

Chapter Seven

Transportation Policy and Operational Changes in the 1920s

Introduction

There were contrasting economic and transportation trends in the 1920s. Industrial prosperity was partially offset by a depressed agricultural economy resulting from wartime over-expansion. Non-regulated motor and air operations expanded at a rapid pace presenting challenges to the railroads for freight, passenger, mail and express business. On the horizon, but not yet a formidable competitor, were the oil and products pipelines. Federal and state legislation changed railroad policies and provided increased support for improved highways, aviation facilities and river development. National prosperity enabled the railroads to improve properties and equipment. Interurbans shifted to freight traffic and city street railways started on the slow decline toward obscurity. Increased motor vehicle ownership and operation renewed demands for hard-surfaced roads, from which emerged the twin problems of planning and financing highways, possibly the most important transportation issues debated in the state during this decade.

Rail-Highway Competition

Although maladjustments growing out of World War I had not been fully overcome, the nation was prosperous during the 1920s. Construction of public and private works was booming, exports expanding and business failures declining. Steam railroads in 1921 experienced a remarkable recovery from early postwar gloom, but their net operating revenues were only three percent on investment, not enough to cover fixed charges. The economic expansion was paced by the automobile industry which recorded substantial production, improved the vehicles and reduced prices. By introducing installment sales and strengthening the used-car market, the industry increased sales from 1.6 million units in 1921 to 5.3 million units in 1929, valued at \$3.4 billion and produced by a work force of 471,000 employees.

Truck competition was used by some railroad executives as a reason for failure to make a better financial showing—competition they claimed was “subsidized” by relatively free use of highways paid for, in part, by railroad taxes. Their arguments were given some recognition in President Hardings’ address

to Congress in 1922, when he stated that motor haulage would be wasteful if assessed its proper share of highway costs. But realists in the railroad industry knew that improved highways and motor vehicles would become a permanent segment in the nation’s transportation structure and railroads would have to accommodate them. Some suggested that low volume unprofitable branch lines could be replaced by motor trucks to assist in the local collection and delivery of long-haul carload freight.

American railroads had been accustomed to intense intra-industry competition, but now they faced inter-industry rivalry. One notable result was the dramatic decline in their passenger traffic. Before 1920, passenger miles had increased an average of five percent per year, but between 1921 and 1929 ridership fell by two percent annually. Freight tonnage increased in every year since 1890, but the rate of increase slowed through highway competition. Agricultural tonnage was particularly vulnerable to diversion, and losses occurred in less-than-carload, agricultural products and animals and products, three categories which represented 15 percent of total traffic and 30 percent of freight revenues. Inroads by trucks on railroad carriage of mine, forest and manufactured products had not yet developed.

For the electric interurbans and street railways, motor vehicles were a disastrous and eventually fatal competitor. Few states in the early 1920s regulated motor buses as common carriers so that bus companies sprang up by the hundreds and competed for passenger business. In the cities, unregulated “jitneys” operated alongside the street railways. These vehicles were in violation of traction company charters, however, and were outlawed after a relatively short period.

Agricultural Distress in the Postwar Years

The demands of World War I had enormously stimulated production of farm commodities. Loans were made by the federal government to allied nations for purchases of food and war supplies—part of the “war debts” about which there were endless political debates. The slogan “Food Will Win the War” was an incentive for farmers to produce to the limit, and bankers urged them to buy more land with borrowed money to meet this objective. It seemed that no one could lose by making the down payment, mortgaging the balance and discharging the debt in a few years. Wheat sold for \$2.30 to \$3.60 and corn from \$2.00 to \$3.00 per bushel. At the close of the war, President

Wilson ordered an immediate return to the free enterprise system although price supports and foreign loans continued through 1919. Despite warnings of possible disaster, farmers were surprised when both were discontinued in the spring of 1920.

Agricultural commodities were priced too high for foreign purchases when loans stopped. While exports continued at the same or higher levels, they did so at greatly reduced prices. Farm income dropped about 50 percent before 1920, and just when the farmer needed credit to carry him through this difficult period, the Federal Reserve Board raised the discount rate, resulting in tight money and reducing the possibility of renewing mortgages. Adding to their discomfort was the large increase in freight rates granted in 1920. As a result, farm bankruptcy rose on a national level from 5.5 percent of the farm community in 1914 to 14.4 percent in the early postwar years.

From 200 in September 1920, the farm price index fell to 120 in December and reached 90 by the end of the year. In terms of income from leading commodities, grain declined 53 percent; hogs, 39 percent; and cattle, 30 percent. The relatively high level of other prices intensified the distress. Henry C. Wallace summarized the imbalance confronting the farmer: "In the Corn Belt, the value of an acre of corn in 1921 was 20 percent under the prewar value, whereas monthly wages for farm labor were 14 percent higher; land values were 107 percent higher; implements, 66 percent higher and freight rates about 60 percent higher."¹ During the last half of the decade, farm prices recovered somewhat but in no way proportionate to the general price level. At the peak of the industrial boom in 1929, the index was 146 as contrasted to 220 in 1919, and purchasing power was still five points below prewar averages.

While agricultural distress was admittedly a major problem to Iowa's economy, some attention should be given to the remarkable growth in the industrial sector. In 1860, the ratio between the value of farm crops and that of manufacturing was two to one. By 1920, the ratio was one to one and three-tenths. In 1924, farm crops increased in value 19 times over that of 1860, but during the same period the increase in the value of manufactured products was 49 fold. Histories of the state dealt generously with politics, communications, and civic problems but maintained an almost complete silence with respect to industrial growth. State census reports gave industry slight emphasis as compared with population changes and

farm statistics.

The Transportation Act of 1920

Efforts of individual states to develop and control transportation systems in most instances were subjected to policies initiated in the nation's capital. The early 1920s was a time to pause and reflect upon progress made in providing transportation services to the nation with the war experiences of the railroads a vivid memory. The railroads, still the dominant carrier, had come through a difficult period between 1917 to 1920. Were internal management deficiencies or regulatory inadequacies and defects or both the cause of the failure to adjust rapidly to wartime conditions? If in periods of emergency their private operational performance was in question, then their future effectiveness was a matter of public concern. Not only were their problems inherent to the industry, but government supported modes posed a serious threat to their position.

The Act of 1920 was a landmark piece of legislation. It represented an attempt to repair regulatory defects and brought about changes in the emphasis on national transportation policy. The railroads were transferred from federal control back to private operation, but only after serious public debate showed that under a different political climate, nationalization might have been made permanent. The act did more than refine previous legislation. It endeavored to restructure the railroads into a national system. Its provisions were variously described as "radically constructive" or "shifting from a negative to a positive regulatory philosophy" and were hailed as the solution to the railroad problem.² Rates,

¹ U.S. Department of Agriculture, *Yearbook*, 1921, pp. 5-7; *Congressional Joint Committee of Agricultural Inquiry, Greater Iowa*, Report 28 (December 1920); p. 2; Henry C. Wallace, *Our Debt and Duty to the Farmer*, New York: The Century Co., 1925, p. 65.

² 41 Statutes at Large, part 1, pp. 466-497 (1920). Senator Albert B. Cummins of Iowa, chairman of the Committee on Interstate Commerce, was joint author of the Act. Other Iowans prominently involved were Clifford Throne of Washington, an attorney for shippers, and Glen Plumb of Clay, who represented labor. Details of the Act are found in D. Phillip Locklin, *Economics of Transportation*, 7th edition, Homewood, Ill.: Richard D. Irwin, Inc., 1972, Chapter 11; Truman Bigham, *Transportation Principles and Problems*, New York: McGraw-Hill Book Co., 1946, pp. 173-181; Edgar J. Rich, "The Transportation Act of 1920," *American Economic Review* (September 1920): pp. 507-527.

consolidations, securities control, services, abandonments and labor disputes were dealt with in its most important sections.

“The Rule of Rate Making” (Section 20), was designed to allow the carriers a “fair return” on invested capital, assuming operations were conducted in an honest and efficient manner. The movement to protect earnings grew out of the impaired credit position facing the railroads after the war. The concept required determination of what constituted “fair return” and the amount to be used as a valuation base for rate-making purposes. Congress decided that a uniform “fair return” was to be fixed at five to five and one-half percent of valuation with no guarantee by the federal government. The valuation process had been underway since 1913 and was established at an aggregate figure of \$18.9 billion, some \$1.1 billion below book value estimates. To assure the carriers of this level of income, the ICC allowed rate increases of 25 percent in the South, 35 percent in the West and 40 percent in the East—the highest rate advances in history. The increases were to be applied as a whole or in rate groups, not on a specific railroad-to-railroad basis.

