district. The town is one with a past, a present, and a future, and in each of these aspects 'it possesses more than the ordinary interest for the traveler.

Hundreds of years ago, the Spanish adventurers in search of gold penetrated into Southwestern Colorado. The Needles of the San Juan, which lie to the south of Silverton, were seen and described by them, but the impenetrable passes of the range held them at bay and as far as is known, none of them ever ventured into the high hills.

In 1848 Fremont made his way up the Rio Grande River with a government expedition in search for a location for a short railroad route from the Atlantic to the Pacific coast.

Working his way gradually along the river he and his party arrived at a point which has since become known as Starvation Gulch, and which is probably some twenty miles from Silverton.

Apparently the purpose of the explorers was to work to the south as winter was approaching and they did not care to get caught in the mountains at this season of the year. Instead of reaching a lower altitude, their route carried them gradually into the heights of the divide.

At Starvation Gulch, the first snow storm hit them and before they could retrace their steps, winter had set in. Heavy snow falls on all sides of them hemmed the expedition in and it became necessary for Fremont to send out runners for help. Four men were dispatched for assistance before one got through, and finally it was the Indians who came to the rescue of the party. Before this time, however, several members of the party had died, the stock had been killed off and those who survived were nearly all ill. It was months before they recovered from their experience.

This marked the conclusion of Fremont's attempt to reach the south via the Silverton district and it was not until 1860 that a second attempt was made to penetrate the range.

Then John Baker's expedition worked their way into the valley prospecting as they went and for a long time after that the valley was known as Baker's Park. It was



not until 1870, however, that pay ore was found in this district, but from that time on mining development was rapid and settlers poured into the valley.

With the influx of travel came a demand for transportation. The situation was far more serious than that presented in even the mountain counties of the state as all of the outlets from Silverton are rugged in the extreme and for a long time pack saddles were the only means of communication.

Then came Otto Mears, master among the road builders of the early days in the state, with a proposal to construct a toll road which should take the travel from Ouray over the heights of Red Mountain, thence down to Silverton.

To fully appreciate the nature of this undertaking, it is necessary to see the canyon of the Uncompahgre. The stream drops down from Red Mountain at an exceedingly rapid rate through a box canyon whose walls of solid rock rise sheer from the river bed to a height of thousands of feet. There was no possibility of construction of a road along the river, and had it been possible, the high waters of

Heights Above Ouray on the Famous Old Toll Road to Silverton



early spring would have washed out the roadway more often than it could be repaired.

The only alternative presented was to blast the roadway from the side walls for a major portion of the distance and when it is remembered that this was in the days before the modern road tools were known, some idea of the difficulty of the undertaking may be had.

But Mears was never the man to stop at impossibilities. The whole history of his road work was one of undertaking projects which others scoffed at as the plans of an idle dreamer and the Silverton road was no exception.

Construction was started against unheard of odds, and problem after problem was overcome as the work proceeded. Whole cliffs were shot off and dropped into the canyon and the hills echoed to constant drum of dynamite blasts.

The road was finished in 1883 and from that time on has been traveled by a steady procession of six "hoss" teams, carrying thousands of tons of precious metals, supplies and other materials to the plains below.

Of recent years, with the advent of the automobile, passenger traffic has started and with the opening of the Durango unit, this will be immeasurably increased in the years to come.

Winding along the walls of the canyon, sometimes looking down for sheer depths of a thousand feet, past fine waterfalls into the heart of the range where snow-clad hills forever guard the way, the trip is one of unsurpassed beauty. Distinctive in its ruggedness, unique in the character of the road, unexcelled in the beauty of its setting, the old toll road is destined to lead a new stream of wealth into the Silverton district and the camp, which is today the center of some of the richest producing mines in the state, will unquestionably be a gathering point in the near future for a host of travelers, whose advent will make it one of the famed mountain resorts of the world.

Only the war now stands in the way of the fulfillment of this new era for Silverton, Ouray, Durango and the surrounding towns of the district, and once peace is declared, the settlers may safely look for a tremendous renaissance.

COLORADO HIGHWAYS BULLETIN

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Owing to the necessarily limited edition of this publication it will be impossible to distribute it free to any persons or institutions other than state and county officials actually engaged in the planning or construction of highways, instructors in highway engineering, newspapers and periodicals and civic associations. Others desiring to obtain Colorado Highways can do so by sending 10 cents for each number desired. Associations desiring to distribute the magazine can obtain it at cost in lots of from 500 copies up. Subscription Price, \$1.00 per year.

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No. 7

ROADS AND RECONSTRUCTION.

The war is over, but in its wake has come peace with a multitude of problems infinitely more complex than those which had to be overcome on the battlefield.

The work of reconstruction is at hand and if this country is to be spared the horrors of Bolshevism, which are sweeping over grief-stricken Europe, a comprehensive program, which will provide employment for thousands upon thousands of soldier-laborers, must be commenced.

No field presenting itself to the immediate vision is more fertile for this work than that of road building. No single industry in the United States reaches down to the fundamental principles of community life more deeply, no question is more vital at the present moment.

We must have roads, good roads, permanent roads. We must have them not by the hundreds of miles, but by the thousands and they must be so constructed as to withstand the hammering of a commercial traffic, beside which the abnormal truckage of the war will become as naught.

The world is clamoring for food. We are told by Herbert C. Hoover, food administrator, that it will take years to rehabilitate the rapidly diminishing stocks of Europe. In the meantime thousands are starving, while the United States remains as the one producing center on the globe which can and will provide a surplus for the hunger of other races.

But if this surplus is to be made effective, then our transportation facilities must be geared to a tension never before equalled in history. It is a comparatively easy matter for this country with its millions of acres of fertile lands to raise the crops, but once they are raised they must be transported, and the first step in 99 per cent. of the transportation of the world is the road, whether the ultimate carrier be the railroad or the water way.

In response for the immediate necessity for transportation, the motor truck has been evolved as an efficient, fast

moving carrier which serves to conserve labor, reduce costs and to stimulate production while relieving congestion.

But while the motor truck has answered the call, the road has not.

Gutted out by the incessant hammering in rain or shine, night and day, chipped to pieces by the traffic in days of frost, ripped to the very vitals, the road of today is in sorry plight. If transportation is to continue, these conditions must be cured. To cure them, funds expended on an unheard-of scale are necessary.

The question is an elemental one. Stripped of all verbiage it spells prosperity or ruin to the United States according to the manner in which it is handled.

Good roads mean reduced costs of living, wider marketing spheres, development of natural resources. Poor roads will inevitably bring about an exactly opposite condition.

Here in Colorado the question resolves itself into one upon which the future of this state depends. If we are to develop our untold acreage of arid lands, if we are to exploit the millions of dollars of potential wealth in our hills, if we are to bring in thousands of travelers, we must have roads. There is no denying or begging the question. It is before us and we must meet it.

Presented from a national viewpoint, the question is one which demands a federal road commission and a liberal federal aid act, which will serve to develop every main highway in the United States.

Presented from the viewpoint of the state, the question demands more funds for the improvement of our miles of county and secondary highways.

It is not a gift which is asked of the people of Colorado when this request is made. It is a positive, gilt-edge investment which they are requested to make.

