Getting Out of the Mud

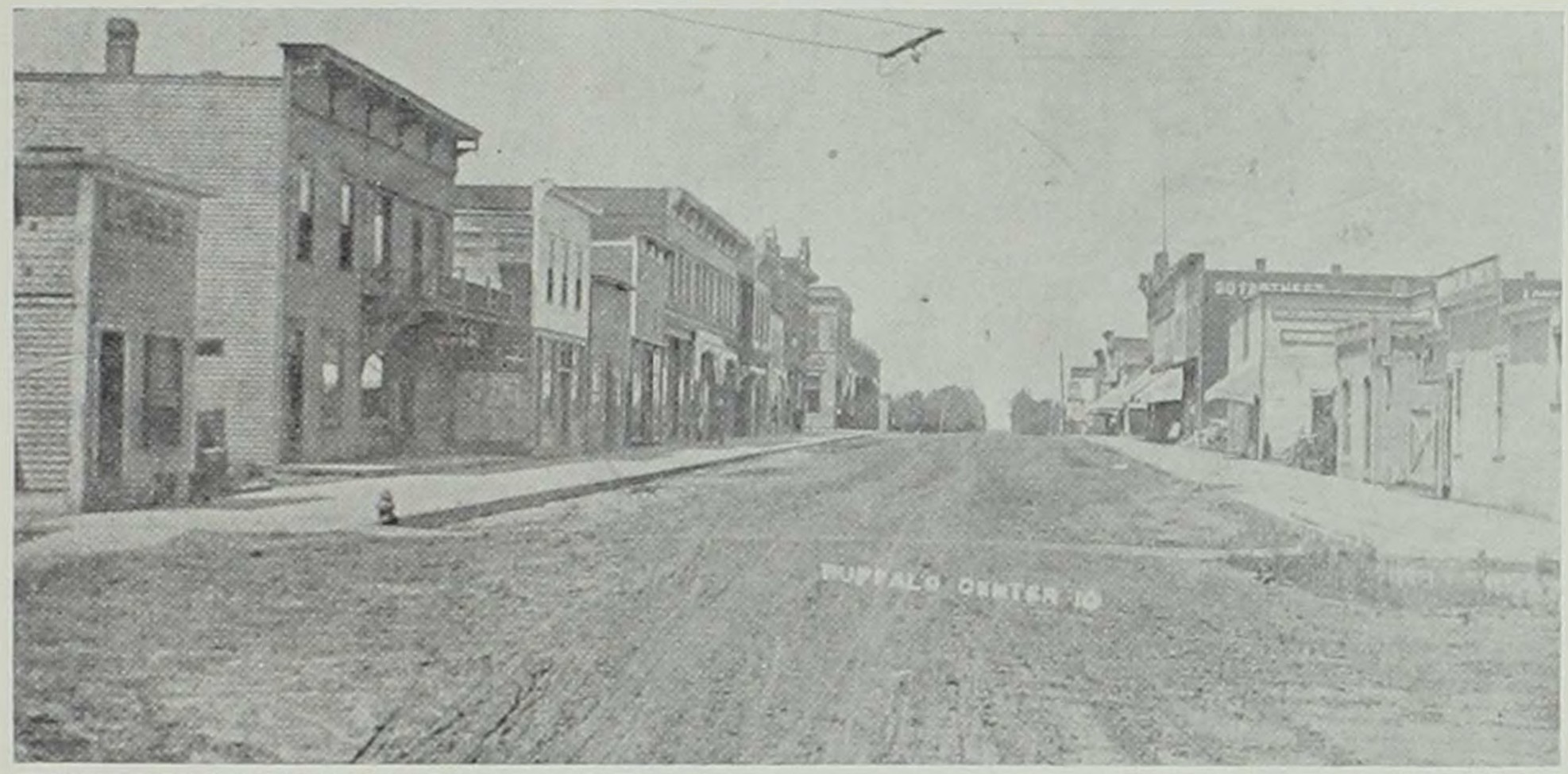
The automobile revolutionized road making. In 1905 only 799 motor vehicles were registered in Iowa. By 1915 the figure had leaped to 147,078 and in 1925 it had soared to 659,202. By the latter year Iowa had one car for every 3.6 persons in the state, an average surpassed only by California.

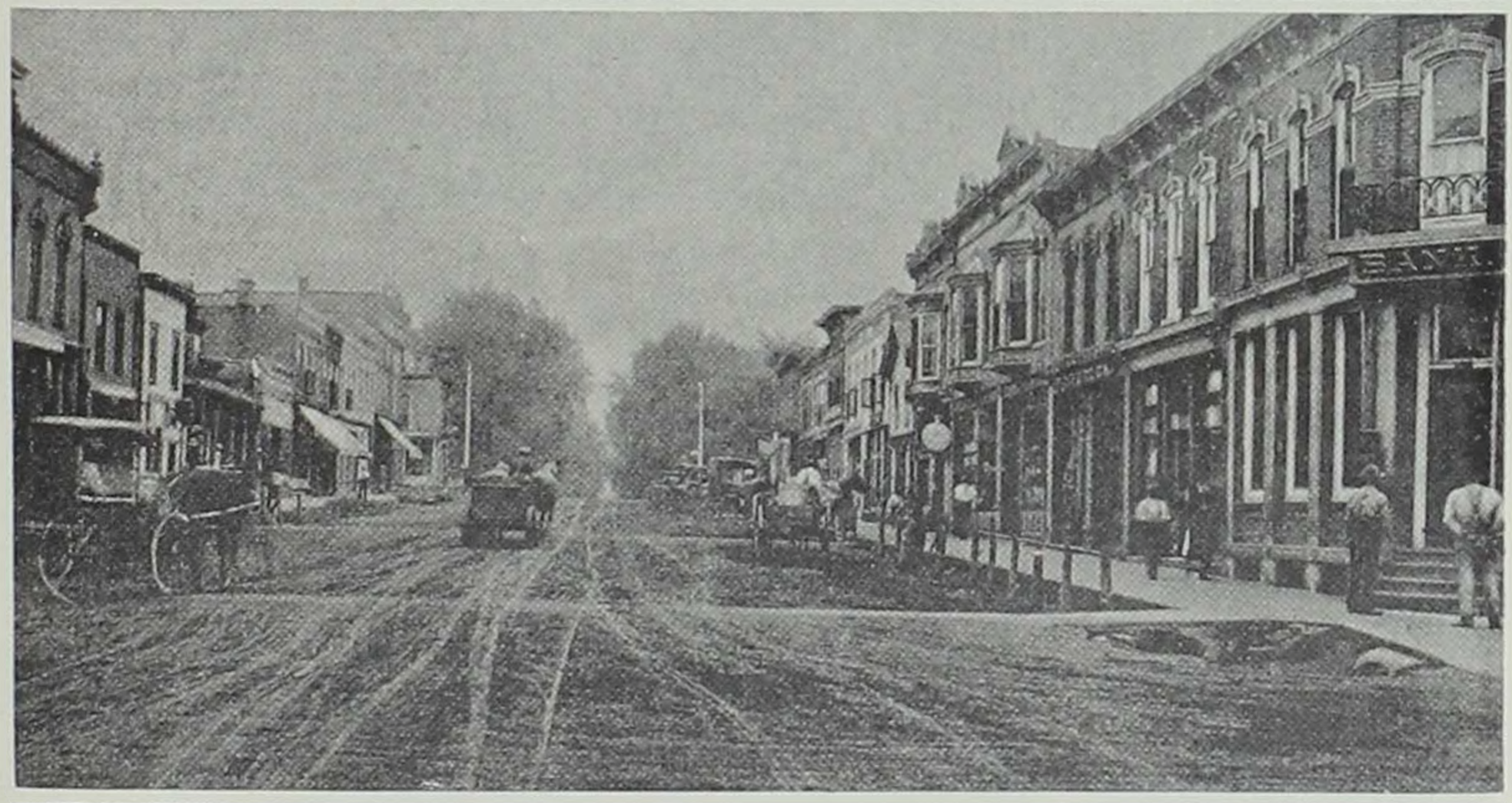
Within a span of twenty years road officials had to revise their thinking completely. As Fred R. White pointed out, in 1900 the road maker thought in terms of road traffic of 20 to 30 vehicles per day traveling at no more than eight miles per hour, whereas by 1920 he had to deal with 500 or 1,000 motor vehicles each day at speeds of 30 miles per hour. While a load of two tons was the heaviest conceivable in 1900, trucks in 1920 could haul loads of 10 to 14 tons. By 1920 the roads were challenging the railroads as conveyors of passengers and freight. Thus, roads which had served the needs of Iowans in 1900 were totally inadequate to meet the needs of 1920.

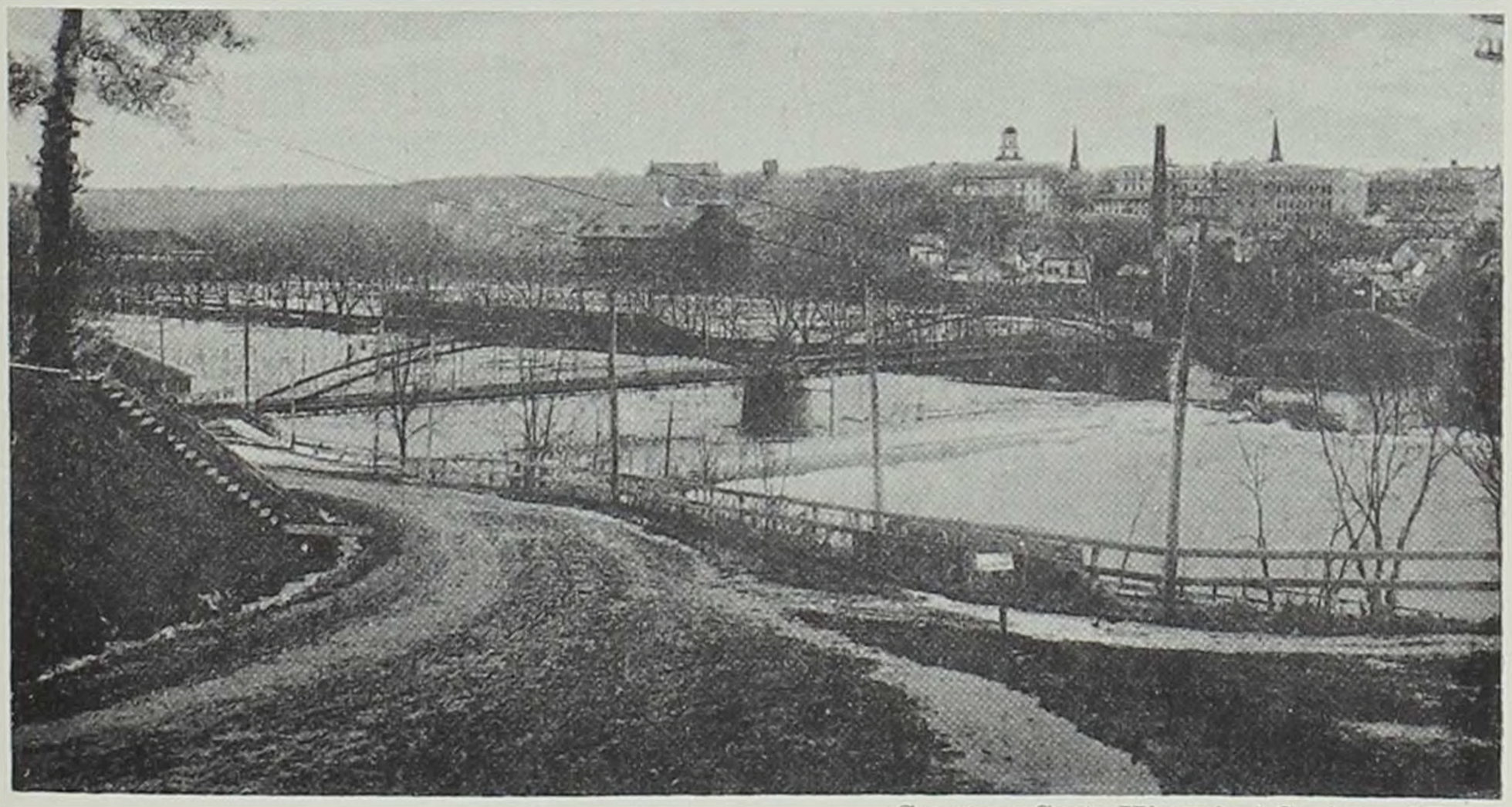
As automobile registrations increased so did the demand for surfaced roads. Until 1910 macadam and gravel were the principal types of surfaced roads. Brick, first used in Burlington in 1887 and widely employed thereafter as street paving, never achieved the popularity for rural roads that it did