Impact on Shippers and the States

The first indication of discontent came from grain and livestock shippers. A petition for reduced rates was approved for hay and grain but denied on livestock traffic. However, the experiment of reducing rates on limited classes of products did not prove successful. As the price level of the nation declined, rates remained rigid, and it was the contention of shippers that the rate level was a barrier to business recovery and a return to normal traffic patterns. Their arguments convinced the ICC to allow reductions in 1922 amounting to 12.5 percent in the South, five percent in the West and 14 percent in the East.

Important to the states were provisions relating to intrastate rates. States, including Iowa, had rate structures on passenger and freight services that were attacked on grounds of discrimination against out-of-state points. The 1920 legislation amended Section 13 by preventing any state from setting the level of intrastate rates so low as to discriminate against interstate commerce. Further, it provided that the ICC might if necessary raise intrastate rates to the level of interstate rates. In essence, control over intrastate rates by state commissions was to be limited.

Other Provisions of the 1920 Railroad Legislation

To restructure the railroads into a viable, efficient system, Congress proposed massive railroad consolidations which were to result in a modified number of systems, 19 in all, to be organized voluntarily. Mergers could not be required but could be rejected if they did not conform to the overall plan. The proposal and final plan were doomed to failure since railroad managements would not suppress their competitive ambitions and cooperate intelligently to meet the highest standards of public welfare. Twenty years later, a Senate investigating committee pointed out that “the consolidation provisions of the Transportation Act (1920) presupposed a higher sense of public responsibility on the part of the railroads and railroad investors than was warranted by the experience.”³

The ICC was given control over issuance of securities, hopefully to prevent further overcapitalization; authority to regulate the use of equipment covering car and terminal service and abandonment of facilities, all designed to promote a more effective use of rolling stock. The fact that controversies over wages and working conditions of employees were pending when federal control ended prompted Congress to include methods for settling these disputes. A Railroad Labor Board was established as a permanent board of arbitration without binding authority, provisions which were superceded by the Railway Labor Act of 1926. To the maximum rate power granted in 1906, Congress gave the ICC control over the minimum rate in order to prevent rate wars.

The Hoch-Smith Resolution

To relieve the agricultural depression through transportation legislation, the “Hoch-Smith” Resolution sponsored by the “farm bloc” was enacted by Congress in 1925. It required that in adjusting freight rates the ICC consider “the conditions which at any given time prevail over our several industries . . . insofar as it is legally possible to do so to the end that commodities may freely move.” On products of agriculture, including livestock, the ICC was directed

³ *Report of the Committee on Interstate Commerce*, 74th Congress, 1st session, part II, 1940, p. 524.

to establish "the lowest possible lawful rates comparable to the maintenance of adequate transportation service."⁴ In 1930, the U. S. Supreme Court in *Ann Arbor Railroad v. U. S.* stated that "the requirement of the lowest possible lawful rates on products of agriculture is more in the nature of an object deemed desirable than a rule intended to control rate making." Although the decision was commonly considered to have nullified the effect of the resolution, it was still law and used in a number of cases to justify comparatively low rates on agricultural products.

Federal Highway and Air Legislation

The Federal Aid Highway Act of 1921 marked the beginning of a sustained highway program. By authorizing appropriations for several years in advance, state legislators, most of whom met biannually, were better able to plan matching funds and budgets. Uncertainty in federal-aid programs had existed in prior years and was now removed. Falling wage and price levels for road construction, combined with the development of higher managerial efficiency in highway departments and construction firms, spurred highway building to record mileages in 1922. This was some three and one-half times as much as had been accomplished since the start of the 1916 federal legislation. The record was made possible by building the roads in stages, first in low type work such as grading and draining earth, clay and gravel roads, and delaying expensive pavement until a later date, depending upon traffic volumes and finances. Building by stage construction was by project agreement or contract with the federal share paid upon completion of the first stage; the remainder deferred until the final stage was finished. Increasing traffic resulted in upgrading the initial construction with better surfaces, but the second-stage projects did not become an appreciable part of the total federal-aid program until about 1926.

Stage construction was viewed as an appropriate program for highway development, but it failed to consider the enormous increase in vehicular traffic during the 1920s or the rapid evolution in highway engineering. The years between the first and second stages witnessed changes in state standards resulting in the abandonment of some of the original construction but avoiding premature investment in high-type work which might later have proven inadequate. The stage construction policy accomplished its objective by giving the poorest

sections of the federal-aid system a modest improvement as soon as possible. In his annual report of 1926, Thomas MacDonald stated: "An exact similar policy was followed by the builders of the railroads, whose first objective was to get the traffic through, leaving until a later date the perfecting processes of ballasting, banking of curves, etc. It is the only satisfactory method of dealing with conditions in many of the southern, midwestern and western states in which there are thousands of miles of road still entirely devoid of any improvement whatever."⁵

To the mid-twenties, federal and state legislation had emphasized surface transportation. However, pioneering in airship and aircraft technology and construction, the adventurous spirit and challenge of individuals to fly these machines had slowly advanced this new form of transportation, and aviation possibilities began to attract public attention. By 1918, the United States had built about 17,000 planes and trained approximately 10,000 men to fly them. These were the postwar aviators who barnstormed across the nation, flew the first flights across the seas, carried sightseeing passengers, took aerial photographs and gave instruction in flying. Surplus planes and pilots following World War I were useful in initiating air mail service, an experiment in 1918, established on transcontinental routes in 1919, and expanded into 24-hour schedules in 1924. In 1925, the Kelly Air Mail Act authorized the Post Office Department to contract with private companies for air mail transportation. The first contracts were made in 1926, and in 1927 the federal government ceased operation of air mail routes. Except for a three-month period in 1934, air mail has been carried by private companies ever since. In 1926, the Air Commerce Act was passed by Congress. It was primarily promotional in character, dealing only with safety regulations and changes in the rates of compensation for air mail carriage.

⁴ 143 Statutes at Large, 801 (1925).

⁵ Bureau of Public Roads, *Annual Report*, 1926, p. 2.

Railroad Operations

The Railroads Adjust to Postwar Conditions

Railroads experienced falling revenues and income during the federal control period. Adjustments in employee wages and working conditions and inflation in prices of materials and supplies greatly increased operating expenses without compensating rate increases. Following termination of federal control, the carriers filed claims against the U. S. Railroad Administration for under-maintenance, deficiencies in materials and supplies turned back to them as compared to inventories taken over, for value of properties retired during the control period, etc. Not all roads were as successful as the CNW which received a \$15.5 million settlement in 1921, one of the few positive notes in their annual report for that year. Business increased in 1922 but was tempered by a strike of railroad shopmen on July 1. The coal industry was also having labor problems, affecting fuel supplies and prices.

Probably the situation was best expressed by Hale Holden, president of the CB&Q, when in 1923 he discussed the "recurring economic disturbances" that for three years had affected the entire industry. He pointed to the "sharp and shifting changes in the volumes of traffic, the general rate reductions of 1922, labor strikes and the continued high cost of materials, all of which contributed to a confused and variable set of conditions which make the problems of management perhaps more difficult than ever before in the history of the railroads."⁶

Overton observed that there were three strategies that the industry could follow in attempting to solve, or partially solve, the internal and external problems and return to normal service patterns. The first was improvement of the physical plant to overcome the under-maintenance of the war years and enable the industry to handle any future emergencies without further federal interference. A second was to coordinate freight car supply and demand to improve equipment utilization, freight service and reduction of car shortages. The third involved rationalization of plant and equipment through combinations-mergers, stock control or lease-to bring about economies of consolidation. All three received serious attention by the railroads.

Huge expenditures were made for plant and equipment. New stations, terminals, yards and bridges were built or remodeled; locomotive round-houses, grain elevators, shops, coal, gas and water treatment facilities and heavier rails were added to the

properties. The IC alone planned a \$250 million modernization program over the 1920s. Thirty-two additional tracks at the Proviso (Chicago) classification yard of the CNW made it one of the largest freight terminals in the world. The CM&StP introduced roller bearing cars, practically eliminating hot boxes at slow speeds. New and more powerful locomotives resulted in a spectacular rise in tractive power and more efficiency in passenger and freight service. To combat highway competition, gasoline or gasoline-electric equipment was operated on branch lines by the CB&Q, CGW and M&StL Railways. These innovations reduced operating costs by substituting three-man crews for the five-man crews of steam trains. Of the approximately 5,000 new or rebuilt freight cars of the CNW, 1,000 were automobile carriers. On the M&STL, the shifting emphasis from passenger to freight service changed the name designation from the Albert Lea route to the Peoria Gateway Line.