If these funds are given, the individual will benefit through a positive known reduction in the cost of his traveling expenses on the road, whether he use horse or machine. He will benefit through the new channels of trade which will be opened to him, through a reduction of costs in everything he buys, since the element of transportation affects the price of every commodity. He will benefit through the increase in realty values, through a broadened horizon of life, in countless other ways.

The issue is plainly before every citizen in this state as it is before those in very other state.

Roads and prosperity or isolation and poverty.

Which shall it be?

TRAFFIC LIMITATIONS.

The chart prepared by Chief Engineer Jas. E. Maloney and published elsewhere in this issue can hardly be termed popular literature, yet the findings therein, when coupled up with the cost of operation, are of serious interest to every resident of Colorado. These conclusions will present a data for future road work which every county commissioner will find worthy of close study.

Nebraska Developing Gateways to Colorado

An Interview with George E. Johnson, Engineer in Charge of Nebraska Roads

“THE day for road building on a large scale throughout the United States is at hand. We must have more funds for road work and the problem is one which is too big for the individual states to handle. We need funds from the United States government and they should be given to the state highway departments in a way which will be as free from ‘red tape’ as possible and which will enable us to proceed to our work without delay.”

Such, in effect, was the opinion expressed by George E. Johnson, road engineer in charge of the highway department of Nebraska, who was in Denver recently on a short business trip.

Mr. Johnson took occasion to visit the state highway department while here, and expressed himself as strongly in favor of a unified program of action on the part of the West, which will secure adequate representation for this section of the country from the next Congress.

Talking about the Federal Aid Act as it applies in his state today, Mr. Johnson said:

“For a full understanding of the workings of the Federal Aid Act it is necessary to know first what our state department has in funds and how they are applied.

“At the present time the state meets the Federal Aid dollar for dollar. Fees from motor car registration go direct to the counties, hence our entire state fund is limited to the Federal Act.

“In consequence of the rules governing that act, it has frequently been necessary for us to either expend large sums on roads which do not need the work or hold back the appropriations. We asked the department of agriculture for a ruling, saying that funds might be used on roads which would open up new country, thus providing post routes, but while they assented, the money has never been so appropriated.

“At the present time we are fostering a bill which will tax all cars 50 cents per 100 pounds, which we believe is the real basis for taxation since it is weight which destroys the roads.

“It is our hope that the Federal Government will grant us more liberal aid in the future with fewer restrictions.”

Talking about work on the gateways leading into Colorado, Mr. Johnson said that the O-L-D highway is practically all a Federal aid project. Some fifteen or sixteen miles of this highway has been permanently improved and the department hopes to be able to continue work on this gateway which is one of the most important of those leading into Colorado.

The Lincoln highway is partially under Federal aid, and is constantly being improved here and there.

In general the state has worked out a state highway system based upon communication between county seats and has taken over supervision of these roads.

However, most of the construction work in Nebraska is being done by the counties. These organizations are required to do grading on their roads from the funds received from motor registrations and in bridge work they are given assistance by the state out of a separate fund.

In addition to his work in charge of the highways, Mr. Johnson is also chairman of the Highways Transport Committee of the State Council of Defense, thus affording the council the same close connection with the state highway department in Nebraska as it has in Colorado.

Talking about this phase of his work, Mr. Johnson said:

“We have been able to do a good deal of development work in Nebraska with the motor truck as medium. Most of this has been in the haulage of live stock, but the work is gradually spreading out.

“Motor trucks are under the common carrier act in Nebraska, a feature which has aided us materially in the regulation of traffic.

“All companies are required to file their rates with the railway commission and after an operating period of about three months these are analyzed and revised to make them equitable to operator and shipper alike.”

Mr. Johnson is an active member of the State Highway Department Association of the United States, and will be one of those present at the annual meeting of that organization which will be held in conjunction with the meeting of the Highways Industries Association in December in Chicago.

He has well formulated plans regarding road work in the Western country and he will be one of the strongest proponents of favorable road legislation at the Chicago meeting.

HIGHWAYS ON THE ISLAND OF TRINIDAD

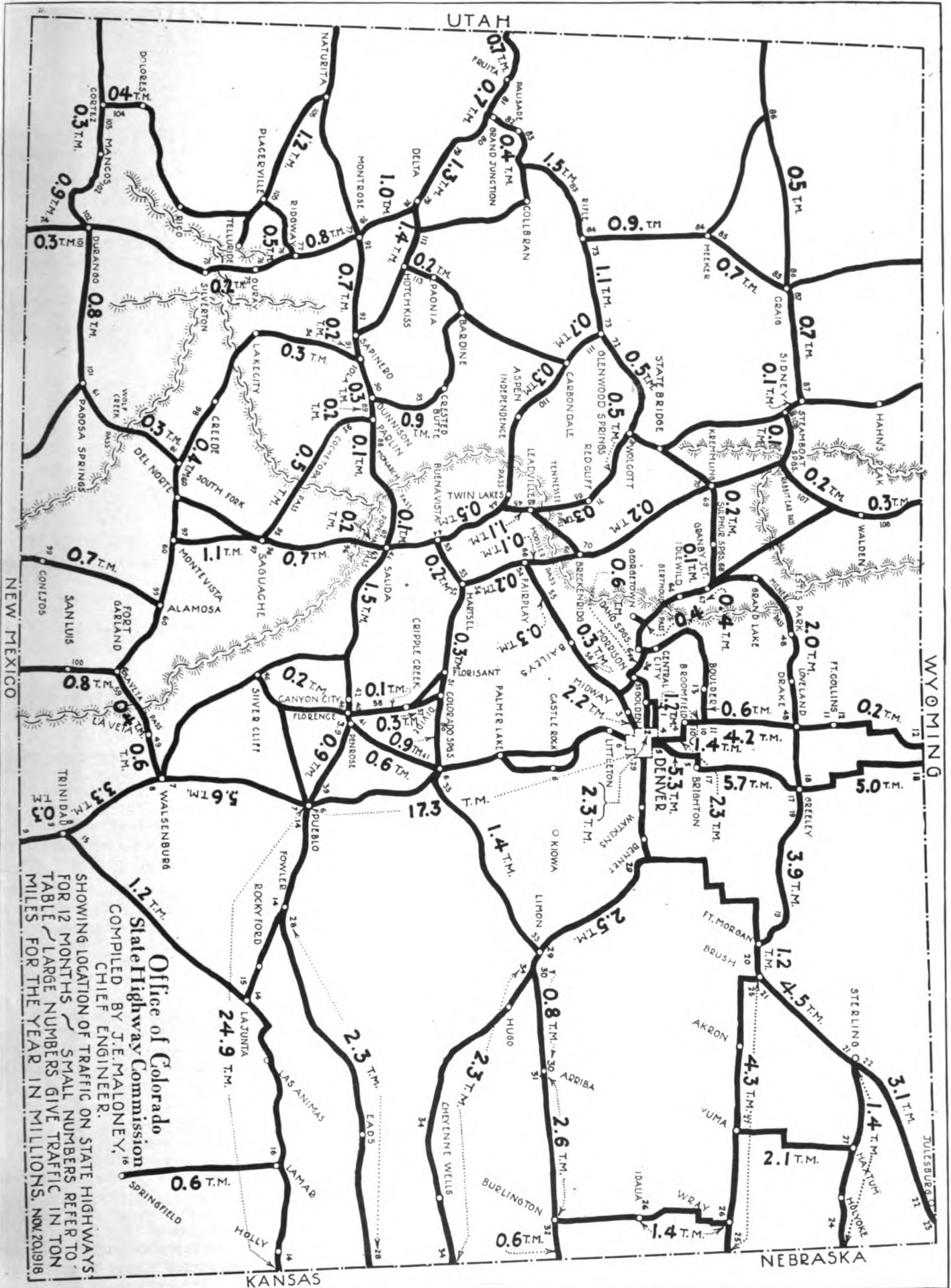
There are about 600 miles of road suitable for motor trucks on the Island of Trinidad, according to Consul Henry D. Baker, writing in a recent issue of the “Commerce Reports.”