DIRT ROADS IN HORSE AND BUGGY DAYS

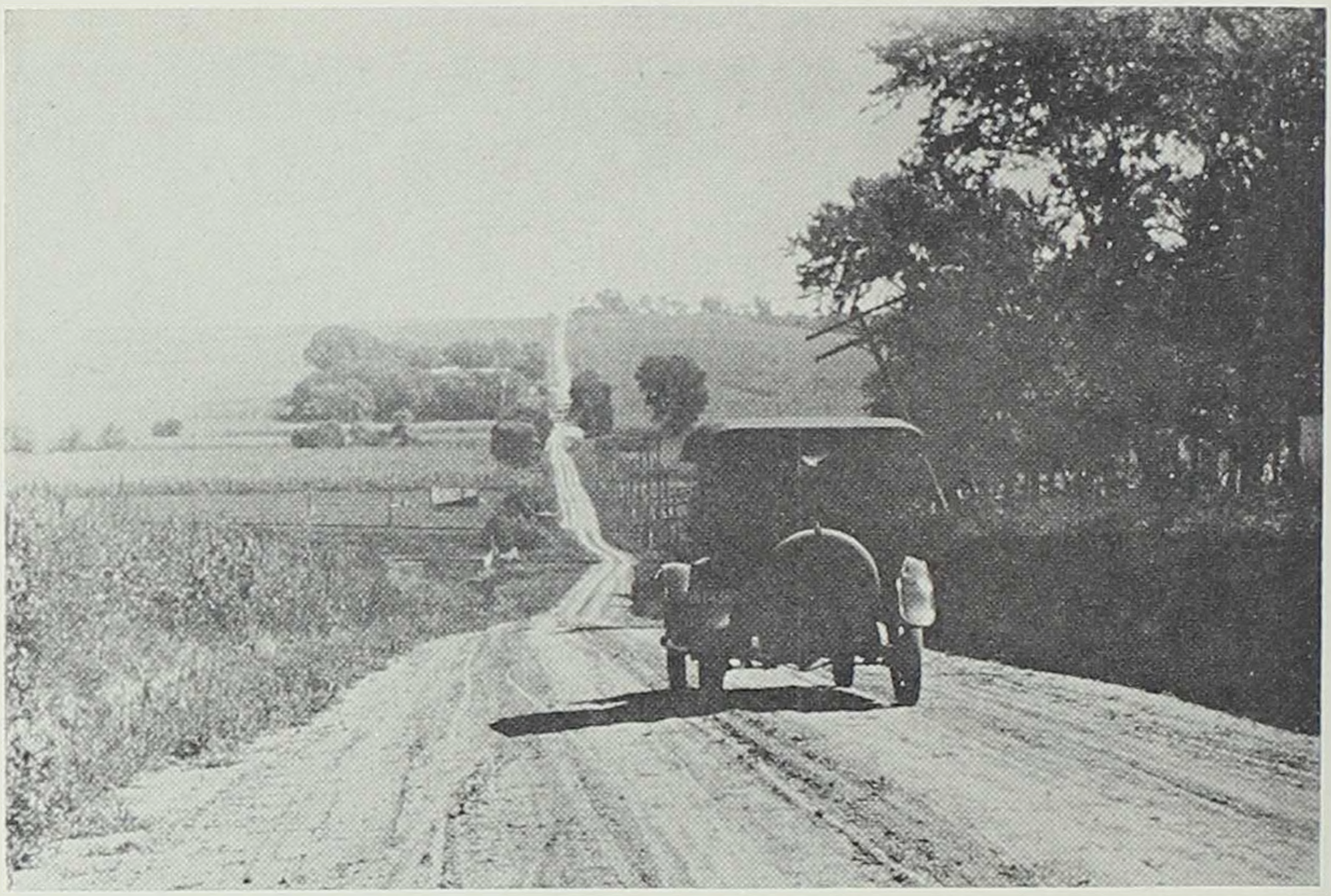
Buffalo Center, West Liberty, Iowa City



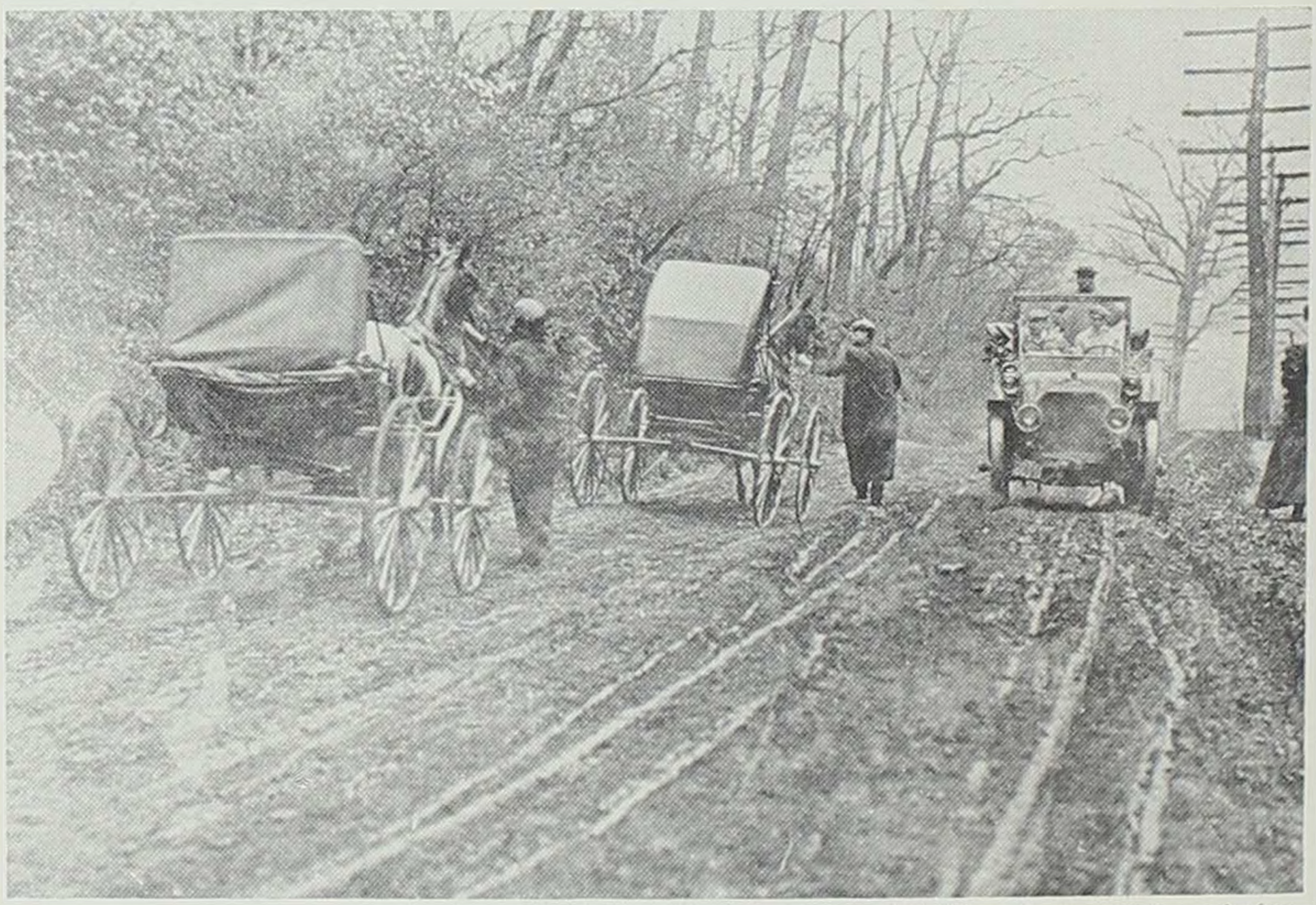




Courtesy State Historical Society of Iowa

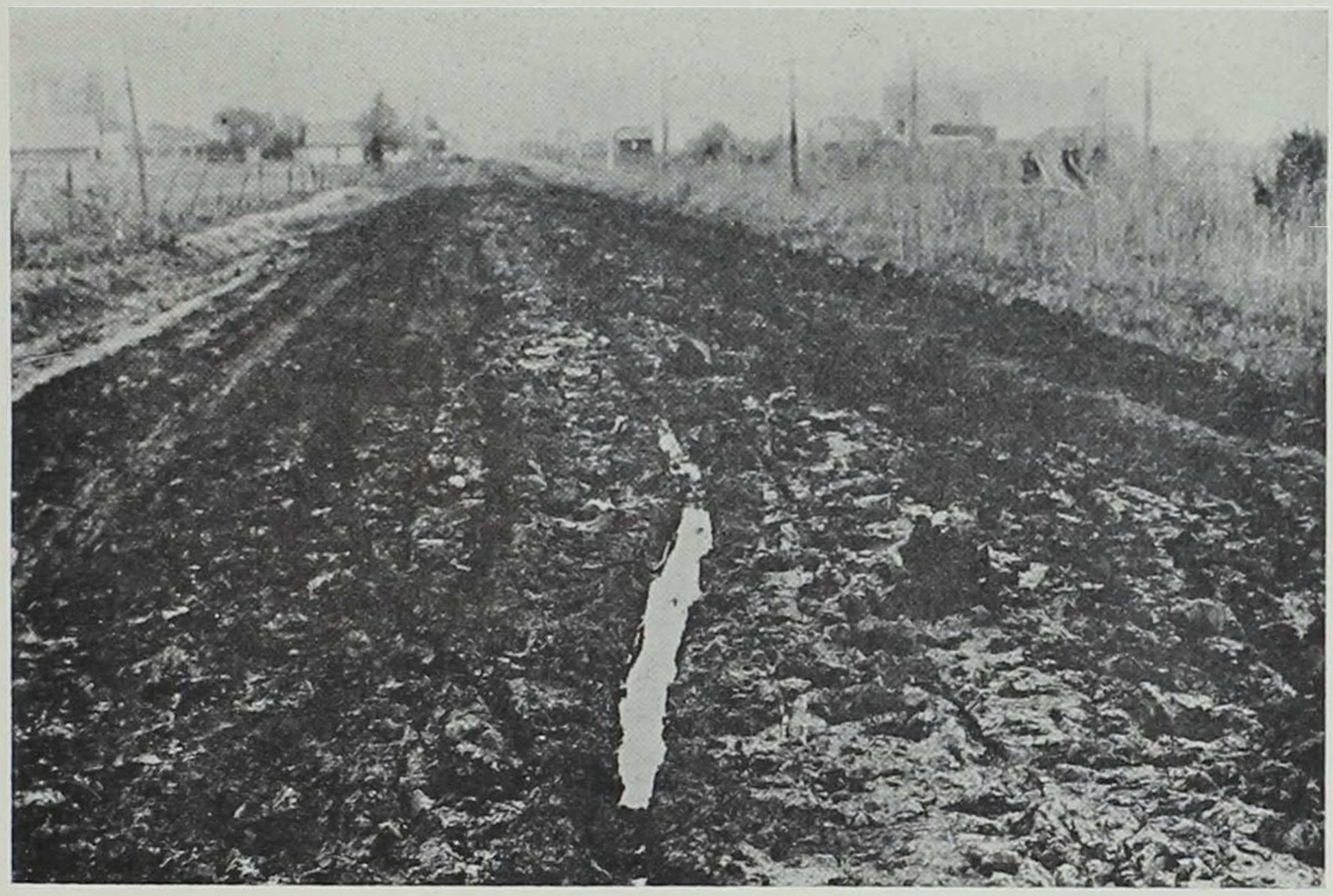


You rolled along smoothly on dirt roads in fine weather — but you slid down sideways into the ditch when heavy rains transformed the road into a sea of mud.

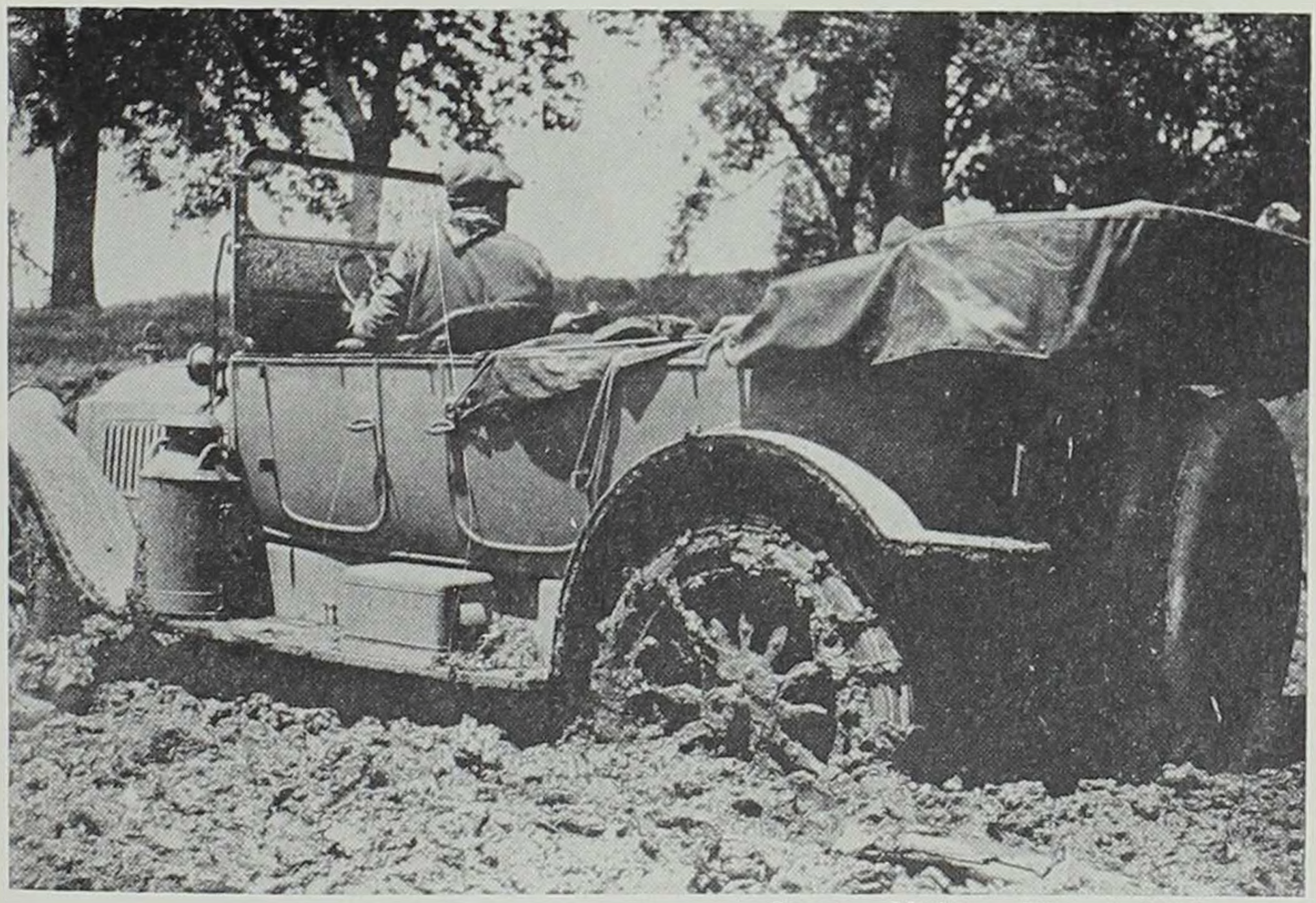


Courtesy Automobile Manufacturers Association

Before the automobile supplanted the horse as the dominant form of road transportation, the law required approaching cars to stop while horsedrawn vehicles were led safely past out of "scaring" distance.

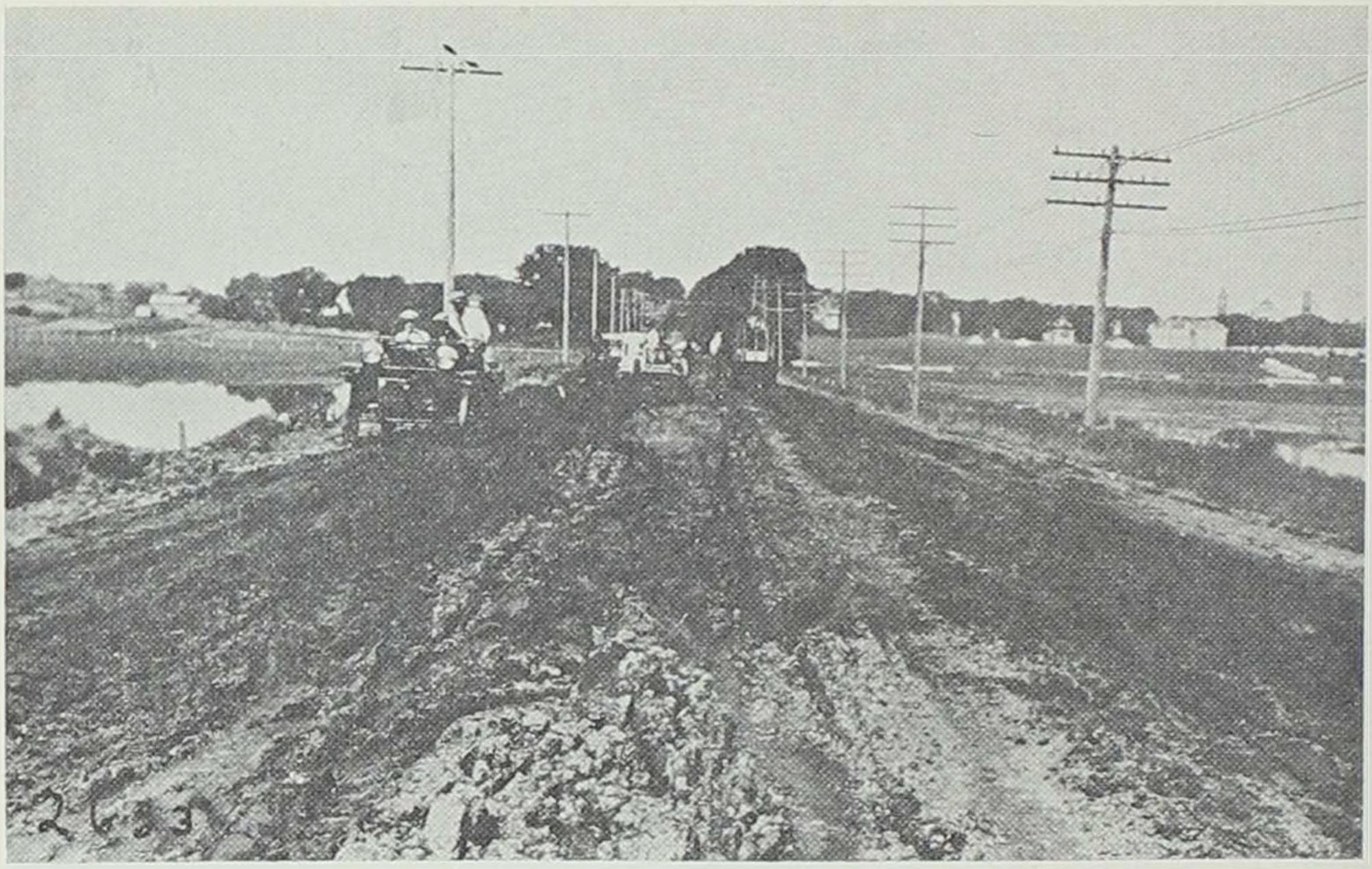


Mud! Rich, thick, bottomless mud impeded progress in wet weather. Spring was the worst season but storms in the summer or fall could transform a perfect road into a quagmire overnight. The scene is believed to be south of Ankeny on U.S. 69.



Courtesy Michigan Historical Collections

Henry B. Joy, president of Packard Motor Company, leaving Tama on the Lincoln Highway in May 1915. Automobiles, such as this one, were helpless without chains on roads which a horse-and-buggy could readily negotiate.

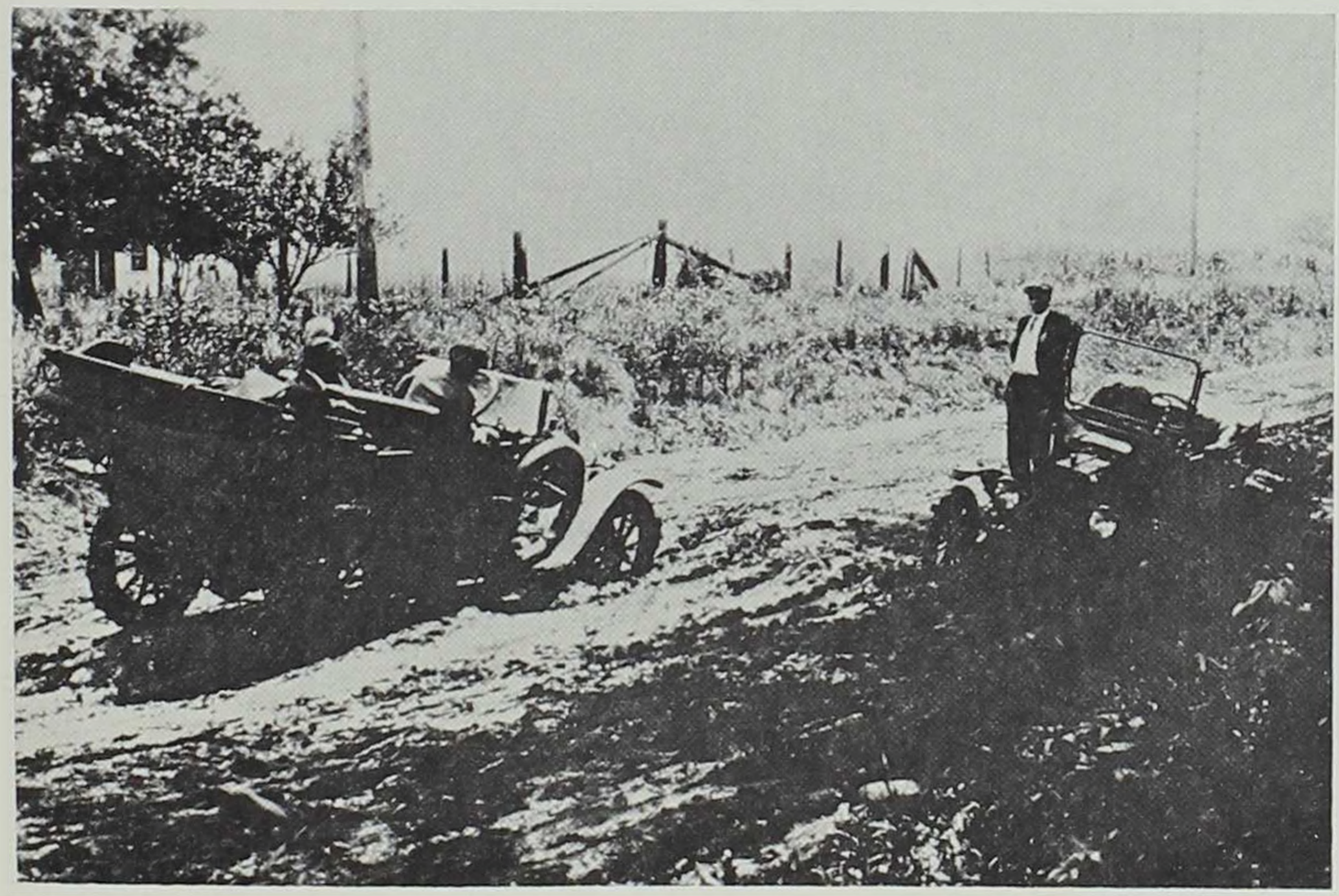


U.S. 30 looking west toward the campus of Iowa State University. Area is what is locally known as the "Squaw Creek Flats" between Ames and the Iowa State campus. A car is being pulled out of the mud but a wagon is passing by without difficulty.