To meet truck competition in the less-than-carload category, somewhat significant in animals and products traffic, train schedules were shortened between major cities. But highway rivalry was only one of the problems. In 1927, the ICC required railroads to establish joint rates with the barge line operating between Dubuque and the Twin Cities and the opening of the municipal barge terminal at Burlington in 1928 indicated the rising importance of river transportation. Inevitably, rail-highway coordination had to be seriously considered, so the CB&Q moved into the highway field in 1929, incorporating the Burlington Transportation Company in Illinois. Substituting buses for unprofitable branch line passenger service began in Illinois and Nebraska. The operations were not profitable but the losses were estimated to be offset by savings in the reduction of rail services on the specific routes.

Railroad Passenger Services and Fares

George W. Hilton observed that railroads probably provided 95 percent of intercity travel during the mid-1880s. Electric interurbans and street railways, while not successful in the long run, slowed the rate of

⁶ Chicago Burlington & Quincy Railroad, *Annual Report*, 1922, p. 7.

increase in steam railroad passenger volume. Railroad passenger traffic peaked in 1920, when 1.2 billion passengers generated 47.3 billion passenger-miles. By 1929, approximately 483 million passengers or 38.1 percent of the 1920 volume had been lost to the automobile and bus. Deficits began to appear in 1930 and in three years, passengers and passenger-miles fell to about one-third of the 1920 levels.

Section 2077 of the Supplemental Code of Iowa (1913), stated that Class I railroads would be restricted to two cents compensation per mile for passengers. In 1920, the railroad commission authorized increases in the intrastate freight rates to correspond to those ordered in the general rate increase case but dismissed the carriers' request for higher passenger fares and surcharges on sleeping and parlor car service for lack of authority under the Iowa statutes. The fare at that time was three cents per mile, ordered by the Director General during the federal control period. The railroads petitioned the ICC for permission to continue these fares and charges rather than revert to the two cent fare in the Iowa Code.

A decision was handed down in 1921. Intrastate passenger fares in Illinois, Wisconsin and Minnesota were three cents and were found lower than those established for interstate travel, thus unduly preferring intrastate and unjustly discriminating against interstate commerce. These were ordered increased. The advantage of the lower Iowa intrastate fares was obvious when the Council Bluffs-Burlington charge of \$8.61 for 286 miles was compared to the Omaha-Burlington fare of \$10.64 for 290 miles. The ICC ordered the fare to be three and six-tenths cents per mile with a surcharge of 50 percent on pullman and parlor car service.

Merger Proposals

Mergers or combinations had been common in the railroad industry, but these had the objective of completing the individual railroad complex. However, the 1920 legislation encouraged consolidation designed to combine large and powerful railroads into giant regional or national systems. It seemed timely therefore for Hale Holden to dust off a plan originally proposed by James J. Hill to merge the CB&Q with its proprietary companies, the NP and GN railroads, into a new company to be known as the Great Northern Pacific Railroad. After prolonged public debate and hearings throughout the decade, the ICC in 1930 approved the merger of the two Northerns on

condition that the CB&Q be divorced from their control. The potential loss of this strategic railroad was not acceptable and the proposal was dropped.⁷

Empire building by mergers through stock control was also on the mind of Edward N. Brown of New York and his associates who controlled the Frisco, but his plan never proved practical. James Gannon, president of the CRI&P, had made considerable progress since 1920, aided by discovery of oil at El Dorado on the Arkansas lines and increased oil movements from Oklahoma and Texas. Charles Hayden was chairman of the executive and finance committees which set company policies geared to increasing net income to a level where dividends on common stock were possible. No matter that maintenance had to be deferred to meet this goal, it was, in the words of Hayes, "Dividends or Bust."⁸

Brown saw in the CRI&P the use of dividends to shore up his shaky financial position, so that in 1926, having purchased 183,000 shares of its stock, he claimed seats on the Board of Directors. Brown and Jerome Hinscham, a New York banker, were appointed to the executive committee and J. M. Kurn, president of the Frisco, was placed on the finance committee. The Brown group was in control and dreamed of merging the two roads. In 1927, the CRI&P common stock earned \$12.10 per share and distributed a dividend of five percent; in 1928, the earnings were \$12.81 and the dividend, six percent; and in 1929, a record-breaking year, earnings reached \$14.04 with a dividend of seven percent, which held through 1930 although earnings dropped to \$5.56 per share. The 1930 dividends were paid out of surplus.

⁷ Piersall v. Great Northern Railway Company, 161 U.S. 646 (1896). An attempt was made during the 1890's to merge the Great Northern and Northern Pacific. It was blocked by the U.S. Supreme Court as contrary to the laws of Minnesota, stating that public regulation would be a "feeble protection against the monopoly thus created if a combination was effective." The merger of the Burlington, Great Northern and Northern Pacific was finally approved in 1970 under the corporate title of the Burlington Northern Railroad.

⁸ William Edward Hayes, *Iron Road to Empire, The History of 100 Years of the Progress and Achievements of the Rock Island Lines*, New York: Simmons-Boardman, 1953, p. 211.

Thirty-two million dollars in 30-year bonds were issued for new equipment, extension of lines in Missouri, and realignment of track on the main line from Chicago to Kansas City. As a result, the total debt of the road in 1930 was a staggering \$380 million, carrying an annual interest cost of \$13.8 million. In the annual report for 1930, stockholders were assured that the properties were in excellent condition, adequate to handle the expected return to normal traffic, even though acknowledging that a reduction in gross revenue was possible. What the report did not mention was the acquisition of 25,000 shares of Frisco stock for \$1.7 million, also paid out of surplus. Brown paid an average of \$70 a share, and by the time the purchase was approved by the directors the price had dropped to \$46 and was still falling. At the end of 1930, the dream of merger had vanished and both roads were in unstable financial positions.

Bankruptcies

Two railroads went into bankruptcy during the 1920's. Financial reverses during and after the war, the agricultural depression, and an unfavorable economy in their territory resulted in a petition for receivership by the M&StL in 1923. The CM&StP had completed its expansion in Iowa but extended its lines into other areas. Since the early years of the century, the road planned to build to the Pacific Coast. The route required construction of 1,400 miles over five mountain ranges, a bold step indeed at that time. By 1909, freight and local passenger service had

been opened to Seattle and Tacoma and by 1911, through passenger trains were in operation. However, the heavy expenditures for construction and maintenance, the increased water competition when the Panama Canal was opened in 1914, and the depressed economic conditions in the Northwest forced the road into bankruptcy in 1925. In 1928, the railroad was reorganized under the name of Chicago, Milwaukee, St. Paul and Pacific (CMStP&P), the word "Pacific" added to the former corporate title.

Railroad Operations in Iowa

Following the transition to private ownership, Iowa railroads gradually returned to normal operations and showed continued growth during the decade. Three tables (Tables 7-1, 7-2, 7-3) using subjectively selected two-year intervals present a trend analysis. The first includes mileage operated and earnings; the second, revenue freight traffic in the major commodity classifications; and the third divides revenues into passenger and freight categories.

The decrease of 142 miles of road operated was the result of abandonment of 91 miles of branch lines on the CRI&P, M&STL and Muscatine, Burlington and Southern Railroads. The remaining 51 miles were due to line corrections and realignment of track. From a relatively low level in 1921, the first year of postwar private operation, net earnings and earnings per mile rose in each of the selected years. Operating ratios averaged 91 percent for 18 railroads reporting in 1921 and fell to 79 percent for 15 roads in 1929.

Table 7-1
Comparative Earnings and Operating Expenses of Railroads
Operating in Iowa, 1921-1929, for Selected Years

Year	Mileage ¹	Gross Earnings ² (Thousands)	Expenses ² (Thousands)	Net Earnings ² (Thousands)	Earnings Per Mile
1921	9,841	\$148,509	\$138,621	\$ 9,888	\$1,005
1923	9,827	153,216	131,621	21,627	2,201
1925	9,756	139,764	115,819	23,945	2,454
1927	9,744	141,779	116,617	25,162	2,582
1929	9,699	151,472	118,757	32,715	3,372

(Source: Iowa Railroad Commission, *Annual Report, 1930*, pp. 6-7.)

¹ Excluding trackage rights.

² Figures rounded to the nearest unit.

Table 7-2
Revenue Traffic of Railroads in Iowa in the Major Commodity
Classifications for Selected Years, 1923-1929

Commodity Classifications	1923		1925		1927		1929	
	Tons ¹	%	Tons^{1}	%	Tons^{1}	%	Tons^{1}	%
Products of Ag.	12,372	31	10,341	26	15,901	25	17,917	24
Animals & Prod.	4,376	11	4,286	11	5,775	09	6,496	09
Prod. of Mines	9,193	23	9,018	23	16,036	25	20,238	27
Prod. of Forests	2,561	06	2,474	06	3,655	06	3,826	05
Man. & Miscell.	9,346	24	11,069	29	19,422	31	23,136	31
Less-Carload	1,785	05	1,841	05	2,717	04	3,205	04
Totals	39,633	100	39,029	100	63,506	100	74,818	100

(Source: Iowa Railroad Commission, *Annual Reports* for Selected Years.)