The railroads of the island face so heavy competition from coastwise shipping that little effort is made to develop them. The more important towns are situated on the coast and most of the larger estates inland are connected with the coast by roads that will carry cart or motor truck traffic.

At present there are over 750 motor vehicles registered in Trinidad, and about 100 of them are trucks. The latter are not very extensively used for the carrying of freight, but their advantages for such work are beginning to be recognized, and it is probable that when importing conditions become easier, motor truck transportation will be further developed.

APPLICATIONS FOR FORSTRY WORK.

Applications for road funds from the U. S. Forest Service should be placed in the hands of District Forester Smith Riley not later than January 1 to receive consideration. The annual distribution of funds will be made shortly thereafter.



Colorado Highway Traffic Table for the Year 1918

Reference No. on Map	East of Continental Divide		Ton Miles				Ton Miles per Mile of Road for year	Remarks	
	Road	Location	Autos	Trucks	Wagons	Total			
69		Kremmling-Sulphur Spgs.	220,248	10,474	7,600	238,322	19.2	12,413	
70		Kremmling-Breckenridge	185,472		10,000	195,472	32.2	6,070	
71		Red Cliff-Wolcott	229,050	71,442	168,000	468,492	27.0	17,352	
72		Wolcott-Glenwood Spgs.	425,040	25,725	72,000	522,765	35.0	14,936	
73		Rifle-Glenwood Springs	792,796	60,002	268,424	1,121,222	29.0	38,663	
74	Western Mountain Slope and Valley Roads	West. N & S Rd Durango-State Line S.	157,192	71,381	78,676	307,249	23.5	13,074	
75			Ouray-Silverton	99,360	52,920	28,000	180,280	24.0	7,512
76			Ouray-Ridgway	355,391	51,726	69,429	476,537	10.7	44,533
77			Montrose-Ridgway	535,821	71,321	236,028	843,170	21.2	39,772
78			Montrose-Delta	683,445	124,142	231,400	1,038,987	22.5	46,177
79			Whitewater-Delta	656,107	155,177	462,800	1,274,084	33.2	38,376
80			Whitewater-Grand Jct.	341,723	124,142	261,482	727,347	10.5	69,271
81			Fruita-Grand Junction	229,638	72,416	401,710	703,764	14.5	48,535
82			Palisade-Grand Jct.	183,710	115,865	127,733	427,308	4.0	106,827
83			Palisade-Rifle	956,823	413,805	97,188	1,467,816	70.0	20,969
84			Meeker-Rifle	557,691	248,283	129,584	935,558	42.0	22,275
85			Meeker-Craig	414,000	147,000	160,000	721,000	48.0	15,021
86			Craig-State Line W.	397,440	29,400	54,670	481,510	94.0	5,122
87		Craig-Steamboat Spgs.	546,480	88,200	72,000	706,680	42.0	16,826	
88	Rainbow	Monarch-Parlin	103,500	14,700	18,512	136,712	28.5	4,797	
89			Gunnison-Parlin	134,343	6,615	11,570	152,528	12.5	12,202
90		Gunnison-Iola	245,916	15,876	21,600	283,392	12.0	23,616	
91		Sapnerro-Iola	159,390	9,261	16,800	185,451	14.0	13,247	
92		Sapnerro-Montrose	491,832	105,840	111,072	708,744	42.5	16,676	
93		Gunnison-Crested Buttes	730,296	39,690	152,000	921,986	30.0	30,733	
94		Iola-Lake City	248,400		12,000	260,400	54.0	4,822	
95		Parlins-Saguache	422,280		36,000	458,280	68.0	6,739	
96		Poncha Pass-Saguache	645,840		36,000	681,840	41.5	16,430	
97		Monte Vista-Saguache	908,902	108,624	106,444	1,124,050	35.0	32,113	
98		South Fork-Creede	412,344		63,000	475,344	24.1	19,704	
99		Alamosa-Conejos	546,756	25,863	157,352	729,971	27.0	27,036	
100	Spanish Trail	Ft. Garland-San Luis	437,405		422,074	859,479	16.0	53,716	
101			Pagosa-Durango	658,260	88,200	30,000	776,460	64.9	11,964
102			Mancos-Durango	417,312	317,520	132,000	866,832	30.4	28,514
103			Mancos-Cortez	241,445	13,230	50,400	305,075	18.4	16,550
104			Dolores-Cortez	269,004	87,318	88,800	445,122	12.5	35,611
105			Placerville-Naturita	794,880	411,600	44,000	1,250,480	40.0	31,262
106			Walden-State Line N.	264,960	2,940	24,000	291,900	24.0	12,163
107			Walden-Rabbit Ear Pass	142,830	5,513	4,500	152,843	34.0	4,495
108			Sydney-Rabbit Ear Pass	132,066	4,042	4,000	140,108	22.9	6,118
109			Sydney-Steamboat Spgs.	96,048	4,410	20,400	120,858	4.0	30,215
110		Carbondale-Aspen	198,720	11,025	90,000	299,745	27.8	10,788	
111		Carbondale-Glenwood Spgs.	447,120	36,750	201,600	715,470	13.2	54,202	
112		Delta-Hotchkiss	894,240	105,840	412,000	1,412,080	24.0	58,837	
113		Paonia-Hotchkiss	140,843		100,800	241,643	9.0	26,849	
Totals			115,539,888	28,576,262	13,696,238	162,926,098	3,827.50	42,566	-Avg. per m., 3,827.6 mi

Brief Items About Road Work in Colorado

Dolores County Commissioners have let the contract for the bridge across the Dolores River at Montelores subject to the approval of the state highway department. This structure will be a 75-foot span with concrete abutments.

Supervisor Ike Taylor, of Gunnison County, and his road crew have finished the work of improvement on the Muddy Creek road between Bardine and Spring Creek. The work comprised about six miles of construction and was necessary as an outlet for the farmers in the valley above Bardine.

The third stretch of concrete highway to be completed out of Denver is now open to traffic from Denver to the turn at Littleton. This eliminates the need of further diversion of travel from Littleton into Denver via Broadway, as the old road into Littleton can be taken from the turn without loss of time.