The famous Lincoln Highway between Ames and Nevada in 1918. The driver of the motor truck was not consoled by the knowledge that the road had a gravel surface. Unless properly drained a gravel road is no improvement over a dirt road. The Lincoln Highway was the most famous of the name roads that dotted the state and the country before the adoption in the 1920's of the system of numbering roads. The Lincoln Highway became U.S. Highway 30 and was entirely paved by 1928.

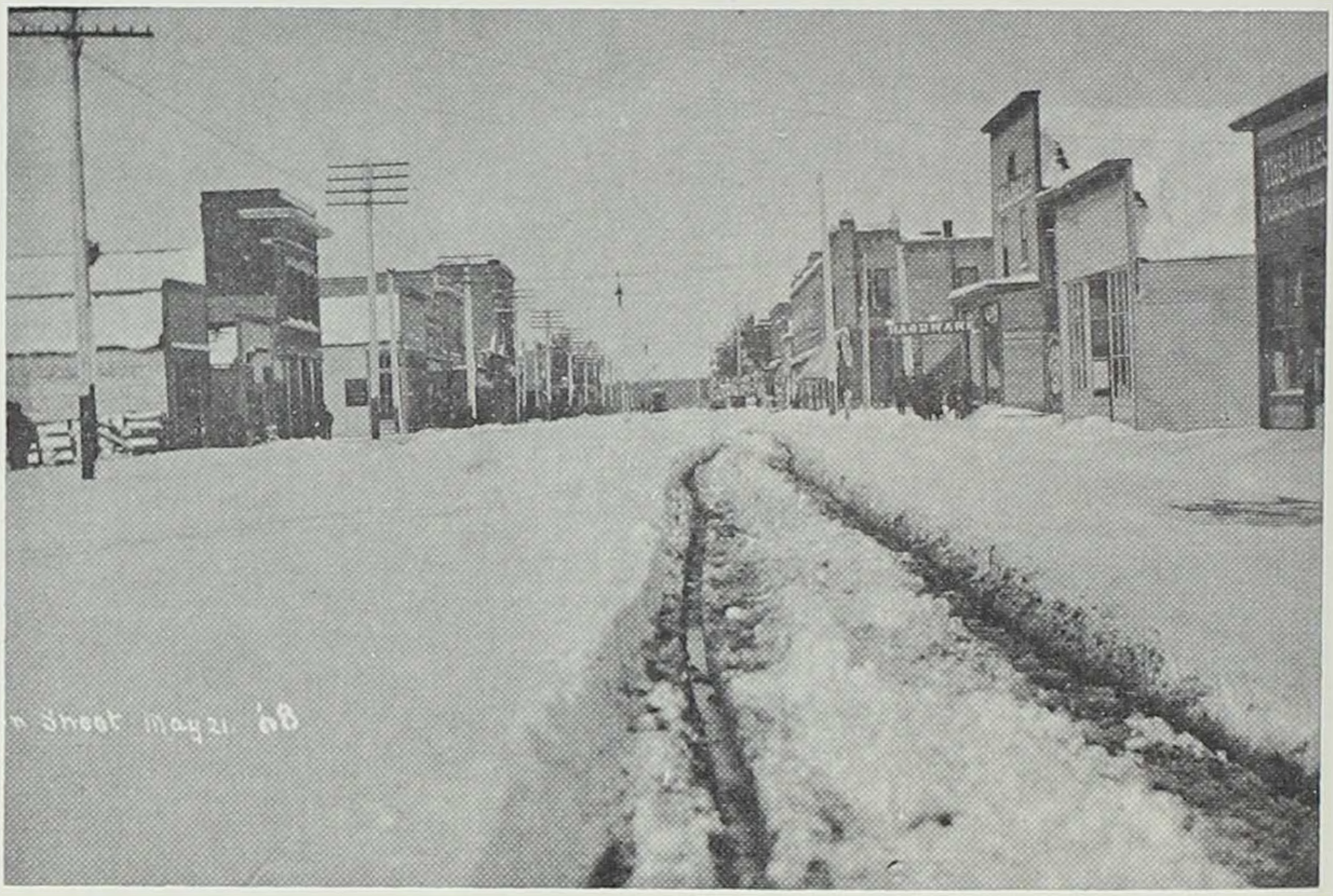
Courtesy Sarah Cox Rigler

The Arthur Cox family of Iowa City slid into a muddy ditch with their car and had to be pulled out by Old Dobbin.

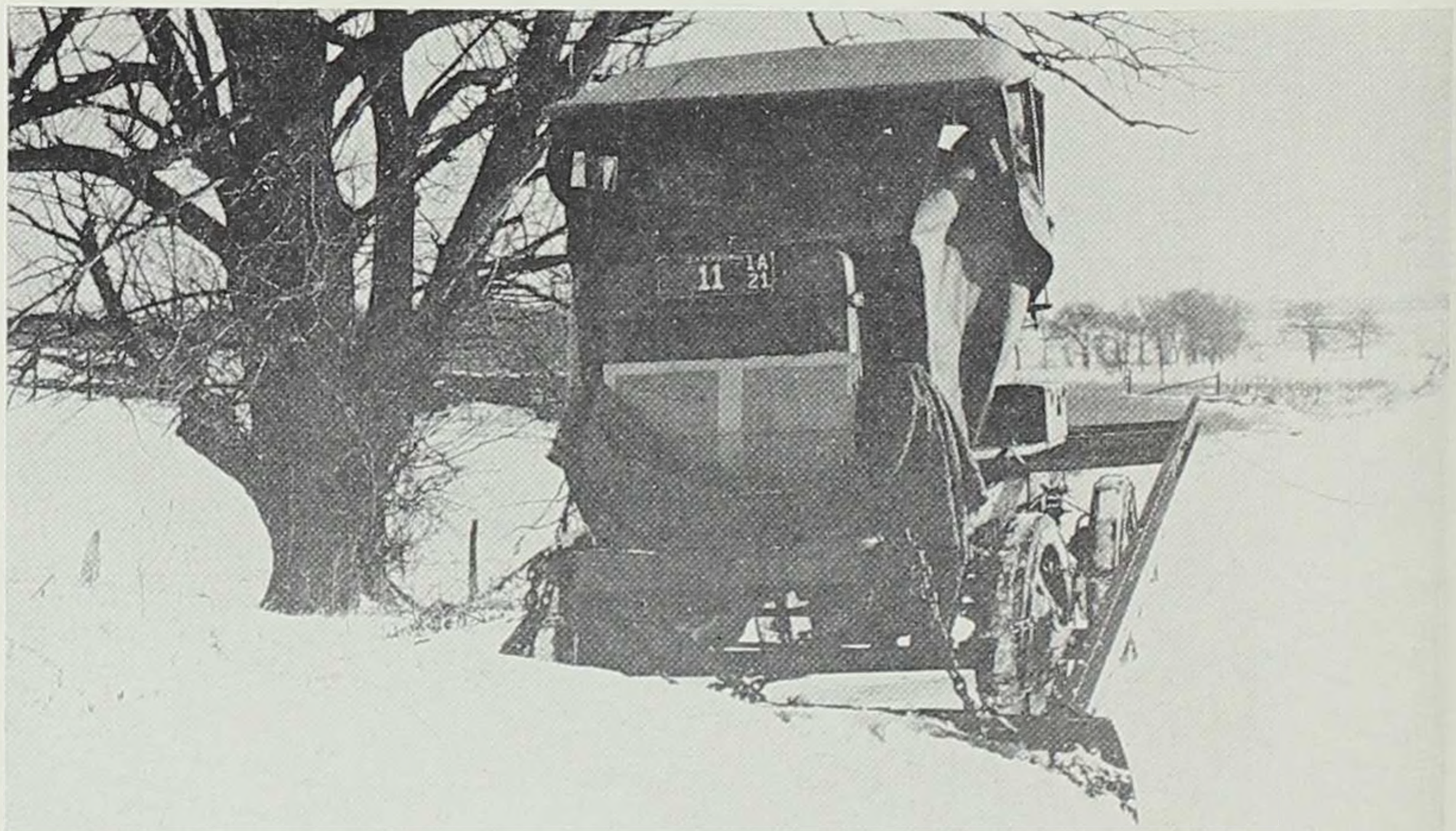


Stuck — on an unidentified Iowa mud road in those "Good Old Days."

SNOW COULD CAUSE MANY PROBLEMS

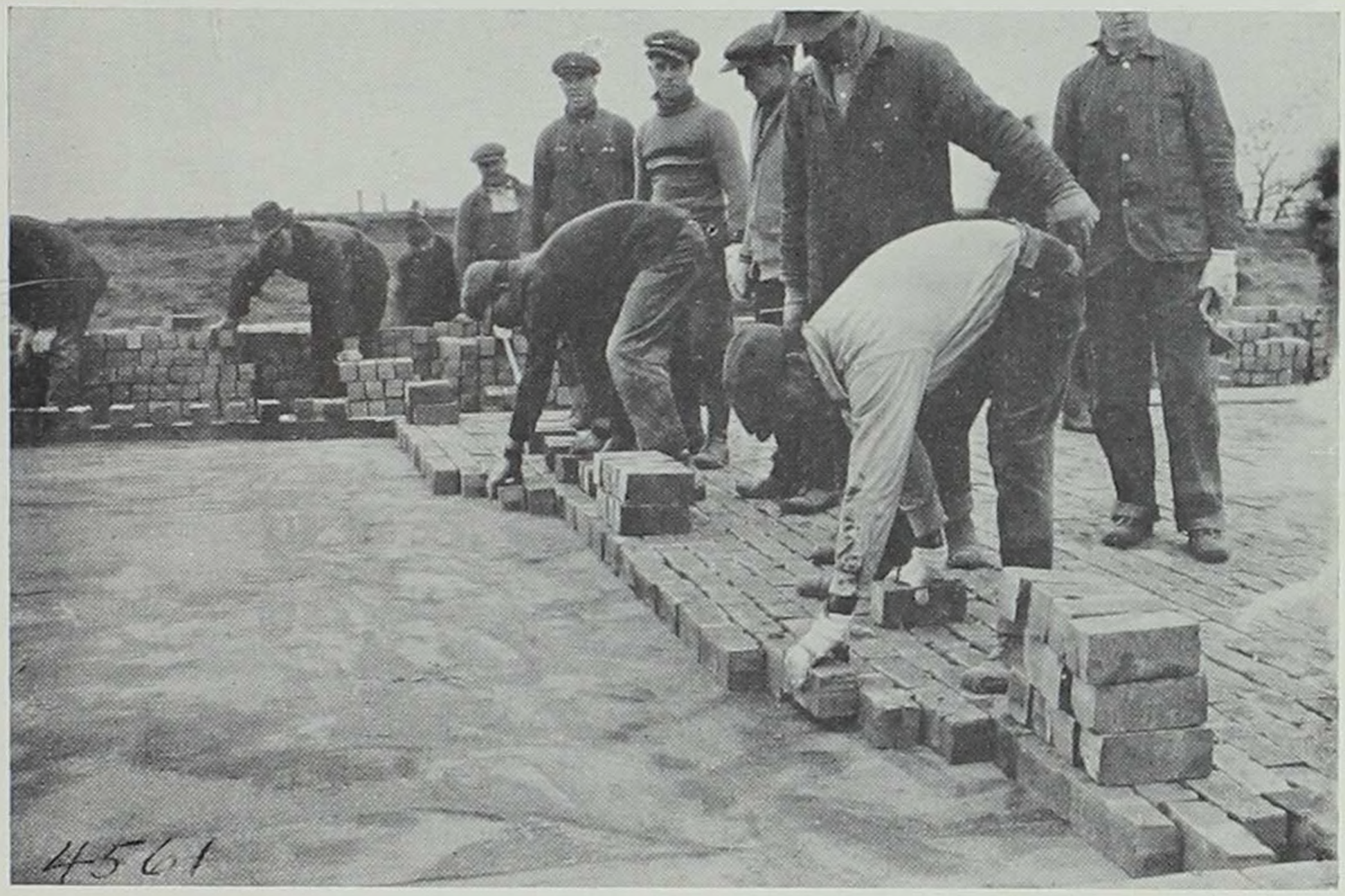


Main Street at Center Junction in 1908.

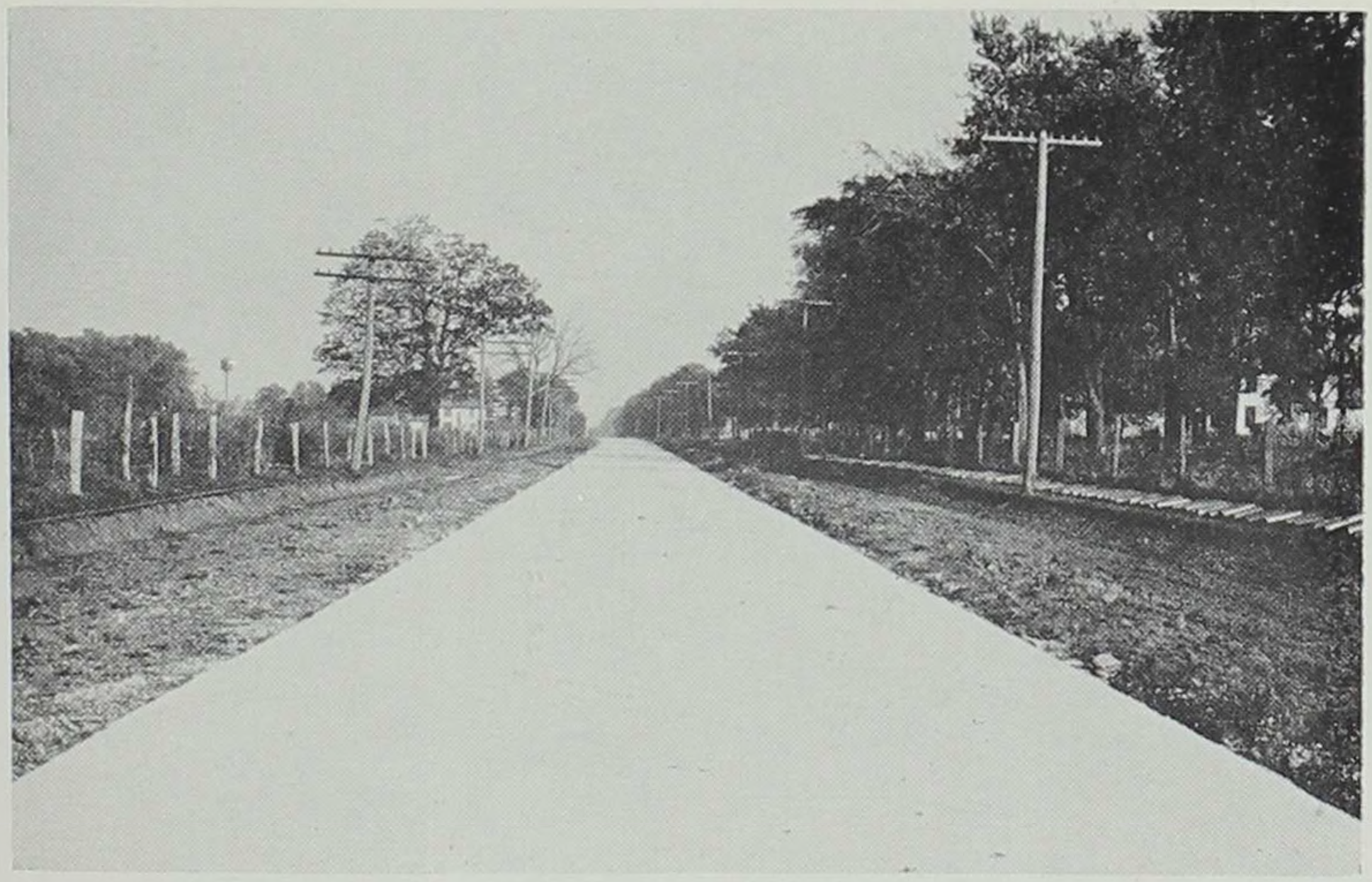


The old method of snow removal on Iowa highways.

