U.S. DEPARTMENT OF AGRICULTURE

BUREAU OF PUBLIC ROADS

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APPROACHING DINGMANS FERRY (N. J.), ON ROAD THAT CONVICTS BUILT

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U. S. DEPARTMENT OF AGRICULTURE

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PUBLIC ROADS

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1919

COLORADO'S FIRST FEDERAL AID ROAD.

By Clyde E. Learned, Highway Engineer, Bureau of Public Roads.

BPR 16755

OLD ROAD LOOKING TOWARD DENVER, SHOWING HAND RAIL ON OLD WOODEN BRIDGE.

COLORADO'S first completed Federal aid project is 3.95 miles of concrete construction beginning at the southerly limit of the city of Denver and extending into the center of the town of Littleton. It is the first link in the Colorado Springs Highway, being also a part of the "Great North and South Highway," and located on the Colorado State primary road No. 3. It runs within a few hundred feet of and parallel to the tracks of the Sante Fe and Denver & Rio Grande railroads, except for that portion in the town of Littleton.

Traffic over the old road was very heavy, a traffic census showing 1,200 vehicles passing every 24 hours. This was made up of tourist travel to Colorado Springs and other southern points, and a large volume of motor trucks. Upon the completion of the road the indications were that this traffic would be doubled within a short time.

The cost of the road totaled $80,703.10, and the Federal aid allotted was $37,198.49, or 46.1 per cent of the combined cost of construction and engineering.

LAID 570 FEET IN ONE DAY.

Gravel for the concrete pavement was hauled, piled, and screened along the side of the road in the winter and spring of 1918. Concrete pavement work was started on July 19 and completed November 5, 1918, 52 working days being actually consumed in the pavement work. The maximum day's run was 570 lineal feet. Final trimming of the shoulders and ditches was completed on December 21, 1918.

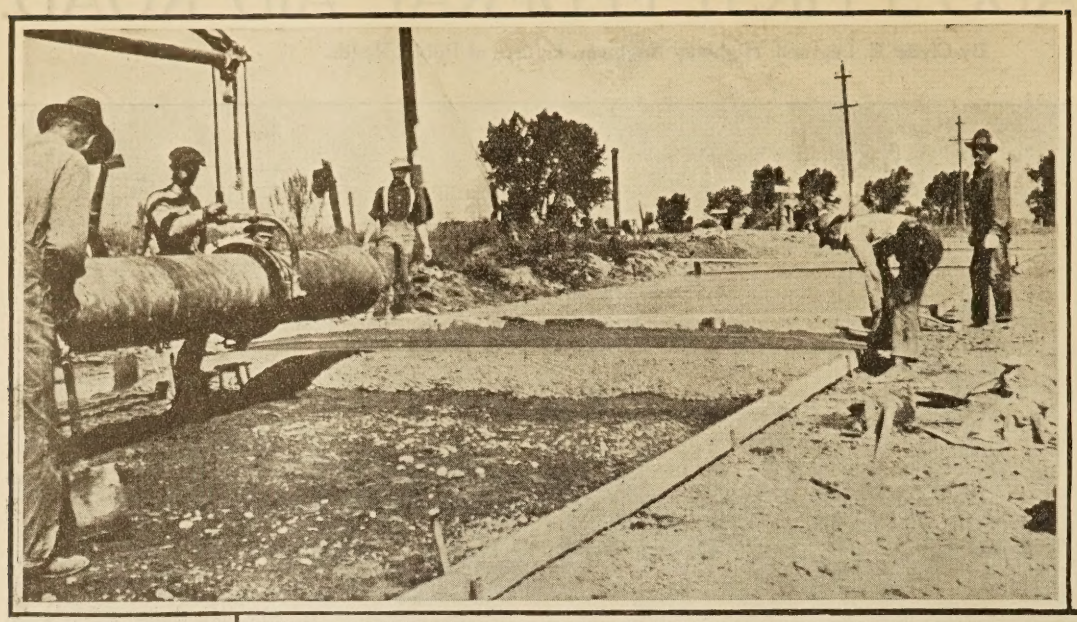
The concrete pavement is 16 feet wide with 4 feet of gravel or sand surfaced shoulders on each side.

The drainage structures included two reinforced concrete bridges, the first over Big Dry Creek, having a 28-foot span on a wooden pile foundation; the second over the Littleton electric car line tracks with a 22-foot skew span on a rock foundation. Considerable trouble was experienced in putting the concrete foundation of the bridge over the Big Dry Creek because of the gravelly nature of the foundation, which made it practically impossible to pump the cofferdams dry.

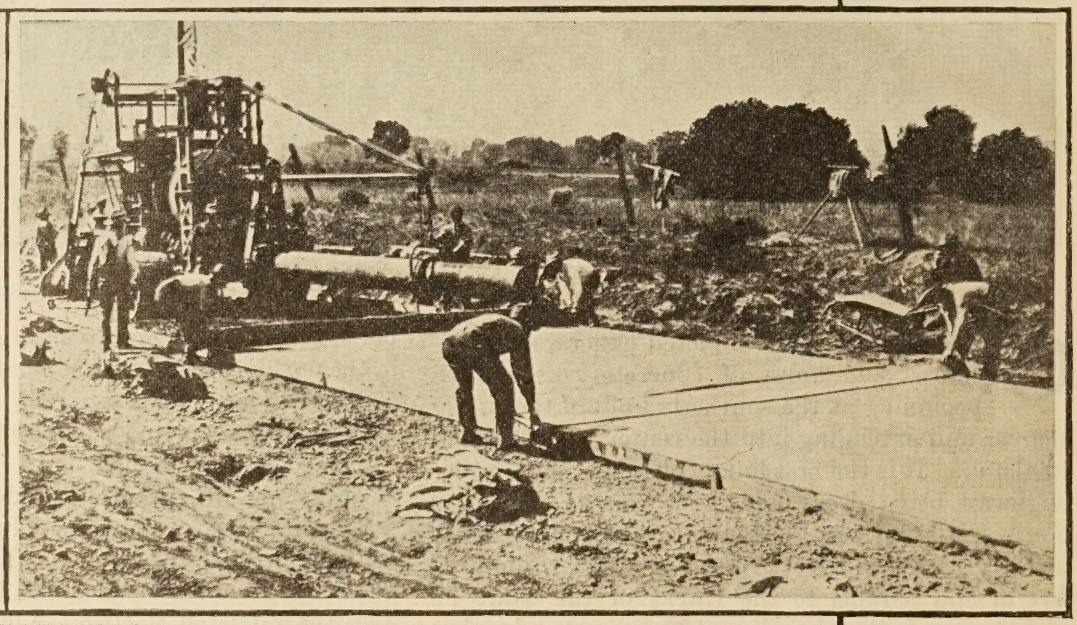
The remainder of the drainage structures consisted of 12, 15, 18, and 24 inch corrugated pipe culverts with concrete head walls. In a number of cases it was necessary to take care of the old irrigation ditches that cross the road, and in no case was it possible to use one of them for drainage purposes.

SHOULDERS VERY FLAT.

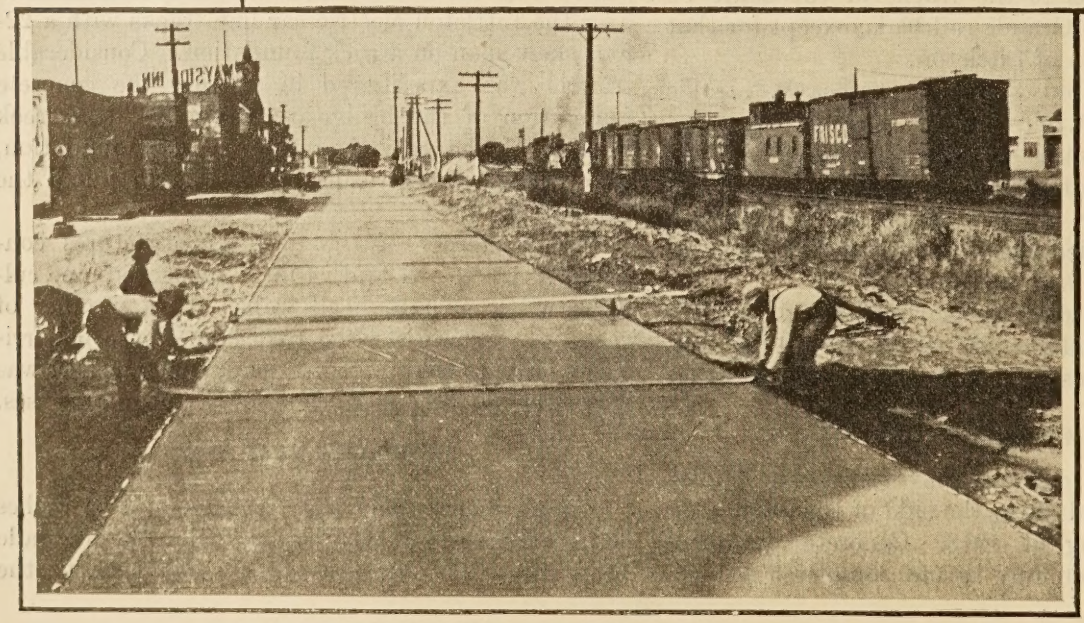
The pavement itself has a thickness of 6½ inches at the center and 5½ inches at the sides, the subgrade being flat. The finished surface conforms to the



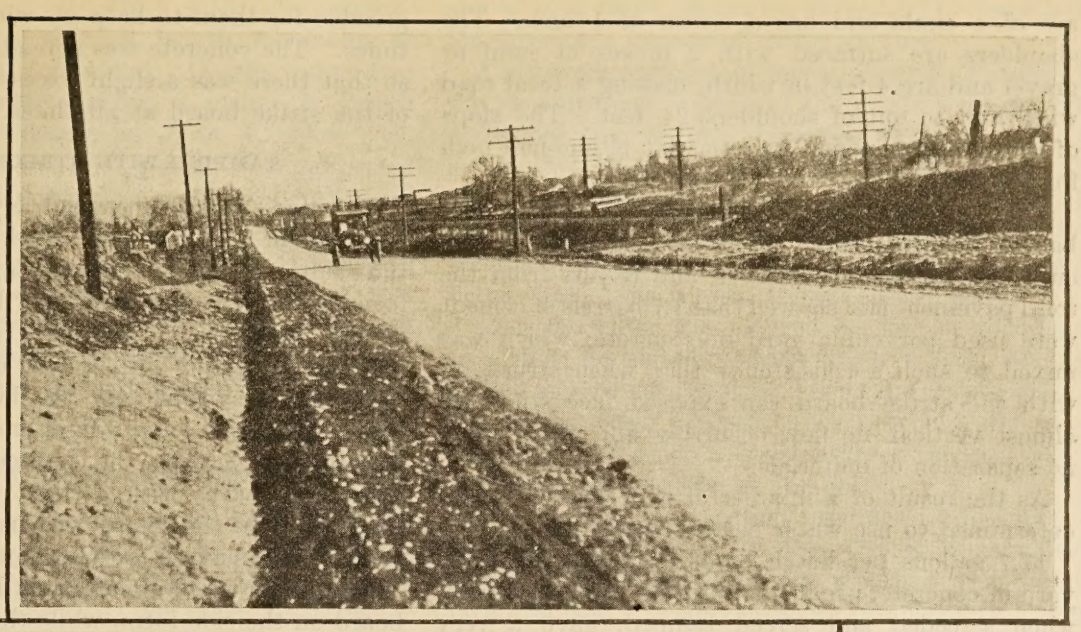
MEN STRIKING OFF—SHOWING EVEN DISTRIBUTION OF CONCRETE AND CONSISTENCY OF MIX.



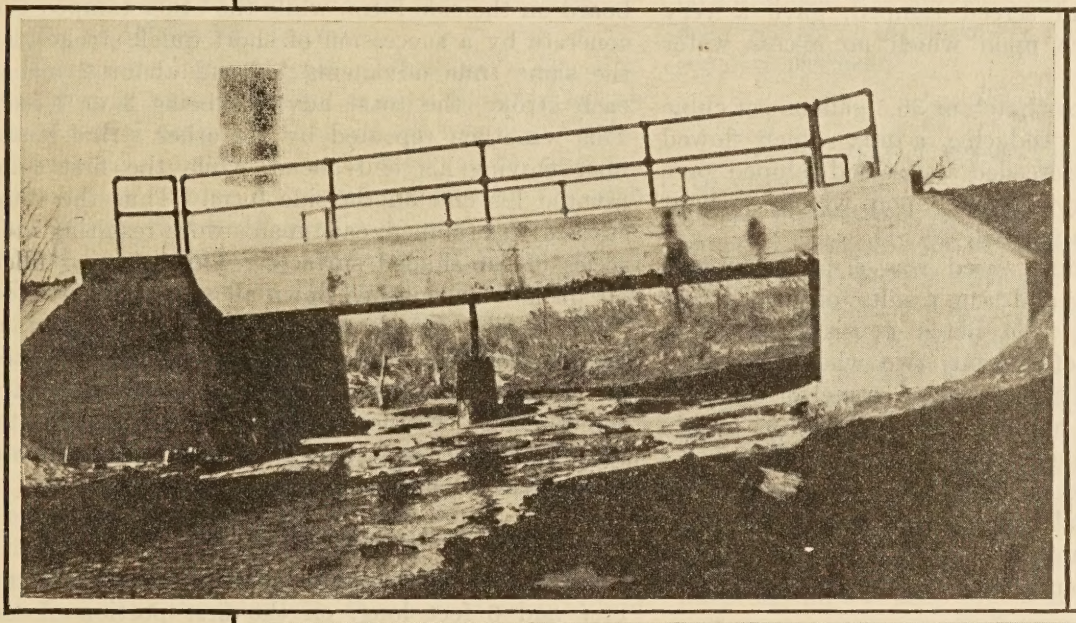
REVOLVING DISTRIBUTOR TYPE OF PAVER, SHOWING OPERATION OF STRIKING OFF AND BELTING—NOTE SURFACE AFTER BOTH OPERATIONS.



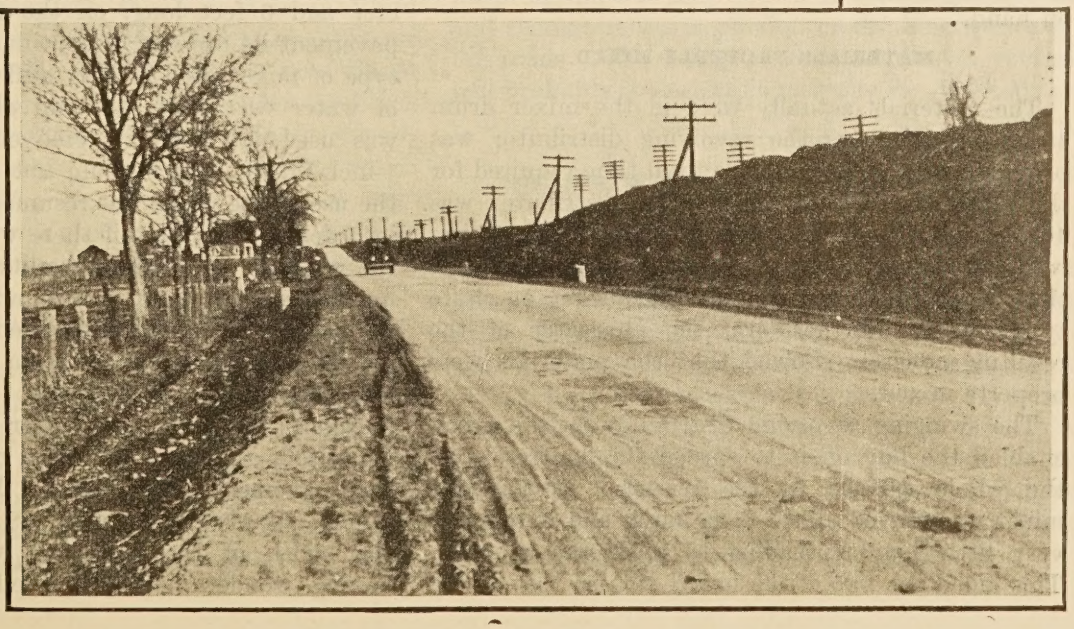
MAXIMUM DAY'S RUN 570 LINEAL FEET—MEN ARE SHOWN BELTING THE LAST BLOCK LAID.



SECTION OF FINISHED ROAD, LOOKING TOWARD DENVER—NOTE THE SHALLOW V-SHAPED DITCH.



REINFORCED CONCRETE BRIDGE OVER BIG DRY CREEK, HAVING A SPAN OF 28 FEET.



ANOTHER SECTION OF FINISHED ROAD, LOOKING TOWARD DENVER—SHOWING THE SAND SURFACED SHOULDERS.

arc of a circle and has a crown of 1 inch. The shoulders are surfaced with 2 inches of sand or gravel and are 4 feet in width, making a total road width out to out of shoulders 24 feet. The slope of the shoulders which are very flat is one-half inch for the 4-foot width.

The concrete was mixed in the proportion of 1 bag of cement to 2 cubic feet of sand and 3 cubic feet of screened gravel, and results from the total pavement laid showed that 1.7 barrels of cement were used per cubic yard of concrete, which was mixed to such a consistency that when struck off with the strike board the exposed face stood up almost vertical, no flow occurring and there being no separation of materials.

As the result of a number of experiments it was determined to use water per batch as follows:

17.7 gallons per batch or 33.8 gallons per cubic yard of concrete, producing a rather stiff mix which, when screeded and screed tamped, gave a very satisfactory surface upon which no excess water appeared.

Or 19.1 gallons per batch or 36.5 gallons per cubic yard of concrete, producing a mix which flowed slightly and when screeded and screed tamped gave a very satisfactory surface upon which a slight amount of water appeared.

The concrete mixer used was a paver with a rotary distributor and the results obtained were very satisfactory. The batch consisted of three and a half bags of cement, two wheelbarrows of sand and three wheelbarrows of gravel of 3½ cubic feet capacity. It required just 100 seconds to mix one batch. Eighteen batches were required for a 30-foot block, and as this block was laid in 30 minutes the normal running time was 1 linear foot of pavement per minute, and this rate of progress was maintained hour after hour when materials were on hand..

MATERIALS PROPERLY MIXED.

The materials actually were in the mixer drum 45 seconds, but as the revolving distributor was provided with blades and the total time required for the materials to pass through the distributor was 40 seconds, it was considered that the materials received at least as much, if not more, mixing than they would have received in the bucket or chute type mixer. Furthermore, the character of the resulting concrete showed that the materials were properly mixed.

The swinging revolving distributor on the mixer enabled the boy on it to spread the concrete over the whole surface to the required depth. The mixer was moved ahead each batch and it required very little hand spreading to place the concrete. This aided the two strike board men so that it was possible for them to keep up with the mixer at all times. The concrete was spread by the distributor so that there was a slight excess, or wave, in front of the strike board at all times.