The road which is four miles long is the first Federal Aid project to be completed in Colorado and was constructed at a cost of approximately \$76,000, one-half of which was borne by the state, the rest by the national government.

Assistant Highway Engineer Cheney has returned from Granite where he was supervising construction on Federal Aid Project No. 3, from Granite to Twin Lakes. Work has been discontinued because of adverse weather conditions, but will begin again with the first touch of spring.

The engineers of the U. S. Office of Public Roads are now investigating the cost of improvements to be made on the road

between Dolores and Rico. The strip will comprise one of the main road openings from the southwestern end of the state to Montrose and Grand Junction and as such is regarded as one of the most important links in the state. The purpose of the investigation is to furnish a basis for construction cost, which the U. S. Forestry Department and the state department will share.

An investigation has been made into the highway running from Pagosa Springs to Chama, New Mexico, with a view to its future improvement by the U. S. Forestry Department. This road is one of the main gateways into Colorado from the south and its improvement will materially increase the volume of traffic in this region.

Construction work has been discontinued throughout Larimer County, save on the Poudre, until weather conditions improve. Maintenance is being done wherever needed, but most of the road men have come in for the winter.

Contractor Edward O'Neill has started work on Federal Aid Project No. 4, between Meeker and Rifle, but it will be the end of next season before this work can be completed. Preliminary work includes the establishment of a camp and preparation of the lime shale quarries for material for surfacing the highway.

Good progress is being made on the Federal Aid Project between Lamar and Springfield. The bridge over Sand Creek is about completed and the contractors expect to complete the grading and surfacing of the 3.5 miles stretch of road by next month.

The New Era of State Development

(Continued from page 4.)

Colorado tell the prospective investor, honestly and intelligently, concerning the best locations? Can it tell him where the potatoes and the fruits are produced, and in what quantities? Can it tell him what disposition is made of the present crop and what opportunities there are for increasing the production of today when his factory has made increased production profitable? Can it tell the small investor the approximate cost of the construction and equipment of a plant, the cost of operation, the railroad and highway facilities and the existence or non-existence of a near-by market for his manufactured product?

To be prepared, Colorado must be equipped with facts, not fancies; true totals, not the estimates of enthusiasts and boosters. It must know today what the prospects for tomorrow are, and it cannot know that without knowing first the history of all the yesterdays.

What is the answer to criticisms of that sort? It is late, but not too late for Colorado to begin to prepare itself to deal intelligently with the problems of immigration and development, which now begin to assume a degree of importance never realized in the past. There is, beyond question, a tide of immigration which within a few months will set westward and which will stagger the imagination of the most optimistic. For nearly two years the great war has held immigration at a standstill. The government did not encourage the movement of people from one section of the country to another, and the government controlled the railroads and their rates. Homeseekers' rates were annulled and immigration was discouraged. The west suffered temporarily, but the reaction which will set in now will compensate for that temporary loss many times over.

The return of the soldiers means more than the voluntary statement of 500,000 men that they want to return to farm life rather than to the cities. It means that thousands of men will be released by the return of men who went from the farms to the military service, and that these thousands are going to turn their eyes to the lower priced lands of the west, where population has not yet exceeded the possibilities of the land. It means that within the next ten years the population of the west is going to be increased by millions, not by thousands.

What are the western states, and particularly Colorado, going to do to meet the tremendous demand for information that is coming? Are we to tell them that there are millions of acres of farm land and billions of dollars in the manufacturing industries and the mines awaiting them, and let it go at that? Are we going to content ourselves with the vague generalities which merely confuse, or are we going to make an honest, earnest effort to give to each man the specific information which his problem demands?

Unless the state takes the measures necessary to secure the accurate, specific information, it must content itself

with the generalities, which too frequently send the applicant away disgusted instead of inducing him to remain and to add to the wealth of the state his capital, whether it be brains, muscle or money. If Colorado is to give him the sort of information which will encourage him to remain, it must undertake at once a most extensive survey of its record in the past and the possibilities of the future. Its agents must cover every corner of the state, delving into the problems of agriculture, mining, stock growing, manufacturing and business.

It must know its opportunities and be able to prove that they are, in truth, real opportunities, not mere temptations. It must prove its case to the cautious investor and be prepared to deal intelligently with the man who brings little but his energy and his experience. It must show each how to make the most of his capital, give him reason to believe that he has more than a fighting chance of success; and to do that it must first know the facts itself.

Colorado's legislature must enact laws providing for the gathering of information concerning its every opportunity, and it must, if it wants to secure the lion's share of the flood of immigration, go further, as Australia, New Zealand and other countries have, and arrange for the purchase and improvement of its idle lands and the arrangement of terms under which the honest, intelligent workman can achieve success without more than an ordinary total of cash capital. It must co-operate with its new-comers, helping them to success instead of standing by and watching them cope disconsolately with all the problems of one in a strange land and without an inexhaustible supply of capital.

Such a program, sanely and intelligently carried out, cannot but result in tremendous increases in the valuation of the state and in the total of its taxable property. It cannot fail to bring about the development for which all the state looks and wonders why it does not come more rapidly. It will add millions—even billions—to the contribution of Colorado to the world's supplies. It will bring Colorado from a place in the last ranks of states as producers to a place in the front ranks.

No other state possesses possibilities exceeding Colorado's, but these possibilities can not be made into realities, or even into probabilities, unless the state itself possesses the broad vision which has made it possible for little countries, remote from the world's centers, to attract worldwide attention. Immigration and development are not problems of securing something from the settler; they are problems which are solved when the state and the settler give alike—the one giving opportunity and substantial co-operation and the other giving his capital of brains, energy and money. A combination of that sort cannot fail to bring material prosperity to both.

Farm Homes for Returning Soldiers

(Continued from page 10.)

The California Land Settlement act created the Land Settlement board, consisting of five members with authority to purchase, subdivide and sell to settlers 10,000 acres of land. The board also was given authority to improve farms, loan money to settlers with which to purchase livestock and farming equipment and to provide practical advice in agriculture to beginners. In a general way settlers were given forty years' time to pay for their farms, with interest at five per cent.

After considerable study the board decided that a plan of group settlement should prove more successful than one that placed new farmers on individual tracts isolated from other farmers acquiring the land under the same plan. Several tracts were examined and the board finally selected a tract of 6,500 acres in Butte County, on which there was a partially completed irrigation system.

Without going into details, it is sufficient to say that the irrigation system was completed, the land was subdivided into farms, fences and farm buildings were erected, and in some cases the land was actually planted to crops. These farms then were allotted to certain of these who applied for them, though not nearly all could be taken care of. Settlers were constantly advised as to what crops to plant, how to prepare and cultivate the land, how to market crops to the best advantage and in general were furnished such expert advice as they needed. There are many details in connection with the working out of the plan that can not be discussed here, but President Mead of the Land Settlement board is authority for the statement that the plan has proved almost an unqualified success. The adoption of such a plan in Colorado would, of course, require special legislation and if meant exclusively as a soldier settlement enterprise would have to be modified considerably from the original California plan.