GETTING OUT OF THE MUD

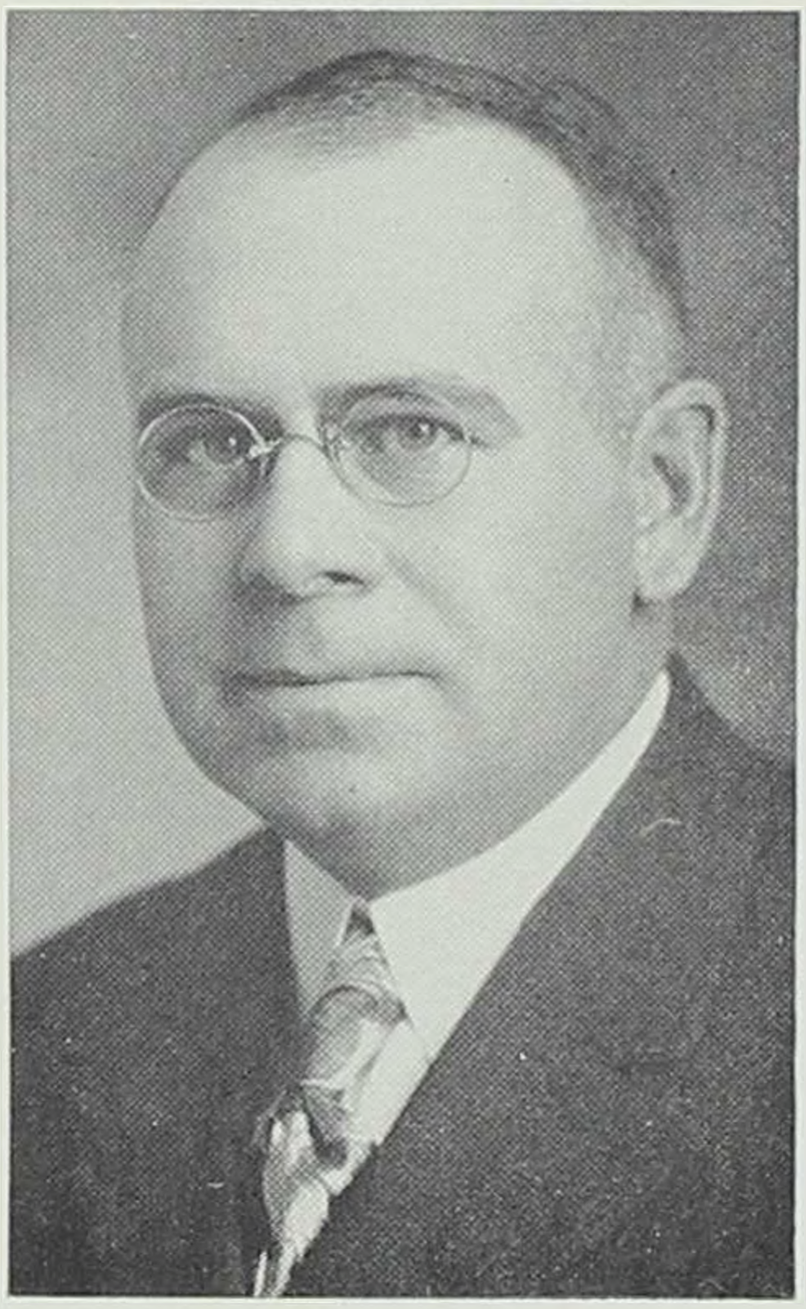


Laying brick on the Des Moines-Camp Dodge road in 1917. Ralph Clover, in the white shirt, could lay 500 feet of 20-foot paving in a day.

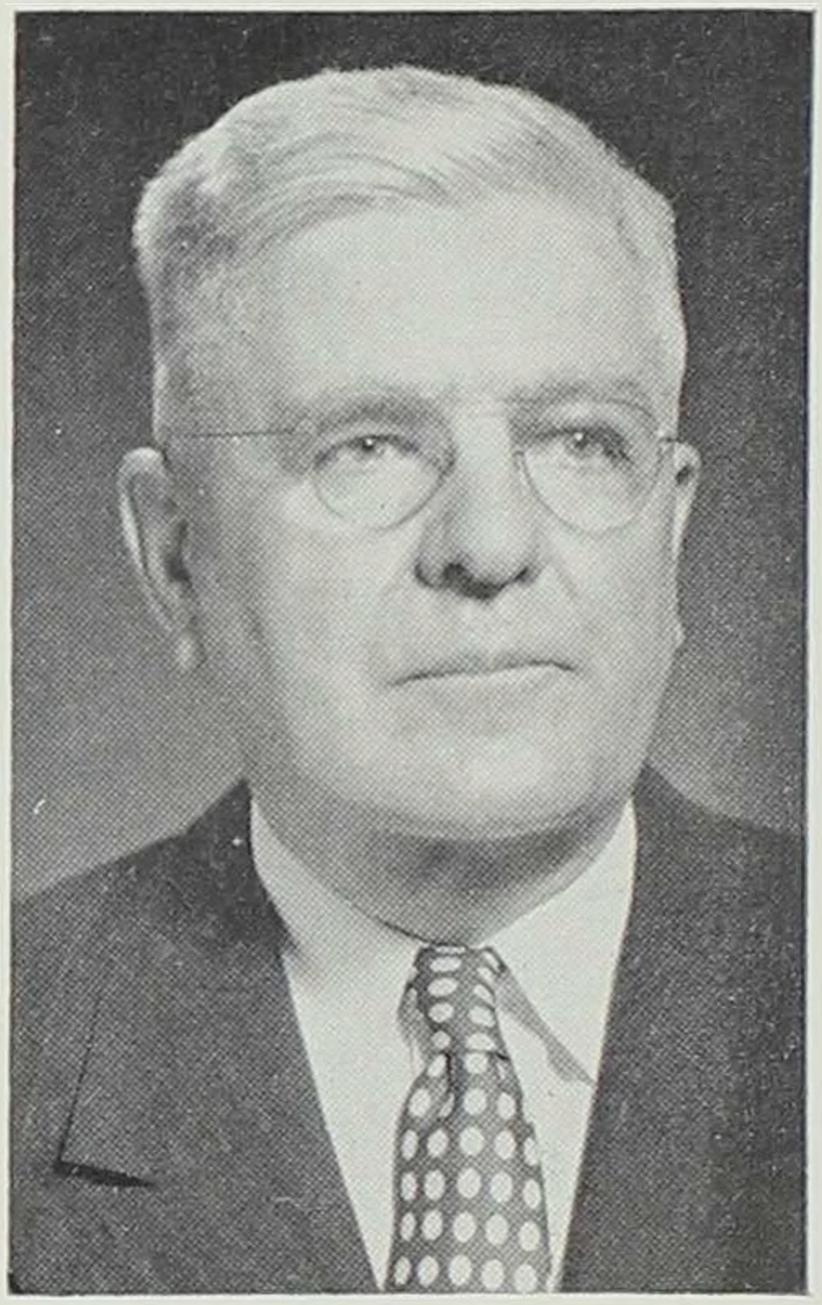


An early Iowa concrete road, built west of Burlington in 1915. Actual paving costs were $1.31 per square yard. Drainage was not neglected — note tile!