TAMPING WITH STRIKE BOARD.

The strike board or screed as used on this work was built of a 2 by 10 inch plank, 2 feet longer than the width of the pavement, having a crown conforming to the typical section. The board was shod on the finishing edge with an ⅛ by 2 inch band iron and was provided with a pair of handles on each end. The first time over the board was advanced with a combined longitudinal and crosswise motion, this passage leaving the surface a series of small transverse waves with a slight excess of concrete, following this the board was used as a tamper to compact the surface in the following manner:

One of the strike board men held his end of the board on the side form, while the other tamped the concrete by a succession of short quick strokes, at the same time advancing his end about 2 inches each stroke, the total advance being 3 or 4 feet. This was then repeated by the other strike board man moving his end ahead, while the first man pivoted his end on the side form. Thus the total surface was tamped, each man's work resulting in a series of fan-shaped surfaces. This tamping filled all pockets and pushed down all protruding stones.

The strike board was passed over the surface again as at first, care being used to see that it rested on the side forms at all times. It was necessary sometimes to use the strike board four or five times over the surface so as to get the desired result, but ordinarily three passages were sufficient.

USED ROLLER ON ONLY PART OF ROAD.

After using an 80-pound roller, 10 inches in diameter and 6 feet long, on the first portion of the pavement its use was discontinued because with the type of mixer used a fairly stiff mix with no excess of water was produced, and also when the roller was used too soon it removed a portion of the 1-inch crown, which could not be afforded. Later the use of the roller was resumed upon two stations in order to determine if there was any difference in the wearing and riding quality of the rolled and unrolled sections. It was found that the roller did not roll out the crown when used at the proper time, which on this work ranged from one-half to one hour after depositing the concrete.

About one-half hour after the concrete was deposited, or after it had been rolled, the surface of the pavement was belted. For this work an 8-inch, six-ply rubber belt, 18 inches longer than the width of the pavement was used, the belt having wooden handles bolted on each end. It

was first passed over each block with a long sweeping stroke about 18 inches in length, advancing at each stroke from 4 to 6 inches. On the return trip a shorter quick stroke about 8 inches in length was used, the advance being 6 to 8 inches each stroke. The third and final passage was performed by holding the belt down close to the side forms and advancing the belt by sliding it over the surface, there being no side movement. After the belting was completed the pavement presented a very smooth and uniform surface. The finisher followed with a wooden hand float, with which he floated and smoothed along the side forms for a width of about 2 feet.

EFFECT OF HOT WEATHER.

As soon as the concrete had set up a little the finisher went along the sides of the pavement and across on both sides with a sidewalk edging tool, the idea being to eliminate all sharp edges which traffic would tend to destroy.

During the hottest weather the concrete placed in the morning was sprinkled as soon as it was set up so it would not pit. This usually was about noon. Even then a number of sun or wind checks appeared, which in a number of cases lengthened out to such an extent that they produced noticeable cracks. On the night following the laying of the pavement the watchman kept it wet down, and the following morning the surface was covered with about 2 inches of material from the shoulders. This earth was continuously wetted down throughout the day and every night over the last 10 days' run until the weather became so cool that it was not necessary.

In screeding or striking off near the joints the pavement was struck off by continuing the movement of the strike board right up to the joint, all excess concrete being removed by shovels. The surface near the joint was then screed tamped and rescreeded toward the joint, making sure all excess concrete was removed. The screed was then placed at the joint and worked back zigzag over the block for a distance of 4 or 5 feet. This resulted in spreading over a large surface any excess material which may have been left adjacent to the joint. A large wooden split float was used at the joints in assuring that the concrete was at the same elevation on both sides.

SPRINKLING ALONE NOT SUFFICIENT.

It developed that the pavement work done from the latter part of September to the completion of the work was free from sun checks, whereas the work performed during the hot months of July and August had a number of such checks. In such a dry climate and with a warm wind it is practically impossible to eliminate checks by sprinkling alone, and in such cases canvas covers should be provided for covering a portion of the day's work.

A sidewalk edging tool was used on both sides of the asphalt-filled joint, and the joints were cut off about one-quarter inch above the pavement, which is the height specified in the specifications. It would have afforded more protection to the joint if the filler had been cut off one-half inch above the pavement and provision made for ironing the fillers before traffic was allowed to pass over them.

The contractor was allowed by the specifications to surface the shoulders with gravel or sand, and as he had a large surplus of sand from the gravel screening on the work, he used this. It would undoubtedly have been more satisfactory if he had been limited to gravel alone on this work.

The typical cross section provides for a slope of only one-half inch for the 4-foot width of shoulder, which is not sufficient to give the road proper surface drainage. It also provides ditches only 1 foot deep, which is not adequate for the foundation of concrete pavement.

COLORADO ROAD LEGISLATION.

The proposition agitated in Colorado for the issuance of $20,000,000 in State road bonds failed to pass in the legislative session for this year. A bond issue of $5,000,000 was, however, authorized, one-half of which is to be reserved to meet Federal aid and the other half to be distributed among the counties according to road mileage. The proposition must be voted on by the people at the general election in 1920, so that the money will not be available before 1921, if the vote is favorable.

Other legislation affecting the roads included laws levying an additional half mill tax for road purposes, an automobile license law, a gasoline tax and segregation of a portion of the inheritance tax for roads. The newly created sources of revenue will probably make available this year, $500,000.

RIGHTS-OF-WAY FOR COUNTY ROADS.

Many counties in Colorado have no record or apparent title to their roads, even some main roads, according to Chief Engineer J. E. Maloney, of the State Highway Department. He is urging the county authorities to secure at once ample rights-of-way for all roads which it is proposed to surface. The typical sections for surfaced roads, adopted by the Colorado Highway Department, call for an 18-foot or 20-foot roadway. Mr. Maloney believes that for four-fifths of the hard surfacing gravel or macadam will prove adequate for some time.

MOUNTAIN HIGHWAY RECONNAISSANCE.

By T. A. BEDFORD, Division Engineer, California State Highway Department.

THE SELECTION of highway routes in a mountainous region requires the exercise of certain well-developed faculties almost as rare as what is sometimes called "horse sense." The reonnaissance engineer must have a keen sense of proportion, course, distance, and locality; something almoat akin to animal instinct. If he does not possess this, he would better specialize on something else.

Any competent engineer may, by mechanical means, take accurate topography over all possible routes between two points and by trial lines, shifting and calculating, find, in the course of time, the most economical location for a highway and yet, in the end, get it in the wrong place and have no money left with which to build.

The writer served as topographer on railroad location under just such an engineer. He was a splendid technician and a whirlwind in mathematics, but he could not find his way back to dinner without first finding the line of stakes and then following it back to camp. On this work topography was sketched in for miles around to improve the looks of the map and then control points and influence points were found on the map. He could not see them on the ground.

DETERMINING POINTS TO BE CONNECTED.

As for methods, the first things to be determined are the points which are to be connected up by the road; next, a thorough knowledge of the topography of the intervening country should be obtained by walking out the ridges and climbing the highest peaks to get a general idea of the topography and then following out the canyons or main water courses to get a more accurate knowledge of the topography, as the road will most likely follow the watercourses. A simian ability to climb trees is a useful accomplishment for the engineer at this stage of the reconnaissance.

Thus with a mental picture of thousands of square miles of topography standing out before the mind, like a huge relief map, roads must be "looked into" place and the likely routes selected for further examination. The controlling points and influence points on the routes should be picked out next. A probable selection must be made of the lines connecting these points and afterwards it is necessary to determine if a grade line run from one to the other will fall below the maximum grade adopted. These grade lines should be developed by well-trained assistants, who may work singly in open country but who must work in pairs in dense undergrowth. With clinometers and flags, trial grade lines are run between controlling points and bits of colored cloth tied on the branches as markers.

SNOW CONDITIONS INFLUENCE LOCATION.

After the final route is selected, it is gone over carefully and strips of white cloth are tied on branches of trees to guide the chief of survey party, who runs a preliminary line from flag to flag. If the reconnaissance work is well done, the final location will fall within the cross-sections taken from the preliminary line.

In a large percentage of mountain-road problems, snow conditions materially influence the location of the road. A road located with a southern exposure and exposed to the sun's rays and the warm south winds will be clear of snow much longer than one with a northern exposure. Furthermore, since the snow lies longer on the northern slope and the sun does not reach it to dry it out, the vegetation is heavier, the soil much deeper and the roadbed harder to drain and slower to dry out.

There are a thousand and one other conditions which may affect the road location. In one instance, a mammoth hydraulic placer mine made a certain location possible for one of the California State highways, while a similar mine in another part of the State made the desired location for another road impossible.

AN ART RATHER THAN A SCIENCE.

A hillside location may be preferable to a location through an adobe flat carrying an excess of irrigation water. A high mountain ridge route, open and cool, with plenty of desirable camp sites, though closed a portion of the year by snow, may be preferable to a deep canyon route open the year round, if the principal traffic is to consist of summer tourists and the canyon be narrow and hot, with few places to turn off the road. But if the principal traffic is to be freight, which will be continuous through the winter, then the canyon route is to be preferred. Such considerations, however, may lead the engineer into prophecy. Who can say what the future may bring or what class of traffic should be favored?

From the foregoing it is apparent that the writer believes that the location of highways is an art rather than a science. An engineer with a "good eye for country" and for the beautiful, and equipped with plenty of experience and "horse sense," almost seems to know where a road should go, oftentimes without the need to consider why.

APRIL FEDERAL-AID PROJECTS EXCEED PREVIOUS RECORDS.

FEDERAL-AID road projects approved from one State, Pennsylvania, call for Federal aid to the amount of $1,444,697.54 in the building of nine roads having an estimated cost of $2,516,628.69. A single project in Illinois approved will cost $1,636,445.50 and will receive $818,222.75 of Federal money. An Allegany County (Maryland), project approved, for a concrete road 4.68 miles long, will cost $56,817 a mile. These facts stand out in the April record of Federal-aid projects approved or of project agreements executed.

They emphasize the conclusions arrived at from a study of the March record, that the people have decided to build roads to handle the traffic demands, that the great road-building program predicted for this year is in progress, and that more attention is now paid to the construction of through highways.

April again saw all past records surpassed for Federal-aid projects approved and in agreements signed. Approved statements and agreements together called for $9,559,571.30 of Federal aid for roads having an estimated cost of $20,861,957.96. The number of projects was 174, as against 150 in March. The mileage was 1,443.76 as against 1,270.13.

The increases over the March record are: Number of projects 24, mileage 173.63, estimated cost $3,302,347.89, Federal-aid allowance $2,819,732.13.

The statements approved during the month were 120, with a mileage of 923.53. The estimated cost of this mileage was $16,261,326.51, as against $14,425,114.87 for the projects approved in March, and by far the largest amount yet reached in a monthly record since Federal aid for roads became an accomplished fact. The Federal-aid allowance for these projects was $7,528,550.68, an increase over that for the previous month of $2,066,393.96.

Agreements for 55 projects were signed by the Secretary of Agriculture. All but one were for projects approved in previous months. The Federal aid allowed for these projects was $2,039,614.99 and the estimated cost of the roads $4,626,415.48.

The total Federal-aid agreements executed up to May 1, 1919, number 535, with a mileage of 4,624.83. The estimated cost amounts to $39,059,327.44 and the Federal-aid allowance to $15,614,929.61.

In five States the cost of the new projects approved will be in excess of $1,000,000, while in six other States the estimated cost runs from $576,000 to $908,000. The Federal-aid allowance in these States runs from $296,000 up, in four of them being more than $500,000. In several of them the agreements executed greatly increase the estimated cost and the amount of Federal aid for projects which were considered during the month.

The Pennsylvania projects mentioned, which in their estimated cost and Federal-aid allowance so far tops the record for all the States to date, have an aggregate mileage of 57.81, and nearly all are for concrete roads.

These States follow in the order named in the relative cost of the roads involved in the approved contracts: Georgia, 16 projects, 103.91 miles, estimated cost $1,837,446.21, Federal aid $873,182.05; Illinois, a single project, 65 miles long, estimated cost $1,636,445.50, Federal aid $818,222.75; Ohio, 7 projects, 35.36 miles long, cost $1,241,677.02, Federal aid $387,600; Connecticut, one project, 32.1 miles, estimated cost $1,002,650, Federal aid $501,325; Maryland, 7 projects, 23.93 miles, estimated cost $908,347.77, Federal aid $413,821.38; California, 3 projects, 40.69 miles long, estimated cost $834,239.02, Federal aid $448,969.51.

While Ohio projects come fourth in the estimated cost of the roads the Federal-aid allowance is below that awarded to four States where the cost of the roads is smaller. This happens because in that State the Federal aid asked for is only about 31 per cent of the cost of the roads.

Georgia leads in the number of projects approved, 16, and also in the mileage of the roads covered, 103.91. Pennsylvania and Virginia each had 9 projects approved. The Pennsylvania mileage was 47.81 and the Virginia 41.53, being third and fourth in the list. Pennsylvania's 65 miles put her mileage next to that of Georgia.

The big Illinois and Connecticut projects both ask for 50 per cent of the estimated cost as the Federal aid allowance. The Illinois project is for a concrete road through Grundy, La Salle, Bureau, Putnam, and Marshall Counties. The Connecticut project is for a bituminous road in Hartford and New London Counties.

Idaho comes third in the size of a single project. It is 30.50 miles of earth road in Gooding and Twin Falls Counties, a part of the north and south highway, estimated to cost $649,000 and with Federal aid of $324,500. This large cost for an earth road is due to the heavy grading necessary. Georgia has one project, 15.50 miles of concrete in Chatham County, which will cost $484,774.89, with Federal aid of $200,000.

In the agreements executed during the month Wisconsin leads in number, 14; Texas in mileage, 131.58; and Illinois in Federal aid allowance and in the cost of the roads, $456,043.33 and $917,890.36. The Wisconsin agreements are for roads estimated to cost $630,493.08, with an allowance of $198,625.50.

The Maryland road having the highest average cost per mile, $56,817, will be 4.68 miles of concrete, which will cost $267,905. A road in Warren County, Pa., will cost $44,000 a mile and one in Howard County, Md., $39,853. These also are to be of concrete.

The month's record shows the South moving forward in the road building campaign, with projects showing higher grade construction. Of the 16 Georgia projects approved two were for bridges, 7 for concrete and 1 for either a brick, concrete, or bituminous road, the others being for sand-clay roads. The concrete roads will cost from $30,000 to $32,000 a mile, indicating the highest type construction, for the cost in the South is usually less than that in the North. Louisiana will build a short bituminous macadam road at an estimated cost of $36,377 a mile. Virginia has one bituminous macadam and three concrete roads in 9 projects approved.

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FEDERAL-AID RECORD FOR APRIL.