Professor Richard T. Ely, of the University of Wisconsin, believes that private commercial colonization, with certain modifications from the old established colonization methods, and perhaps with limited state control, will have to be depended upon for some time to come rather than state or federal colonization. He has made special study of certain colonization enterprises in Wisconsin, which he believes could be used as guides for private colonization enterprises to take care of returning soldiers. As an example he cites what is known as the "Rush Farm," in Rush County. Here the promoters of the colony furnish ready-made farms, much like those furnished under the California plan, and also provide capital for the purchase of livestock and equipment. They seek to make the comparatively small profit with which they are satisfied, not on the sale of the land, through increased price, so much as on the service they render the settler in selecting the land, properly dividing and equipping it and in furnishing expert advice to the

farmer after he begins cultivating his land. An experimental farm is a vital factor of this plan as it is of the California plan.

Professor Ely is convinced that such a colonization plan undertaken by private enterprise, scientifically directed, in the various states would aid greatly in solving the immediate needs of soldiers who soon will begin to be discharged from service. Of course, no state action would be necessary to put such a plan into operation.

Apparently very little attention has been given up to this time to the part that private capital, patriotically inclined and willing to be satisfied with a very low rate of income, might play in providing homes for our returning soldiers before state or federal agencies get their somewhat slow-moving machinery under way.

It is possible that capital, directed by individuals eager to do something toward keeping Colorado in the van of the procession of progress and at the same time to aid the boys who have fought for world freedom, might step in and by undertaking in a small way to provide farm homes for a few soldiers who want them at once, hasten and direct government action on a larger scale. It is assumed, of course, that such private enterprise would be undertaken with an understanding that profits to be returned would not exceed a certain agreed percentage of the funds invested.

There is precedent for such enterprise, both in this and in other countries. One notable example is that furnished by the City Suburban Homes Company, organized by Dr. E. R. L. Gould several years ago. The purpose of this company was not to make money for the organizers, but to furnish homes at small cost to deserving working people of very moderate means. The company has operated so as to return an income of five per cent. upon investment, and has succeeded in furnishing good homes for many working people who could never have purchased them from ordinary real estate and home-building companies.

The same principle might readily be applied to farm homes, exclusively for returning soldiers. There would be no element of charity in it, yet it would supply homes to many of our soldier boys who need them at once and who are not prepared to purchase them through the ordinary channels. Since the risk is perhaps a little higher than it would be in the case of suburban homes the plan apparently should provide for a somewhat higher return upon capital. It might be possible to organize a company of this kind in Colorado, to take over 10,000 acres of land or more, subdivide it into small farms, improve them and turn them over to soldiers, either on long time leases or on a partial payment plan covering a period of at least twenty years. It might be possible with proper publicity to interest the general public in such a plan, and to sell bonds in small denominations to furnish the capital. A successful enterprise of this kind carried out in Colorado would attract nation-wide attention.

Results of a State Development Policy

By the Colorado Department of Immigration

THE Colorado State Board of Immigration, though its available funds during the past two years have been smaller than those provided in most other states maintaining immigration departments, has accomplished much in the direction of general state development and in aiding state war work since the United States entered the World War.

The Immigration Department endeavors to keep a detailed permanent record showing the results obtained, so that the public may always be informed of what is being done and may determine whether or not the results justify the expenditures. It is difficult to trace all the investments made as a result of the work of the department or to get in touch with all persons locating in the state through the department's influence. A careful follow-up system is maintained, and through it the department is able to show directly some of the results obtained. Commercial bodies and many public-spirited people in all parts of the state co-operate with the department and their untiring aid is one of the chief factors in making the work of the department a success.

From time to time during the past eighteen months the department has prepared from its records and sent out to its co-operators lists of people located in the state and of investments made as a result of department activities. Seven such lists have been prepared. They do not contain records of nearly all the immigration and development work done, but they give a fair idea of what is being accomplished.

The following summary gives some of the most important work done by the department in the past two years:

The department has aided numerous drafted and enlisted men in disposing of their property and settling up their business affairs before entering military service.

It has brought approximately 10,000 people from other states to locate in Colorado, exclusive of those locating upon homestead land.

It has brought investments to the state, for farm lands, factories, business establishments, mining development, etc., amounting to more than \$10,000,000.

Among the business enterprises established are banks, drug stores, general stores, hardware stores, grain elevators, alfalfa meal mills and other factories. Locations also have been found for many physicians, attorneys, bankers and other professional men.

Approximately 4,750,000 acres of homestead land has been filed upon in Colorado in the past two years, much of it through the direct influence of the department.

Surveys have been conducted covering more than 250 towns and putting the department in the possession of information which has enabled it to furnish many needed business establishments, professional men, manufacturing industries and public utilities.

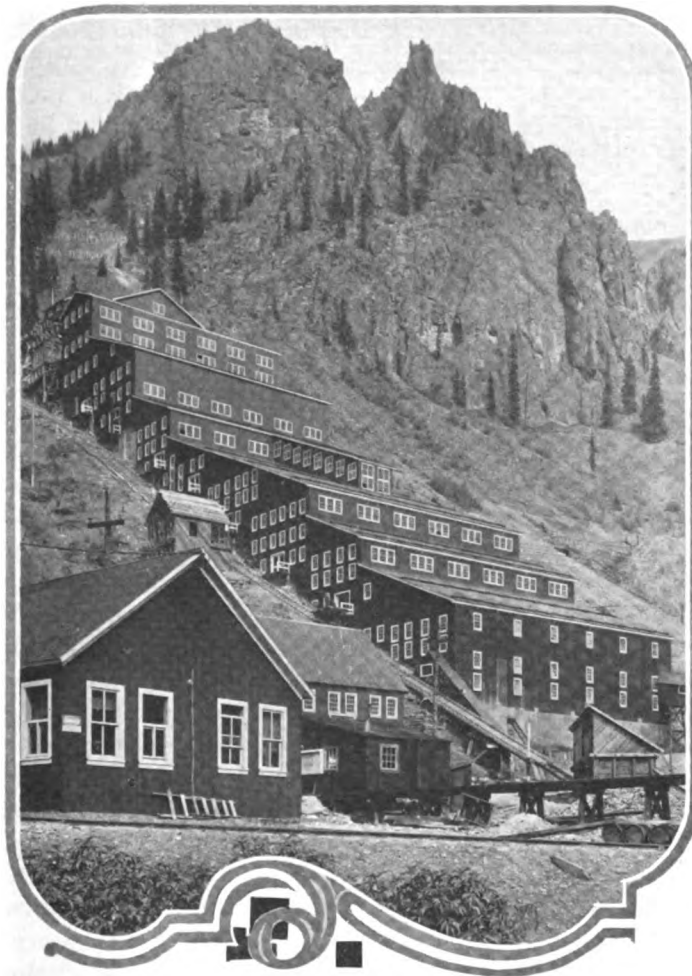
Numerous surveys have been conducted to determine the location and character of available privately-owned agricultural land not now in cultivation.

The department has been largely responsible for an increase of approximately 500,000 acres in the cultivated area within the state.

Numerous maps and pamphlets have been published, giving authentic information on the vacant lands and undeveloped resources of the state, which have been widely distributed in other states, bringing hundreds of new settlers to Colorado.