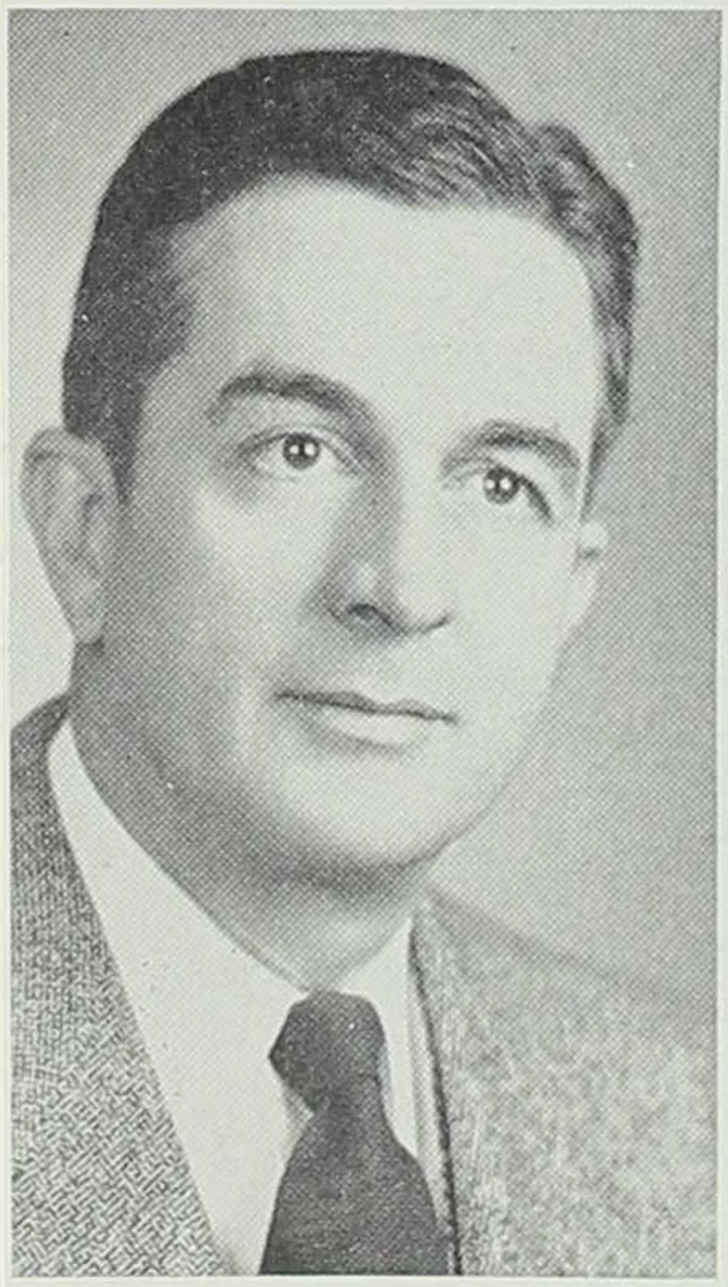
IOWA'S CHIEF ENGINEERS



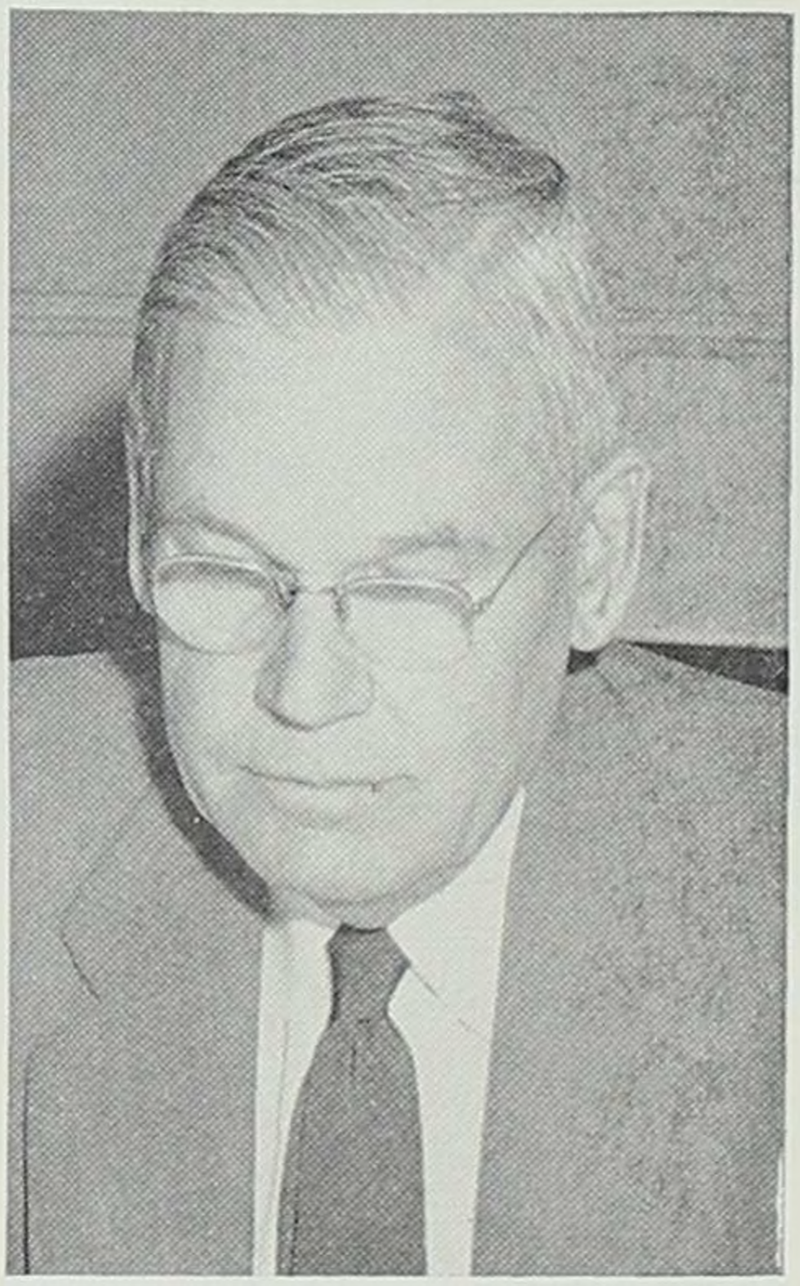
THOS. H. MACDONALD
1913-1919



FRED R. WHITE
1919-1952



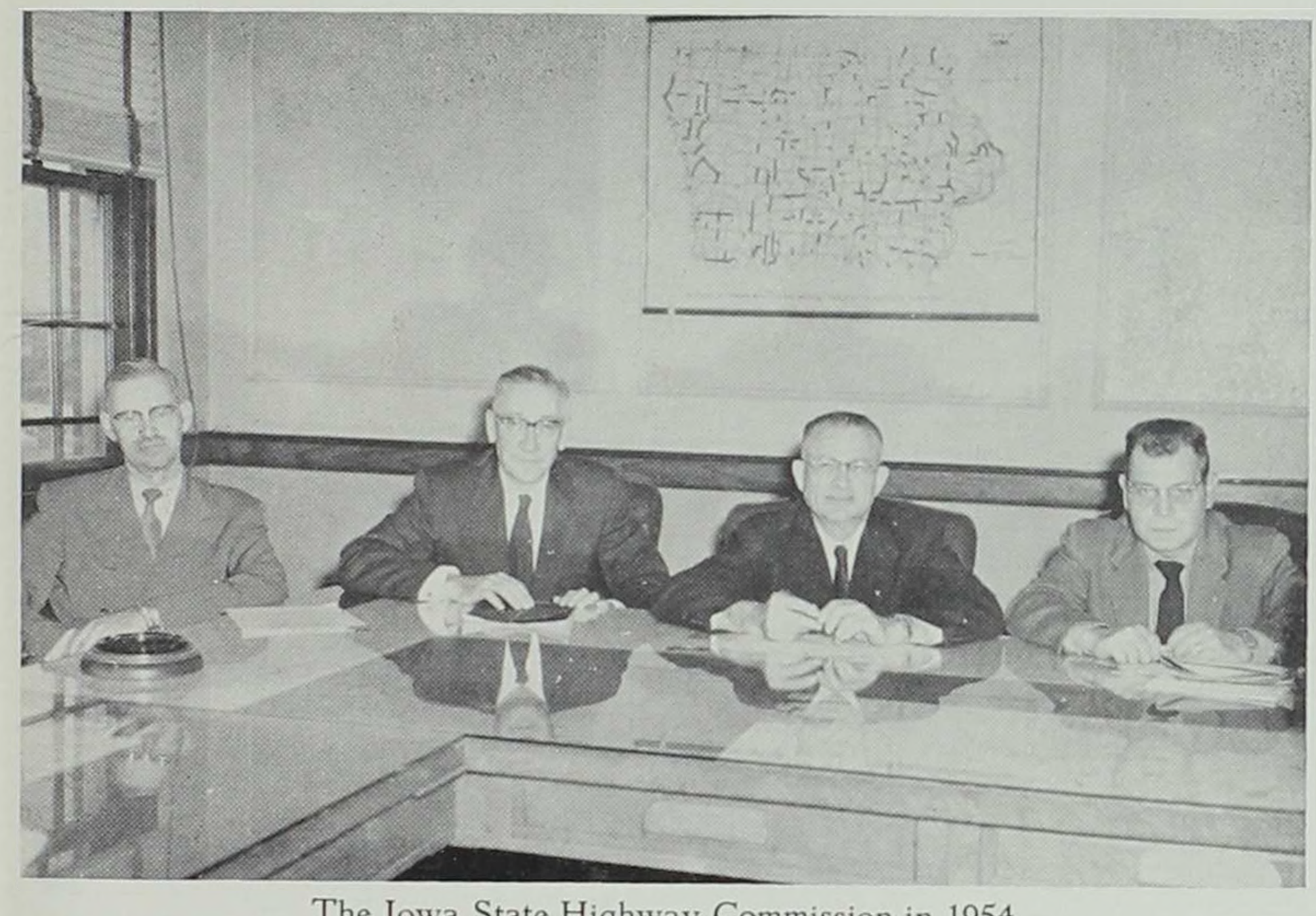
EDWARD F. KOCH
1952-1954



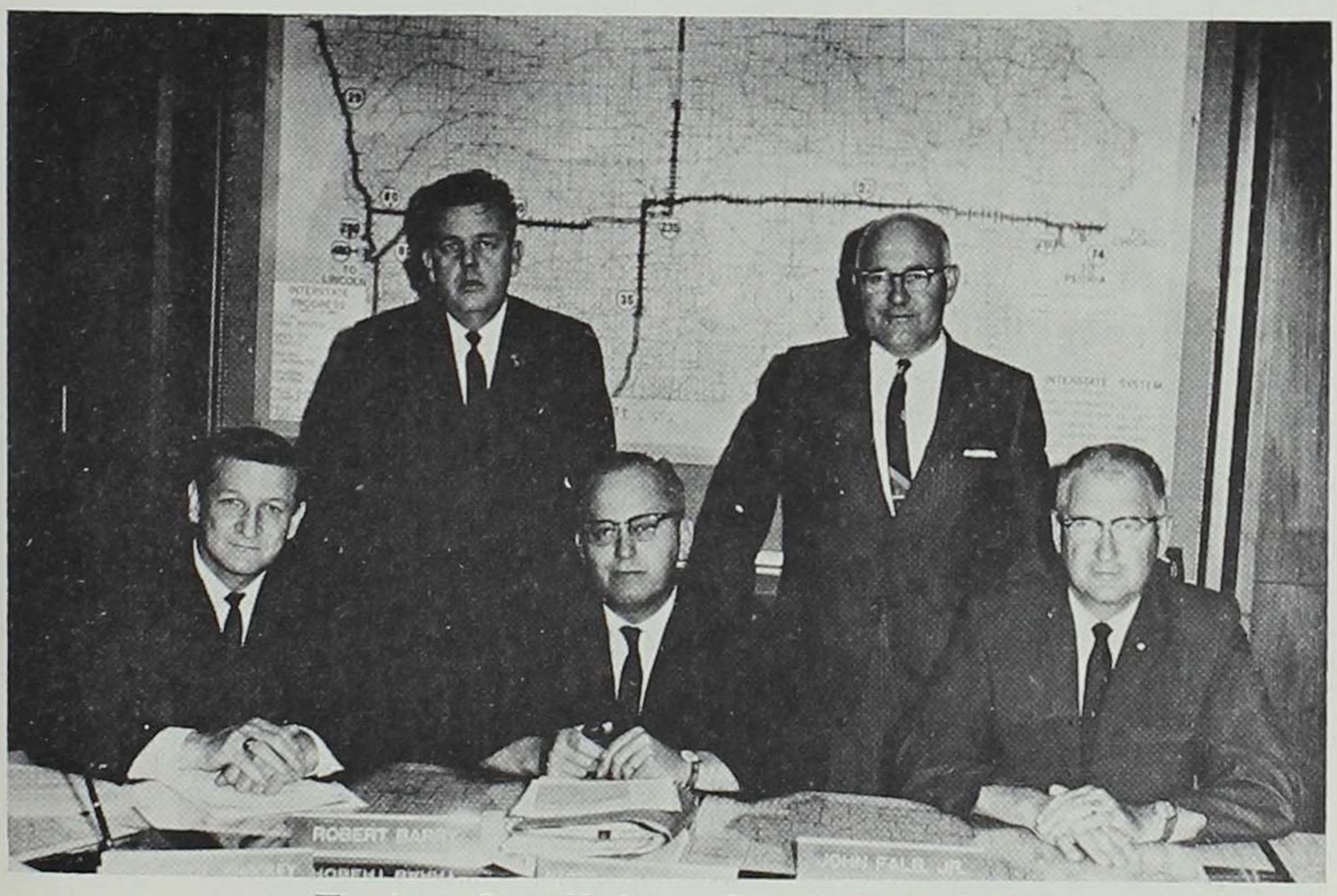
JOHN G. BUTTER
1954-1960

L. M. CLAUSON
1960-

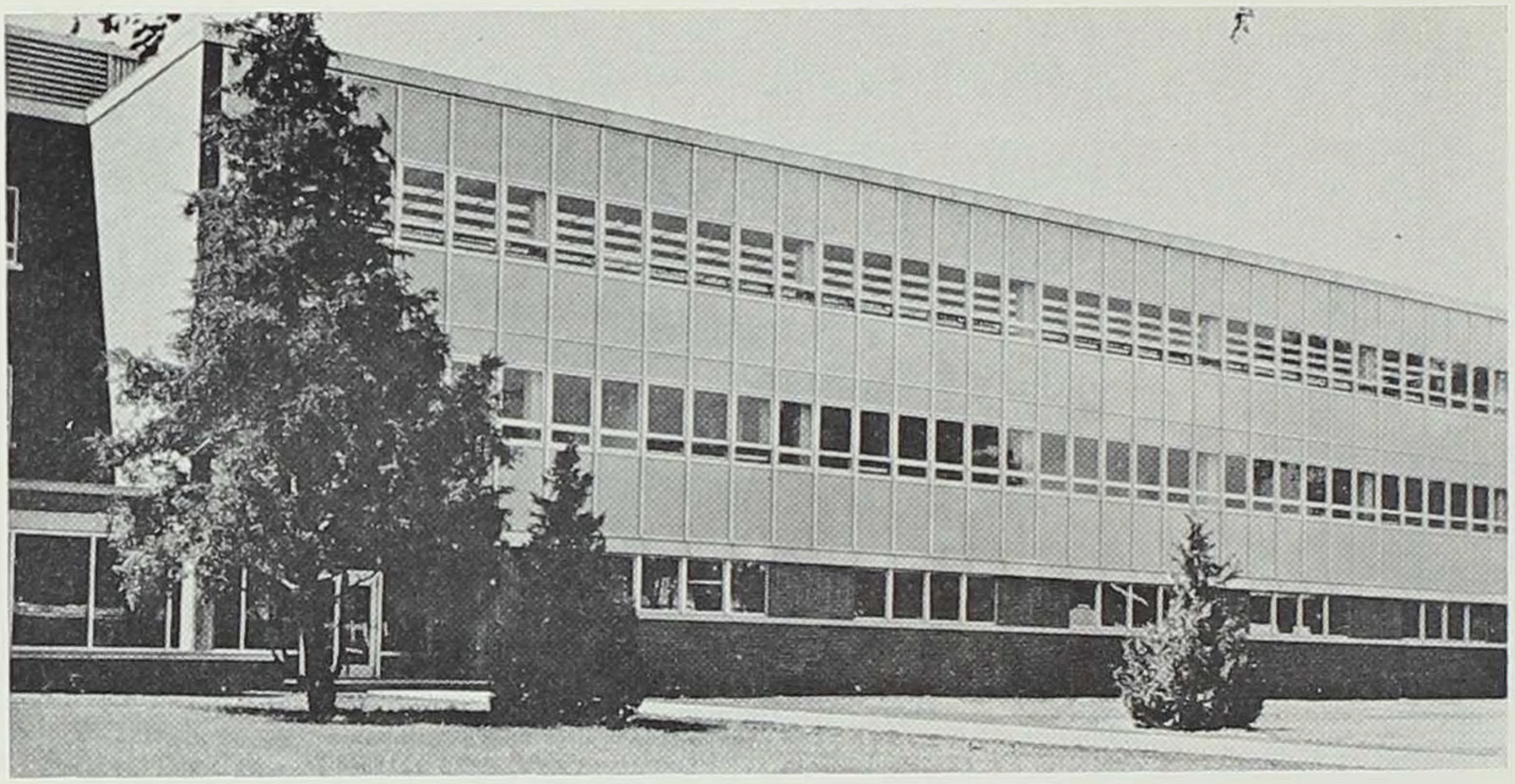
IOWA STATE HIGHWAY COMMISSION



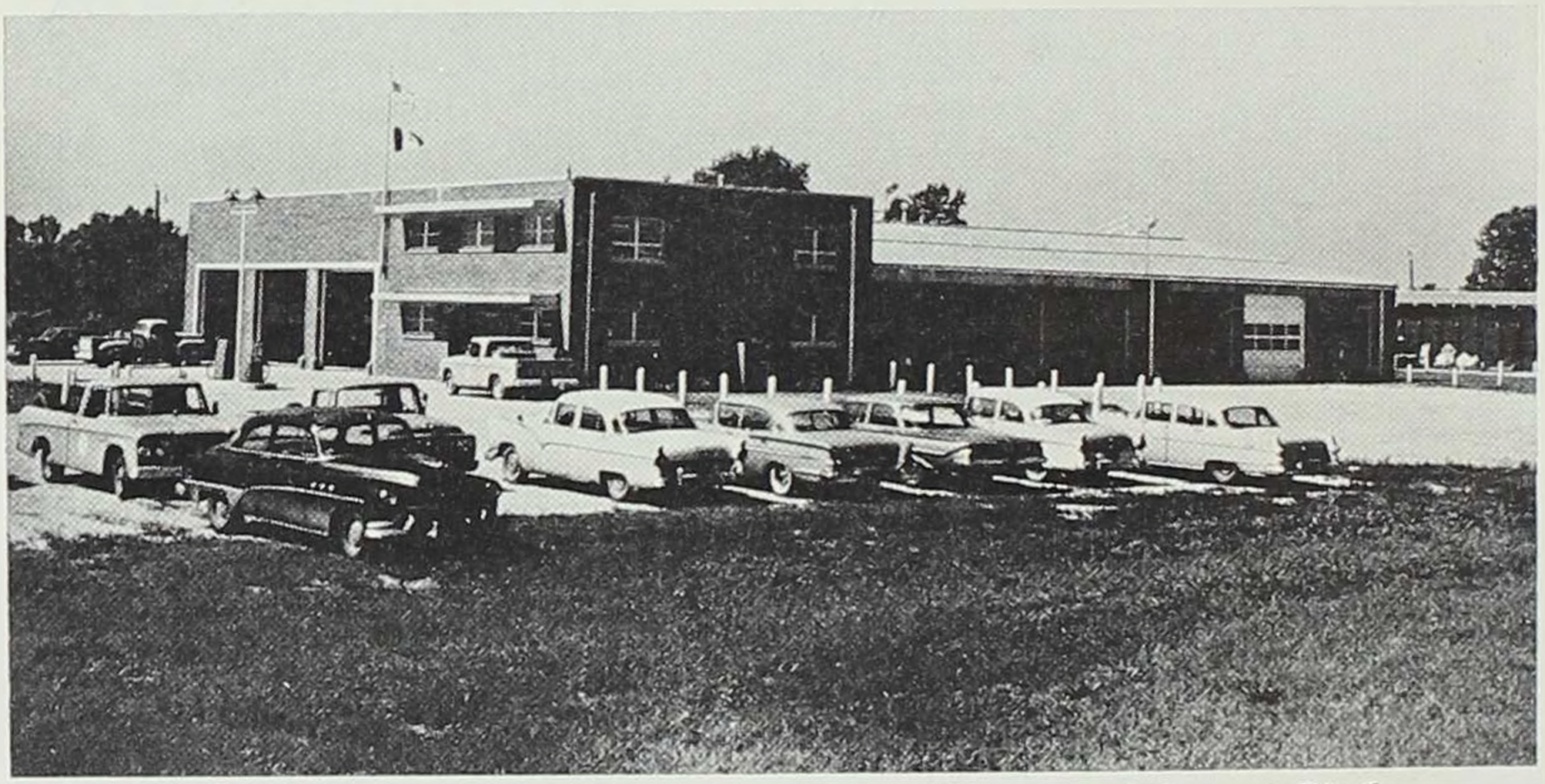
The Iowa State Highway Commission in 1954
Left to Right: Robert Keir, Spencer; John R. Hattery, Nevada; Chairman Sanford Zeigler, Fairfield, and Mel Graham, Audubon. Not present: Frank R. Kerrigan, Dubuque.



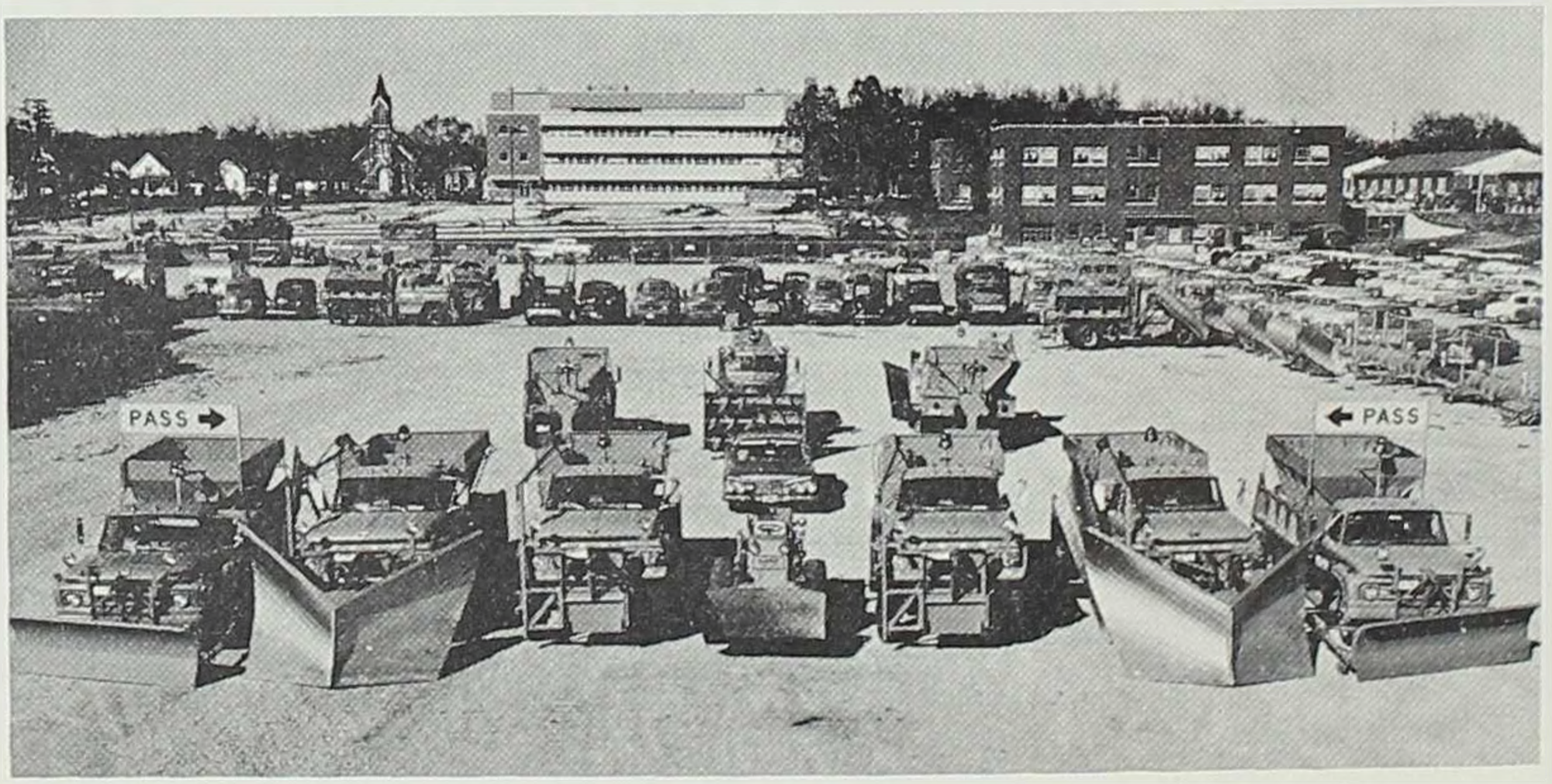
The Iowa State Highway Commission in 1964
Left to Right: Everett L. Shockey, Council Bluffs; Robert C. Barry, Danbury; Harry J. Bradley, Jr., Des Moines; John Falb, Jr., Postville; Derby D. Thompson, Burlington.



Iowa Highway Commission headquarters in Ames.