State.	Project No.	County.	Length, in miles.	Type of construction.	Project statement approved.	Project agreement executed.	Estimated cost.	Federal aid allowed.
Alabama	31	Lamar	6.14	Gravel		Apr. 2	$28,071.30	$14,035.65
	40	Marshall	5.60	Macadam	Apr. 10		29,900.31	14,950.15
	44	Dale	.63	Concrete bridge	Apr. 17		69,099.80	34,549.90
	45	do	7.95	Sand-clay	Apr. 12		42,718.50	21,359.25
	49	Limestone	9.97	Gravel	Apr. 19		42,675.60	21,337.80
	50	Coffee	6.41	Sand-clay	Apr. 11		32,161.71	16,080.85
	51	Russell	5.44	do	Apr. 19		32,317.34	16,158.67
Arizona	7	Pinal	12.71	Earth, surfaced in part		Apr. 17	153,436.25	76,718.12
Arkansas	9	Monroe	8.08	Gravel, asphalt carpet coat		Apr. 15	75,183.68	37,471.83
	19	Craighead	5.00	Asphaltic concrete		Apr. 8	102,013.56	30,836.16
	22	La Fayette	15.42	Gravel		do	48,950.95	22,205.52
California	11	Fresno	8.17	Concrete	Apr. 11		211,799.06	105,899.53
	12	Merced	14.90	do	do		251,900.00	125,950.00
	13	Los Angeles	17.62	do	Apr. 25		434,239.96	217,119.98
Colorado	2	Huerfano and Las Animas	64.12	Brick or concrete, gravel		Apr. 12	309,215.71	154,607.85
	16	Morgan	.50	Concrete or bituminous	Apr. 8		10,995.66	5,497.83
	18	Pueblo	1.70	Concrete	do		44,000.00	22,000.00
Connecticut	4	Hartford, New London	32.10	Bituminous	Apr. 26		1,002,650.00	501,325.00
Delaware	5	Kent	5.96	Concrete	Apr. 4		262,240.00	119,200.00
Florida	12	Suwanee	8.70	Sand-clay	Apr. 7		26,367.90	10,000.00
Georgia	2	Chattooga	13.62	Gravel		Apr. 4	98,921.79	49,460.00
	10	Towns	11.66	Graded and drained earth		Apr. 22	67,238.86	33,600.00
	31	Dade	9.80	Top soil or gravel		Apr. 7	59,847.25	29,900.00
	32	Columbia		do		Apr. 17	[1] 10,619.79	[1] 5,326.59
	36	Douglas	12.07	Top soil		Apr. 14	54,443.72	27,000.00
	39	Lawrence		Bridge	Apr. 9		151,723.55	75,861.77
	41	Douglas	6.50	Sand-clay	Apr. 10		41,615.14	20,000.00
	42	Chatham	15.50	Brick, concrete, or bituminous	do		484,774.89	200,000.00
	43	Habersham	5.00	Concrete	Apr. 19		150,672.50	75,336.25
	44	Hall	3.20	do	do		101,751.10	50,875.55
	45	Crawford	7.00	Sand-clay	Apr. 10		25,126.75	12,563.37
	46	Bibb	8.75	Concrete	Apr. 17		309,870.00	154,935.00
	47	Screvens	12.40	Sand-clay	Apr. 26		36,478.48	18,239.24
	48	Clarke	3.50	Concrete	do		100,100.00	50,000.00
	49	Mitchell	13.50	Sand-clay	do		67,298.00	33,649.00
	50	Colquitt	4.32	Concrete	Apr. 29		87,583.65	43,791.82
	51	do	4.70	do	do		108,575.28	54,287.64
	52	Evans	13.20	Sand-clay	Apr. 26		30,062.45	15,000.00
	53	Bibb	2.14	Concrete	do		90,129.60	42,800.00
	57	Butts	4.00	Sand-clay	do		19,976.00	9,998.00
	58	do		Bridge	Apr. 29		31,708.82	15,854.41
Idaho	8	Gooding, Twin Falls	.41	do	Apr. 7		63,217.00	31,600.50
	9	Adams and Idaho	30.50	Earth	Apr. 3		649,000.00	324,500.00
Illinois	[2] 1	Dupage, Kane, Dekalb, Ogle, Lee, Whiteside.	2.79	Concrete and bituminous macadam		Apr. 19	82,570.40	41,285.20
	[2] 1	do	6.51	do		do	201,925.35	100,962.67
	[2] 1	do	4.68	do		Apr. 23	127,838.28	63,919.14
	[2] 2	Kankakee and Iroquois	7.52	do		Apr. 21	244,291.27	122,145.63
	[2] 2	do	7.15	do		Apr. 26	224,061.39	112,030.69
	5	Marshall	1.57	Concrete		Apr. 7	37,203.67	15,700.00
	7	Grundy, La Salle, Bureau, Putnam, Marshall.	65.00	do	Apr. 17		1,636,445.50	818,222.75
Iowa	36	Palo Alto	11.93	Gravel	Apr. 15		85,360.00	22,113.25
Kansas	[2] 2A	Labette		Gravel or macadam		Apr. 29		[1] 25,697.98
	[2] 2B	do		do		do		[1] 35,563.91
	23	Montgomery	9.92	Gravel	Apr. 9		87,628.75	43,814.37
Kentucky	12	Graves	6.13	do	Apr. 14		73,113.70	36,556.85
	13	Carter	16.00	Earth	Apr. 29		158,730.00	79,365.00
Louisiana	22	Rapides	1.66	Bituminous macadam	Apr. 19		60,384.86	30,192.43
	33	West Baton Rouge	13.85	Gravel	Apr. 28		116,527.62	58,115.31
Maryland	13	Prince Georges	5.33	Concrete	Apr. 4		191,730.00	95,865.00
	14	Frederick, Washington	3.51	do	Apr. 15		87,133.20	43,566.60
	16	Howard	5.20	do	do		207,515.00	103,757.50
	19	Wicomico	1.53	do	Apr. 23		55,000.00	27,500.00
	21	Kent	3.03	do	Apr. 12		79,011.57	39,505.78
	23	Caroline	.65	do	Apr. 14		20,053.00	10,026.50
	24	Allegany	4.68	do	Apr. 23		237,905.00	93,600.00
Massachusetts	12	Essex	2.17	Bituminous	Apr. 26		64,372.00	32,186.00
	13	Middlesex	6.49	do	do		222,557.50	111,278.75
Michigan	[2] 4B	Presque Isle	2.85	Gravel		Apr. 15	41,839.38	20,919.69
	28	Branch	5.25	Concrete or bituminous		Apr. 7	146,252.59	73,126.29
	36	Ingham	1.66	do		Apr. 25	61,064.56	30,532.28
Minnesota	2	Chisago		Gravel		Apr. 30		[1] 22,981.40
	9	Sherburne		do		Apr. 23	[1] 4,021.65	
	29	Otter Tail	19.52	do		Apr. 30	103,647.74	45,000.00
	35	Hennepin	5.80	Concrete, brick, or asphalt	Apr. 19		201,118.61	60,000.00
Mississippi	9	Kemper		Gravel		Apr. 21	[1] 11,669.38	[1] 7,683.09
	15	Wilkinson		Clay, gravel		Apr. 25	[1] 15,602.94	[1] 7,849.61
Montana	17	Flathead	9.00	Earth	Apr. 16		17,600.00	8,800.00
	29	Missoula	.54	Gravel	Apr. 19		16,500.00	8,250.00
	39	Ravalli		Bridge	Apr. 8		22,000.00	11,000.00
Nebraska	1	Lancaster		Brick		Apr. 12		[1] 18,705.00
	4	Wayne, Cedar		Sand-clay		Apr. 23	[1] 12,789.21	[1] 6,394.60
	5	Madison, Platte		Earth and sand-clay		do	[1] 11,661.71	[1] 5,830.85
	10	Lincoln		Graded and drained earth		Apr. 26	[1] 4,235.42	[1] 2,132.71
	12	Logan, McPherson		do		Apr. 15	[1] 8,703.42	[1] 4,351.71
	19	Lancaster		Earth		Apr. 23	[1] 2,750.00	[1] 1,375.00
	27	Dodge, Saunders	30.33	do		Apr. 8	64,130.00	32,065.00
	53	Boone, Nance	24.20	do	Apr. 15		53,746.00	26,873.00
	56	Seward, York, Hamilton	49.85	do	Apr. 26		76,505.00	38,252.50
	73	Buffalo	20.00	do	Apr. 16		53,460.00	26,730.00
	81	Dodge	5.94	Concrete	Apr. 28		197,930.15	98,965.00
Nevada	11	Esmeralda	8.93	Earth		Apr. 19	38,423.23	19,211.61
	16	Lander	8.52	do		Apr. 30	28,454.80	14,227.40
New Hampshire	22	Grafton, Merrimack	1.23	Gravel	Apr. 11		9,997.63	4,998.81
	24	Grafton, Hillsborough	1.09	Bituminous	Apr. 10		13,996.62	6,998.81
	25	Merrimack	1.11	Gravel	Apr. 26		7,972.80	3,986.40
	26	do	.79	do	do		9,999.99	4,999.99
	32	Rockingham	1.50	do	Apr. 25		9,948.18	4,974.09
	33	do	3.50	do	do		17,674.53	8,837.26
	34	do	1.05	do	Apr. 29		7,485.14	3,742.57
	35	do	1.00	do	do		12,608.20	6,304.10
	37	do	9.69	Bituminous	Apr. 26		219,211.41	109,605.70

[1] Modified agreement. Amount given is increase over previous estimated cost or Federal-aid allowance.

[2] Agreements are for sections of project.

State.	Project No.	County.	Length, in miles.	Type of construction.	Project statement approved.	Project agreement executed.	Estimated cost.	Federal aid allowed.
New Mexico	[2] 1A	Colfax	9.71	Gravel		Apr. 3	$98,622.21	$49,311.10
	18	Eddy	31.00	do	Apr. 4		72,648.40	36,324.20
New York	2	Wyoming		Bituminous macadam		Apr. 29	[1] 29,800.00	[1] 14,900.00
	7	St. Lawrence		do		do	[1] 10,427.89	[1] 5,213.95
	21	Rockland	1.45	Concrete	Apr. 24		52,200.00	26,100.00
	27	Cattaraugus	7.06	do	Apr. 23		224,600.00	112,300.00
	29	Allegany	15.10	Bituminous	Apr. 26		395,700.00	197,850.00
North Dakota	5	Traill	24.87	Earth		Apr. 22	32,078.85	16,039.42
Ohio	10	Wayne	5.00	Bituminous macadam or brick		Apr. 1	150,000.00	50,000.00
	12	Ashland	6.72	Brick		do	213,000.00	50,000.00
	34	Erie	3.04	Concrete	Apr. 2		110,000.00	30,000.00
	36	Columbiana	3.00	do	Apr. 4		84,059.30	35,600.00
	37	Knox	5.10	Concrete or brick	do		200,337.72	50,000.00
	38	Auglaize	6.52	Brick, concrete, or bituminous	Apr. 21		246,320.00	104,320.00
	39	do	7.80	Brick or concrete	Apr. 22		245,000.00	45,680.00
	46	Ashland	3.80	do	Apr. 25		132,000.00	32,000.00
	47	Wood	6.10	Concrete or asphalt	Apr. 29		223,960.00	90,000.00
Oklahoma	6	Okmulgee	15.00	Bituminous	Apr. 12		183,717.60	91,858.80
	7	Muskogee	2.50	do	Apr. 22		84,189.60	42,094.80
	8	Ottawa	15.60	do	do		308,580.25	154,290.12
Oregon	15	Harney	16.14	Gravel macadam	Apr. 15		121,725.71	45,000.00
Pennsylvania	[2] 8C	Erie	4.90	Cement concrete or bituminous concrete on cement base.		Apr. 12	181,997.33	90,998.66
	[2] 8D	do	2.90	do		Apr. 7	117,168.21	58,000.00
	[2] 8E	do	1.70	do		do	64,441.52	32,220.76
	21	Lehigh	6.60	Concrete	Apr. 7		229,300.00	132,000.00
	22	Monroe	4.45	do	do		177,813.90	88,906.95
	24	Warren	7.20	do	Apr. 19		316,800.00	144,000.00
	25	Adams, Franklin	5.70	do	Apr. 16		205,181.19	102,590.59
	26	Elk	5.60	do	Apr. 19		274,093.60	112,000.00
	27	Allegheny	8.26	Bituminous	Apr. 7		363,440.00	165,200.00
	28	Mercer	4.50	Concrete	Apr. 10		198,000.00	90,000.00
	29	Pike	5.60	Bituminous concrete	Apr. 16		246,400.00	112,000.00
	30	Bradford	9.90	Concrete	do		435,600.00	198,000.00
South Carolina	21	Edgefield	8.42	Sand, clay	Apr. 8		35,062.36	17,531.18
	23	Greenville	3.53	Bituminous	Apr. 17		26,762.56	13,381.28
Texas	6	Shackleford	11.12	Gravel		Apr. 4	62,310.25	30,679.81
	30	Jasper	14.73	do		Apr. 12	107,652.94	30,000.00
	35	Gaudalupe	14.58	Bituminous gravel		Apr. 7	70,064.45	34,900.00
	45	Hemphill	15.58	Sand-clay		do	21,046.97	10,523.48
	57	Wilbarger	4.66	Concrete slab		do	108,468.10	46,353.45
	60	Randall	17.65	Sand-clay		do	36,955.94	11,800.00
	66	Comal	19.80	Bituminous gravel, or macadam		do	73,886.77	29,750.00
	67	Wheeler	27.98	Sand-clay and gravel		do	63,482.01	31,741.00
	76	Harris	5.50	Shell		do	19,827.50	8,600.00
Virginia	15	Washington	6.75	Earth		Apr. 2	45,291.95	22,645.97
	18	King and Queen, Gloucester, Middlesex.		Graded and drained		Apr. 1	[1] 21,302.66	[1] 10,651.33
	23	Caroline, Essex	4.19	Gravel	Apr. 15		18,824.30	9,412.15
	24	Alleghany	8.03	Slag macadam	Apr. 17		76,725.33	38,362.66
	27	Smyth	5.71	Macadam	Apr. 3		89,621.68	44,810.84
	32	Fairfax	3.27	Bituminous macadam	Apr. 16		63,873.15	31,936.57
	34	Norfolk	5.31	Concrete	Apr. 12		135,910.50	67,955.25
	35	Rockbridge	4.28	Macadam	Apr. 28		53,900.00	26,950.00
	36	Halifax	3.42	Concrete	Apr. 23		79,247.52	39,623.76
	40	Dinwiddie	1.62	do	Apr. 7		36,256.82	18,128.41
	42	King George	5.70	Sand-clay	Apr. 29		37,840.00	18,920.00
Washington	8	Douglas	13.80	Macadam		Apr. 23	127,513.71	63,750.00
	14	Okanogan	2.41	Gravel		do	[3] 16,694.21	[3] 8,278.35
	14	do	5.44	do	Apr. 29		[3] 42,186.32	[3] 21,093.16
	15	do	4.14	do		Apr. 23	[3] 25,326.40	[3] 11,447.98
	15	do	5.07	do	Apr. 30		[3] 36,491.99	[3] 18,245.99
	16	Stevens	13.00	do	Apr. 23		168,821.25	84,410.62
West Virginia	10	Mason		Concrete		Apr. 28	[1] 9,299.55	[1] 38,470.00
	29	Ritchie	5.00	do	Apr. 9		112,040.00	53,500.00
	33	Preston	2.56	Asphaltic macadam	Apr. 28		30,000.00	15,000.00
	34	Monroe	2.00	Macadam	Apr. 29		19,200.00	9,600.00
	35	Monongahela	4.50	Concrete	Apr. 9		88,851.00	44,000.00
	36	Upshur	5.20	do	Apr. 25		128,800.00	28,800.00
Wisconsin	17	Eau Claire and Chippewa	8.80	Concrete or brick		Apr. 1	173,812.56	47,000.00
	33	Fond du Lac	[1].73	Concrete		Apr. 29	[1] 26,656.39	[1] 8,885.47
	37	Portage		Gravel		Apr. 30	[1] 12,377.26	[1] 4,125.75
	41	Grant	2.15	Earth		Apr. 9	25,797.84	8,599.28
	50	Ozaukee	1.74	Bituminous macadam		Apr. 26	35,399.61	11,799.87
	56	Kewanee	4.41	Gravel		Apr. 23	24,255.27	8,085.09
	60	Green Lake	7.61	Grading and concrete		Apr. 9	44,205.05	14,100.00
	62	Washington	2.90	Concrete		Apr. 15	62,396.58	20,798.86
	63	Waukesha	2.68	do		Apr. 29	52,796.54	17,598.85
	64	Monroe	1.10	Earth		Apr. 9	13,287.25	4,429.08
	66	Richland	2.09	Concrete		Apr. 23	51,089.03	17,029.68
	69	Sheboygan	3.18	do		Apr. 29	62,998.25	20,999.42
	74	Oneida	3.17	Earth		Apr. 23	19,739.32	6,579.77
	79	Walworth	1.28	Concrete	Apr. 8	Apr. 29	25,783.13	8,594.37
	83	Crawford	5.04	Earth	Apr. 12		25,553.00	8,517.66
	84	Jackson	3.20	do	Apr. 16		25,509.00	8,000.00
	85	Oconto	4.36	Gravel	Apr. 15		25,058.43	8,352.81
	87	Buffalo	2.75	Earth	Apr. 16		29,910.54	9,970.18
	88	Sawyer	4.38	do	do		26,897.20	8,965.73
	89	Polk and Burnett	8.22	do	do		44,484.00	14,828.00
	90	Washburn	4.50	do	Apr. 29		25,247.20	8,415.73
Wyoming	23	Niobrara	11.27	Earth	Apr. 7		20,226.91	10,113.45
	24	Lincoln	4.18	do	Apr. 8		19,998.00	9,999.00
	26	do	9.17	do	Apr. 7		30,968.19	15,484.09
	29	Albany	26.87	Gravel	do		73,886.78	36,943.39
	32	Fremont		Two bridges	Apr. 29		27,500.00	13,750.00
Total	174		1,443.76				20,861,957.96	9,559,571.30

[1] Modification of agreement previously signed. Figures given are increases over those in original agreement.
[2] Agreement is for section of the approved project.
[3] The first figures for projects 14 and 15, Washington, are for agreements executed for the originals previously approved. The second are increases in mileage, estimated cost, and Federal aid allowance in revised statements.

LIFE'S PATHWAY.

By A. D. Williams, Associate Member American Society of Civil Engineers.

HISTORY is the story of man's actions as viewed by various writers as they passed along life's pathway—that road leading from the present back through the ages to the unknown. On this pathway we can find the footprints of greed, avarice, revenge, and other propelling passions, which have found their vent in conquest individually and collectively, which might be described as man's inhumanity to man.

As we stand by this path and look across the plains, vales, and hills as it wends its way back through the centuries beyond vision we see but little written on the many pages telling of constructive achievements and still less touching the hearthstone of the masses.

The pages as they unfold tell of bloodshed, of war, of slaughter, of punishment and depression and extoll as great the instigators of these national crimes, but they have failed to tell us much of the men who have struggled to lift the weight of oppression from the soul of a fellow man. Too much of history is devoted to extolling the great deeds of national criminals. War, horror and destruction, terror and suppression stand dominating the milestones of history. Even the pages of the sacred Book of Books are marked and marred by narration after narration of conquest, war, and oppression. But little is told of the real horrors of prison and the whole course of history is woefully lacking in suggestion of prison reform.

WHO WAS THE FIRST PRISONER.

As to when the first prison was built or who was the first prisoner we have no record. We read that Joseph was cast into an Egyptian prison and confined with the king's prisoners. We are told he was imprisoned upon a false accusation, as some men are to-day, because conditions were not understood and the truth was or could not be produced in court. The prison did not make Joseph worse, neither did placing him there make him a criminal; but Joseph's influence made Egypt better, because he brought forth a message which set a new light in the valley of the Nile and saved Egypt and his home land from famine. It is written "as a man thinketh, so he is," but environments lend color to thought and shade to action.

Cain, the first criminal of which we have record, offers a lesson because the slaying of Abel has cast its shadows down through the ages, but the living lesson posted at that time seems to have been overlooked.

Students of life's evolution tell us that the minute cells which make up the body multiply and reproduce themselves. Cells generated in a body are susceptible to the influences that control that body at the time of their generation. The propelling and controlling power of the human body is the mind and as is the mental condition of parents at the time of the production of these cells so will the strength of the cells be in the life to which they are transmitted. Cells produced in a body brooding with revenge and passion will display their marks in the life that follows, in either a weakened or abnormal state as the new life develops. They may and can be changed by culture and influence, but the weaker and finer the cell the more susceptible to the influences that come its way.

A LESSON FROM THE FIRST GREAT CRIME.

We might draw a picture from the life of Cain. It is fair for us to believe that the conception for that life was about the time the parents, filled with the spirit of remorse and revenge, were banished from the garden. Thus we have a vision of the life, conceived under influence over which it had no control, becoming the first criminal. If we read Genesis (iv 15), "whosoever slayeth Cain vengeance shall be visited on him sevenfold," as a careful student we can see the divine recognition of the weakness in that life and likewise a divine disapproval of capital punishment, and a more careful study of the lesson reveals to us that the Great Judge intended that crime should be punished, but punishment tempered with mercy. Cain was punished for the purpose of correcting his life and not to avenge the crime. His faulty life was to be corrected by proper discipline. A further study of this case reveals the fact that the Great Ruler recognized in the beginning of human life and progress that man himself was the only person capable of judging the sufficiency of the punishment. This case has laid the foundation for prison reform, and the only regret that should be expressed at the present time is that thousands of years and millions of opportunities have been lost, and untold suffering has resulted and will continue for many years by reason of neglect.

The Mosaic laws which form the basis of our present-day statutes are shaded with the impulses of the author's period of banishment. The expressions of "an eye for an eye," "a tooth for a tooth," "blood for blood," and "life for life" are the outbursts of a revengeful spirit. These products of barbarism couching on the penstock of the ancient lawgiver cast their shadows over the peaks of centuries and leave their marks in the valleys of human misfortune.

The most prominent method of execution employed in that period was that of stoning to death. The prosecuting witness cast the first stone, not because of the crime, but in gratification of revenge and satisfaction of the mob spirit.

The world's greatest teacher, who gave us the purest of law, "whatsoever ye would that men should do unto you, do you even so unto them," was the victim of jealous and frenzied court action. The greatest tragedy on the pages of history is that of a trial judge yielding to the demand of a blood-thirsty, self-intoxicated audience. Thus the man who directed that the one in the audience without sin cast the first stone was convicted and condemned to die the most hideous of deaths, not for crime but to satisfy the revenge and passion of a frenzied mob.

THE PURPOSE OF THE PRISON.