Approximately 12,000 individual inquiries have been received from people in other states contemplating location or investment in Colorado. These have been carefully followed up and many of the inquirers have become citizens of the state.

Colorado Needs More Mills Like This One



Do Our Soldiers Want Homestead Lands?

By the Colorado Department of Immigration

In the discussion of plans for supplying homes in Colorado for returned soldiers considerable stress usually is laid upon the fact that there is more than 10,000,000 acres of government land open to homestead entry in this state. Usually it is assumed that most of this land will be just what is required as farms for all our own soldier boys who want them, with a considerable amount left over to be distributed among soldiers from other states.

The following table shows the acreage of homestead land open to entry on July 1, 1918, in each county:

County	Surveyed	Unsurveyed	Total
Adams	40	.....	40
Alamosa	56,507	3,840	60,347
Arapahoe	160	.....	160
Archuleta	72,575	.....	72,575
Baca	56,532	.....	56,532
Bent	51,845	.....	51,845
Boulder	760	.....	760
Chaffee	71,831	.....	71,831
Cheyenne	1,646	.....	1,646
Clear Creek	6,880	13,440	20,320
Conejos	188,647	.....	188,647
Crowley	960	7,040	8,000
Custer	27,960	.....	27,960
Delta	189,132	55,560	244,692
Dolores	38,563	50,542	89,105
Douglas	2,120	.....	2,120
Eagle	45,242	205,157	250,399
Elbert	800	.....	800
El Paso	3,800	1,320	5,120
Fremont	360,081	.....	360,081
Garfield	764,688	191,088	955,776
Gilpin	7,680	3,840	11,520
Grand	110,350	13,860	124,210
Gunnison	465,500	96,880	562,380
Hinsdale	104,280	11,200	115,480
Huerfano	69,719	3,840	73,559
Jackson	239,030	.....	239,030
Jefferson	9,380	.....	9,380
Kiowa	3,270	680	3,950
Kit Carson	4,892	.....	4,892
Lake	8,382	.....	8,382
La Plata	93,492	2,200	95,692
Larimer	47,020	.....	47,020
Las Animas	195,216	29,440	224,656
Lincoln	4,497	720	5,217
Logan	479	4,320	4,799
Mesa	722,435	235,020	957,455
Moffat	1,410,238	318,625	1,728,863
Montezuma	49,434	12,940	62,374
Montrose	472,718	179,360	652,078
Morgan	2,020	159	2,179
Otero	26,730	8,360	35,090
Ouray	27,040	.....	27,040
Park	247,341	10,844	258,185
Phillips	561	.....	561
Pitkin	28,606	24,300	52,906
Prowers	14,828	.....	14,828
Pueblo	1,900	.....	1,900
Rio Blanco	1,169,054	176,906	1,345,960
Rio Grande	104,018	.....	104,018
Routt	117,009	79,880	196,889
Saguache	444,480	.....	444,480
San Miguel	250,502	73,100	323,602
Sedgwick	280	.....	280
Summit	5,385	4,630	10,015
Teller	32,597	280	32,877
Washington	4,442	.....	4,442
Weld	2,259	10,234	12,493
Yuma	3,628	889	4,517
Total	8,441,461	1,830,494	10,271,955

It is the purpose of this brief review to call attention to a few facts connected with the character and distribution of his land, for the information of those who are making a study of its possible use for soldier settlements.

Nearly one-third of the available homestead land in Colorado, 3,075,823 acres, lies in two northwestern Colorado counties, Moffat and Rio Blanco. It is classed by the authorities of the Glenwood Springs land district, in which it is found, as farming, grazing and mineral land, with no information given as to what parts belong in each of the three classifications. It is from 10 to 100 miles from any railroad. Much of it is good farming land, but a very considerable part of it is apparently useful only for grazing purposes or because of the coal or other minerals it may contain. The rainfall here varies from 12 to 17 inches, and in some districts farming will not be profitable without irrigation. There is a very considerable amount of water available in this section for irrigation, but the government has never announced definite plans for reclamation of government land here.

Somewhat more than one-third of the homestead land in Colorado, approximately 3,500,000 acres, lies at an elevation of 7,000 feet or more. Some of this is in the state's mountain park districts and is primarily useful for stock-raising purposes. Such land is found in Rio Grande, Saguache, Conejos, Grand, Jackson, Park and Gunnison counties. Small areas of homestead land in each of these counties are suitable for restricted agricultural operations. In other counties having homestead land lying at high elevations the surface is principally rugged or broken, adaptable only for grazing purposes, though there is some fine level land along the small mountain streams. Such conditions prevail in Pitkin, Eagle, Hinsdale, Summit, Clear Creek, Gilpin and Teller counties and in parts of Archuleta, Chaffee, Dolores, Delta, Garfield, La Plata, Mesa, Montrose, Ouray and San Miguel counties.

About 530,000 acres of homestead land is to be found in the twenty-five counties comprising what is generally spoken of as eastern Colorado, which includes the Arkansas and South Platte basins and the great non-irrigated plains east of the range. Perhaps not to exceed twenty-five per cent. of this land is suitable for farming, and it is distributed over the eastern two-fifths of the state in such small parcels as to be absolutely useless for the colonization of soldiers.

The remainder of the available homestead land in Colorado, somewhat less than 3,000,000 acres, is widely scattered over the western part of the state. A considerable part of it is good farming area, but most of it lies at considerable distance from railroads. The rainfall on some sections is not sufficient to produce good crops without irrigation and no definite plans have been announced for its reclamation by the government.

Grain Land in the Valley and Rich Pasture in the Hills—a Stockman's Paradise



How the State Can Aid New Farmers

By the Colorado Department of Immigration

REGARDLESS of what Colorado may do to aid in the meritorious project of furnishing farm homes for returning soldiers there are many things it should do for all new farmers coming to the state and for many of those already here, if this state is to keep abreast of the procession of agricultural development.

Few states in the Union have a wider variety of soils than Colorado, yet there is perhaps no state that has available soil surveys for a smaller percentage of its area than this. Nobody in the state is prepared to give the prospective settler authentic information regarding the variety and usefulness of the soils in any considerable agricultural district, though knowledge of this kind is in a measure necessary to the best kind of agricultural success today.

The U. S. Bureau of Soils has prepared detailed soil surveys of a few irrigated districts in Colorado, the aggregate of the area covered being not to exceed 2,000,000 acres. They are all in irrigated districts, where long experience has given settlers practically all the information they require about the character and distribution of soils. The great unirrigated districts, where general knowledge of soil characteristics is very necessary in guiding the work of new farmers, there is no such information available. There is little authentic soil information for the large amount of land in the state which may eventually be irrigated, but which is not yet supplied with water.

In many of the states the state government co-operates with the U. S. Bureau of Soils in preparing such surveys. Usually the agricultural college takes the information these surveys develop and puts it into shape to be utilized by the farmer. Wisconsin is such a state, and scarcely any new

colony is established there until a soil survey is completed. The federal government, with an immense amount of work on its hands along the line of agricultural development in the past few years, has been unable to do much on soil surveys, except where the states furnished aid and thus made the results broader and more beneficial.