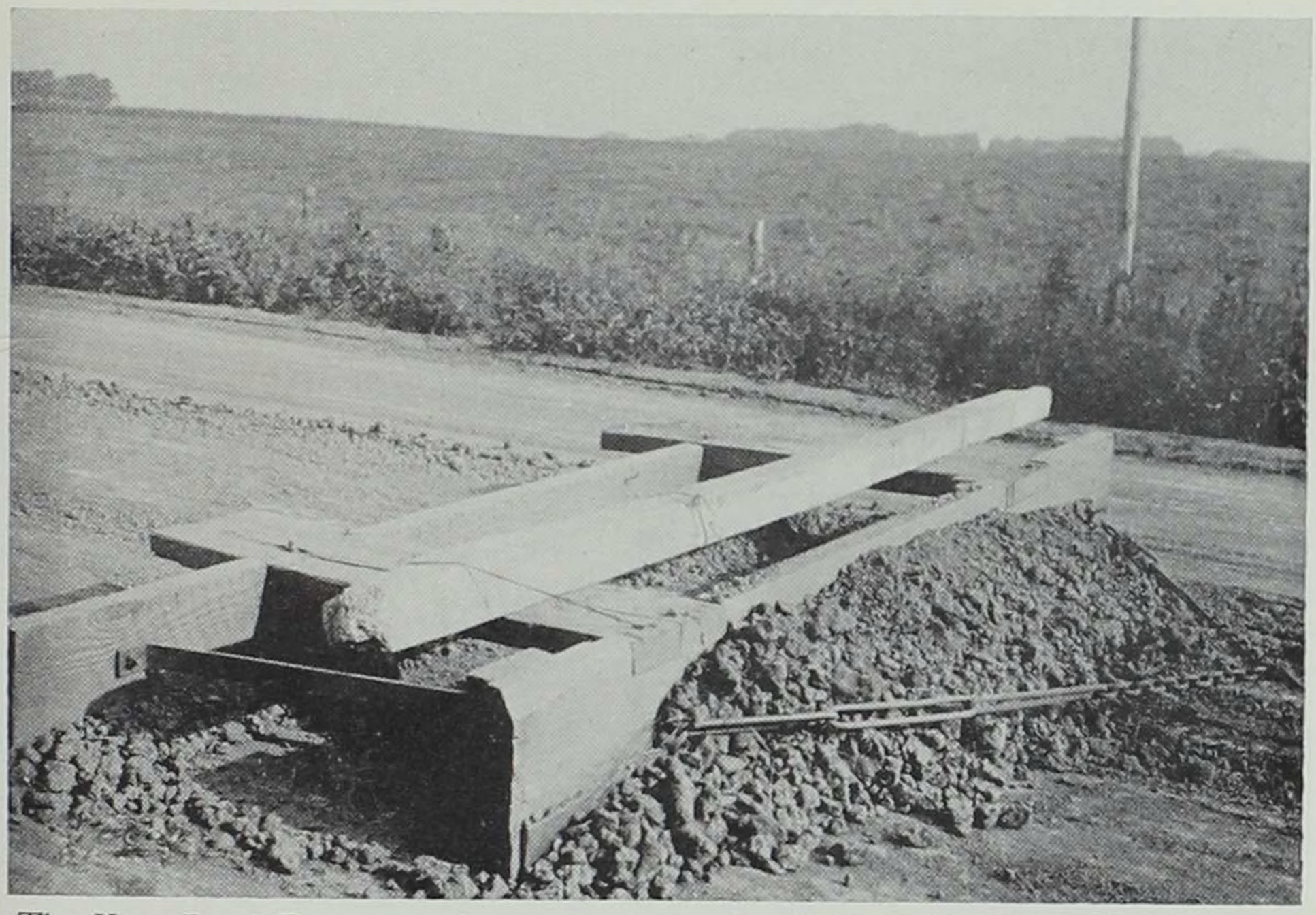


New highway maintenance garage on Iowa 192 south of Council Bluffs.

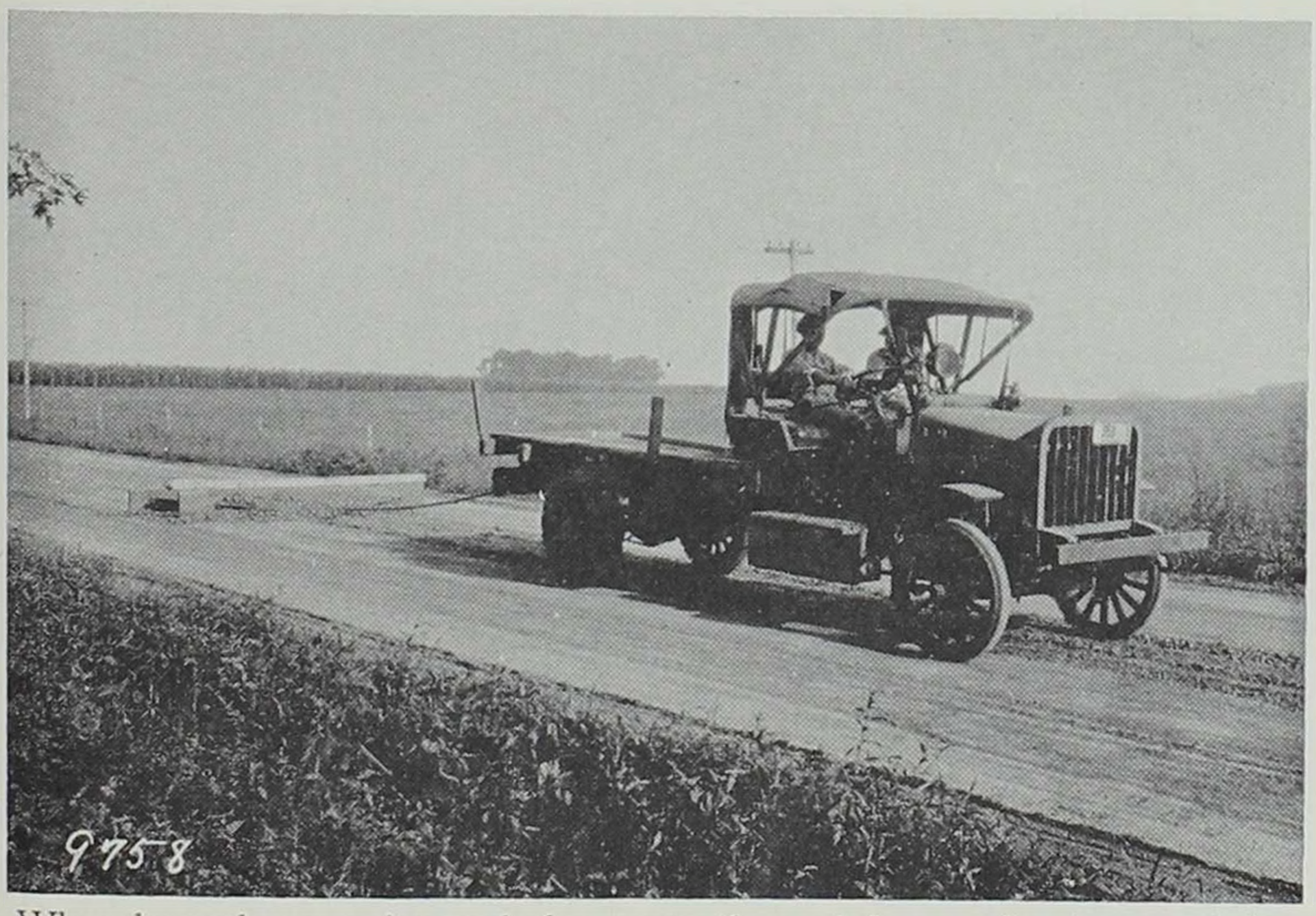


Heavy equipment used in snow and ice control during winter months.

IMPROVING DIRT ROADS



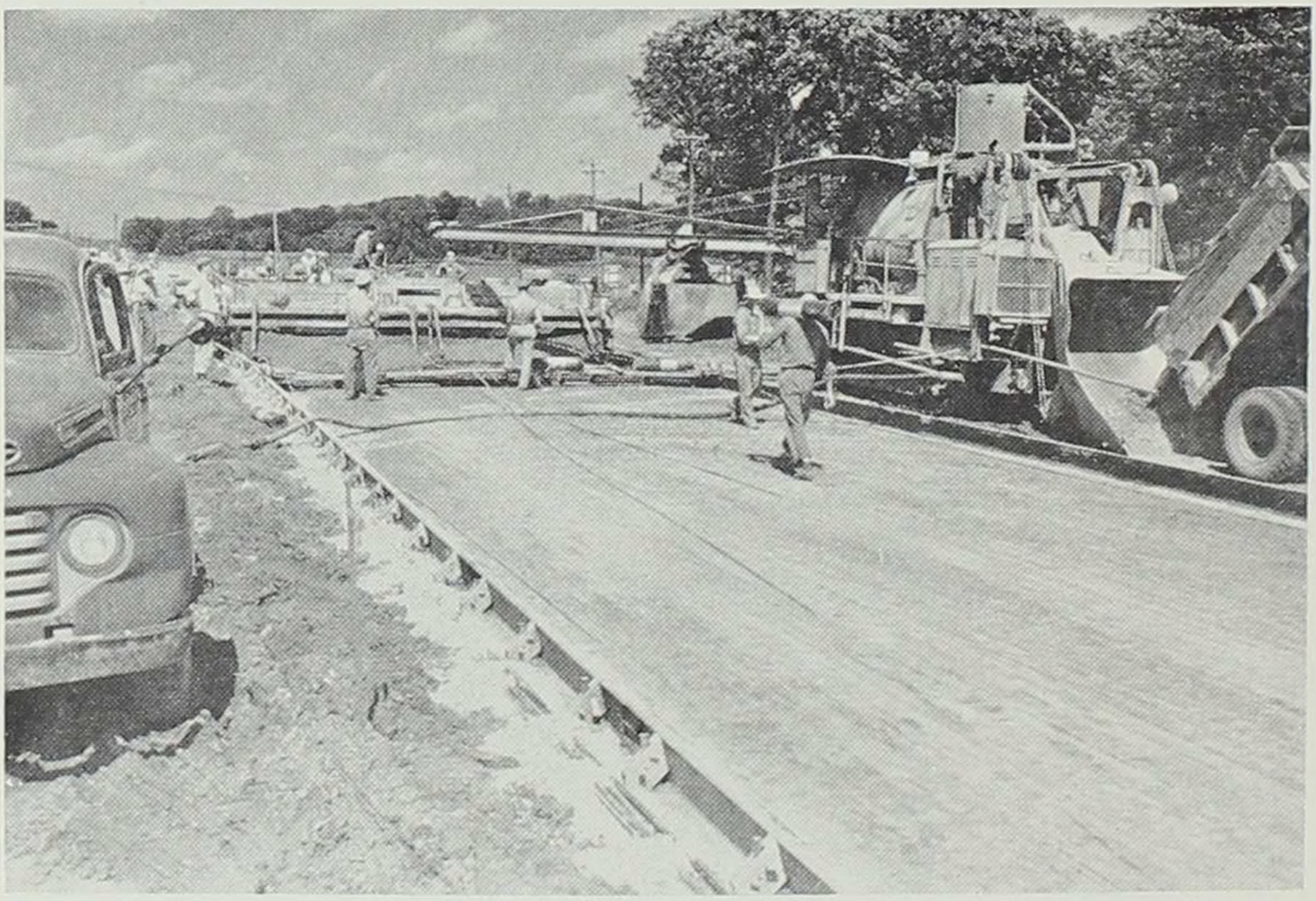
The King Road Drag, popularized in Iowa after 1905 by D. Ward King of Missouri. It is an "improved" model. King preferred to use split logs, rather than the planks used in the drag shown above.



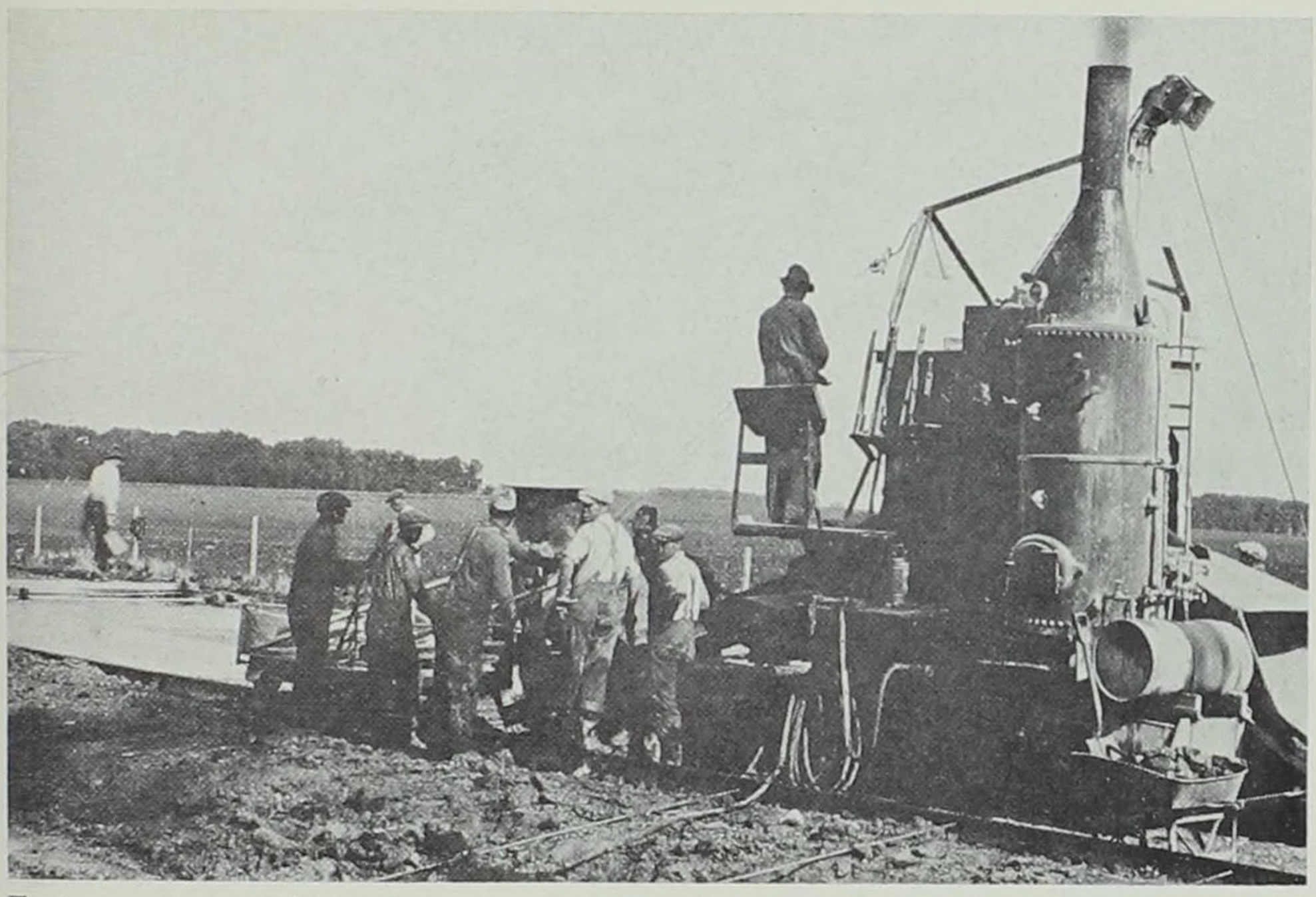
When dragged over a dirt road after a rain, the road drag produced a remarkably smooth surface. Horses were used first, but by the early 1920's maintenance crews, such as this one in Union County, were equipped with trucks.

ROAD BUILDING: YESTERDAY AND TODAY

Road building tools and methods were still in a primitive stage of development in 1915, as indicated by these workmen on the Dubuque-Dyersville gravel road construction project. This was Iowa's second road to receive federal aid.

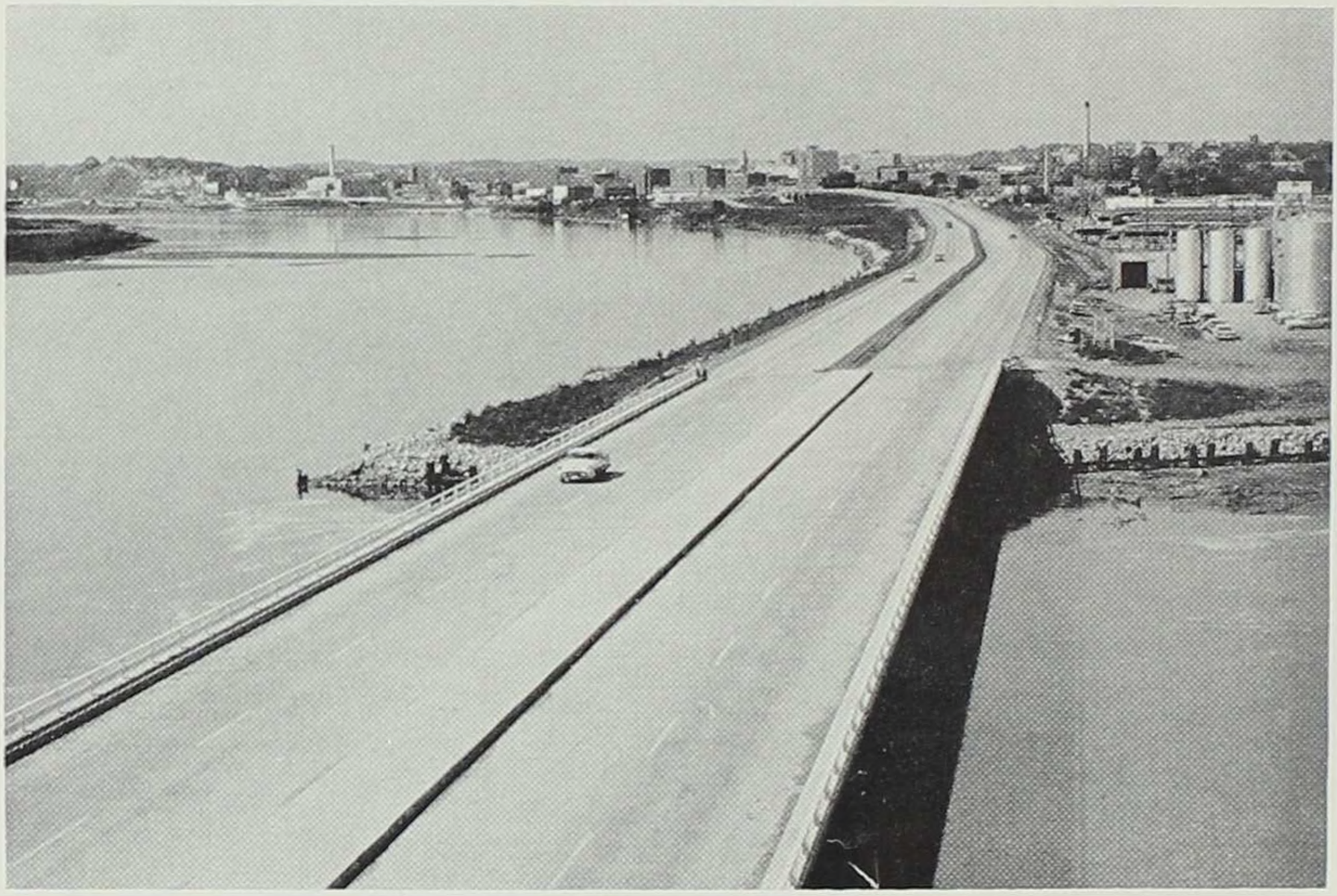


The multitude of equipment used to pave a section of Highway 6 west of Iowa City in 1951 provides a vivid example of the complexities of modern road work.