Conception of the purpose, a prison, and of punishment has been wrong. A prison should be a moral hospital in which the needs of the morally and socially weak can be treated with character-forming and constructive remedies. These statements are made because we are the creatures of custom. We do things because and as others have done them. The truth of this statement can be found in the location of our roads. In both highway location and dealing with prisoners and prison life we have blindly followed the time-worn path of custom without pausing to make improvements. The census reports will show the truth of this statement. In 1850 we had one prisoner for each 3,442 persons, in 1860 one prisoner for 1,647, in 1870 one for 1,020, in 1880 one for 837, in 1890 one for 760, in 1913 one for 824. These impressive comparisons show us that something is wrong and warn us we should apply scientific remedies to light the pathway along which we are now groping. They say we must collect ourselves, with the determination to blaze a path through the wilderness of custom and precedent to the field of justice, faith, hope, and charity. The problem and its solution lie in the community and the community is dependent on the roads that bring it together.

Crime has a cause, and often we would do a greater work by seeking the cause than by continuing to crush the life of the person who committed the act. Instead of confining unfortunate victims who have transgressed the law merely to justify the law, and inflicting punishment on the body of the individual, we should use imprisonment for only two purposes, while seeking as a community to locate and remove the cause—first, to protect society from the violence of the individual, and, second, by a change of environments so as to correct and reconstruct the life of the prisoner. This basic thought can not be carried out by the old methods of excessive physical punishment and confinement in idleness.

REMOVING A CAUSE OF CRIME.

West Virginia has found and removed one of the causes of the crime. The effectiveness of this removal is found in the following figures. Including the fiscal year ended July 1, 1914, the last year saloons existed in the State, to the present time the prisoners received at the State prison each year and the percentage of decrease is shown here:

Fiscal year.	Prisoners received.	Per cent of decrease.
1913–14	427	
1914–15	388	11
1915–16	335	19.2
1916–17	324	24.1
1917–18	305	28.5

The further proof of this statement is borne out in the records of the 55 county jailers scattered throughout the State. Partially complete report gathered from these jailers showed for the year ended July 1, 1915, the first year in which we attempted to collect such statistics, a total of 198,000 prison days in jail, of which we received 72,550 days' work on the public roads. For the fiscal year ended July 1, 1918, these reports showed 76,726 days in jail, a decrease of 61.2 per cent, and of this number 44,584 days were sentences to work upon the roads, which resulted in 26,098 days actual work; 25,316 days were awaiting trial and the remaining days represented felons waiting transmission to the State prison, Sundays, sick, and bad weather. These figures tell a story of the effect of State-wide prohibition. By it West Virginia in three years' time has lost from prison labor upon the public highways 45,452 days and has added to the usefulness of its citizenship in lieu thereof 121,274 man days.

The prisoner and the prison official are the products of society and while the prison keeper has been looked upon at some times in the past with feelings of resentment the time has come that this feeling must be changed because into his care and keeping must be intrusted lives and souls out of which better citizenship should and must be constructed. There is a better part in every man and when found and cultivated the life can be improved.

A real criminal is an abnormal being and is, in a manner, sick. He needs the treatment that will effect a cure in his case. To do this the right man is needed to care for him. A man to be a leader in a moral hospital must be a moral physician who can diagnose the case before him and then apply the proper remedy. He must have the rarest of judgment, the best of character, the greatest of tact, and the spirit of the truest Samaritan.

REGENERATION THROUGH WORK.

Society during the past has been cruel. The histories of prisoners of war and the cruel treatment of unfortunates who have fallen into the hands of the avaricious and revengeful is an appalling record that shows the failure of man's conception of justice when guided by his own passions in dealing with his fellow man. This damnable

spirit was revealed on the plains of Belgium and the hills and vales of France, of Italy, Rumania, and wrecked Russia. Selfish thoughts by individuals and the neglect of society has caused crime and produced criminals. Society has often caused crime by placing temptation before the weak and then persecuting the individual, for which they should be prosecuted.

Placing a man in jail does not make of him a criminal, nor does his detention and punishment free him from crime. A Paul at heart, a Bunyan in action, a Saviour crying "Father forgive them, they know not" has changed the color of prison life. Many a man in prison to-day can be made serviceable to humanity and society if society does its duty by him. The crime is the act and the criminal is the person who bears the feeling that produces the act whether he be the instigator or perpetrator. The man who is a criminal either in or out of jail is the same in the eye of truth and justice. Punishment can not, but regeneration from within will, reform him. This reformation can come only through useful and economical employment. The idle prisoner is a detriment to himself and to society. Idleness is not kinsman to reform. Every prisoner, for his own good, which is the good of society, should be employed.

COMMUNITY PAYS COST OF IDLENESS.

The community pays the cost of every idle man whether in or out of jail, and with this thought in view West Virginia has spread upon her statute books a law requiring every able-bodied man to labor at least 36 hours per week. This has done much to reduce the charges of poverty and likewise improve the entire citizenship.

Then agreeing that for the sake of the community and of the prisoner he should be employed, the next question that arises is as to the kind of employment that will be the most beneficial to all persons interested. The statistics gathered by the writer revealed the fact that of the inmates of the various institutions of this country from 8 to 33 per cent were serving second or more sentences. Answers from the same institutions relating to men that had been worked on the honor system and in the open air range from 2 to 8 per cent, which establishes the fact that open-air employment is the most beneficial from a reformatory standpoint.

The prisoner being a public charge and a debtor to the public for transgressing society's laws, should be so employed as to render the most beneficial service to society. The public road being the common property of the county or State, and Nation as well, offers a class of service in its construction and maintenance that is beyond a doubt the most beneficial. With this thought in view, West Virginia has been employing a portion of her State prisoners since 1914, establishing first a camp in Pleasants County on the Ohio River; second, a camp in Berkeley County, near Martinsburg; and camp No. 3, in Kanawha County, near Charleston, which camp is still in existence.

COST OF MAINTAINING CAMPS.

We have read much relating to the cost of maintenance of prison camps, and to satisfy ourselves during the year 1917 we kept a very careful account of costs under various headings. Table No. 1 shows the cost per meal; also shows the average number of prisoners by month, total meals served, and the movement of prisoners. Table No. 2 shows the cost of guarding and maintaining the prisoners. Table No. 3 shows, by months, the distribution of team cost, including the maintenance of the county's teams and teams hired and maintained by the county.

DISTRIBUTION OF COSTS.

The distribution of the costs was kept under the following headings: Overhead—steam-shovel excavation, hand and scraper excavation; pipe culverts (subheaded), foundation excavation, building forms, placing concrete, placing pipe; bridges (subheading)—foundation excavation, building forms, placing concrete, riprap, unloading and hauling material, clearing and grubbing; placing drain tile, 4-inch and 6-inch; French drain; preparing to and moving machinery; repairing equipment; draining subgrade preparatory for work; coal mining; carpenter work; building and repairing; farm and garden; extra work, not included in unit prices, was kept under the following headings, placing steel, moving fence, building fence, repairing and removing buildings, repairing present and temporary roads, miscellaneous. Total hours, total days, rate, and total dollars were kept on the same chart with lost-labor hours, under the headings of bad weather, Sundays and holidays, sick, camp duty, total hours. This was subdivided each month under the heading of superintendent, foreman, steam-shovel engineer, roller engineer, county teams, hired teams, prison labor, guards, prison-labor overtime. The results showed a total of 36,243 hours prison work and a total of 27,846 lost hours (or, say, uneffective hours), which included 4,808 hours bad weather, 7,991 hours holidays and Sundays, 1,134 sick hours, 13,913 hours camp duty.

The total cost of the camp and all expenses connected therewith amounted to $19,441.34; of this amount $5,039.39 was distributed as camp bills, which included equipment, supplies, etc., for the camp, as shown on Table No. 2, plus the guard salary, $1,092.60, making a total of $6,531.51 shown in the table. The item "pay roll" is shown

at $6,685.84. The road bills are shown as $6,624.51, distributed under the headings, reinforcement, $165.99; rental on equipment, $40; sand and gravel, $681.42; pipe, $44.19; cement, $659.80; freight, $42.70; lumber, $397.93; explosive, $12.68; extra, $962.39; coal, $188.61; 4-inch tile, $58.14; team expense, $2,201.20, less a credit of $74.35, leaving $2,126.85; equipment, $747.10; miscellaneous, $496.64. For this we removed 28,883 cubic yards of unclassified excavation at a cost of 40.9 cents, or $11,815.09; 128 cubic yards of foundation excavation for bridges at a cost of $1.48 per cubic yard, or $2,855.29. This includes 263.57 cubic yards of concrete, costing $10.12 per yard, 74.7 feet of 12-inch pipe in place, including 113 yards of excavation, $964.09, making the excavation cost 90½ cents per yard and the pipe $3.24 per foot; 28 yards of excavation and 17.87 feet 18-inch pipe culvert cost $321.16, or $1.30 for excavation and $5.04 per foot; 215 feet French drain cost $52.65, or 24½ cents per foot; 768 feet 4-inch subdrain, $170.42, or 22 cents per foot; 89 feet 6-inch guard rail, $10.27, or 11½ cents; 22

TABLE No. 1.

Months.	Average number of prisoners.	Total number meals served prisoners.	Total number meals served foreman and visitors.	Grand total of meals served.	Number prisoners returned to penitentiary.	Number sick days.	Number released.	Number of escapes.	Number prisoners received.	Number prisoners captured.
January	15	1,546	84	1,630	3		2		20	
February	15	1,344	68	1,412		2				
March	14	1,389	91	1,480	3		2		4	
April	15	1,458	108	1,566						
May	15	1,449	134	1,573	3		3		6	
June	14	1,376	152	1,528		5	2	1	2	
July	12	1,241	266	1,517		21		1		
August	22	2,359	236	2,595	1	57	5	4	19	
September	21	2,095	231	2,326	1	2				3
October	23	2,309	195	2,504	1	24			10	
November	28	2,730	230	2,960		7	2	1	2	
December	24	2,399	164	2,563	4	8	2			1
Total		21,695	1,959	23,654	16	126	18	7	63	4

Total cost of food, $3,303.22. Cost per meal, $0.1396.

TABLE No. 2.—*Cost of guarding and maintaining prisoners, by the day and in total, at West Virginia State road camp No. 3.*

[Covering the year 1917.]

	Total.	Guards.	Miscellaneous.	Food.	Equipment.	Clothing.	Tobacco.	Garden seed.	Transportation.	Rewards.	Coal.
January	$447.46	$91.05	$3.25	$158.94	$6.79	$58.68	$11.40		$97.10		$20.25
February	351.13	91.05	8.55	186.01	15.85	13.00	9.52		2.40		24.75
March	382.72	91.05	7.53	203.82	3.30		9.52		59.75		8.75
April	355.67	91.05	20.00	188.19	9.68	22.55	20.40	$12.45	3.35		18.00
May	429.19	91.05	36.60	201.03	1.60	37.50	11.41	2.40	46.70		.90
June	435.76	91.05	6.62	273.54	12.19	38.10	13.01	1.25			
July	352.16	91.05	3.90	206.31	20.24	8.75	19.86	.30	1.75		
August	771.40	91.05	32.40	410.07	19.40	51.35	28.00	3.35	135.78		
September	816.74	91.05	15.60	357.35	25.40	107.59				$229.75	
October	652.24	91.05	48.05	367.53	23.90	92.09	29.62				
November	778.50	91.05	41.60	539.98	15.00	14.73	17.49		58.65		
December	717.54	91.05	28.32	300.87	48.66	129.44	23.91		45.29	50.00	
Total	6,531.51	1,092.60	252.42	3,393.64	202.01	573.78	194.14	19.75	450.77	279.75	72.65
Inventory	329.52			90.42	57.36	251.74					
Grand total	6,131.99	1,092.60	252.42	3,303.22	144.65	322.04	194.14	19.75	450.77	279.75	72.65
Total days prisoners	7,232										
Cost per day	.8465	.151	.035	.456	.02	.0443	.027	.0026	.062	.0386	.01
Effective prison days	4,027										
Cost effective day	1.5227	.2717	.0627	.82	.036	.08	.0482	.0049	.1117	.0695	.018

TABLE No. 3.

January	$100.11	$15.65	$84.46						31	6	186
February	79.90		69.90	$6.00	$4.00				28	6	168
March	64.37		59.67	2.80	1.00	$0.90			31	6	186
April	123.86	.60	105.26	12.00	6.00				31	6 1 8½	186
May	153.55	1.40	117.60	10.55	1.00		$23.00		30	1 9½	255
June	159.63	7.25	152.38						30	9	270
July	281.89	74.35	173.62	12.00			15.25	$6.67	31	9	279
August	260.50	2.65	250.05	5.90		1.90			31	9	279
September	221.95		220.31	.90		.74			30	9	270
October	271.19		261.19	10.00					31	9	279
November	226.68		200.62	10.00			16.06		30	9	270
December	257.53	25.20	187.33	21.00	24.00				31	9	279
	2,201.16	127.10	1,882.39	91.15	36.00	3.54	54.31	6.67			2,907

[1] Months.

Feed cost per day, per head, $0.648. 879.55 effective working days, at $2,201.16, equals $2.5026 per team per effective day. Total cost teams, total effective working days, 879.55; cost per day, $2.5026.

yards of riprap, $55.91, or $2.554 per yard. Extra work, $2,605.41; engineering, $596. As a matter of comparison these quantities were figured on the price given by the court for a similar piece of work on the opposite side of the river. Using the contractors' items of cost, the total cost would have been $26,847.68, or a net saving to the county of $7,642.34, or 39 per cent.

PENITENTIARY SELF-SUSTAINING.

The legislature of West Virginia has for some years treated the penitentiary as a self-sustaining institution and made no appropriation for its maintenance, so the State road department in conjunction with the board of control and the county courts have worked out plans to suit as near as possible each separate condition. When camp No. 1 was established March 23, 1914, the State undertook to guard, feed, clothe, and supply the labor to the county at 75 cents per day. On this it lost money. On May 20, 1914, camp No. 2 was established on the same basis at a per diem cost of 82½ cents per day. This venture likewise was not satisfactory and proved expensive to the prison department. Camp No. 3 was established on the basis of camp No. 1 on July 6, 1914, and so operated for a period of time. Then the county agreed to assume all of the cost of maintenance, including transportation and guarding, and to arrive at some figures on which we could base our future actions the heretofore explained accounting system was installed.

On the first of the calendar year 1918 it became necessary to change the remuneration to the State, because of the high cost at the penitentiary, and a new contract was made at camp No. 3, whereby the county bears all of the expense and pays the State 75 cents per day. Of this 25 cents per day is returned by the State to the prisoner, who in addition thereto receives 15 cents per hour for all time over 9 hours per day. Camp No. 4 was established March 13, 1918, with 30 men as a minimum. The county of Fayette pays all of the costs and pays the State $1 per day, of which the State pays the prisoner 25 cents and the county pays the prisoner 15 cents per hour for all overtime. Camp No. 5 consists of 50 men working from the penitentiary—the State boarding and clothing, the county furnishing transportation and guards. For this service the State receives $2 per day, of which 25 cents per day and overtime is paid to the prisoner.

FOURTH OF CONVICTS ARE TRUSTIES.

In order to take care of some railroad improvement needed in the Benwood yards, camp No. 6 of 50 prisoners is worked direct from the penitentiary for the Baltimore & Ohio Railroad, the railroad paying $2.85 and furnishing the men their dinners or noonday meal. The State pays the prisoner 25 cents per day of this $2.85. We have at the present time a total of 170 men working in the public-road camps, and 50 men on the special railroad work, making a total of 220, or over 25 per cent of the prison population, working as trusties or on the honor system. The warden, the State board of control, the governor, and the State highway commission are pleased with the results thus far obtained. We hope to do more.

Concluding, the prisoner should be given employment on the public road because it is the most beneficial, both to him and the community. He should be treated with all the confidence that possibly can be imposed. He should have some compensation for his labor; in addition we feel he should have consideration for good behavior, and to this end we grant him five days per month in addition to what the prison rules allow, that being one day per month for each year of the sentence. Everything possible should be done to instill within the man a confidence and to help him construct a substantial moral fabric within his life. Beyond constructing the prisoner into a substantial and useful citizen and constructing public highways by the proper direction of his labor, society's first and greatest duty is to remove as fast as possible whenever and wherever possible the environments that tend to make crime.

Arizona One of the Pioneer States to Utilize Convict Labor on Its Roads and Bridges.

By B. M. ATWOOD, State Engineer.

THE STATE of Arizona has been one of the pioneers in the use of convicts on the construction of State roads and bridges. Such labor has been in use in Arizona from the year 1909 and has been used on practically all types of road construction, including heavy mountain work, light grading across desert areas, the construction of reinforced concrete bridges and culverts, and in the production of crushed stone, concrete pipe, and other road materials.

A force of convicts from the State prison was engaged in the construction of a large reinforced concrete arch bridge across the Gila River, south of Clifton, and in the construction of the highway

TUCSON-FLORENCE HIGHWAY, PIMA COUNTY, ARIZ., CONSTRUCTED BY PRISON LABOR, SHOWING CONCRETE PAVED FORD.

leading from Clifton over this bridge and through the mountain pass on the south side of the Gila River to Solomonsville. Cochise County also utilized a force of 40 or 50 county prisoners who had been given a jail sentence for some misdemeanor. These county prisoners were put on the construction of a reinforced concrete arch bridge and also the construction of the highway crossing it and connecting Tombstone and Bisbee.

A COUNTY CONVICT CAMP.

These two prison camps are not handled in precisely the same manner but both give satisfactory results. Near Bisbee, in Cochise County, there are between 45 and 55 men, the number fluctuating from time to time. These men are housed in a large bunk house surrounded by a high barb-wire fence stockade, closely wired and so constructed as to discourage thoughts of going over the top. Large gasoline lamps are used at night in order to thoroughly light up the stockade and the surrounding country, while guards are on duty at the two opposite diagonal corners of the stockade in a raised tower.

In each camp strict adherence to the daily program is required, the time for retiring being 9 o'clock and that for rising 6 o'clock. Promptly after the completion of the breakfast the men are loaded into autotrucks, leaving camp in time to start the work at 8 o'clock. Each separate gang is in charge of a foreman, who is assisted by armed guards accompanying the men wherever they go on the work. Dinner is carried to the gangs on the road in autotrucks, unless the men are working close to camp. The length of the working day is strictly confined to 8 hours, the legal workday in Arizona for free labor.

WELL ORDERED STATE CAMP.

At the Clifton camp, in Gila County, where the convicts from the State prison are worked, the men are housed in large tents with bunks arranged in two rows of two tiers each extending down the sides of the tents with an open passage extending down through the middle of the tents. In both camps each man is provided with a pillow, two blankets, and a mattress with the necessary linen. Absolute cleanliness is insisted upon in and around the bunk house, tents, and stockade.