¹ In thousands of tons of 2,000 pounds

Table 7-3
Passenger and Freight Revenues of Railroads Operating in
Iowa for Selected Years, 1921-1929

Year	Passenger Revenues (thousands)	Freight Revenues (thousands)	Net Operating Revenues ¹ (thousands)
1921	\$31,742 ²	\$105,103 ²	\$ 9,888 ²
1923	27,796	112,883	21,627
1925	23,601	104,476	23,945
1927	21,009	108,389	25,346
1929	18,045	119,212	32,699

(Source: Iowa Railroad Commission, *Annual Reports* for Selected Years.)

¹ Gross operating revenues minus gross operating expenses.

² Figures rounded to the nearest unit.

There was no commodity data in the Annual Report for 1921. Between 1923 and 1929, revenue tonnage increased by 88 percent with all classifications showing some increase. As a percentage of total tonnage, however, two categories showed little or no change; agricultural products and animals and products declined, whereas, mine and manufactured products increased percentagewise. The traffic gains in the latter group were not surprising when value added to manufacturing was considered, rising from

\$18.7 million in 1921 to \$32.8 million in 1929. Less-than-carload traffic was not seriously impaired by motor carriers at the end of the decade.

The table speaks for itself. Passenger revenues showed a declining trend throughout the decade, freight revenues fluctuated but rose significantly from 1921 to 1929, and net operating revenues provided a key to a relatively prosperous railroad situation.

Electric Interurbans

The interurbans reached their highest level of earnings in 1920, while operating 514 miles of single track. However, by the close of 1929, gross earnings had fallen by 30 percent and net earnings per mile by 70 percent with four fewer railways reporting to the commission. As contrasted to the 50 percent decline in passenger revenues, freight revenues rose by 40 percent. The operating ratio of 81 percent in 1921 increased to 90 percent in 1929. Both interurbans and street railways were affected by improvements in highways, paving of city streets and the increased use of motor vehicles. Throughout the twenties, line segments of the interurbans were abandoned as were routes on street railway systems. Motor buses were introduced, services curtailed and fares increased to meet the competition. No city was immune from the changing public response to the automobile age; they directed their efforts to preserve the street railway systems through reorganizations and operational techniques designed to reduce operating expenses.

The Motor Vehicle in Iowa

It was assumed that the number of motor vehicles had steadily increased year after year, but the extent of the increase was not generally known. In 1905 there were less than 1,000 vehicles in the state; a decade later the number reached 147,078. The percentage of increase declined but the numerical increase became larger. By 1920 there was one motor vehicle for every 5.5 persons and by 1925, one for every 3.6 persons, surpassed only by the state of California. The number of vehicles on farms was second only to Texas. Table 7-4 presents the total vehicle registrations between 1905 and 1927 together with the ratio between registrations and population.

Distance between towns in rural Iowa may have been a factor in the ratio of vehicles to population. In 1920, automobiles accounted for 90 percent of highway traffic and rose to 98.8 percent in 1926. In the latter year, 14.4 percent of travel was interstate, 29.6 percent was intercounty and 56 percent was on an intracounty basis. By 1927, automobiles were responsible for approximately 85 percent of total highway traffic in the state.

In addition to the expenditures for construction and maintenance, an important item in highway transportation costs is that of vehicular operation. With increased volume, savings in operation made possible by improved roads became an irrefutable argument for construction of all-weather roads. Table

7-5 shows how savings could accrue, using the Lincoln Highway as an example. Data was obtained by actual vehicle count. Fuel costs were estimated by tests conducted by the Engineering Experiment Station at Ames.

Table 7-4
Iowa Motor Vehicle Registrations

Year	Total Vehicles Registered	No. of Persons Per Motor Vehicle
1905	799	2,766
1910	10,422	215.4
1915	147,078	16.03
1920	437,378	5.50
1925	659,202	3.65
1926	718,013	3.37
1927	782,634	3.31

(Source: Charles H. Sandage, *The Motor Vehicle in Iowa*, Iowa City: Bureau of Business Research, February 1928, p. 4)

¹ Estimated

Estimates of economies resulting from motor vehicle operations on surfaced rather than earth roads did not consider cost of travel under unusual conditions over rough and slippery highways. Wear and tear on tires and chains, engine or car damage, loss of time or injuries to persons were not included. These items were under investigation to determine the life of automobiles on different types of roads. However, even with the data at hand, the thoughtful motorist needed little proof to convince him that bad roads had an appreciable impact upon the depreciation and maintenance of his vehicle.⁹

⁹ Further studies were published by Robley Winfrey, *Automobile Operating Cost and Mileage Studies*, Bulletin 106, Ames: Engineering Experiment Station, July 1931; and Ralph Moyer and Robley Winfrey, *Cost of Operating Rural Carrier Motor Vehicles on Pavement, Gravel and Earth*, Bulletin 143, Ames: Engineering Experiment Station, July 1939.

Table 7-5
Fuel and Maintenance Costs Alone Would Pave
Lincoln Highway in 15 Years
(East of Ames)

Daily Average Traffic	904 vehicles
Daily Average Tonnage	1,232 tons
Savings per ton-mile on Concrete over Gravel	0.38 cents
Daily Average Fuel Saving per mile	\$4.78
Savings per mile, per Year	\$1,746
Cost per mile of Maintaining Gravel, Average	\$803
Cost per mile of Maintaining Concrete, Average	\$89
Fuel Savings plus Maintenance Saving per mile, per Year, nets	\$2,460
Average Cost of Concrete in 1922	\$26,400
Average Interest on Investment per mile for term of Years	\$660
Fuel and Maintenance Saving less Interest Costs nets	\$1,800
Net Savings would pay for Road in	15 Years

(Source: Iowa State Highway Commission, *Service Bulletin*, August-September, 1922, p. 13)

Supervision of Motor Buses and Trucks

The General Assembly gave the railroad commission supervision of motor buses and trucks in 1923, requiring the addition of a motor bus department, later changed to a motor carrier department. The law was difficult to interpret. There were no penalties for violations except revocation of certification, unless they were deemed a misdemeanor. Also, appropriations were inadequate for employment of supervisors and inspectors. In 1924, the commission noted that many persons were operating motor buses and trucks contrary to the law; that they had great difficulty in determining what "public convenience" signified, either in law or in fact, and whether evidence would show that the proposed service would actually promote the public welfare. The law was challenged by various organizations. Manufacturing firms objected to it. County supervisors protested that authority given to heavy vehicles would injure or deface their roads. Railroads fought the threat of short haul competition and the resultant loss of revenue. Civic bodies split on the issue, whereas, small communities generally indicated support.

In 1929 the law was clarified, and under its provisions the commission published rules and regulations covering operations of trucks, effective July 1. These covered applications for permits, annual fees (\$5.00), liability insurance requirements, schedules of rates and charges, equipment certificates, marking of trucks (permit number and owner), freight receipts, accident

reports, safety requirements, and the sale or lease of the permit. At the close of 1929, there were 12 Class I passenger carriers certified with annual gross operating revenues of \$30,000 or above. Twenty-two passenger and 99 freight-hauling vehicles were operating in Class II—revenues under \$30,000. The number of employees in the motor carrier department of the commission had risen from three in 1923 to 39 in 1930.

A Busy Railroad Commission

During the years 1920-1924, valuation of Iowa railroads was a concern to the commission. Provisions of the 1920 Act required an aggregate valuation to be made; also, that it be kept current and established to state lines. The work required permanent employment of a valuation department, established in 1921 with J. R. Rolls as valuation counsel and five land appraisers. Control over motor carriers and airport construction were responsibilities of the commission. In addition to the seemingly endless number of cases on grain elevator sites, their rental terms and contracts, the commission was responsible for: farm and public highway crossings, separation of grades, warning signals, applications for building stations, terminals, spurs and switch tracks, warehouses, electric transmission lines, etc. The variety and number of cases handled by the commission during the 1920s are found in Table 7-6.

Table 7-6
Cases Decided by the Railroad Commission During the
Decade of the 1920s

Year	R.R. ¹	Express	Air-ports ²	Elec. Trans.	Motor Carriers	Ware-houses	Signal Engineering ³
1920	280	20	---	30	---	---	---
1921	208	11	---	26	---	---	---
1922	295	12	---	36	---	---	---
1923	147	3	---	42	18	---	---
1924	209	4	---	82	150	---	---
1925	143	5	---	174	391	2	---
1926	189	1	---	137	301	1	49
1927	227	1	---	167	183	---	86
1928	111	1	---	214	241	---	263
1929	<u>126</u>	<u>2</u>	<u>4</u>	<u>388</u>	<u>588</u>	<u>2</u>	<u>375</u>
Total	1,935	60	4	1,296	1,872	5	773

(Source: Iowa Railroad Commission, *Annual Reports*)

¹ Including condemnation cases.