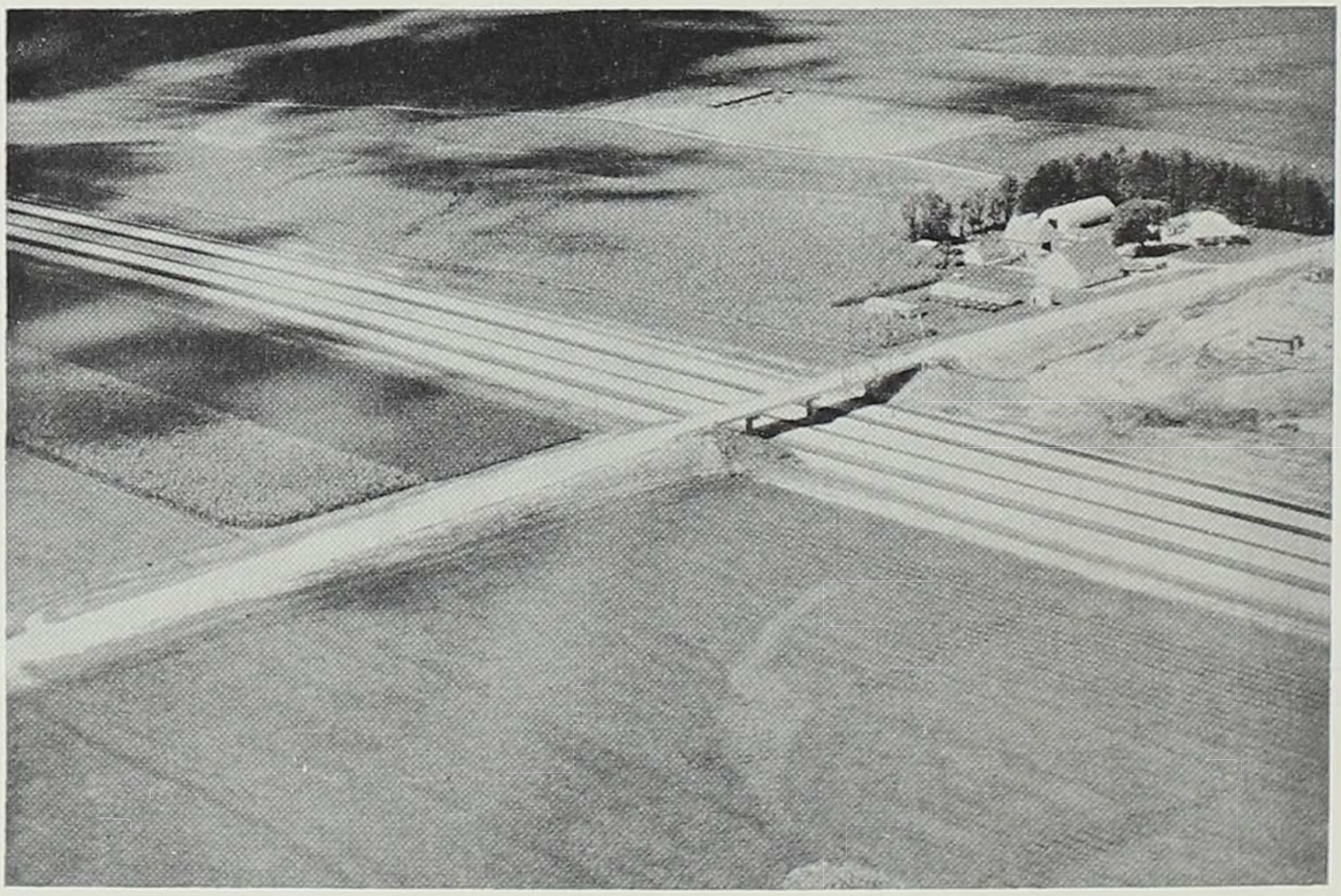


Early paving machines were steam-powered (note the wheelbarrow of coal) and could lay about 600 feet of 8-inch thick, 18-foot wide pavement in a 10-hour day.

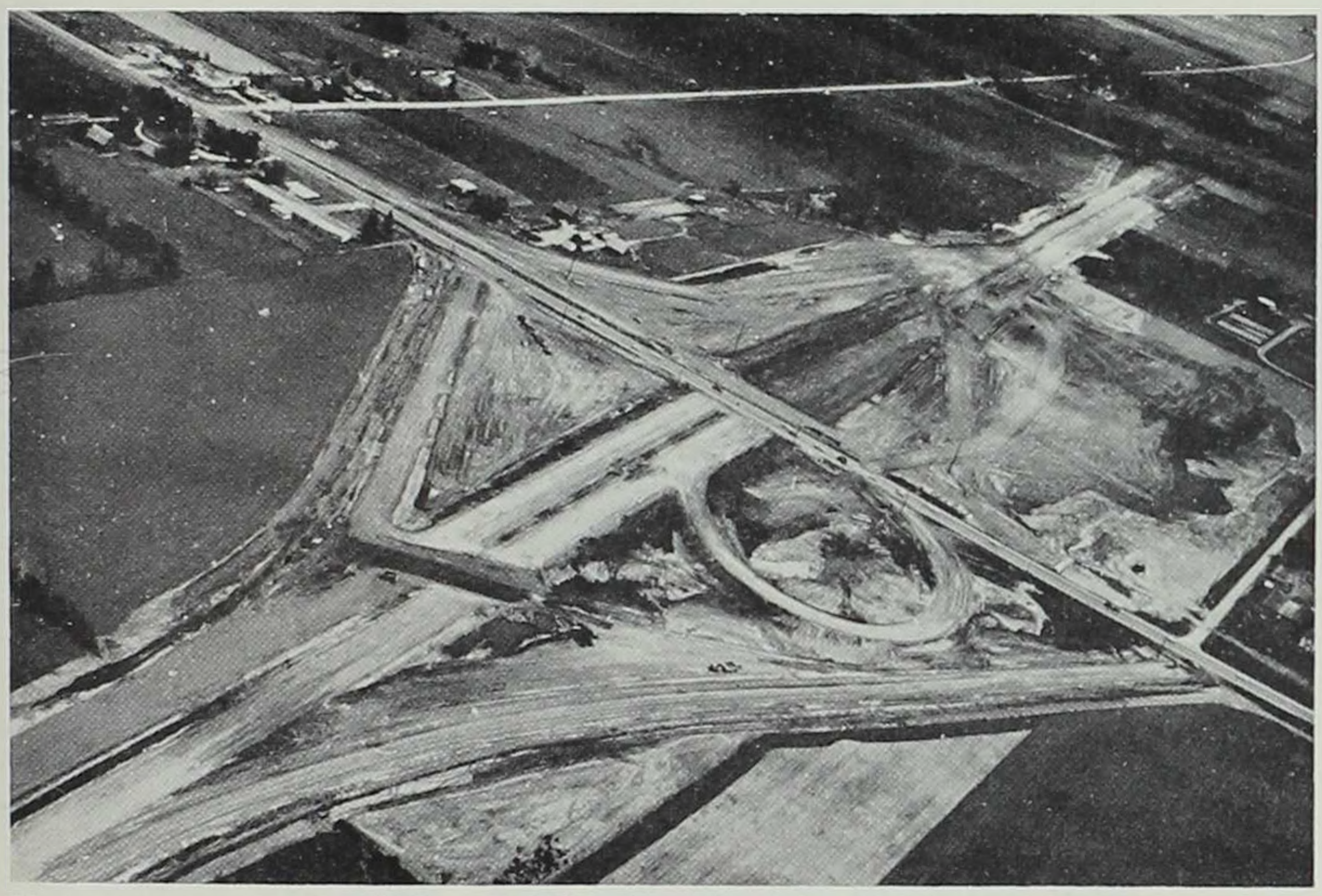
U.S. Highway 30 after its relocation to the north edge of Jefferson. Relief routes which touch the edge of a city rather than its main street are becoming more accepted by the people of Iowa.



Interstate 29 paralleling the Missouri River at the south edge of Sioux City shows that city's urban connection to the Iowa Interstate system.

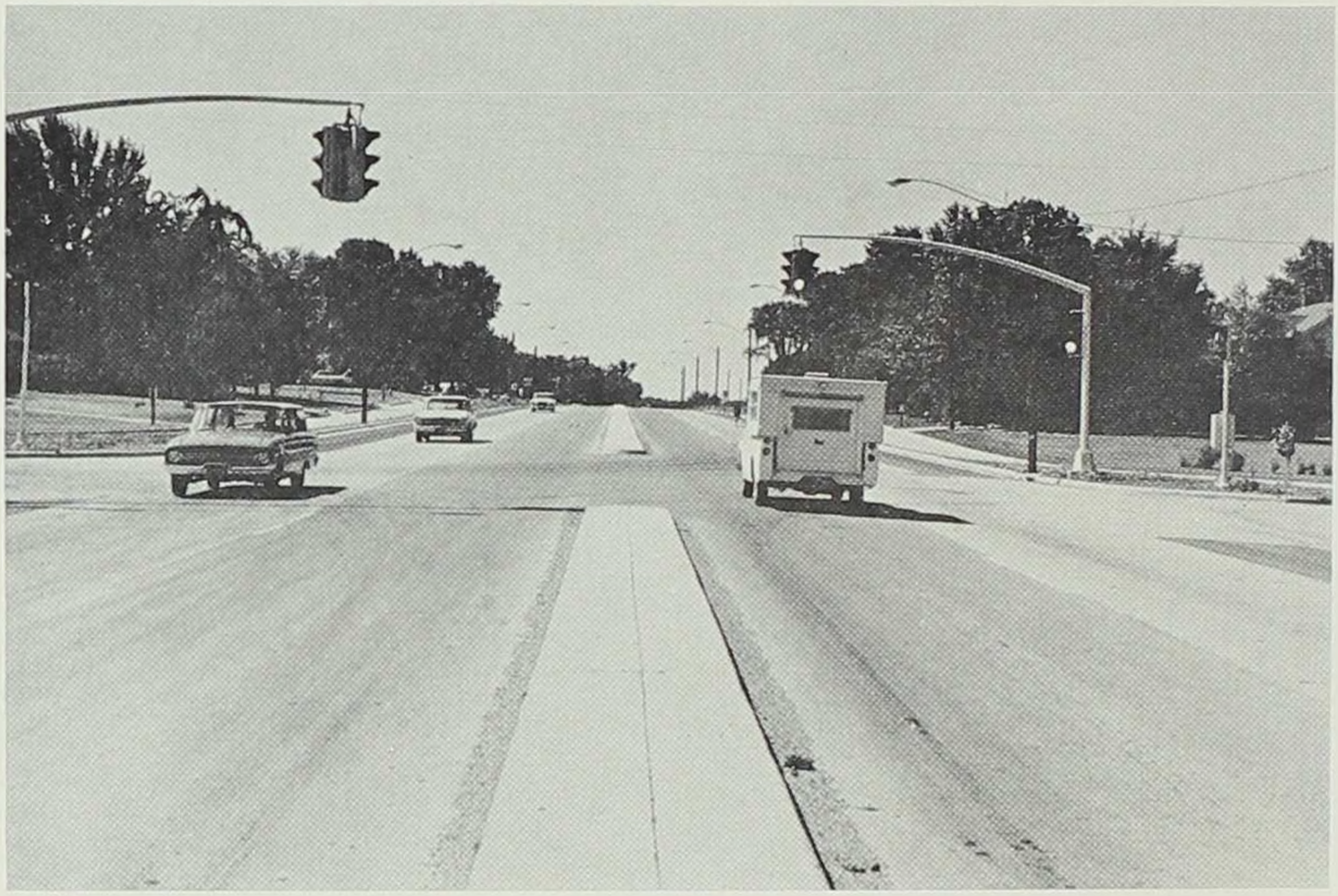


Aerial view showing a typical grade separation on Interstate 80 between Grinnell and Iowa City.



Under construction in 1963 and 1964 (completed by 1965), is this interchange between U.S. 69 and relocated U.S. 30 at the south edge of Ames.

The $57 million Des Moines Freeway is part of the Iowa Interstate system. It will not only provide a connecting link through Des Moines to the Interstate routes skirting the city, but will also relieve heavy congesting traffic on local streets.



This is a primary municipal extension at the north edge of Ottumwa on U.S. 63. This four-lane, divided thoroughfare, provides an attractive entrance to the city and replaces an old two-lane road.

Courtesy Iowa Good Roads Association

A powerful force in encouraging the construction of good highways is the Iowa Good Roads Association — R. M. "Dick" Hileman, executive secretary. The above shows a meeting of the Association with other interested groups in Des Moines.

in many eastern states. Various forms of asphalt pavement, however, first used in Iowa by Des Moines, Cedar Rapids, and Marion in 1901, have been used on a large scale on rural highways.

The difficulty with macadam and gravel roads was in obtaining materials. If macadam roads were the only answer to Iowa's road problem, one observer declared in 1893, "there is a large part of Iowa which can hope for no improvement for many years to come." Outside of a few areas in eastern Iowa where stone was more plentiful, the macadam road was not a factor in pulling the state out of the mud. The discussions of early Iowa good roads enthusiasts, however, indicated that macadam was considered the ideal surfaced road.

The automobile quickly changed that opinion. Before the advent of the motor vehicle the stone dust which served as the binder for the stones in the macadam road was ground in by the steel tires of the horse-drawn vehicles. The automobile, however, Anson Marston explained, "sucks out the binder and loosens the stones, and . . . tears the road to pieces rather than bind it together." Iowa, in fact, was fortunate that it could not build many miles of macadam road, as New York did, only to find it necessary to spend prohibitive amounts of money to maintain them under the pounding of motor traffic.

Iowa's gravel supply was better than its stone. Northern and eastern Iowa were blessed with

more gravel than the rest of the state, but by 1928 only seven counties had been found to have no source of gravel at all, although the supply in eleven others was nearing exhaustion by that date. Iowa's gravel, however, tended to be inferior to that of some other states, lacking the natural binder which made New Jersey's gravel roads famous. Nevertheless, around World War I many felt that gravel offered the best solution to Iowa's road problems. Gravel has proved practicable for surfacing side roads, but on main highways heavy maintenance costs have ruled out its use in favor of concrete, which has become the preferred type of surfacing.

The use of concrete pavement on a large scale is relatively recent. The nation's first such pavement was laid in Bellefontaine, Ohio, in 1893-1894. Not until 1904, however, did concrete paving begin to achieve any degree of acceptance. Its popularity soon grew with amazing rapidity. Where there were only 364,000 square yards of concrete pavement in the entire country in 1909, by 1914 the figure had increased to an estimated 19,200,000 square yards.

A half block paved at Le Mars in 1904 seems to have constituted the earliest use of concrete paving in Iowa. Not until 1909, when 6,000 square yards were laid in Mason City and Davenport, was any substantial quantity built. By 1912, concrete, which only three years before had ranked at the

bottom of the list, was far and away the most popular paving material in Iowa with a total of 316,279 square yards laid during the year.

The first rural concrete pavement was built in 1911 near Eddyville on a quarter mile stretch of deep sandy road which had long been a bottleneck for farmers. Businessmen of Eddyville contributed several hundred dollars to the project, farmers supplied the labor, and the Mahaska County Supervisors donated $500 worth of cement. A roadway fourteen feet in width was laid under plans drawn up by the State Highway Commission. At the prevailing rates the road cost $1.02 per square yard, about a third of what a similar paving job would cost at the present time. Forty years later this road was still in usable condition.