There is one tent for the camp barber shop, although the barber is required to perform other duties in addition to those of his trade. The stockade is equipped with a concrete toilet and good shower bath with proper sanitary arrangements. There is a dining tent in the Clifton camp 18 by 50 feet, having two long tables and benches seating 100 prisoners. Connecting with this tent is the kitchen tent 14 by 16 feet in size, and the baking is done in still a third tent adjoining the kitchen.

CONVICTS ARE PROPERLY FED.

Careful attention is given to the matter of proper feeding. It has been found that failure to furnish satisfactory food will cause trouble among the men quicker than any other single item. In both camps the cooks and assistants are selected from among the

prisoners themselves. The rations are varied and the best effort is made to prepare them and serve them in an attractive manner. While working out in the desert regions the difficulty of obtaining fresh fruits and vegetables is so great that at times it is necessary under these circumstances to replace fresh fruits and vegetables that would otherwise be served by canned goods and dried fruits. An effort is always made, however, to obtain the fresh articles in place of all forms of canned goods.

At the Clifton camp, where a force varying from 90 to 100 men are worked and fed, the following articles are included in the weekly diet:

For breakfast the men are served corn, bacon, mush, sirup, bread, and coffee. Twice a week hot cakes are added.

For dinner there are potatoes, beef stew, beans, bread, dried fruits, and coffee.

Supper consists of either steak or stewed beef, potatoes, rice, macaroni, canned sweet corn, peas, or tomatoes alternatively, bread and coffee.

For Sunday breakfast they get ham and eggs. Twice each week either pie or cake is served with the dinner, and three times each week they are furnished with smoking or chewing tobacco.

Complaint about the food is seldom heard and the men are found to be gaining in physical condition from the time they reach the work until they leave it.

The following table shows the amount of food allotted to each convict during a month's time in the Clifton camp:

	Pounds.		Pounds.
Flour, wheat	12	Fresh beef, pork, or mutton	23.5
Flour, milo maize	1.6	Flour, barley	2
Rolled oats	1.7	Corn meal	22
Sugar	3	Macaroni	.8
Prunes	1.5	Vermicelli	.2
Canned peas	2.4	Dried apples	2.0
Dried peaches	.1	Dried apricots	4.0
Canned tomatoes	4.4	Canned corn	6
Cottolene	4	Bacon	5.2
Beans	1.6	Ham	1.6
Onions	3.7	Lard	1.5
Velva sirup	5.0	Condensed milk	3.9
Coffee	2.6	Potatoes	17.0
Rice	1.7	Eggs	17
Cheese	1.0		

THE EFFICIENCY OF THE WORK.

During the nine or more years Arizona has been employing convicts on State highways and bridges there has been a wide variation in the character of the work done and in the satisfactory features attending it. There have been times during this period when the work done by convict labor has proven expensive, when it has been inefficient, when the convicts have shown poor discipline, and when the camps have been prone to show a big percentage of men idle and undergoing disciplinary detention.

It has been notable also that when the work has been going badly the percentage of escapes at the same time has often been high, and the costs have necessarily gone up as the efficiency has fallen.

At other times the convict camps have been a source of great satisfaction and have shown low costs, high efficiency, a praiseworthy disposition among the men, and generally healthful and satisfactory results.

The general conclusion that has been reached in regard to convict labor is that such labor is capable of producing work of good quality, both in highway work and in the construction of reinforced concrete bridges, that costs are low and escapes few. It appears, however, that such convict labor is more dependent on the quality of its leadership than is free labor, and that a convict camp under poor management may easily become a source of great annoyance, of danger to the public, of loss in money, and may fail to produce any work of value to the State.

SOURCE OF PROFIT TO THE STATE.

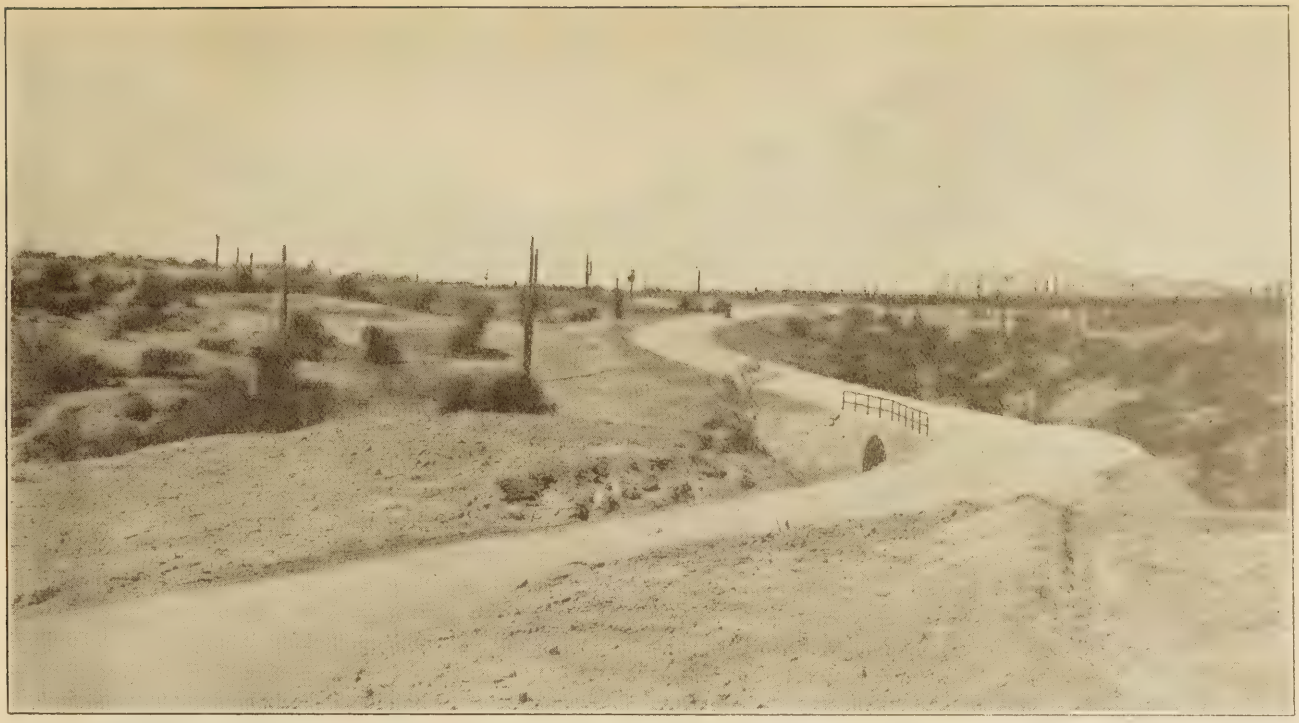
I have no hesitancy in saying that convict labor may be made a source of profit to the State. That such labor can be so led as to produce the best quality of work; that a convict camp may be so managed as to be reasonably contented, cleanly, healthful and of assistance to the men in improving their moral and mental condition; and, furthermore, that whenever convict labor fails to achieve such results the methods and personnel of the management should be held accountable for the failure rather than the quality of the labor that is used.

This broad statement is not intended as a personal criticism of anyone who may fail to obtain satisfactory results in the control of prison camps. As a matter of fact there are relatively few men who are gifted with the quality of leadership required in handling this class of labor. Somewhat different qualities are required in dealing with a mass of prison labor than with the average free labor camp.

The mental endowment and training of the average convict laborer is below that of the average free laborer and, speaking generally, convict labor can not be developed so as to give the most satisfactory results in the handling of high-class machinery or in the control of other laborers. In order to obtain satisfactory results it has been found advisable to employ paid labor on such machinery as is in use on bridge and highway work and to employ paid labor exclusively for foremen.

COSTS TWO-THIRDS FREE LABOR.

From the results obtained in Arizona in a period of nine years, we feel warranted in stating that the cost of work done by convict labor under our laws



PHOENIX-TENEPE HIGHWAY, MARICOPA COUNTY, ARIZ., CONSTRUCTED BY PRISON LABOR.

has been approximately two-thirds the cost of similar work under the day labor system. In comparing work done by paid labor under our own organization with work done under contract, we are inclined to the opinion that work may be done by prison labor for about two-thirds the cost of the same work under the contract system, provided the contractor carries on his work in an equally satisfactory manner and that his bid is a reasonable one, satisfactory to himself.

There is no doubt that the moral and physical tone of the men employed on State highways has been much improved by taking them away from the surroundings of the State prison and keeping them actively employed in the open on work that is interesting, more or less arduous, and healthful in its nature. The benefits derived along these lines by the prisoners themselves are worthy of consideration and undoubtedly can be greatly increased.

CONSTANT WORK OR RECREATION.

Too much importance can not be placed upon keeping prison labor constantly employed either in some form of useful work or some form of healthful recreation. Each prison camp in Arizona has, as a part of its regular equipment, baseball bats, balls, and such facilities in the way of a baseball field and stands as it may be possible to provide, also such games as chess, etc., that tend to develop and improve the mental qualities, and in addition a small library with suitable magazines, books, etc.

The importance of providing proper recreation is so great, we believe, that when recreation can not be furnished the men they should be assigned to different forms of work on different days, in order to vary the monotony of their employment. It is better to insist on long hours of employment than to allow idleness without proper amusements. It need hardly be said that the amusements should be insisted upon in a regular manner quite as much as the work.

GIVE REWARDS FOR EFFICIENCY.

Some systematic reward should be arranged for the convict laborer who performs his work to the complete satisfaction of the men in charge. This reward may be either in the form of scrip that can be exchanged for fruit, candy, or such other things as may be available at the commissary, or it may be, in the form of a reduction in the length of his sentence, or possibly in the form of funds held in trust for the benefit of the convict himself or his dependents.

The reward should be of such a nature that those convicts who cooperate with the management of the camp shall clearly appear to benefit from such reward more than their fellows who fail to render the service and obedience required. In Arizona the superintendent or engineer in charge of the prison camp makes a report to the State engineer at the end of each month, recommending for parole or commutation those whose services have been such as to entitle them to this reward. The State engineer in turn makes his recommendation to the governor and the parole board.

Those contemplating the use of prison labor should visit some properly conducted camp operating with

TOMBSTONE-BISBEE HIGHWAY, COCHISE COUNTY, ARIZ., CONSTRUCTED BY PRISON LABOR.

such labor. They should be prepared for many disappointing instances in connection with its employment and much harsh criticism from those not familiar with all the facts. We feel certain, however, that taking the average results over a period of years they will find that it is no mistake to use the prison population as far as it is available for public work.

Building Oklahoma State Roads With Convict Labor.

By H. C. SMITH, Assistant Highway Engineer State Department of Highways.

IN 1915, the State legislature enacted a law which made it possible for the board of affairs in conjunction with the highway department to use State convicts for the purpose of building State highways. As petitions from counties for convicts for this purpose are granted by the board of affairs on the recommendation of the State highway department, it has been possible to use the convicts to build especially difficult stretches of road which proved to be too costly for the counties to themselves handle, thus completing through State roads that would otherwise have links that could not be constructed as soon as the rest of the system.

The method of administering this labor has been as follows: Any county desiring the use of convict labor must make application to the board of affairs to have it establish a convict camp to construct a given section of road within the county. This application is considered and recommendations are made by the State highway department, and largely upon the basis of this recommendation, the board of affairs makes its decision.

When convicts have been granted to a given county, the State furnishes all teams and tools and allows the county an amount of money for the rations of the convicts equal to what it is costing the State at that time for the rations of the men kept at the penitentiary. The county has to provide for any excess cost of rations as well as feed for teams and furnish fuel and explosives.

On May 20, 1916, the first convict camp was established, and since that time there have been 14 camps in all. Late last year there were only eight camps at work, due largely to the fact that the labor had been shifted to agricultural and other urgent work.

The excess cost of rations has varied from 1 cent per day to 26 cents, which represents the daily cost per man to the county.

The camps that have been established have varied in size from 15 to 100 men, which required at least

2 employees and more in the larger camps. Where the men have not been trusties, additional guards are required, all of which expense is borne by the county.

In general, the convicts are used on mountainous sections of road where the cost of labor is the big item in the construction cost. However, it has been possible to handle the convicts in concrete work on small bridges and culverts, by employing a competent concrete worker to act as foreman.

The roads built have been very satisfactory, having been constructed according to plans and profiles which had been approved previously by the highway department.

Florida Has Efficient State Convict Road Force; Plans To Use It on Higher Type of Construction.

By WILLIAM F. COCKE, State Road Commissioner.

PRISON labor has, to some extent, been utilized in Florida for road work, almost from the time the State was organized. Howe for many years all of the State, or felony, prisoners and a very large per cent of the county, or misdemeanor, prisoners were leased out to individuals or corporations to be worked in sawmills and turpentine camps.

Not until about 1910 did the counties generally begin to make use of their misdemeanor prisoners for road work, and no State prisoners were worked on the roads until 1915, when the State legislature passed a law allowing the several counties to lease from the State such State prisoners as were not of the first grade and, therefore, not sought after by the other lessees. About the same time the State purchased a large farm on which were placed all of the female prisoners and such male prisoners as were not eligible for the lease.

A late prison census showed there were approximately 1,000 able-bodied male State prisoners and approximately 1,200 county or misdemeanor prisoners. Nearly all of the county prisoners were then employed on road construction and maintenance and approximately 450 State prisoners were also thus employed. The balance of the able-bodied State prisoners were leased out.

PLANNED FOR STATE CONVICT ROAD FORCE.

In 1916 the State road department, having been created by the legislature of the previous year, began to lay its plans for the organization of a State convict road force, which would eventually utilize all of the able-bodied State prisoners. This movement met with strong opposition from the advocates of the large prison farm where all State prisoners of every class would be employed in agricultural work. However, the legislature of 1917 did create a State convict road force to be worked under the State road department, and provided that not in excess of 300 of the lower-grade State men should be furnished same after the needs of the farm and the several counties had been met. So far the greatest number employed on the State convict road force has been 160. These have been worked in 5 separate camps scattered over the State.

These prisoners have been housed in cages mounted on wheels. These cages are 24 feet long, 7 feet wide, and 7 feet high at the eaves and will accommodate 18 men each. While authorized by the law of the State, the writer considers these cages very bad for both the physical and moral welfare of the prisoners.

The State road department planned the construction of a portable knock-down building built of two by fours, latticed and bolted at each intersection. The rules of the State prison board do not allow the chaining of a prisoner in the sleeping quarters, so the building must necessarily be strong enough to confine the men at all times. Should this type of building prove a success a more detailed description, accompanied by plans and photographs, will be furnished at a later date.

COST OF MAINTENANCE.

Since the establishing of the State convict road force in 1917 the cost of feeding, clothing, and guarding has increased so rapidly that it would be hard to determine a fair average price per man, but inasmuch as the price of labor has about kept pace with the cost of living, it would be safe to assume that the total cost per man has not exceeded 50 per cent of the current wage for the same class of labor.

The prisoners have been employed chiefly on grading and sand-clay construction. They have also been used to some extent on the higher types of surfaces. The accompanying picture shows the men laying paving brick. It is expected very shortly to use prison labor on concrete surface and also asphalt laid on concrete base.

Owing to the character of men furnished for the State convict road force a comparatively small per cent of trusties have been available. Although, the best grade of prisoners have not been provided and other conditions have been unfavorable, the success

CONVICTS LAYING BRICK ON A FLORIDA ROAD.

of the State convict road force is assured and it is expected that the lease system will be entirely abolished and all of the able-bodied State prisoners placed on road work.

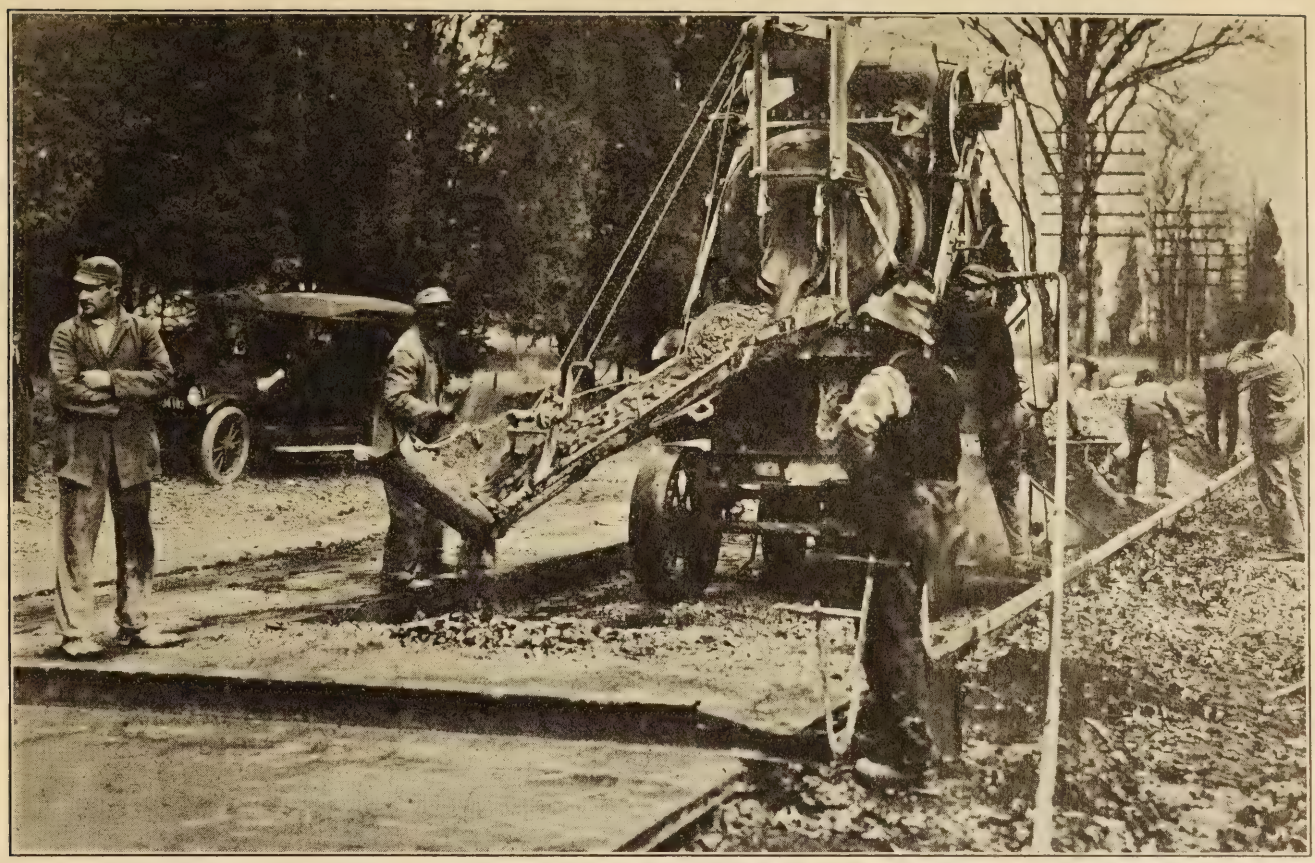
Some of the counties have very efficient and well-equipped road forces. A few continue to lease out their misdemeanor prisoners but these are the exception.