² Applications for building permits.

³ Interlocking, signal and safety devices at crossings but not regular inspections.

The State Highway Commission

Highway Progress

There were startling contrasts in highway conditions in 1920. In some instances, roads were so impassible that county engineers had to lay planks over mud holes. Just when Iowa had begun to feel proud of her excellently graded earth roads as a near foundation for paving, it was rather humiliating to have to return to pioneer days of plank roads to keep them passable. The driver of a motor vehicle on the famous Lincoln Highway between Ames and Nevada was not consoled that the road was surfaced with gravel when it did not drain properly. On the other hand, concrete surfacing was progressing slowly. One example was the Des Moines-Ankeny stretch of the heavily traveled Des Moines to Ames highway. No road in the state had been "cussed" or "discussed" as much as this section of one of the oldest roads leading to the state Capitol. It had passed through every stage of highway improvement, having been scraped, dragged, wheel-scraped, blade-graded and steam-rollered. It had been a prairie trail, earth road and an oiled dirt and graveled road. Finally, it was built into a 20-foot concrete highway with hopes that it would last for at least one generation.

Under federal law, the Secretary of War was authorized to distribute excess war materials to various state highway departments. In March, 1920, Iowa received 578 motor vehicles consisting of 512 trucks, 37 cars, and 29 ambulances. Also included were 16 tractors, two concrete mixers, and other miscellaneous equipment. Of the total, 288 trucks were distributed to counties and to seven state institutions which had control over their roads. To store and properly care for the equipment, the state had to provide facilities. A tract of land, west of the Des Moines branch of the CNW lying along the Lincoln Highway in the south edge of Ames, was leased for seven years with the privilege of purchase in two years. On this land four buildings were erected. They were 52 x 142 feet, constructed of hollow brick tile, with a rubberoid roof and cinder flooring, to be used as storage warehouses. Title and possession of the equipment remained with the highway commission, but could be assigned to the counties for highway work with the understanding that counties would maintain the equipment in good condition and pay all costs.

The year 1921 was the first since the primary road law

was enacted that it was possible to carry on road construction without delays for reasons beyond state control. There were three and one-half times as much graveling and paving and two and one-half times as much grading as had been accomplished in 1920. The construction also played an important part in relieving unemployment in communities where the work was in progress. Since primary road construction was not funded by property taxes, the work did not increase tax levies except in a few counties where bonds had been voted by the people.

Congress, in the Federal Act of 1921, authorized the Secretary of Agriculture to select and establish with cooperation of State Highway Departments, a system of national roads comprising not over seven percent of the total mileage of the nation. The Iowa primary road system included approximately six and one-half percent (6,422 miles) of total mileage and was laid out on a state rather than a county system. The network met all of the requirements of the federal program with minor adjustments along the Missouri border.

The interstate system would consist of important through east-west transcontinental as well as Gulf-to-Canada routes, which in Iowa would include portions of the Lincoln and Jefferson Highways, the River-to-River Road, plus such routes designated for long-distance interstate traffic. The balance of the Iowa primary system would comprise the federal intercounty system.



Planks covering mud holes on Grand Avenue, north of Ames, 1920.
(Courtesy: Iowa State Highway Commission)



Des Moines-Ankeny concrete road, 1920.
(Courtesy: Iowa State Highway Commission)

Numbering and Marking Highways

With the advent of the automobile in the early 1920s, signings and markings became prevalent on principal highways and in and around cities. Naming, numbering and marking roads began with motorist associations or clubs, Chambers of Commerce, and in some instances, the states. Numbering county roads in Iowa was proposed as early as 1915 and 1916 under a system whereby the state Capitol would be the central location and roads would bear such designations as North 1, 2, etc.; South 1, 2, etc.; East 1, 2, etc.; West 1, 2, etc. The idea was that a tourist who found himself at a corner marked North 67 and West 32 could locate himself instantly. Chapter 70 of the Acts of the 37th General Assembly described a system of numbering township roads for the purpose of designating road-dragging districts.

Marking primary roads began in 1920. Standard

symbols were adopted with each main traveled road given a specific number, painted on telegraph or specially built poles at every intersection, turn or crossroad between transportation centers. For example, the Jefferson Highway became No. 1; the River-to-River Road, 7; the Red Ball Highway, 40; the Lincoln Highway, 6; and the Blue Grass Trail, No. 8. All numbers corresponded to those used on connecting interstate routes in adjoining states. Marking was important to provide directions for the rising tide of motorists who had depended upon local trail associations and automobile clubs for route guidance.

From the total of 1,068 cities, towns and villages in the state, 556 were on the primary road system, including all towns over 1,000 population, except for Hiteman, Buxton and Lockman, mining camp communities. Eighty-five percent of the state's

population either lived on the system or in towns nearby. Every county seat was linked by the most direct route to every other county seat and with the state Capitol and other important centers. With such coverage, it was necessary that a uniform numbering system be developed. There was no interference with the special signs to indicate association trails.

Road associations smeared paint of various colors on telephone poles as high as painters could reach and when the colors gave out, the roads were marked with association names. The rivalry was intense between main road associations and private automobile owners to show off their roads and attract people to the communities served. An example of an automobile guide for motorists traveling between Mason City and Des Moines is found in Table 7-7. Note the precise directions, landmarks for identification and the total and intermediate mileages listed.

By 1924 there were at least 250 marked trails nationwide and about 64 in Iowa, sponsored by separate organizations, each with its own headquarters which issued maps and other materials and collected support funds. The situation finally became so confusing that the American Association of State Highway Officials (AASHO), acting upon recommendations of the Mississippi Valley

Association of State Highway Departments, approved a resolution calling for a Board of Public Road Engineers to formulate a system of numbering and marking interstate highways. The chairman was Thomas MacDonald, and Fred White of the Iowa department played a prominent role. Initially, an interstate system of 75,884 miles was established, of which Iowa supplied approximately 3,000 miles. Within Iowa, five routes crossed from east to west and five north and south and were renumbered to conform to the federal plan. The Jefferson Highway, formerly State Highway No.1, became U.S. 65, and the Lincoln Highway was changed from State No. 6 to U.S. 30. A partial list of Iowa's portion of the new numbered interstate system is shown in Table 7-8. The new markers were placed on the roads in 1926 and the familiar black and white shields have guided American motorists ever since (Fig. 7-1, 7-2, 7-3).

Private trails were replaced by one or more of the U.S. numbered routes, and one by one the trail associations disappeared, their purposes accomplished in promoting road identification. Yet, for many years afterward and to the present, sections of highways in many states continued to be referred to as "the Lincoln Highway," "Prairie Trail," "Dixie Highway," and "Yellowstone Trail."



Placing monolithic brick pavement for the Des Moines to Camp Dodge road, 1917-1918.
(Courtesy: Iowa State Highway Commission)



Rolling the Des Moines to Camp Dodge brick pavement with a 700 pound roller, 1917-1918
(Courtesy: Iowa State Highway Commission)

Numbering License Plates

In January, 1922, every Iowa county was given an individual prefix number for its license plate followed by a dash and the number assigned to the individual motor vehicle which could run as high as necessary. For automobiles, the five counties having more than 10,000 cars registered—Polk, Woodbury, Scott, Linn and Pottawattamie—were given the first five numbers in the order mentioned. The remainder of the counties, starting with Adair with six, were numbered in alphabetical order to 99. Black Hawk County was 12; Dubuque, 36; Johnson, 57; and Story, 86. In 1927, letters from A to N were assigned as prefixes for counties with 9,000 or more registrations. Black Hawk, Dubuque, Clinton, Webster, Cerro Gordo and Des Moines joined the previous five counties with the highest registrations. Now Adair took 1 and the others followed in alphabetical order. Johnson County carried 47 and Story 76. License plates showed black colors on a white background, a color scheme selected by Iowa and five other states.

The Primary Road System in the Early Twenties

Most of the improvements on the primary roads were mainly in the form of grading and graveling. Actually

when dry and well-maintained, the earth roads were excellent highways, but no matter how well they handled traffic in dry weather, in rainy seasons they became quagmires. A famous incident in 1922 illustrates the point. Following a homecoming football victory on a rainy November 12 at Iowa City, hundreds of motorists were mired in the mud enroute to Cedar Rapids. Their plight provided a bonanza for farmers who used teams of horses to extricate the cars, charging as much as \$50 for each vehicle in addition to a fee for overnight accommodations for those who sought them. The *Chicago Tribune's* headline the next day read: "Autos Stuck in Iowa Mud: Gold Harvest in Iowa."¹⁰

Iowa's economic advantages were hampered by poor roads. In 1923, the Greater Iowa Association spent large sums of money in Eastern newspapers advertising the potential economic wealth of the state,

¹⁰ George S. May, "The Good Roads Movement in Iowa," *Palimpsest* 46 (February 1965): p. 68.