A mile of concrete was laid west of Mason City in 1913. By 1915 it extended into Mason City, and in 1917-1918 the eleven miles from Mason City to Clear Lake were completed, constituting Iowa's first interurban concrete highway. A dedication ceremony was held, with speeches at Mason City, followed by a parade to Clear Lake. At the halfway point a few shovelfuls of dirt were removed from the pavement, symbolizing the end of dirt road connections between the two towns.

The chief importance of the early paved roads, once their ability to withstand use was proved, was to stimulate a desire for more such pavement. In 1918 Linn County built a "seedling mile" of

pavement on the Lincoln Highway six miles east of Cedar Rapids, and the same distance southeast of Marion and northwest of Mount Vernon. This location was chosen because it was felt that it would be easier to obtain money to pave the road into one of the towns. The "seedling's" limited practical value was demonstrated when, in December, 1918, J. W. Eichinger, editor of the Highway Commission's *Service Bulletin*, asked County Engineer R. W. Gearhart if they could drive over and take some pictures. "Drive!" the engineer replied. "Man! We'd have a time getting through the mud with a team. We couldn't possibly get to the pavement with a car."

Once the practicability of concrete roads had been tested the question of their expense became the important one. By the 1920's the cost of the average concrete pavement built in Iowa was around $30,000 per mile, a figure which has since risen to $100,000. Bankruptcy, many asserted, would be the only result of an attempt to pave many miles of Iowa's roads.

Advocates of concrete paving were able to cite the maintenance costs of concrete which were lower than any other type of road and eventually would make paved roads the least expensive. Tests conducted by the Highway Commission, Iowa State College, and other engineering groups during the 1920's showed that it cost an average of 2.6 cents less per mile to operate a motor vehicle

on a paved road than on a dirt road. Other tests showed that tires wore out five times faster on gravel than on concrete. Such figures indicated, the Commission contended, "that vehicle operating expenditures by private individuals and not road-building costs paid from public funds are the big item of expense in Iowa's annual transportation bill." The savings in operating expenses gained from paving the more heavily traveled highways would be sufficient to pay the cost of that paving within a few short years, even if one disregarded the other savings such roads would bring. In short, good roads enthusiasts argued, Iowa couldn't afford not to build hard roads.

In addition to enormously stimulating the demand for surfaced roads, the automobile also provided a means of financing those roads. Before the automobile the only practical means of providing the money for the expensive macadam road improvements advocated by many good roads leaders was through increased taxes on the property abutting the road.

In the pre-automobile era there was some justification for treating road improvements as a matter of interest chiefly to the local residents. But with the coming of the automobile, Governor Hammill observed in 1925, a road was no longer "a neighborhood or town road, but a county, a city, a state, a national highway, used by everybody from everywhere. Under these changed conditions it is

simply common sense and common fairness to say that the people who use the roads and get most of the benefits from them, the motor vehicle owners, should pay a share of the cost." Through the automobile license fee and the gas tax the automobile provided two reasonably painless means of financing road improvements. By 1927 the last of the special property taxes assessed to help pay for primary road improvements was repealed.

The motor vehicle license tax was introduced in 1904 when a one-dollar registration fee was required for each vehicle. Later, in 1911, the Kulp bill increased the fee to fifteen dollars, and provided that 85 per cent of the proceeds would be distributed to the counties who were to use it for improving rural roads. In 1917, however, the necessity of matching federal highway funds compelled the legislature to order that an amount equal to Iowa's annual share of those funds be taken out of the motor vehicle license revenues.

In 1919 the licensing regulations were revised to make the fees correspond more closely to the price and weight of vehicles. The owner of a $6,400 Pierce-Arrow now paid a fee of $82.40, while the owner of a $525 Ford paid only $12. This revised tax was expected to yield as much as six million dollars a year, and Highway Commission officials hopefully declared that this would pay for most of the hard-surfaced roads in the state in the coming years. Actually, by 1921 the

motor vehicle license revenue had risen to $7,719,-127, a sum which contrasted remarkably with the $65,608 raised in 1910, yet was less than a third of the total income from road taxes. The remaining two-thirds was supplied chiefly by county and township property taxes.

In its annual report for 1922 the State Highway Commission recommended that a tax be levied on gasoline for highway construction and maintenance purposes. Eighteen states at this time had such a tax with ten placing the money in a general state road fund. The legislature in 1923 authorized a two-cent tax on every gallon of gasoline or other petroleum products suitable for generating power, with the exception of kerosene. At the same time county and township road taxes were to be abolished. Governor Nate Kendall vetoed the measure, calling the levy a "plain and palpable sales tax." Despite the ending of other road taxes, he felt a gas tax was too great a burden for the people of the state to bear. The bill's most serious defect, however, was that it made no provision for exempting those who used gasoline for heating purposes or for generating light and power.

Kendall's successor, John Hammill, and the Good Roads Association renewed the fight for a gas tax in 1925. "Under the present law," the latter group argued, "the man who drives ten thousand miles per year, pays no more into the road funds than the man who drives a similar vehicle

5,000 miles per year, yet he gets twice the service and does twice the damage to the roads." Furthermore, the gas tax was the only way in which the increasingly numerous out-of-state motorists could be made to pay for the use of Iowa's roads. The legislature again passed a two-cent gas tax, but provided refunds on all gasoline used for purposes other than moving vehicles on the roads. Governor Hammill had requested a three-cent tax, half of which would go into the primary road fund and half for secondary roads. The legislature, however, divided its two-cent tax equally among the primary, county, and township roads. Two years later the General Assembly increased the tax to three cents, the additional cent going entirely into the primary road fund.

Total receipts in the primary road fund during 1928 were $14,604,521. By itself, this sum could not build paved roads at the rate desired by the majority of the people in the state. This raised a fundamental question: should Iowa's roads be built only as fast as the revenue permitted, or should construction be accelerated with bonds.

As early as 1894 Governor Frank D. Jackson advocated the pay-as-you-go plan of road construction. "The burden of expense in a single year ought not and need not be a heavy one," he declared. "Each succeeding generation of people, at no burdensome expense to themselves, can leave to their successors a few miles of permanent roads as

a just and proper legacy." The opponents of this plan have always contended that it is much too slow and costly because of the economic losses inflicted by poor roads.

In the 1880's and 1890's Edward H. Thayer and Samuel D. Pryce favored road bonds as the best method of building surfaced roads. "To do this," Thayer admitted, "a great many people will have to conquer their prejudices and listen to a kind of reason and argument that they turn from now with a solemn shake of the head and the exclamation 'no bonds if you please, and no debt for road building.'" But why not? Thayer inquired. Business firms and farmers were continually borrowing money to make needed improvements, while bonds had been issued to finance public works. "Debt has made America what it is," Thayer argued. "The business of civilization is transacted on the credit system."

The theory behind road bonds is that by anticipating income and building good roads quickly with the funds obtained from the sale of bonds the saving in decreased maintenance costs plus the economic benefits which improved roads will bestow upon those who use them will be more than sufficient to pay the principal and interest on the loan. Improved roads, it is further contended, will benefit future generations, as well as the present, and thus both should pay their share of the cost.

As most states began adopting road bond plans

the demand for similar action grew in Iowa. In 1912 the Good Roads Association recommended "that our coming legislature test the sentiment of our people by submitting at the next general election the question of issuing bonds for road improvements." Until the mid-1920's most of the discussion centered around permitting the counties to sell bonds, although a $25,000,000 state bond issue had been strongly advocated by Harvey Ingham in the columns of the Des Moines *Register and Leader* in 1912.

In 1914 the Republican party gave guarded support to bonds when its platform recommended "that our road laws should be so further amended as to permit the several counties to finance public road improvements in a similar way as court, school houses and other public works are financed." The following year Governor George W. Clarke, noting the support which had arisen for road bonds, expressed his approval and recommended legislative action. In addition, he appointed a commission, headed by D. W. Norris, Jr., Marshalltown editor, to prepare recommendations as to the legislation needed to build permanent roads. Early in 1916 the commission reported that it favored "the issuance of county bonds . . . so as to build a road that will not wash away at every rain." It believed that "the people of Iowa can be trusted, at least with their own money."

Road bonds were a major issue in the heated

political campaign of 1916. E. T. Meredith, who had been a member of Clarke's special commission, was the Democratic candidate for governor and received the support of such normally Republican papers as the Des Moines *Register* partly because of his support of road bonds. On the other hand, William L. Harding, the Republican nominee, was widely referred to as the "mud roads" candidate because of his failure to support bonds. The bond forces were led by the Greater Iowa Association together with such groups as the Greater Des Moines Committee and the Iowa Bankers Association. Opponents asserted that most members of these "self-appointed committees and associations . . . do not pay any road tax, and that the burden of paying for these bonds will be placed upon the farmers of Iowa." Harding declared that the voters were asked to approve "long-time indebtedness . . . for extensive work in experimental road building."

Actually, bond supporters contended, all they desired was that the voters in each county be permitted to express their opinion on whether they should adopt a method successfully used elsewhere to build roads. "Is there anybody anywhere that has not been benefited or who has not profited by the anticipation of revenues by the great business enterprises of the country?" Governor Clarke asked. "Why fear to apply the principle here, applied everywhere else? . . . If there

is nothing compulsory about it what can be the objection?"

According to Harding, however, his victory meant that "the voice of the people" had spoken in "no uncertain tone" against the issuance of bonds, "and for making our road improvements out of funds previously raised by normal taxation, and in such manner and to such extent as should be determined by those who must furnish the money to pay for them."

The sale of millions of dollars of Liberty bonds in the state during World War I changed the minds of many people, who agreed with the Rev. A. H. Cooke of Des Moines that "it ought to be as easy to issue bonds for good roads as it was for war." At a conference in January, 1919, called by the Greater Iowa Association in Des Moines, representatives of the Farm Bureau Federation, Federation of Women's Clubs, Bankers Association, Manufacturers Association, League of Commercial Clubs, organized labor, Ministerial Association, Retail Clothiers Association, United Commercial Travelers, and other groups supported county road bonds. As a result, the primary road law authorized counties to issue bonds to speed the construction of hard-surfaced primary roads. The principal would be paid out of the county's share of the primary road fund, the interest by a special county property tax.

The legislation of 1919 marked the beginning of

the great construction program to get Iowa's main highways out of the mud. Fred R. White called it "the biggest engineering undertaking this country has attempted for some time." From 1913 to 1919 Iowa had made greater progress than probably any other state in the construction of permanent concrete bridges and culverts. In addition, although Iowa was far behind its neighbors in the amount of paving laid, the work of building the roads to permanent grade, which the Highway Commission insisted must precede any surfacing, advanced at a much greater pace. Thomas H. MacDonald declared in 1917 that Iowa "may be behind just yet in surfacing but when she starts, she will be in shape to make exceptional strides."

During the first half of the 1920's the number of ungraded miles of primary road was reduced from nearly 5,000 in 1919 to less than 1,500 by 1926. The increase in paved mileage, however, was disappointing. From a start of 25 miles of pavement in 1919 only about a tenth of the primary road system had been paved by 1926. In 1919 and 1920 the delay was attributable to shortages of material and manpower as a result of unsettled post-war economic conditions. After that the difficulty was a shortage of money.

The county bonding plan of 1919 failed to produce the funds anticipated. After an initial burst of activity in 1919 stirred up by Joe L. Long of the Greater Iowa Association, which saw thirteen

counties authorize a total of $18,475,000 in bond issues, no counties voted in favor of bonds until 1926. By 1925 primary road funds had dropped to a point where construction would have to be cut by two-thirds unless additional funds were provided. If this was not done, Governor Hammill declared, "few men now past their majority will live to see a connected system of highways covering this state." Furthermore, most of the work which had been accomplished was not spread evenly over the state. By 1926, one-fourth of the counties, in the northern part of Iowa where conditions were most favorable, had surfaced all their primary roads, but in 60 per cent of the counties no surfacing had been accomplished.

Several actions were taken to meet this situation. The two-cent gas tax was introduced, but the one-third allotted to the primary road fund amounted to only $1,575,000 in 1926. The Highway Commission in 1926 announced a three-year stopgap program to provide gravel surfaces for 2,700 miles of the primary road system. Although it admitted that later much of the mileage would have to be re-surfaced with concrete its program was a means of getting Iowa out of the mud as soon as possible.

In addition, there was renewed bond activity. With Johnson County setting the example, vigorous campaigns by local good roads groups resulted in twelve counties voting in favor of bond issues

VOTE YES
MARCH 16

You are now paying in auto license fees and gas tax enough to get paved roads; but are still pulling through mud.

Other Counties In The State

are getting about 20% of your money to improve their roads. Here is a plan to beat them to it.

VOTE YES
MARCH 16

A million dollar bond issue will enable you to anticipate your license fees and gas tax over a period of 19 years and in the meantime you can

RIDE ON A PAVED PRIMARY ROAD

Enjoy Life While You Live.

Courtesy W. J. Smith

A poster which helped sell Wapello County on the desirability of authorizing primary road bonds in 1926.

during 1926. In 1927, the Shaff Act, by assuring counties that all obligations arising from primary road bond issues would be paid out of the primary road fund, greatly encouraged further bond issues. As a result, 33 counties authorized bonds during 1927, bringing the total amount approved since 1919 to $63,685,657.

Meanwhile, support for a state bond issue had grown. Groups like the Good Roads Association argued that road development with county bond issues resulted in disorganized, patchwork construction. A few counties that refused to approve road bonds could block the completion of hard-surfaced roads across the state or between important cities. Only through a state bond issue could a state-wide network of connected modern highways be achieved. Even after the Shaff Act gave the Highway Commission authority to use the primary road fund wherever it wished, the Commission felt obligated to use funds from primary road bonds in the counties which had voted for them.

By 1928 the demand for a state bond issue was so great that Governor Hammill called a special session of the legislature in March. Although he had earlier expressed disapproval of state road bonds, he now strongly supported them. The legislature submitted to the voters in the general election of November, 1928, a $100,000,000 state bond proposal. No more county bonds would be sold, and those already issued would be called in

and replaced by 20-year state bonds. Since no more than $100,000,000 in bonds could be outstanding at any time, this meant, the proponents of the plan declared, that the state's bonded indebtedness would be increased only about $34,000,000 after the county bonds had been absorbed. The bonds were to be redeemed from the motor vehicle license fees and the gas tax, which, at the 1928 levels, would provide ample funds to pay for the debt and maintenance of the completed system.

With the money from the state bond issue the primary road system would consist of nearly 5,000 miles of pavement and 1,700 of gravel by 1934, ten years sooner, it was contended, than with county bonds. The Farm Bureau Federation objected that "the state will have to pay as interest . . . the staggering total of $66,000,000 for which it receives nothing except that the completion of the program is advanced eight or ten years." John F. D. Aue, president of the Good Roads Association, retorted that this was precisely the point of the bond issue. By speeding up the completion of the primary road system, Aue maintained, reduced operating expenses on paved roads would save drivers of motor vehicles $14,000,000 more than the interest on the bonds.

The bond proposal was approved by a 2 to 1 majority in November, 1928, but the following March it was declared unconstitutional. The legislature had provided that the bond act would not

be operative until tested in the courts. The Iowa Supreme Court ruled that the provision that the last bond would not be retired until 26 years after the first had been issued violated the constitutional requirement that state debts must be retired within 20 years. Furthermore, the attempt to pledge license fees and the gas tax during the life of the bonds was ineffective since "the constitution confers upon the legislature no mortgaging power over future resources, other than the proceeds of a direct tax."

The decision did not prove to be as serious a setback to the primary road program as was at first feared. An attempt was made to amend the constitution to make state bonds possible, but, in addition, the legal limit of a county's bonded indebtedness was raised. This stimulated 18 counties which had already issued bonds to vote additional bonds totaling $12,200,000 during 1929, while 18 others voted new issues totaling $21,080,000. Thus, over $33,000,000 was authorized in 1929, which was virtually what the state could have raised had it been permitted to go ahead with its bonding plans. Eventually every county except Louisa voted for bonds, with a total of $118,186,000 being obtained by this means from 1919 to the end of the 1930's. By November 1, 1950, all bonds had been retired.

The increased funds made available after 1926 quickly accelerated the paving of primary roads.

In both 1928 and 1929 approximately 700 miles of pavement were laid, more than had existed in the entire system in 1926. The year 1930, however, was the peak year of construction in the entire history of Iowa's roads. A thousand miles of concrete were laid, with primary road construction costs for the year reaching $42,600,000. For the first time it became possible to travel from Des Moines to all ninety-nine county seats on surfaced roads. Whereas three years earlier only three roads across the state had been completely surfaced, by the end of 1930 seven east-west and two north-south surfaced highways spanned the state.

The exhaustion of the road bond funds and the effects of the depression forced a sharp reduction in work on the primary roads following 1931. Despite this, by 1934 the state was within 690 miles of the goal set by the defunct state bond program. An additional 324 miles had been blacktopped, a method of surfacing cheap to lay but expensive to maintain, first introduced in 1932. In large, bold type the Highway Commission proudly declared on its 1931 primary road map: "Motorist, Get This, Once for All — IOWA IS NO LONGER A MUD ROAD STATE!"

GEORGE S. MAY