Maryland's Governor Believes Work on Roads in Line with Ideas of Proper Treatment of Convicts.

By Gov. E. C. HARRINGTON.

IT SEEMS to me that no matter how important the question of utilizing to the utmost all labor that is in any way available, the questions we are now considering have a more far-reaching importance, if that be possible, than that of supplying imminent needs, for they tend to the solution of the grave problems that vitally affect thousands of unfortunate men who are continuously passing through our penal institutions and who will be better or worse at their release therefrom through our dealings with them there. The State, which through the power and majesty of law assumes the right to confine and punish, assumes at the same time a great responsibility, which, however lightly it may have ignored it in the past, in this enlightened day must be gravely considered, to the end that the State may discharge its duty in conformity not alone with justice, but having primarily in mind the best interests of those whom it seeks to reform and to reinstate in society, as well as to punish. The manner in which the State discharges these important duties and effects these various results furnishes evidence of its progressiveness and efficiency, or the reverse, for its methods in dealing with its convict classes and with its unfortunate poor and afflicted wards furnishes an unmistakable gauge of the refinement and intelligence of its citizenship and of those who are charged with the responsibilities of government.

Gone is the day when these responsibilities could be ignored, and with that day too recedes into the past the unspeakably cruel and inefficient methods of torture, of solitary confinement, of neglect, of willful and arbitrary corporal punishment which were formerly inflicted upon those whom the State sought only to destroy or to punish, with no thought



MARYLAND CONVICTS MIXING CONCRETE.

of reforming or of reinstating them in society. However, a new day has long since dawned, and the light which has followed the dawn has pierced even the dungeon walls, and with the light which has been diffused through the darkness of prison cells have gone bright rays of hope which have dispelled the gloom of human minds and which have struck to life again thousands of our despairing fellow men.

THE PUBLIC AND THE CONVICT.

The attitude of the public, and especially the attitude of those entrusted with the administrative and executive functions of government, Nation, State, or municipality, toward those who are punished by imprisonment for some violations or infractions of the laws of the land has, indeed, undergone a wonderful change during the past decade.

Our penitentiaries and houses of correction have been looked upon in the past as places of punishment alone, and the moral or physical welfare of the criminal, much less his possible reformation and restoration as a useful member of society, has not received until within recent years that serious thought and consideration which, in my opinion, the possibilities for wonderful service toward the salvation and redemption of these offenders justify.

It is now fully recognized that environments make some criminals just the same as environments keep others straight, and that individuals differ largely because of differences of opportunity for education, for social advantages, and for proper livelihood.

Therefore, there has arisen a public demand for the giving to all these convicts whose antecedents, whose records for good behavior at the places of confinement, and whose youth or previous conduct justifies the hope for their redemption another chance or opportunity in life to make good.

THE PAROLE SYSTEM FAVORED.

With such objects or purposes in view the legislatures of different States have passed laws giving the power to a pardoning board, or board of prison parole, to pardon or parole, or upon their recommendation for the governor to parole in all cases, which, in the opinion of the board or the executive, there would appear to be reasonable grounds for the reformation of the criminal and his restoration as a useful or desirable member of society.

I believe the parole should be liberally exercised. In our State we have an advisory board of parole, who investigate all applications for parole or pardon and send the result of their investigations, together with all papers or records in the case, to the governor, with their specific recommendation and their reasons therefor, and the governor approves or disapproves, the power of pardon or parole after sentence, under our constitution, being placed in the hands of the governor alone.

CONVICTS SPREADING CHIPS FOR SURFACE TREATMENT ON WASHINGTON-BALTIMORE ROAD.

The parole board makes no recommendations until the convict has served one-third of his sentence. With the power of parole in the hands of the court before sentence, as the certainty of punishment and not its severity is a deterrent of crime, the fact that all persons who receive sentence to imprisonment have to serve one-third of their time gives a uniformity that means a greater sense of justice.

But in the practice we found that these prisoners who were the better informed or who had more influential friends or who were in a position to employ counsel were the cases which received consideration, while others less fortunate, but equally deserving, went unheard. So the last session of the legislature passed a law requiring every case to be investigated and every case heard at least every second year of their sentence, whether application was made therefor or not. I believe thoroughly in the parole. Since I have been governor of Maryland I have paroled about 225 cases, and there have been but 15 cases, or about 7 per cent, who have violated their parole, a remarkable showing overwhelmingly justifying the parole system.

One thing we always do which I deem particularly important and that is to rearrest all violators of the parole and that they are required to serve out the full time, or at least one properly punishing them for their failure to respect the parole.

WORK NECESSARY FOR CONVICTS.

But not only is it necessary to give the criminals another chance, if that be possible, but it is equally as important to see that the conditions and circumstances which surround them while in prison shall be of such a character that would be in the highest conducive to their welfare, to their proper protection, to their reformation, if possible, and to the advancement of their future lives, when they are returned, either by pardon, parole, or the ending of their sentence, to take their places in society once more.

That the convicts should not remain idle has always been universally conceded. But in his employment the different institutions have been until lately more interested in the revenues accruing therefrom to their respective institutions and somewhat regardless of the health and welfare of the convict himself. Hence has grown up at these institutions what is now admitted on all sides to be an iniquitous contract system for prison labor with the contractor interested in nothing but getting the most work and the most hours per day from the convict labor at the lowest cost he can. That the contract system shall go as soon as possible is now being promulgated from every authoritative source. But what shall take its place are the questions to be solved.

TWENTY-FOOT CONCRETE ROAD, WASHINGTON-BALTIMORE HIGHWAY, BUILT BY MARYLAND CONVICTS.

CONVICTS ON MARYLAND ROADS.

The extra session of the legislature of Maryland authorized the State roads commission to call upon our board of prison control for the use of as many of the convicts as could be used by it in the building and maintenance of our State system of public roads, and now there are about 200 employed from the house of correction and 100 employed from the Maryland Penitentiary upon the public roads of Maryland.

The prisoners remain under the personal supervision of the State board of prison control and every arrangement is made for the proper care and protection of the convicts, and a very large part of the daily pay is paid over for the benefit of the convict himself.

The convicts themselves are delighted with their open-air work and their average health has been much improved.

Illinois Uses Convicts In Preparing Material.

By CLIFFORD OLDER, Chief Highway Engineer.

IN 1913 the Illinois Legislature passed an act authorizing the employment of convicts and prisoners in the penal and reformatory institutions of the State in the preparation of road building materials and in working on the public roads.

The prisoners and convicts in the penal institutions of the State of Illinois have been used in the preparation of road building material since 1906. Crusher plants were established within the walls or adjacent to the penitentiaries at Joliet and Menard. The output of crushed stone from the two plants varies from 40,000 to 154,000 cubic yards per annum. All crushed stone thus far prepared has been furnished free, f. o. b. cars at the penitentiaries to county and township road officials making application for it and agreeing to pay the freight charges. All applications for such material are handled through the State division of highways.

SEVEN CAMPS ESTABLISHED.

Since 1913 seven convict camps have been established in different communities of the State for the purpose of constructing earth, gravel, and macadam roads. Experience shows that these camps have been a success from both the economic and humanitarian standpoint.

All road camps thus far established have been recognized as "honor camps," and only "select" men were chosen for them. The compensation for the convicts in camps thus far established has been 50 cents per day straight time, and each convict secures one day off of his sentence for each three days employed in a road camp. The 50 cents per day per man has been used in feeding and housing the men. There have been no guards employed except one night watchman at each camp and one custodian having general supervision over the men. There have been no escapes from the road camps. The road officials have been required to pay for the two men in addition to the 50 cents per day per convict. No convict road camps have been established since 1916.

Complete arrangements have not been made for establishing camps this season but tentative plans contemplate that a sufficient wage will be set aside for each man which will not only take care of his keep but will give the prisoner something that may be sent to his immediate family or be credited to his account for his use upon completion of his sentence.

EXTRA MONEY INCENTIVE TO MEN.

Experience in the use of convicts in construction camps has shown that better results are possible when the men are given an opportunity to earn a little extra money. Satisfactory results, however, have been secured without this incentive in the preparation of crushed stone and road building materials at the penitentiaries and our experience indicates that this method of utilizing convict labor is preferable to construction camps.

Last year Illinois parolled a very large number of convicts for work in munition factories. Thus far the parolled men have made good. Practically all of the remaining able-bodied prisoners were used either in the preparation of road building materials or engaged on other industrial work.

Louisiana Finds Work of Convicts Satisfactory; Cost of Construction Less Than With Free Labor.

By DUNCAN BUIE, State Highway Engineer.

THE State highway department of Louisiana utilized convict forces for road construction at the very time the department was created by law; that is, in February, 1911, and whenever available thereafter employed this class of labor until the year 1914. After this period the Board of Control of the State Penitentiary had just sufficient men available as were necessary to work its plantation and other industries; therefore, say from the year 1914 to June 19, 1918, no convicts were used by the highway department in its road construction, because this class of labor could not be obtained.

However, about July 1, 1918, the department was fortunate enough to secure from the Board of Control of the State Penitentiary, 100 convicts, at a cost of $2.50 per day, to wit: "For all men in camp and on work, except such as are in hospital and performing no work, the Board of Control of the State Penitentiary to feed and up-keep these men, including medicines, doctors, etc."

When one takes into consideration the high cost and scarcity of labor prevailing at that time, the convicts, at the cost of $2.50 per day were very cheap labor, and in fact, by their employment, materially reduced the cost of construction work on the road where they were being used, and on which, prior to their availability, free labor, such as could be secured, was used. Unfortunately the highway department had to return these convicts to the State Penitentiary by October 1 of last year, as they were needed for harvesting crops raised on the State Penitentiary farms.

CONVICTS BUILT 155 MILES OF ROAD.

Approximately 155 miles of roads were constructed with convict labor in the State of Louisiana between the period from April 20, 1908 (prior to the organization of the highway department), to April 20, 1914. This construction was divided over eight parishes (counties), and the total cost of all these roads amounted to $152,914.98. Of the 155 miles constructed 3 miles were sand-clay roads, 5 miles sand-clay gravel, and the balance ordinary earth—that is, the soil was of such a character that it was not necessary to add any sand or clay. The amount thus expended also covered the construction-of 1.1 miles of drainage canal, the canal costing approximately $3,000. The roads mentioned cost approximately $884.90 per mile for earth roads and $3,196.58 per mile for gravel roads.

At the present time the highway department would hardly venture to say just what it would cost to construct a metal-surfaced road with the use of convict labor, due to the fact that the hard surfacing material available in this State for road building purposes consists mainly of gravel and what is known as "commercial clam shells," and the price of this material is constantly increasing. However, just as a comparison between the cost of construction with free labor and with convict labor, that on

a section of road where the highway department last used convicts and where a metal surfacing of clam shells was applied the same material, prior to the use of convict labor was costing the department and parish in the neighborhood of $4 per cubic yard in place, the same work was done for $2.60 per cubic yard.

One of the principal factors in the reduction of the cost of the above construction was that the convict labor was on hand at all times, and when we were using free labor teams and work were tied up, due to the fact that the free labor did not always return to the job.

DES ALLEMANDS SWING BRIDGE AND APPROACH. THIS IS PART OF THE ROAD UPON WHICH LOUISIANA CONVICTS WORKED.

WORK BENEFICIAL TO CONVICTS.

The work in the open air adds to and improves the physical and mental condition of the convict. Being constantly on the job, in time he becomes an expert in his line, whether it be wheeler work, handling a shovel, or working a drag. Through experience he knows just how to go about it, and this also is a time saver and reduces the cost of construction.

The convicts on our road work were well housed in substantial wooden structures. Of course, they were under guard, sometimes under what is termed a "trusty," a convict who, through meritorious conduct, has earned the confidence of the penitentiary authorities. He is in reality a sort of "subforeman" or "straw boss," and acts in the double capacity of guardian and overseer.

The men were all well fed, with good, substantial food, including beef, poultry, beans, rice, potatoes, corn, corn bread, coffee, and on Sundays and holidays a few extras in the way of fruit, etc. They were not worked Sundays and holidays, but on such days did pretty much as they pleased, except, of course, they had no liberty.

Experience Gained on Rhode Island Roads Makes Ex-convicts Available for Work after Release.

By I. W. PATTERSON, Chief Engineer, Board of Public Roads.

THE first instance of the use of convict labor upon the public roads of Rhode Island was in 1917. Previous to that time there was no legislation providing for such use of convicts, our present convict-labor law having been passed by the general assembly early in 1917. This law provides for the employment of convicts upon State roads in accordance with a formal agreement between the State penal and charitable commission and the State board of public roads. The law further provides that the guarding and maintenance of the convicts shall be taken care of by the penal and charitable commission and that the direction of the work of the convicts be undertaken by the State highway department.

Two convict camps of 30 working men each were established in 1917. The work undertaken from both camps was the construction of bituminous macadam pavements. All of the work except the quarrying and crushing of stone was done by the convicts. It was deemed advisable to employ free labor for the quarrying and crushing of stone, inas-

much as it appeared impossible to select from the convicts men who had had experience in this branch of the work. The handling of explosives by inexperienced convicts did not appear to us feasible.

FIRST CAMP HOUSED IN TENTS.

At the first camp established, which was termed camp No. 1, the convicts were housed in a large tent. A small wooden cookhouse, a small wooden storehouse, and a dining hall consisting merely of an open-sided wooden building completed the camp structures. At camp No. 2 the men were housed in a portable wooden building.

An allowance of $1.50 per workingman day for the services of the convicts was the rate first agreed upon between the penal and charitable commission and the State highway department. When the work to be done by the convicts from both camps was approximately half finished, the penal and charitable commission insisted upon an allowance of $2.25 per man day, straight time, no deduction to be made for days when the weather permitted no work to be done. In order that the work undertaken might be carried to a conclusion by convict labor this rate was allowed, although it was deemed excessive as compared with the wages prevalent for free labor at that time.

Both roads constructed by convict labor were advertised for bids early in 1917 but contracts were not awarded. An interesting comparison of costs by convict labor and by contract at the low prices bid was, therefore, possible. The actual cost of the work done by the convicts from camp No. 1 was $26,054.68. The cost at the low-price bid in the early spring would have been $23,686.72. The work done by the convicts from camp No. 2 cost $21,105.24. The cost at the low-price bid for this work would have been $25,462.81. The variation in the results secured, as far as cost is concerned, reflects very accurately the success obtained by the use of convicts from the two camps. The results secured by the employment of the convicts at camp No. 1 were never wholly satisfactory, while the results secured by the use of convicts at camp No. 2 were highly satisfactory, both as regards costs and quality of work done.

WHY FIRST RESULTS WERE UNSATISFACTORY.

In attempting to diagnose the reasons for the variation in results secured, we arrived at the conclusion that they were due to the differences in housing facilities, in food, and in the personalities of the guards. The tent in which the convicts at camp No. 1 were housed was not wholly waterproof at times of heavy, long-continued rains. Late in the season, when the weather became cool, it was impossible to heat the tent sufficiently for comfort. The wooden building in which the convicts at camp No. 2 were housed was, on the other hand, a very satisfactory shelter. There were numerous instances of food of rather poor quality having been served the convicts at camp No. 1. The effect upon the efficiency of the gang for several days after an unsuitable meal, was very noticeable. There were pronounced differences in the manner in which the various guards dealt with the convicts, although all were prison guards with more or less experience in the handling of convicts. Our investigation of the very noticeable variation in the results secured by the employment of the convicts from the two camps convinced us that a difference in *esprit de corps* of the two gangs, occasioned very largely by the conditions mentioned, was responsible.

Our attempts to remedy conditions at camp No. 1 met with some success, but the efficiency never reached that secured at camp No. 2.

Attempted escapes at camp No. 1 were rather frequent, but attempts to escape from camp No. 2 were practically unknown.

Figures submitted to this department by the penal and charitable commission show that the average cost of maintaining the convicts at the two camps was $6.65 per man per week. The cost of maintaining prisoners at the prison was stated to be $4.20 per week, which shows an excess cost of $2.45 per man per week for the maintenance of convicts at the camps.

OBSERVATION PROVES SUCCESS.

Our observation of the use of convicts for road work leads us to believe that convict labor is a success, and is a very practicable and humane method of employing the able-bodied inmates of our penal institutions. We believe that the best results are to be secured by the use of convicts of middle age. We do not feel that the employment of convicts under 30 years of age is advisable because of the fact that the younger convicts are less apt to be reconciled to their fate, and are therefore more apt to attempt to escape and less apt to evidence interest in their work.

It appears to us highly desirable that some incentive for faithful work be offered convicts employed upon types of construction where careful workmanship is necessary in order to secure good results. We feel that a small money incentive to the convicts, a reduction of sentence for good behavior, and better food than as a rule prevails at prisons are feasible incentives.

The efficiency of our convict gangs was impaired more or less by frequent changes in personnel. Care was not taken to send to our camps convicts whose terms did not expire until after the completion of the work. We feel that it is preferable to select convicts whose terms are relatively short, but that it is an advantage to select convicts whose terms are of sufficient duration to make unnecessary frequent changes in personnel of gangs.

EX-CONVICTS EMPLOYED BY CONTRACTORS.

The honor system, strictly, was not employed at our convict camps. Guards were always in attendance over the convicts both at the camp and at the site of the work. The guards were armed with revolvers which, however, were not in evidence. At the site of the work the guards served as foremen under a superintendent employed by the State highway department. The fact that the guards were not at all familiar with road work at the beginning of course handicapped the work more or less.

The preparation and cooking of food was taken care of by convicts, who also did all the routine work in connection with the maintenance of the camp. No allowance to the penal and charitable commission was made for the convicts employed at the camp.

We are gratified to note that a number of the convicts employed upon road work in 1917 and whose terms have expired since have been employed by contractors or by this department upon road work. We have no data available to show the exact number of the convicts who since their release have taken up road work as a means of livelihood, but we know that a considerable number have done so. Several of the former convicts now employed upon road work have expressed themselves as very appreciative of the experience obtained at the camps, which has enabled them to qualify as experienced laborers.

The use of convicts was not attempted during 1918 because of the demand for practically all of the able-bodied convicts in connection with extensive farm work at the prison. But now we look for further use of convicts for the construction and maintenance of State roads in Rhode Island.

New Jersey Maintains Three Convict Road Camps; Plans To Expand System That Has Shown Value.

By W. G. THOMPSON, State Highway Engineer.

CONVICT labor was first used on the highways of New Jersey during the autumn of 1912, when about 15 men were taken from the State penitentiary and used on the grading of the White Horse road in Mercer County. They were transported to and from the institution each day in charge of two guards, representing the prison department, and the foreman of the State highway department, who directed their activities from a construction point of view. As the season was short, but little could be learned of the efficiency of this labor before winter weather conditions caused the stopping of work for that season.