Table 7-7

Automobile Guide for Motorists**Route 267****Mason City Section****Route 267—Mason City to Des Moines, Ia.—133.4 m.**

Route map, page 184

Reverse route, No. 205

Via Iowa Falls, Story City and Ames. Good dirt roads most of the way.

The Blue Book car did not cover part of this route between Iowa Falls and Ames, the data having been compiled from accurate local information and no trouble should be encountered in following same.

MILEAGES (For this and other exits, see **city map**, page 185.)

Total Intermed.

0.0	0.0	MASON CITY , Main & State Sts.—park on right. Go south on Main St. with trolley under RR. 0.7. Cross RR. 1.5.
9.8	9.8	End of road; turn left with telephone to next
10.2	0.4	Right-hand road—poor road ahead; turn right with poles, passing Rockwell to left 11.8, crossing RR. 12.9.
15.1	4.9	End of road; turn right with wires to next.
15.6	0.5	Left-hand road; turn left, still with poles. Avoid good road to right into Sheffield , crossing RR. 28.3 into western edge of
28.8	13.2	Hampton , large brick high school on left—business center a few blocks to right. Straight ahead, crossing RR. 29.3, continuing straight south through all intersections. Cross RR. 43.7.
43.9	15.1	4-corners; turn right. Cross RR. 46.1 and 46.4, running onto Rocksylvania Ave.
46.7	2.8	Tremont St. ; turn left 2 blocks and then right on Washington Ave.
47.0	0.3	Iowa Falls , Washington Ave. & Main St. Keep ahead on Washington St. For diverging routes see index map , page 184.
47.1	0.1	4-corners; turn left between livery stable and blacksmith shop.
47.2	0.1	Fork; bear right across iron bridge, crossing RRs. 47.4 and 47.6. Jog right and left with road 48.7, 50.1 and 50.6.
56.6	9.4	4-corners; turn right.
57.1	0.5	Left-hand road; turn left past school on right 58.1.
62.2	5.1	4-corners, RR. just ahead; turn right, avoiding road to left leading into Hubbard 62.6.
65.1	2.9	End of road; jog left across RR. and immediately right along same. Cross another RR. 67.6, continuing straight ahead, following RR. through Radcliffe 69.6.
76.1	11.0	4-corners; turn left around school.
82.1	6.0	4-corners; turn right.
83.1	1.0	4-corners; turn left, shortly running onto winding road. Turn square right with road 84.6.
85.1	2.0	Left-hand road; turn left.
87.1	2.0	Story City . Turn right along RR., turning left across same 87.6. Pass school on left 89.0.
93.0	5.9	4-corners; turn right around school.
94.0	1.0	4-corners; turn left. Pass school on right 96.0, running onto winding road.
100.0	6.0	4-corners; turn left.

Table 7-7 (Cont.)

Mason City Section		Route 268
100.4	0.4	Right-hand road; turn right.
101.3	0.9	Ames. Business center on right. Ames Auto Co. For diverging routes, see index map , page 184.
		Straight ahead on Duff St. across RR., keeping straight south across RR. 106.7. Meeting trolley from right just beyond, follow same for over a mile, where turn left with road 109.0.
109.5	8.2	End of road; turn right past Huxley to right 110.7, crossing RR. 110.8.
117.6	8.1	End of road, school on left; turn right to first.
118.1	0.5	Left-hand road at trolley crossing; turn left, following trolley straight south, jogging right and left across same 120.1. Take first right and first left with main travel to
122.4	4.3	ANKENY. Go east 1 block from center of town, where turn right.
122.6	0.2	4-corners immediately after crossing RR.; turn left along tracks curving right away from same 123.1. Straight ahead through all crossroads, passing County Poor Farm buildings 126.7, through old mining settlement of Marquesville 127.6, same thoroughfare becoming 14th St. , which follow
130.8	8.2	Washington Ave. , brick school on right; turn right, leaving trolley to first paved cross-street.
131.1	0.3	12th St. ; turn left crossing RR. 131.2, picking up trolley from left 131.8.
132.1	1.0	Grand Ave. , Historical building on right; turn right with trolley to far side of Capitol Bldg., where turn left 1 block, then right onto Locust St. , which follow straight ahead across long concrete bridge 132.9 to center of
133.4	1.3	DES MOINES , Locust & 5th Ave. Wellington Hotel, 5th & Grand. Iowa Auto & Supply Co., Fourth & Locust Sts. For city map, see page 135. For diverging routes, see index map , page 137. For diverging routes, see index map , page 210. For through connections, see trunk-line chart and map in front of book.

(Source: *Official Automobile Bluebook, 1913. Automobile Bluebook Publishing Company, Illinois, 1913: 104-105.*)

hoping to attract industries and people. The Bridgeport, Connecticut *Evening Post*, perhaps smarting over Iowa's victory at Yale in 1922, replied editorially that Iowa's football fans faced the prospect of spending Saturday nights in their cars during rainy periods. The editorial further suggested that each Iowa farmer should add one hen to his flock so that

money from the sale of additional eggs could be used to build permanent surfaced roads. "Who would live in this kind of state, for all its agricultural wealth?" the editor asked. Naturally, Iowa newspapers responded in the same spirit of friendliness and compassion.

Table 7-8

IOWA'S PORTION OF THE NEW U. S. INTERSTATE SYSTEM

Federal Number	Former Primary Road Number	Mileage	Route
U. S. No. 18	No. 19	287	McGregor-Mason City to Primary Road No. 22
U. S. No. 20	No. 5	201	Dubuque to Fort Dodge
	No. 23	130	Fort Dodge to Sioux City
U. S. No. 30	No. 6	369	Clinton to Council Bluffs
U. S. No. 32	No. 7	181	Davenport to Des Moines
	No. 2	141	Des Moines to Council Bluffs
U. S. No. 34	No. 8	283	Burlington to Council Bluffs
U. S. No. 53	No. 20	324	Minnesota State Line thru Dubuque to Missouri State Line
U. S. No. 61			
U. S. No. 63	No. 2	61	Des Moines to Oskaloosa
	No. 24	32	Oskaloosa to Ottumwa
	No. 13	36	Ottumwa to Missouri State Line
U. S. No. 65	No. 1	228	Minnesota State Line to Leon
	No. 3	14	Leon east 14 miles and south to Missouri Line at Lineville
	No. 14	22	Road No. 3 to Missouri State Line
U. S. No. 69	No. 1	20	Leon to Missouri State Line
U. S. No. 71	No. 4	86	Minnesota State Line to Early
	No. 23	10	Early to Sac City
	No. 18	154	Sac City to Missouri State Line
U. S. No. 75	No. 22	34	Minnesota State Line to Sioux City
	No. 12	77	Sioux City to Missouri Valley
U. S. No. 161	No. 28	72	Dubuque to Cedar Rapids
	No. 40	123	Cedar Rapids to Missouri State Line
U. S. No. 218	No. 40	139	Minnesota State Line to Primary Road No. 6 west of Cedar Rapids.

(Source: Iowa State Highway Commission Service Bulletin, 1923)



Figure 7-1
Primary road markers prior to 1926.



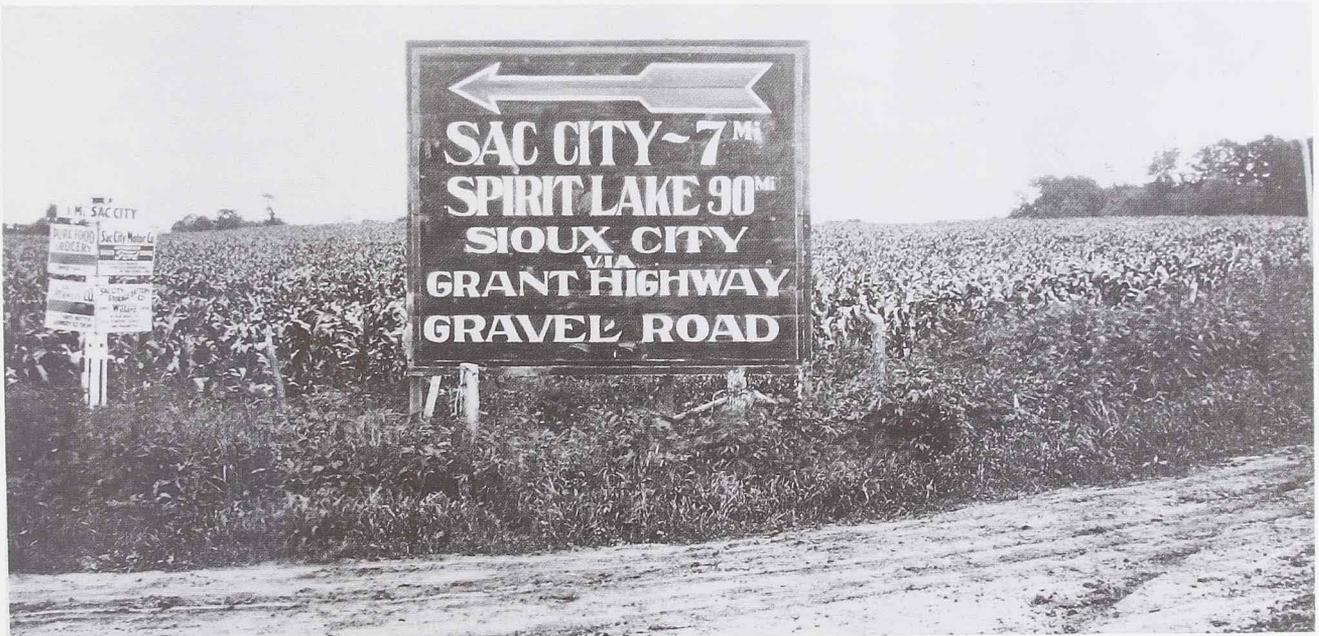
Figure 7-2
New primary road markers adopted in 1926.