The state geological survey has collected many data regarding the distribution of underground water available for domestic purposes in most sections of Colorado, but for various reasons has been unable to complete its inquiry or to publish the results of this work. Such a survey would undoubtedly prove of great assistance to farmers in the location of domestic wells, and save them untold expense through advising them what localities are most certain to show no underground waters at reasonable depths. A survey of this nature would be of value in almost every section of Colorado.

Many experienced authorities have advocated a sort of state control over and protection for the real estate business through a system of state licenses. Some states have adopted such a system. From time to time it has been advocated in Colorado by some of the best real estate men and firms in the state. It might prove an aid to immigration through giving the state more authority to protect the prospective settler against the misrepresentations practiced by unreliable land agents, and such are to be found in Colorado, as well as in all other states. If the state exercises supervision over immigration it appears logical that it should provide for some sort of co-operation through law with private immigration companies and land agents who

(Continued on page 28.)

Road Work and Road Builders the State Over

His Excellency, General Emillaro Chamorro, president of the Republic of Nicaragua, has asked for a copy of the road laws of Colorado together with issues of the Colorado Highways Bulletin. The request was transmitted to the state highway department by Dr. B. L. Jefferson, American minister to Nicaragua, who was in Denver recently.

The Nicaraguan executive is actively interested in good roads work in his own country, and is seeking full information regarding the methods of procedure.

Similar requests for information in re road laws have been received from Italy and Russia by the department.

Superintendent Froelich, of Lincoln County, was in Denver recently to discuss the county budget for next year for road improvements and bridge work. He reports that county and state have improved the road north from Limon toward Brush. The highway is now graded with good bridges along it.

Engineer Corley, of the U. S. Office of Public Roads, who was stricken with influenza while working on the Durango-Silverton project, died a short time after Engineer Kingsley succumbed to the disease.

The Road Maker of Chicago published articles by State Highway Engineer James E. Maloney and S. E. Norton, Highways Transport chairman, in the November issue. In addition liberal space was given to Colorado road projects.

The State Highway Department has mailed photographs to the American City for use as cover pages in that magazine. In addition photographs have been furnished to Field and Farm, Western Farm Life, the Metropolitan Magazine of Denver, The Commercial, and other publications. Forty photographs of the motor truck parade held in Denver during Highways Transport week have also been sent out by the Highways Transport Committee to all of the leading motor trade publications of the United States, most of whom had stated in advance that they would be glad to use these pictures.

Assistant Highway Engineer James Bertholf was in Denver last month for a brief time, looking over office plans for future road work on the Western slope. Mr. Bertholf has now returned to Grand Junction, where he is making plans for an active season in 1919.

Finlay MacFarland, Cass E. Herrington, Warwick Downing, Frank L. Woodward and S. E. Norton will all be in Washington shortly, where they will interview members of Colorado's congressional delegation with a view to obtaining Federal aid for emergency work on Colorado highways during the coming year.

State Commissioner T. J. Ehrhart has sent out an open letter to all western highway department chiefs calling their attention to the need of immediate funds for road work in order to take care of the demands of heavy traffic, and also to provide employment for returning soldiers. He suggests that an appropriation of \$100,000,000 be made by Congress as an emergency measure, the funds to be distributed among the States of the Union on the same basis as those of the Federal Aid Act, road bonds to be issued at 4½ and to be absorbed by the states in which the work is done.

As the Bulletin goes to press, the time intervening has not been long enough to bring in replies, save from the commissioners of Nebraska and South Dakota, both of whom have given the plan their hearty endorsement.

A. C. Batchelder, executive chairman of the A. A. A., has requested the state highway department to furnish the American Motorist with photographs and articles on roads in Colorado,

asking particularly for the Devil's Wing, which was published in the November issue.

Cris Wallrich and A. E. Headlee, Alamosa County commissioners, were in Denver recently. Mr. Wallrich reports grading and graveling on Spanish Trails highway in eastern end of county, general improvement out of Monte Vista, grading and graveling on the Conejos road and similar work on that north to Hooper.

Work next year will include improvement and the replacement of several wooden bridges with substantial concrete structures.

R. P. Coulter, Garfield commissioner, from New Castle, made a visit to the State Highway offices in regard to work on the Glenwood Canyon project now being done by a convict crew. It is the hope of the commissioners in this county that they will be able to push through construction on this road next spring.

Assistant Engineer Randall has gone to Georgetown to make a location for the proposed road improvement from Georgetown to Silver Plume. This highway is badly needed and it is hoped that work can be undertaken in the spring.

George Gammon, a member of the bridge building force of Douglas County, died recently from influenza.

Assistant Engineer Allred is making a survey and investigation of proposed road improvements in Kiowa and Cheyenne Counties.

Legislative Aid for Settlers

(Continued from page 27.)

are in the immigration business. Such a measure would be a protection to the reliable real estate dealer, who often has to suffer in loss of business and sometimes in his reputation because of the misdeeds of the few unreliable men found in this business, as in all other lines of business.

The county agricultural agent has been one of the most important factors in the successful development of agriculture in many of the districts in Colorado where a few years ago it was openly proclaimed even by the most enthusiastic Colorado booster that farming could never be a success. The county agent has given the individual farmer such aid in meeting his problems as he has never before been able to obtain from anybody. He brings scientific aid and advice right home to the farmer and his wife, and shows them how to make use of it.

But fewer than half the counties in the state have county agents, though more than two-thirds of them need them. The federal government, under agricultural extension act, is ready to do its part in putting county agents in every county in Colorado where farming in any of its branches is followed. This act provides for the co-operation of federal, state and county authorities. While the county agent system was not developed under this act, it has been greatly improved and extended by reason of it, and certainly Colorado is as much in need of the benefits it provides as any state in the Union.

The Blue Lodge of Colorado Road Builders

THOSE who have followed The Bulletin in its course have probably noticed an item now and then relating to the question of good roads. In fact, if the reader gives this publication more than a passing scrutiny, it is not improbable that he will find that good roads are more or less of a hobby with The Bulletin and that, taking it on the whole, there will be quite a few pages on the subject in the magazine during the course of, say, a year or so.

But if the careful reader hereinbefore mentioned really desires to hear something more upon the subject, then he is respectfully referred to E. McLearn of Rifle, Colorado,

county commissioner for Garfield County from 1913 to 1916, and before and since a student and a worker on good roads.

"I do not believe that there is anything that is more beneficial to the State of Colorado than good roads," says Mr. McLearn, and continuing, "There is not enough attention given to this subject by our taxpayers and our state legislators and other state officials. They do not give the State Highway Commission the support they should receive. If every one would put his shoulder to the wheel we would soon have good roads. When they do we will have the most prosperous state in the Union. Good roads mean more to Colorado than any other state in the Union."

Therein is contained Mr. McLearn's platform, one which he has lived up to strictly, as may be evidenced by these facts, gleaned from a busy four years on the roads in Garfield County:

- Rebuilt 12 miles between Glenwood and New Castle.
- 5 miles between Glenwood and Carbondale.
- 6 miles between New Castle and Rifle.
- 20 miles between Rifle and Meeker.
- 3 miles between Rifle and Grand Valley.
- 2 miles between Grand Valley and county line.
- 6 miles in Glenwood Canyon.