During the summer of 1913 State road camp No. 1 was established at Andover in Sussex County. Proper camp buildings were erected by the State highway department on property owned by the county, road building equipment of various kinds was purchased by the State highway department, and operations commenced which involved principally grading, such as reducing the then existing grades of highways within the county; widening, the elimination and straightening of sharp curves, installation of drainage facilities, etc.

PRISON IN CHARGE OF WELFARE.

The direction of the construction work by these men was under the supervision of foremen and the engineers of the State highway department, while guarding, feeding, and general welfare was directly under representatives of the prison department. Sufficient guards were maintained to keep a proper watch over the gangs, several of which might be quite widely separated from each other, and considerable liberty allowed the men—that is, they did not wear a ball and chain nor was there any evidence of arms carried by the guards.

Considerable work was done though under adverse conditions, due to lack of entire cooperation between the prison department and the highway department. This was due to the defeat in the legislature of 1913 of several bills intended to enable a closer cooperation and more favorable working conditions as between the two departments. The experience gained in 1913 proved conclusively that this class of work could be done by prison labor only under the principles of the honor system. A force of about 42 men was maintained at the pioneer camp during the construction season of 1914 under five guards from the prison department. During this period but one man escaped; he was recaptured within two days and returned to the institution.

SECOND CAMP ESTABLISHED.

A second convict labor camp was established near Princeton in the autumn of 1913 at which camp the highway department undertook the housing and feeding of the labor, which was kept at the camp throughout the winter instead of being returned to the institution when the construction season closed.

The camps are frame buildings, well constructed, allowing plenty of light and air. The barracks are supplied with flush toilets, shower baths, and iron beds, all on one level, there being no double tiers of

CONVICTS EXCAVATING FOR STORM SEWER ON THE LAYTON-DINGMANS FERRY ROAD, NEW JERSEY.

berths. Mess halls are supplied with all conveniences; and cooking is done by convicts on hotel ranges. Owing to interdepartmental difficulties, the subsistence of the men was eventually taken over by the prison authorities and is still in their charge. Present laws governing the use of inmate labor on highways leave much to be desired, but with the evergrowing need for more and better roads, it is believed the enactment of more favorable legislation will come at an early date.

Notwithstanding the difficulties under which work was done, there was performed during the construction season of 1915, $41,360.31 worth of work at a total cost of $38,840.57, value of the work done being based on the then current prices for the various items. The work performed included earth and rock excavation, construction of macadam pavement, operation of stone crusher, and quarry; construction of reinforced concrete culverts, etc.

RATE INCREASES WITH HIGHER COST.

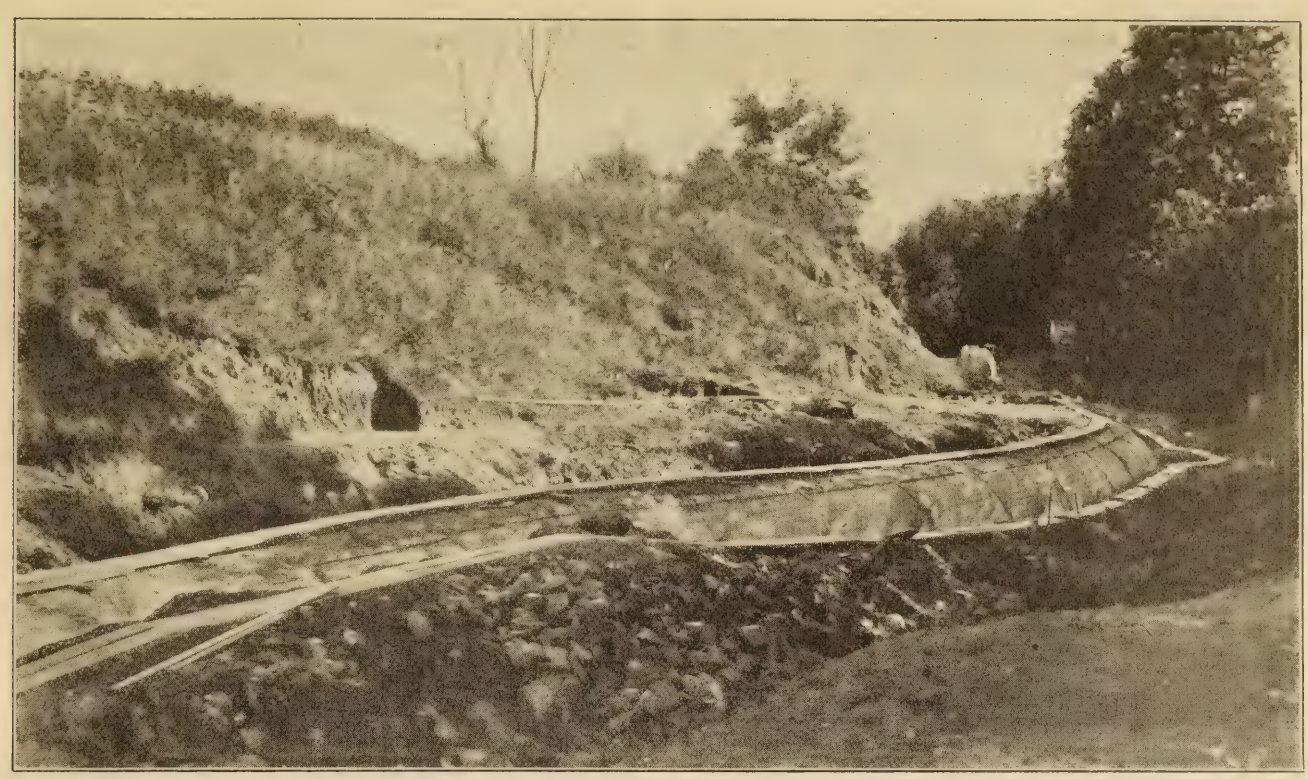
During the experimental period the State Highway Department fed and housed the men, paid the guards, and paid the prison authorities 50 cents per day per man. Later the prison authorities took over the feeding of the men and paid the guards, the highway department then paying the prison $1.25 per man per day. Of this the man received nothing as an incentive to work. Owing to increasing cost of maintenance, the rate paid the prison was increased during 1916 to $1.45 per man per day, and to $1.55 in 1917.

During the winter of 1917–18 a new agreement was effected between the State Highway Commission and the prison authorities, whereby the prison is paid $2 per day for each satisfactory man day's work; of this amount the man is to receive 50 cents which will be credited to him, or turned over to his family. They work 50 hours per week and have Saturday afternoons for recreation.

Any man whose work for a given period of time is unsatisfactory to the superintendent of the highway department is returned to the prison and is not again employed upon the work. Arrangements are now being made by the prison authorities for the mental and physical examination of each inmate of the institution with a view to establishing his fitness for employment on the roads, and in other capacities. As will readily be seen, this system, when effective, will weed out the misfits and provide men able to stand the rigors of highway work.

GOOD WORK ON ROAD TO CANTONMENT.

Until the spring of 1918 there were three camps in operation; one in Cumberland County, southern New Jersey, and two in Sussex County, northern New Jersey. These were all engaged on the construction and improvement of county roads, for which the counties involved furnished the right of way, and certain of the materials. These works were all completed during August, 1918. After that these men were assigned to be employed exclusively on construction of the State highway system.



STORM WATER DRAIN 1,400 FEET LONG TO CARRY CREEK UNDER LAYTON-DINGMANS FERRY ROAD, NEW JERSEY.

During the autumn of 1917 there was undertaken, with young men from the State reformatory, the construction of 4 miles of penetration macadam road leading to Camp Dix, a large cantonment at Wrightstown, N. J. This involved approximately 15,000 yards of grading, the laying of foundation, and surfacing of a broken stone pavement, and its binding with tar. A camp holding 50 men was established near the work, to and from which the men were transported each day in motor trucks. The State highway department paid the reformatory authorities $1.75 per man per day, of which each man received 50 cents when his work was satisfactory. The work performed by these men was so unusual in quality and quantity as to cause much comment especially when compared with free labor employed in the cantonment construction near by, and paid from $3.50 to $4.50 per day. On the work the guards employed by the reformatory acted as foremen, and were paid by the highway department. The reformatory fed and clothed the men out of the $1.75 per day.

CAMP BUILDINGS IN SECTIONS.

Under the present program there are established three camps, each capable of housing 110 men. The highway department furnishes all housing facilities, including heat, water and light, the prison department furnishing guards and feeding the men, while supervision for construction work and the determination as to satisfactory work was entirely under the highway department, which also furnishes working equipment, consisting of steam shovels, grading machinery, motor trucks, wagons, concrete mixers, and small tools.

On all of this work the superintendent's status is exactly that of a contractor. Plans, specifications, and estimates are prepared as if a contract were to be let, and the superintendent must keep within the estimated cost. No extras are allowed except by written order. In each of these projects the work calls for approximately 4 miles of concrete pavement, with culverts, bridges, guard rail, etc., all of which will be performed by this labor. All mechanical equipment is operated by free labor, though in some instances teams are driven and pumps operated by inmate labor.

All camp buildings are built in sections, so they may be readily set up and removed. The main building contains sleeping quarters, kitchen, and mess hall for 110 men, besides quarters for guards and officers and an office. There is provided a tool and material house, from which is checked out all tools and materials needed, and to which the tools must be returned. This includes gasoline, oils, and greases. Sheds are provided for trucks and other equipment, while a machine and blacksmith shop provides repairs for equipment.

SYSTEM WILL BE EXPANDED.

All purchases of materials, supplies, and equipment for these works are made through a Purchasing agent at the central office, the several super-

intendents making out requisitions therefor as needed. The above outlines briefly methods of administration and operation as applied to inmate labor on State work.

The system is but in its infancy and will be expanded as rapidly as numbers of men available will permit, and existing laws are amended or modified to permit greater elasticity in the disposition of the men in the field, and a closer cooperation between the reformatory institutions and the Highway Department.

Of the value of the labor there is no doubt. A decision after comparison between the labor of these men at $2 per day and the general run of free common labor at from $3.50 to $4 per day is decidedly in favor of the inmate labor. From a sociological point of view, the benefits are inestimable, as the men are employed regularly in the open air amid healthful surroundings, as opposed to the old system of hiring them to contractors within the institutions. Considering the numbers of men employed on the highways, very few have attempted or effected clean escapes.

Facilities are provided for athletics, in which the men are permitted to indulge on Saturday afternoons and Sundays. These help to maintain the general morale, and give the men something to look forward to.

The State highway department of New Jersey will be glad to give to other States, and to all interested the benefit of its experience and observations in connection with this work.

Good Results With Convict Labor In Wyoming.

By Z. E. SEVISON, State Highway Engineer.

PROVISION for the use of convicts on the roads of Wyoming was first made by the legislature in 1911 by the passage of an act putting the matter in the hands of the State board of charities and reform and appropriating funds for the purchase of machinery and equipment. Under this law the plan has been followed that convicts might be used on road construction wherever a county agreed to bear all the cost of maintaining them.

During the years 1911–1917, inclusive, a varying number of convict gangs were employed on the roads in the different counties. The size of each gang varied from 10 to 20 men. Practically all of the work was apparently done as is usual with county road work, without survey or plans and with no record of the cost of the work.

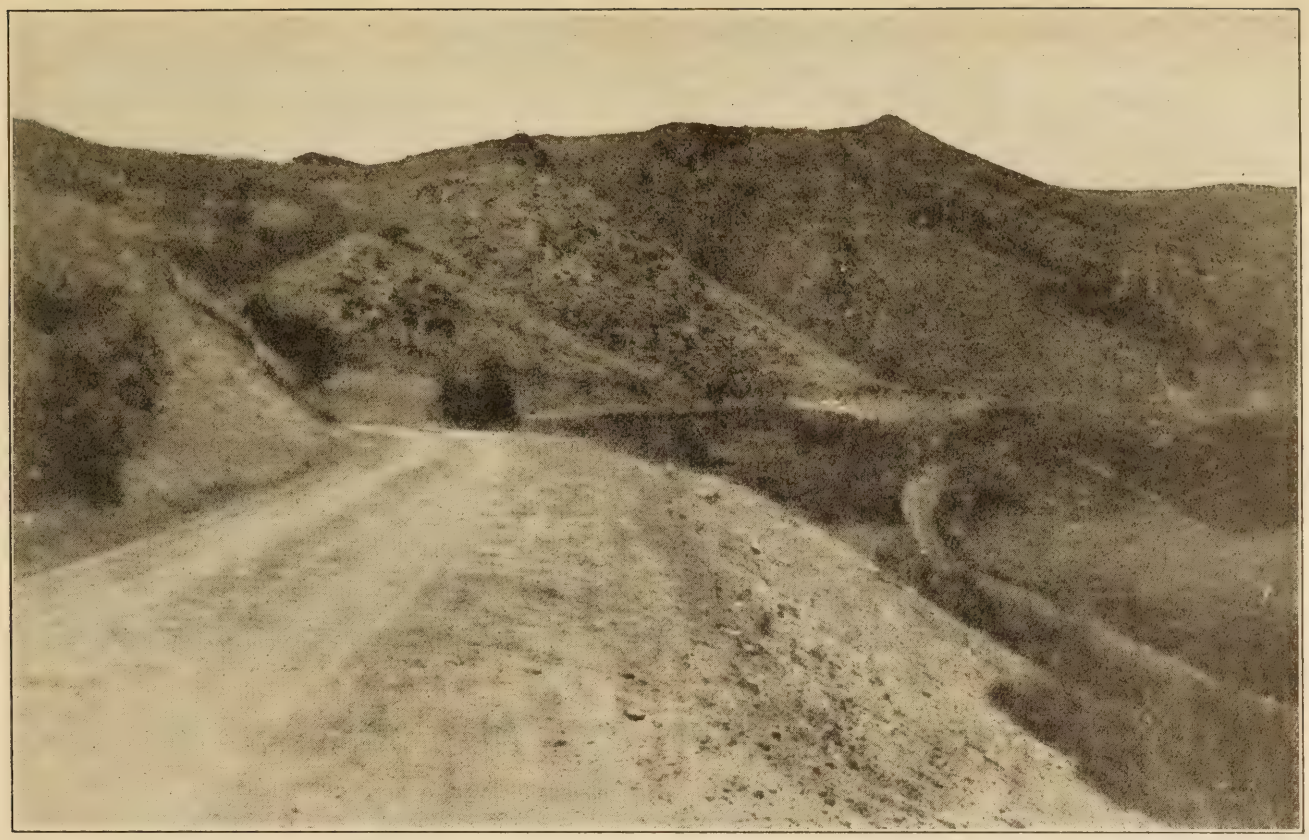
During the year 1917 a convict gang of 16 men continued work on the Cokeville-Star Valley road which had been in progress for two years previously, but working according to the surveys and plans of the State highway department. The entire cost of the work in 1917 was paid by Lincoln County. This project having been approved as Wyoming Federal-aid project No. 21 previous to the 1918 working season, a gang of 18 convicts was placed on the work and was the only convict built road work under way in Wyoming last year. Other convicts which ordinarily would have been available for road work were placed on the farms and ranches on account of the serious shortage of such labor.

This project is located entirely in a canyon, involving a considerable amount of rock work, the percentage of team work being relatively small. This class of work is particularly adaptable to convict labor and is much more advantageously completed than that where it is customary to use principally teams and machinery. It has been the observation of the writer that the work done per convict per day on this project is equal to that of common labor such as was available at the time.

The gang was in charge of a superintendent employed by the State board of charities and reform; a foreman was also employed. Camp and road building equipment were furnished by the State. The superintendent was paid 40 cents per meal for boarding the men. No guards whatever were provided and it was customary to send the men alone to the nearest railroad point, a distance of 36 miles for supplies and to distant ranches for hay and feed. Guns and ammunition were furnished for hunting, also fishing tackle for trout fishing and a very considerable proportion of the fresh meat used at the camp was obtained in this way. The State board of charities and reform allowed each convict $5 per month for tobacco, etc.

During the past two years only two men have attempted to escape and in other years such attempts have been very infrequent.

Without question the use of convicts on road work in Wyoming has been a success, particularly on roads in mountainous country. It is expected that the use of convicts will be continued on road construction and it is hoped that conditions will be such in the other lines of work where they are employed that an additional number will be available, particularly during the duration of the war.



ROAD BUILT BY WYOMING CONVICTS.

Convict Labor on the Mountain Roads of Utah Proves a Notable Success in Heavy Construction.

By IRA R. BROWNING, State Road Engineer.

USE OF convict labor on the public roads in years past in Utah and other thinly settled western states has been given very little attention, probably because of the difficulties of transporting and guarding the prison gangs in the districts where suitable projects of road construction were required and under way.

Shortly after the organization of the State road commission of Utah, however, definite steps were taken toward utilizing convict labor on difficult and extensive sidehill cuts, rockwork, and almost impassable sandy sections of the roads in southern Utah.

The first two years during which such labor was employed resulted in such creditable road improvement as to establish definitely this type of labor for difficult rockwork, heavy cuts, and sidehill construction. One of the requirements in connection with convict labor in the mountain districts must be the compactness of organization in order to effectively guard the prisoners and prevent wholesale escapes from camp into the mountain fastnesses; and this naturally limits their work to heavy construction.

WORK ON NOTABLE PROJECTS.

Notable construction projects upon which the prison labor has been employed in Utah include the Black Ridge road; Grapevine sands and the roads leading to Hurricane and to Little Zion Canyon in Washington County; the Price-Myton Road in Carbon County; Fisher Pass section of the Lincoln Highway, Tooele County; Willow Creek section of the Castle Gate-Duchesne post-road project, Carbon County; the Courthouse Springs section of the Thompson-Moab post-road project in Grand County; and the first section of concrete road paving in Davis County.

In the summer of 1918, after disastrous floods had washed through Mount Pleasant city, Sanpete County, leaving devastation in their path, the State road commission and the State board of correction cooperated in sending a steam shovel outfit and a force of convicts to assist in clearing the streets and reestablishing drainage channels through the city. Especially in this work at Mount Pleasant the work of the convicts has elicited much favorable comment by competent observers. The labor shortage

was never more keenly felt than in midsummer of last year, and the relief that came to the citizens of Mount Pleasant by the prompt establishment of an effective working force has been attested by the mayor, the city council, and many other prominent citizens.

HONOR SYSTEM A GREAT AID.

We have had gangs of prisoners and of ordinary laborers working on the same roads in Utah at various times and have been impressed with the lack of efficiency of the convict laborers at times, due to their lack of dependability for regular service on working days. For instance, a gang of 30 convicts showed an average of less than 20 regularly employed at road work during one period of observation. The inclination to stay in camp on account of slight illness or indisposition accounts in a large measure for the disparity between convict and free labor. However, it is confidently believed that a solution has been found for this problem; the "honor" system among the prisoners that will abide by the rules granting more liberty has placed them practically on a par with the average free laborer so far as effective work is concerned.