Figure 7-3
New U.S. road markers adopted in 1926.



Take your choice to Omaha.
(Courtesy: Iowa State Highway Commission)



Example of a historic highway.
(Courtesy: Iowa State Highway Commission)

State Policy Requested on Future Highway Improvements

As long as the roads remained in a generally deplorable condition, economic and social progress was in jeopardy. The Iowa farmer was the heaviest loser since he used the roads most often; consolidated school movements were crippled and rural churches closed during the winter and early spring. These conditions were recognized in 1922 when Fred White challenged state officials and legislators to decide future policy relative to highway surfacing (Fig. 7-4). Traffic had outgrown the unsurfaced roads, and the rapid increase in vehicle numbers, size and weight was causing problems. Iowans owned 718,000 automobiles, increasing the daily average of cars on the roads from 20-30 to 500-600. Speeds had risen from 4-8 to 25-35 miles per hour, and loads increased from 2 to 10-14 tons. Some action was necessary, and quickly. Highways in 1921 carried more passengers

than railroads and nearly as much freight at almost equivalent speeds. The question White raised was whether primary road improvements should end with graded earth roads or with hard surfaces.

He also indicated that road revenues averaged \$552 per car registered in 1910 as contrasted with \$50 per vehicle registered in 1921. Supporting his position were studies showing comparison of Iowa's license fees with averages in other states on different models of automobiles (Tables 7-8, 7-9). Additional support came from research by the highway commission and the Iowa State College which concluded that when traffic reached 320 tons per day on an earth road or 470 tons on a graveled road, it became economical to pave (Table 7-10). Paving could be financed through bonding. It was estimated that savings in vehicle operating expenses would retire bonds and pay interest charges over a 15-year period.

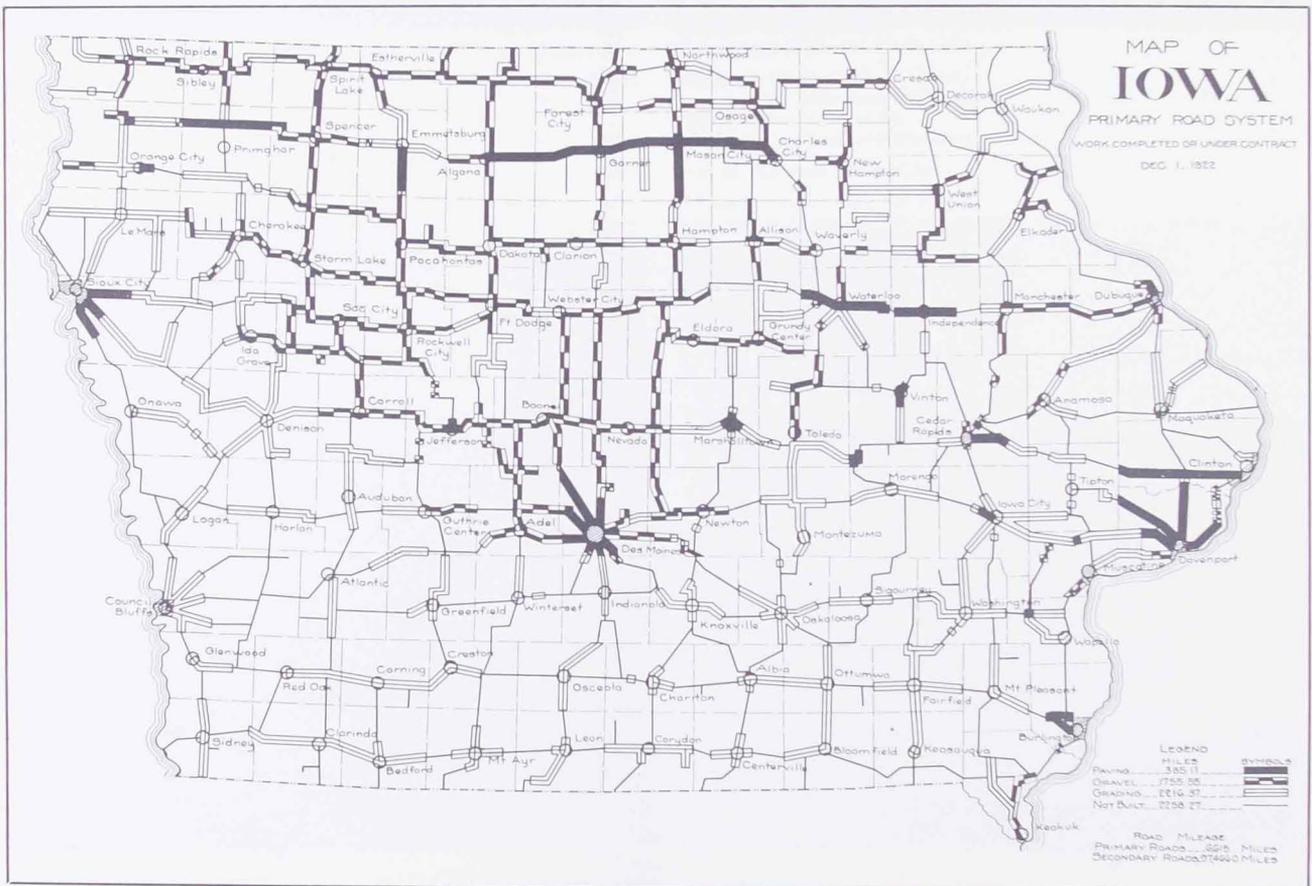


Figure 7-4
Primary Road System by surface type, 1922.
(Courtesy: Iowa State Highway Commission Service Bulletin, 1922)

Iowa Motor Vehicle Fees Lower Than Average for the United States

Table 7-8

COMPARISON OF AUTOMOBILE LICENSE FEES AND TAXES COLLECTED IN UNITED STATES										
	Ford		Dodge		Buick 6-cyl.		Cadillac 8-Cyl.		Packard 12-Cyl.	
	5-Pass. Tour. 15 Mi. per gal.	5-Pass. Tour. 15 Mi. per gal.	5-Pass. Tour. 13 Mi. per gal.	5-Pass. Tour. 13 Mi. per gal.	5-Pass. Tour. 12 mi. per gal.	5-Pass. Tour. 12 mi. per gal.	7-Pass. Tour. 8 mi. per gal.	7-Pass. Tour. 8 mi. per gal.	7-Pass. Tour. 6 mi. per gal.	7-Pass. Tour. 6 mi. per gal.
	Country	City	Country	City	Country	City	Country	City	Country	City
Iowa	\$11.40	\$11.40	\$19.40	\$19.40	\$26.00	\$26.00	\$48.40	\$48.40	\$67.00	\$67.00
Average all states.....	14.54	19.58	19.32	29.69	24.33	38.42	41.35	75.37	53.67	99.08
Difference	3.14	8.18	.08	10.29	1.67	12.42	7.05	26.97	13.33	32.08

Basis of Computation—Registration Fee. Actual Amount.
 Personal Property Tax—Assessed Valuation taken at 60% List Price. Levy taken at 60 mills in country and 170 mills in city.
 Gasoline Tax—4,500 miles driven at rate of gasoline consumption given for each car above.