Most of this work was done on heavy grades that were frequently rated as impassable by critics before the feat of opening them had been accomplished. On the canyon roads through rocky, narrow turns, convict labor was employed, while free labor was made use of on the other highways.

But "good roads mean more to Colorado than any other state," as Mr. McLearn has said, and so in company with the other good roads men of his district he is still pounding away at the subject, doing his part to secure funds for the development of all of the Western Slope and all of Colorado.

WHEN E. E. Sommers was appointed member of the State Highway Commission by Governor Julius C. Gunter last month, he reached the climactic point of a career which has been remarkable for the number of positions held minus the usual stipend.

A complete list of the appointments which have fallen to his lot is not possible in The Bulletin, since space is necessarily limited, but as evidence of the part which he has played in road-building in Colorado, a few of the "high lights" may be touched upon.

When the famous road convention was held in Pueblo in 1912, it was Mr. Sommers who led the rooters for roads in northern Colorado and who was afterward elected president of the Greater Colorado Roads Association. Later, when the two organizations consolidated, he was chosen head of them and served for two years.

He was president of the Denver Motor Club in 1912 and 1913, is at present serving on the Board of Governors of that body and also is president of the Colorado State Automobile Association, a position he has held for four years.

On the side he is vice-president of the Omaha-Lincoln-Denver Association and chairman of the Good Roads Committee of the Mountain Parks Commission of Denver.

In between times he is manager of the Great Western Oil Company, but as this is only the way in which he makes his money, the position may be said to be second in importance.

Mr. Sommers was appointed a member of the State Highway Commission to succeed Lafayette Hughes, resigned. He will represent the First Highway District, which includes all of northeastern Colorado from the front range to the state line and from a point south of Denver to Wyoming.

However, Mr. Sommers' attitude toward roads is broader than that of district boundaries.

Any road is a good road in Colorado, is the way he expresses it, and further, "We need good roads throughout the state, to bring tourists in and to widen our marketing areas."

Mr. Sommers first became interested in road-building when he purchased his first automobile several years ago and since that time his name has been prominently connected with every step which has been taken in the promotion of roads throughout the state.



E. McLearn



E. E. Sommers

Highway News and Notes on Work in Field

Five miles more of hard-surfaced road on the Denver to Brighton highway, more graveling for the Denver to Limon road, surfacing of the last stretch of the Boulevard F road, and improvement of numerous county roads together with a good deal of bridge work, are the plans worked out for 1919 by the commissioners of Adams county.

Working with H. C. Flanders, Commissioner H. G. Tiffany has been making a survey of needed improvements and the two men are hopeful of decided improvements throughout their districts. Mr. Webster, the third commissioner, retires this year and plans for his district are still somewhat indefinite, pending the election of his successor, but the funds will be pretty well distributed throughout the county.

Talking about the work, all of which is of direct importance to Denver since three of the main gateways into this city pass through Adams, Mr. Tiffany said:

"We have some 1,000 miles of road in our county. Last year, with a two-mill levy, we had a fund of \$51,000 or about \$51 per year. As every road man will realize, this sum is inadequate to our needs, particularly when it is remembered that we have had hard-surfacing work to do which runs into a cost of about \$22,000 per mile. Still the roads must be improved.

"We hope to have about five miles of concrete added to the Brighton highway through assistance given us by the state and the U. S. Federal Aid Act.

"In addition we must bring the Denver-Limon and Boulevard F highways to standard and should have a more adequate maintenance fee for each of these roads, as the heavy truck traffic on these highways has grown to enormous proportions and is rapidly increasing month by month.

"Further than the work on the main highways, we must replace the bridge across Clear Creek on the old river road and must take care of two old canal bridges northeast of Henderson.

"Sufficient maintenance must also be done to keep the county roads passable and with these needs confronting us we will have a busy season ahead."

Contractor Dick McQueary was in Denver recently. He reported that eighty per cent. of his contract on the Western slope of the Fall River pass road has been completed. Travel can reach the top of the pass although the highway is not open for traffic, as there remain several stretches between Grand Lake and McQueary's work yet to be completed. Work has been discontinued on this project because of weather conditions.

The Morrison road improvement has been completed and the gang has been transferred to the road out of Denver toward Aurora and the Recuperation Camp, where a heavy gravel surface is being laid to take care of the rapid increase in travel to that point.

Some of the important centers of the state have neglected to send in the traffic census reports for travel on highways in Colorado during the month of August. These reports are of the utmost importance in the preparatory plans of the state highway department for the season of 1919 and should be returned to the department without delay.

The convict crew at work on the South St. Vrain project between Lyons and Allen's park is making progress. This job will be under way throughout the winter, weather permitting, and it is hoped that improvement will be far enough along by spring to permit of travel without discomfort on this highway.

A survey of the Ute Pass road between Iron Springs and Green Mountain Falls has been made by the commissioners of El Paso County and representatives from the state highway department, with a view to the elimination of dangerous railroad crossings at Cascade and below Green Mountain Falls. Condemnation proceedings may be necessary in order to straighten out the road, but these will be undertaken by the commissioners. The highway will be for the full distance along the east side of the creek and the improvements begin in the early spring, if the highway council permits. The work is needed to eliminate the danger element and will serve to greatly improve the road.

The bridge at Salida across the Arkansas River has been finished. The structure is built of reinforced concrete.

Surveys and plans have been practically completed for Federal Aid Projects No. 2 and No. 7, the first between Pueblo and the state line, the second between Norwood and Naturita in the Paradox Valley. As soon as approval of the national government is secured these projects will be advertised and let.

The Brighton concrete roadway is finished and open for traffic. The bridge over Sand Creek has been repaired with a new floor, which has been coated with a bituminous surface, this method having been found to be satisfactory in lengthening the life of the timber floor.

The shoulders for the road are practically complete and only a little trimming remains to be done.

The stretch of road running from Sloss to Ruedi, on the Glenwood Springs-Aspen highway, has been surveyed for improvement by the government. The stretch is about six miles long and forms a sector of the main road. The road will be taken from its present location and will be placed on the opposite side of the Frying Pan River with a view to eliminating washouts and snowslides which now make the highway dangerous in winter time.

Preliminary investigations extending over a stretch of about twenty-six miles on the same highway have also been completed.

Abutments have been finished for the bridge at Castle Rock and the contractors will begin placing the floor this week. The structure is on the main north and south highway.

The U. S. Office of Public Roads has completed a preliminary investigation looking forward to the improvement of the Beulah-Rye road west of Pueblo.

P. H. Everitt has completed reconnaissance surveys for the Crested Butte-Somerset forestry project. He has also completed a survey of the Hardscrabble canyon road running from Florence to Westcliffe.

The Crested Butte highway covers a distance of about thirty-eight miles and the project when begun will consist of opening up an entirely new road between these points. The highway will run along side hills and through Anthracite and the Big Muddy Valleys. It will serve as an inlet into the district, which contains lands sufficient to serve the needs of several farmers. At the present time the only communication between these towns is had by traveling in a roundabout way through Gunnison and Delta.

Future plans for the Hardscrabble canyon road include a general improvement of the highway which will serve to bring it to standard.