In the course of extending this system among the prisoners Warden George A. Storrs of the Utah State prison was subjected to a somewhat annoying criticism when he sent a trusty convict, armed, to overtake an escaped prisoner. The trusty continued on the chase into adjoining States, reporting at intervals his nonsuccess. In accordance with the faith of the warden, the trusty convict returned, much to the surprise and chagrin of his erstwhile critics.

It is believed that a foundation is being laid for utilizing prison labor to a greater extent and to greater advantage than ever before, especially in connection with the improved types of highway construction.

Convict Work on Roads of Idaho Could Be Made Profitable to State and Beneficial to the Men.

By H. C. ALLEN, State Highway Engineer.

THE EXPERIENCE of the State of Idaho with convict labor has not been very extensive, at least in the line of road building.

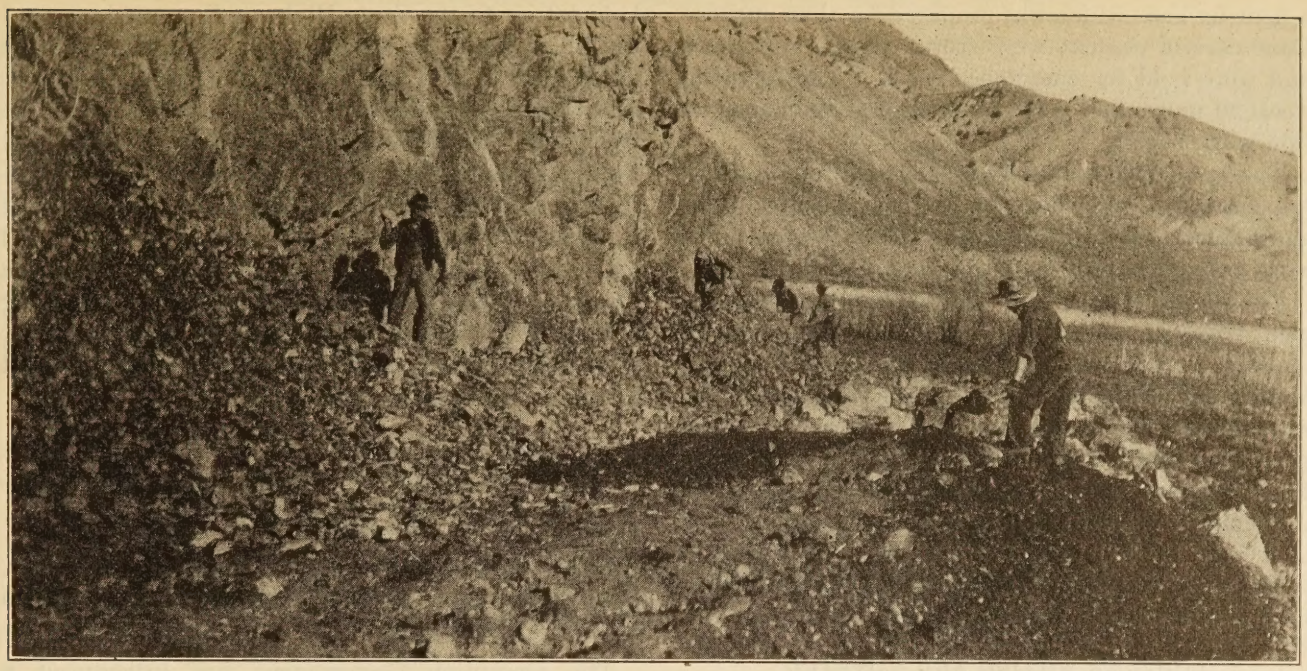
In the year 1916 a convict construction camp was established in the Salmon River Canyon in Idaho County near Whitebird and a short stretch of heavy construction begun under the supervision of the State highway department. The results obtained on this work were rather disappointing because of the heavy overhead expense connected with it. This was due very largely to the remoteness of the work and the consequent high transportation costs of the men from and to the penitentiary and also to the fact that not enough convicts were available for that kind of a camp to keep down the overhead expenses to a minimum. At this camp the men were housed in tents and were fed and treated much the same as free laborers in a contractor's camp.

In 1917 some convicts were used on a piece of rocky, canyon road in Bonneville County. This work was done under the supervision of the prison board and not by the highway department. At this camp, as at the Salmon River camp, the men were out on their honor, no armed guards being used, and, I believe, none escaped. The work was satisfactory at this camp and the results compared very favorably with contract work.

Early in the year 1918 arrangements were made between the prison board and the commissioners of Ada County for the joint expenditure of a limited amount of money for grading a short stretch of highway (on designated State highway location) adjacent to the penitentiary. The old road at this place was very narrow, rough, and rocky. The highway department furnished the engineering and a truck for hauling the prisoners from and to the penitentiary. The labor performed by the convicts compared very favorably with free labor, but because of the divided responsibility in the organization the results obtained were not the most satisfactory, though in general it is felt by the authorities that value was received for the money expended. This work would not have been done at this time had the convicts not been available for the work.

The behavior of the men was very good and they appeared to be much better satisfied than when they were behind the walls. The foreman and the truck driver were the only authorized guards on this work and they were unarmed. Only one escape was made from a crew of 15 prisoners in a period of about eight weeks.

Late last fall the highway department repaired some paved roads within 10 miles of the penitentiary, and as it was almost impossible to secure free labor it was decided to use a crew of convicts on this work. Had the convicts not been available the repairs would have had to wait until some future time. The men were transported back and forth from the penitentiary in a truck. Their lunch was carried with them. The work they performed on this road is very satisfactory and, as stated above, had they not been available this pavement would have been in almost impassible condition for another year at least.



CONVICTS AT WORK ON THE MARYSVALE-SEVIER ROAD, UTAH, SHOWING THE METHOD OF BUILDING FOUNDATIONS IN THE SWAMP AT BLACK ROCK. NOTE THE LARGE STONES BLASTED FROM THE OBSIDIAN CLIFF WHICH WERE LAID IN THE SWAMP IN WHICH SMALLER ROCK AND GRAVEL WERE PILED AFTERWARD.

At the same time the prison board had a gang of about 15 or 20 convicts in camp on a county road about 50 miles from the penitentiary in Canyon County. Their work consisted in reducing a steep, rocky grade.

The penitentiary has for the last few years maintained a large ranch which is farmed by honor men from the prison. In addition to this the penitentiary rented another large farm near Boise for the purpose of increasing the crop production of the country and on which prisoners are worked.

The subsistence of the men on road work, whether obtained at the penitentiary or in camp, is charged to the work. The men are paid a small sum for their work, which is credited to them on the prison books, and this tends to promote some interest in their work.

There is little doubt that with proper organization and when the work is within reasonable distance from the penitentiary the working of convicts could be made profitable to the State as well as beneficial to the men.

Nebraska Experiment Produces Good Results.

By GEORGE E. JOHNSON, State Engineer.

CONVICT labor has been found profitable in the construction of roads in the State of Nebraska. In 1915 one and one-half miles of pavement was put down on Holdrege Street and Warren Avenue in Lincoln, Nebr.

The summer prior to the meeting of the 1915 session of the legislature a movement was started in the city of University Place, which is about 1½ miles from the city limits of Lincoln, to pave the road between those two places. University Place and the county controlled only 50 per cent of the frontage on the proposed pavement. The State, by virtue of the State Agricultural College, controlled the other 50 per cent.

A bill was introduced at Gov. Morehead's request which called for the necessary appropriation to pay for one-half the cost of the abutting pavement. The bill empowered the governor to construct the State's share by the use of convict labor. The contract for the city and county's share of the work was let in July, and by agreement the contractor took the east half of the district and the State the west half. Contracts for necessary material were entered into by the governor, and the State engineer's office was instructed to take charge of the work.

STARTED WITH SEVEN MEN.

The road was to be 32 feet from curb to curb; 6 by 20 inch concrete curbs were specified, as well as a 5-inch concrete base with a re-pressed brick surface filled with asphalt placed on a sand cushion.

The work was started on August 27 with seven convicts, two of whom were carpenters, and the others were used to unload cement and store it in

a near-by barn which was prepared for that purpose. Four cars of cement were stored in this storehouse and were held for emergency work. The following week 30 more men were received and the construction work began.

The wooden forms used for the curb were made by the convicts. The concrete mixed at a central plant and hauled in the regular grader dump wagon to the work proved satisfactory and economical.

The majority chosen for the work were short-term men, with the exception of two who were under life sentence. Selection was based on the individual's ability and willingness to work, reliability, and trustworthiness. Upon leaving the penitentiary they gave their word of honor not to attempt to escape. There was no night guard, and the day guard was there only to see that all rules were observed. The men were housed in the stock-judging pavilion of the State university farm, and meals were prepared by one of their own number.

CONVICTS WILLING AND FAITHFUL.

During the 90 days there was but one man who broke parole, a colored lad who had four months to serve. One other man was sent back because he attempted to create a spirit of dissatisfaction among others.

The men were willing and faithful, and felt that they were just becoming efficient in all divisions of the work when it was finished. Each man took a secret delight and personal satisfaction in the accomplishment of a day's work. On Sundays they were frequently found examining and comparing the adjoining contractor's work with their own. Their work was entirely satisfactory. It may be noted that only three men out of the number employed had ever before worked on any kind of construction work.

The majority of these convicts have been released and are now employed in useful work. Outsiders and certain public officials took as much personal interest in the work as the men themselves.

As a result of the convict labor Nebraska has 1½ miles of excellent pavement, perhaps the best in the State. Financially the work was a complete success. Using the adjoining work as a basis of estimating the probable cost of the pavement laid by the convicts, the net saving to the State was $5,624.28.

MICHIGAN ENCOURAGES ROADSIDE TREE PLANTING.

Tree planting along State trunk highways and other roads built under the State reward system has been intrusted by a recent act of the Michigan Legislature to the State Highway Commissioner and the State Board of Agriculture. The law makes it their duty to set out ornamental, nut-bearing or or other food-producing trees, suitable for shade trees, and the Michigan Agriculture College and Public Domain Commission are authorized to distribute stock for the same purpose at nominal cost to local officials and private individuals who will set it out at intervals of 20 to 40 feet along the roads. Injuring trees along the highways or affixing notices of any kind to them is made a misdemeanor punishable by a fine of $1 to $25 or imprisonment for not more than 30 days.

DOMINION GOVERNMENT AID FOR PROVINCIAL HIGHWAYS.

United States Consul General John G. Foster, Ottawa, Canada, has made the following report to the State Department:

The Dominion Government has introduced a resolution in the House of Commons providing for the payment within the next five years of $20,000,000 to the various Provinces for the encouragement of the construction of good roads. According to the terms of the resolution each Province will receive $80,000 every year plus a further payment based upon population as determined by the latest federal census of each Province. The payments will be subject to the following conditions:

(*a*) Any highway for which aid is granted shall be constructed or improved, as the case may be, in accordance with the terms of an agreement to be made by the Minister with the Government of the Province, which agreement shall contain such provisions as to cost, description, specifications or otherwise as the Governor in Council may approve.

(*b*) The aid to be given in any case shall be 40 per cent of the amount, which in the opinion of the Minister, is the actual, necessary and reasonable cost of the construction or improvement of such highway as the case may be.

Canadian roads have been divided by the Provinces into three classes: (1) Main highways, on which the greatest amount of traffic will take place; (2) market roads, carrying not so much traffic but leading to the market centers; and (3) roads leading to market roads, and first-class highways. The first class are built by the Provinces, the second by the Provinces and municipalities, and the third by the municipalities. The Dominion Government proposes that the federal money shall be advanced only on the first class of roads. The Dominion Government will have the power to appoint inspecting engineers and until the roads are constructed to the satisfaction of the Minister in charge of the good roads branch no grant can be allowed.

ROAD PUBLICATIONS OF BUREAU OF PUBLIC ROADS.

NOTE.—Applications for the free publications in this list should be made to the Chief of the Division of Publications, U. S. Department of Agriculture, Washington, D. C. Applicants are urgently requested to ask only for those publications in which they are particularly interested. The Department can not undertake to supply complete sets, nor to send free more than one copy of any publication to any one person. The editions of some of the publications are necessarily limited, and when the Department's free supply is exhausted and no funds are available for procuring additional copies, applicants are referred to the Superintendent of Documents, Government Printing Office, this city, who has them for sale at a nominal price, under the law of January 12, 1895. Those publications in this list, the Department supply of which is exhausted, can only be secured by purchase from the Superintendent of Documents, who is not authorized to furnish publications free.

REPORTS.

*Report of the Director of the Office of Public Roads for 1914. 5c.
*Report of the Director of the Office of Public Roads for 1915. 5c.
Report of the Director of the Office of Public Roads for 1916.
Report of the Director of the Office of Public Roads for 1917.
Report of the Director of the Bureau of Public Roads for 1918.

BULLETINS.

(In applying for these publications the name of the office as well as the number of the bulletin should be given, as "Office of Public Roads Bulletin No. 28.")

*Bul. 28. The Decomposition of the Feldspars (1907). 10c.
*37. Examination and classification of Rocks for Road Building, including Physical Properties of Rocks with Reference to Their Mineral Composition and Structure. (1911.) 15c.
*43. Highway Bridges and Culverts. (1912.) 15c.
*45. Data for Use in Designing Culverts and Short-span Bridges. (1913.) 15c.
*48. Repair and Maintenance of Highways (1913).

DEPARTMENT BULLETINS.

(In applying for these bulletins the name should be given as follows: "Department Bulletin No. 53.")

*Dept. Bul. 53. Object-Lesson and Experimental Roads and Bridge Construction on the U. S. Office of Public Roads, 1912–13. 5c.
105. Progress Report of Experiments in Dust Prevention and Road Preservation, 1913.
136. Highway Bonds.
230. Oil Mixed Portland Cement Concrete.
24. Portland Cement Concrete Pavements for Country Roads.
257. Progress Report of Experiments in Dust Prevention and Road Preservation, 1914.
*284. Construction and Maintenance of Roads and Bridges from July 1, 1913, to December 31, 1914. 10c.
347. Methods for the Determination of the Physical Properties of Road-Building Rock.
*348. Relation of Mineral Composition and Rock Structure to the Physical Properties of Road Materials. 10c.
373. Brick Roads.
386. Public Road Mileage and Revenues in the Middle Atlantic States.
387. Public Road Mileage and Revenues in the Southern States.
388. Public Road Mileage and Revenues in the New England States.
389. Public Road Mileage and Revenues in the Central, Mountain, and Pacific States, 1914.
390. Public Road Mileage in the United States. A Summary.
393. Economic Surveys of County Highway Improvement.
407. Progress Reports of Experiments in Dust Prevention and Road Preservation, 1915.
414. Convict Labor for Road Work.
463. Earth, Sand-Clay, and Gravel Roads.
532. The Expansion and Contraction of Concrete and Concrete Roads.
537. The Results of Physical Tests of Road-Building Rock in 1916, including all Compression Tests.
*555. Standard Forms for Specifications, Tests, Reports, and Methods of Sampling for Road Materials. 10c.
583. Reports on Experimental Convict Road Camp, Fulton County, Ga.
586. Progress Reports of Experiments in Dust Prevention and Road Preservation, 1916.

OFFICE OF PUBLIC ROADS CIRCULARS.

(In applying for these circulars the name of the office as well as the number of the circular should be given as "Office of Public Roads Circular No. 89.")

Cir. 89. Progress Report of Experiments with Dust Preventatives, 1907.
*90. Progress Report of Experiments in Dust Prevention, Road Prservation, and Road Construction, 1908. 5c.
*92. Progress Report of Experiments in Dust Prevention and Road Preservation, 1909. 5c.
*94. Progress Reports of Experiments in Dust Prevention and Road Preservation, 1910. 5c.
*96. Naphthalenes in Road Tars. 1. The Effect of Naphthalene upon the Consistency of Refined Tars. (1911.) 5c.
*97. Coke-Oven Tars of the United States. (1912.) 5c.
98. Progress Reports of Experiments in Dust Prevention and Road Preservation, 1911.
*99. Progress Reports of Experiments in Dust Prevention and Road Preservation, 1912. 5c.
*100. Typical Specifications for Fabrication and Erection of Steel Highway Bridges. (1913.) 5c.

OFFICE OF THE SECRETARY CIRCULARS.

Sec. Cir. *49. Motor Vehicle Registrations and Revenues, 1914. 5c.
52. State Highway Mileage and Expenditures to January 1, 1915.
59. Automobile Registrations, Licenses, and Revenues in the United States, 1915.
62. Factors of Apportionment to States under Federal Aid Road Act Appropriation for the Fiscal Year 1917.
63. State Highway Mileage and Expenditures to January 1, 1916.
65. Rules and Regulations of the Secretary of Agriculture for Carrying out the Federal Aid Road Act.
*72. Width of Wagon Tires Recommended for Loads of Varying Magniture on Earth and Gravel Roads.
73. Automobile Registrations, Licenses, and Revenues in the United States, 1916.
74. State Highway Mileage and Expenditures for the Calendar Year 1916.

FARMERS' BULLETIN.

(The Farmers' Bulletins are a series of popular treatises issued by the Department of Agriculture. The following list includes only numbers contributed by the Office of Public Roads, and should be applied for by numbers, as "Farmers' Bulletin No. 239.")

F. B. *239. The Corrosion of Wire Fence. 5c.
311. Sand-Clay and Burnt-Clay Roads.
338. Macadam Roads.
*403. The Construction of Concrete Fence Posts. 5c.
*461. The Use of Concrete on the Farm.
505. Benefits of Improved Roads.
597. The Road Drag.

SEPARATE REPRINTS FROM THE YEARBOOK.

(In applying for these separates the numbers should be given as "Yearbook Separate No. 638.")

Y. B. Sep. *638. State Management of Public Roads; Its Development and Trend. 5c.
*712. Sewage Disposal on the Farm. 5c.
727. Design of Public Roads.
739. Federal Aid to Highways.

REPRINTS FROM THE JOURNAL OF AGRICULTURAL RESEARCH.

Vol. 5, No. 17, D–2. Effect of Controllable Variables Upon the Penetration Test for Asphalts and Asphalt Cements.
Vol. 5, No. 19, D–3. Relation Between Properties of Hardness and Toughness of Road-Building Rock.
Vol. 5, No. 20, D–4. Apparatus for Measuring the Wear of Concrete Roads.
Vol. 5, No. 24, D–6. A New Penetration Needle.
Vol. 6, No. 6, D–8. Tests of Three Large-Sized Reinforced-Concrete Slabs under Concentrated Loading.
*Vol. 10, No. 5, D–12. Influence of Grading on the Value of Fine Aggregate Used in Portland Cement Concrete Road Construction. 15c.
Vol. 10, No. 7, D–13. Toughness of Bituminous Aggregates.
Vol. 11, No. 10, D–15. Tests of a Large-Sized Reinforced-Concrete Slab Subjected to Eccentric Concentrated Loads.

* Department supply exhausted.

* Department supply exhausted.