Table 7-9

ACTUAL TAXES AND FEES PAID ON MOTOR VEHICLES IN CERTAIN CITIES IN UNITED STATES						
Place		Ford	Dodge	Buick	Cadillac	Packard
Jefferson City, Missouri.....	State tax + city tax of 1/2 the rate charged by State.....	\$23.08	\$35.94	\$48.30	\$ 91.11	\$121.76
Pierre, South Dakota.....	Registration fee \$6.00 flat.....	26.59	.....	58.19	144.12	.....
Little Rock, Arkansas.....	State tax + city tax of \$5.00 + county tax of \$2.645 per \$100. 50% assessment	30.82	44.84	55.62	104.77	135.36
Lincoln, Nebraska	Registration fee + county tax 1% of list price + city tax 1/2% of list price.....	16.28	.....	48.40	91.23	.....
Raleigh, North Carolina.....	State tax + city tax of \$1.00 + \$2.50 per \$100 on valuation of car	26.50	.....	54.75	109.12	.....
Madison, Wisconsin	State tax + city tax of 23 mills on 90% of true value of car..	19.20	.....	37.00	74.75	.....
Any city, New Hampshire....	State tax + city tax of 24 mills on list price.....	25.89	40.32	51.00	99.84	.....
Any city, Rhode Island.....	State tax + city tax of \$23.00 per \$1,000 on 90% of list price	21.40	.....	41.59	81.23	.....
Any city in Iowa.....	Registration fee only.....	11.40	19.40	26.00	48.40	67.00

(Source: Iowa State Highway Commission Service Bulletin, 1923)

Table 7-10

Tests Show That It Pays to Surface Dirt Roads When Average Daily Traffic Reaches 320 Tons

Saving in Operation of Motor Vehicles Will Pay Interest and Retire Bonds in Maximum Period of Fifteen Years. Gravel Economical Until Traffic Reaches Daily Average of 470 Tons. F. R. White, Chief Engineer, as President of American Association of Highway Officials, Gives Information Based on Iowa Tests to Congressional Committee.

VEHICLE OPERATING COSTS ON VARIOUS TYPES OF ROADS

(Cost in cents per ton-mile)

Type of Surface	Solid tire trucks, 10 M. P. H.	Pneu. tire trucks, 15 M. P. H.	Automobiles, 25 to 35 M. P. H.	Motor busses cts. bus-mi. 25 M. P. H.
Best gravel, yearly average	7.75	7.70	9.3	22.50
Average P. C. concrete and asphalt filled brick	8.00	8.3	10.00	24.00
Best P. C. concrete and asphalt filled brick	7.75	7.70	9.3	22.50
Best gravel, yearly average	8.5	8.8	10.9	25.7
Ordinary gravel, yearly average	9.0	9.40	11.8	27.8
W. B. Macadam, well maintained	8.7	8.95	11.1	26.0
Bit. macadam, well maintained	8.5	8.80	10.6	25.7
Average sheet asphalt yearly average temperature	8.10	8.3	10.00	24.0
Average asphaltic conc. yearly average temperature	8.00	8.3	10.00	24.0
Best earth, well packed by traffic, yearly average	9.0	9.40	11.70	27.8
Ordinary earth with light traffic, yearly average	9.5	9.95	12.6	29.6

(Source: Iowa State Highway Commission Service Bulletin, 1924)

Proposed Improvement Plans

In 1923 and 1924, two six-year improvement plans were introduced. One by White called for hard-surfacing approximately 3,000 miles, or about half of the primary road system. Gravel would be used for the remainder, and grading and graveling was planned for the secondary road system. His proposal included 1,000 miles of grading, 500 miles of graveling and 500 miles of paving each year on the primary system and 1,000 miles of grading and 500 miles of graveling on the secondary system. A second plan was proposed by the Good Roads Association which involved 3,115 miles of pavement, 1,786 miles of gravel surface and 2,013 miles of grading on the primary system between 1927 and 1932. The total cost was estimated at \$125 million. Funds expected to be available were estimated at \$40 million, leaving a balance of \$85 million to be borrowed.

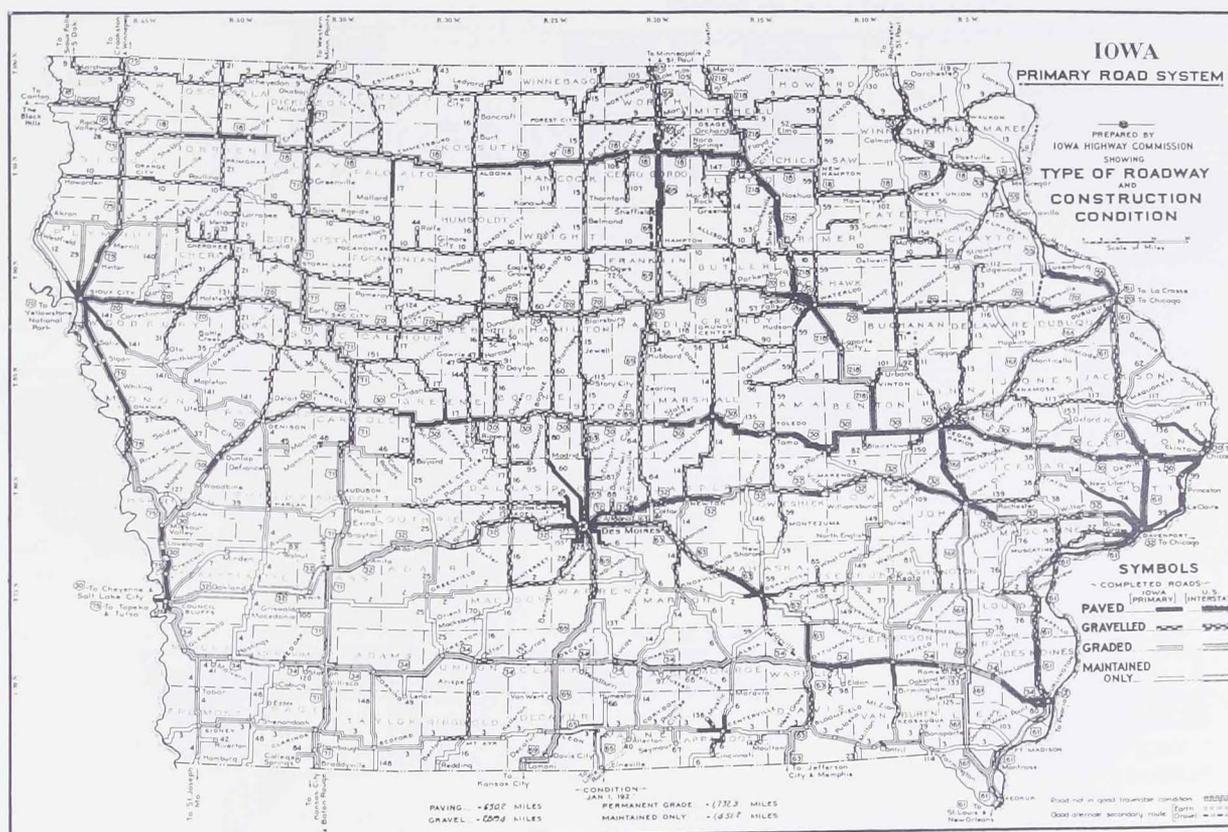
Both plans were difficult to refute. For each of the six years following enactment of the Primary Road Law, an average of 700 miles of grading, 300 miles of graveling and 85 miles of paving had been completed. If this construction schedule was maintained at current levels, the necessary grading would be completed in three years, graveling in six years and

paving in 36 years. But the work could not be programmed at the same pace under present funding. On the basis of annual revenues entering the primary road fund, it would require 20 years to pay outstanding bonded indebtedness and complete the work—16 years if a third cent were added to the gasoline tax. The third cent was added in 1927. The association plan would require no increase in grading or graveling, but paving would advance to about 500 miles per year, similar to the White plan with very few additional employees needed.

Most of the progress in building the well-graded, drained and bridged road system had been possible through current revenues, but considerable indebtedness had occurred by county bonding, anticipation certificates and special assessments against abutting property which totaled \$20.7 million against the primary road fund. Interest payments in the association plan would amount to \$38.6 million and would represent the extra cost of building roads under "use while you pay" as compared with the cost under "pay as you go." The former would complete the road system in six years, the latter in 16 years. The emphasis once more was strongly on bonding to provide the funds.

While plans were being debated over funding, road construction continued. By January 1, 1928, 63 percent of the primary system had been surfaced. Of the 6,655 miles included, 14 percent were paved, 46 percent graveled, 22 percent permanently graded and 16 percent earth improved. It was possible to travel by direct route from Des Moines to 62 county seat

towns and to 15 others by indirect routes (Fig. 7-5). This progress had been made despite the fact that 76 counties did not pay their way on the system in 1926 and only 56 of the 99 counties had voted county bonds for primary road improvements by mid-1927 (Fig. 7-6, 7-7).



Sixty-Two County Seat Towns Can Be Reached from Des Moines by Direct Route on Surfaced Road—15 by Indirect Route

Figure 7-5

(Source: Iowa State Highway Commission Service Bulletin, 1928)

The State Highway Bonding Issue

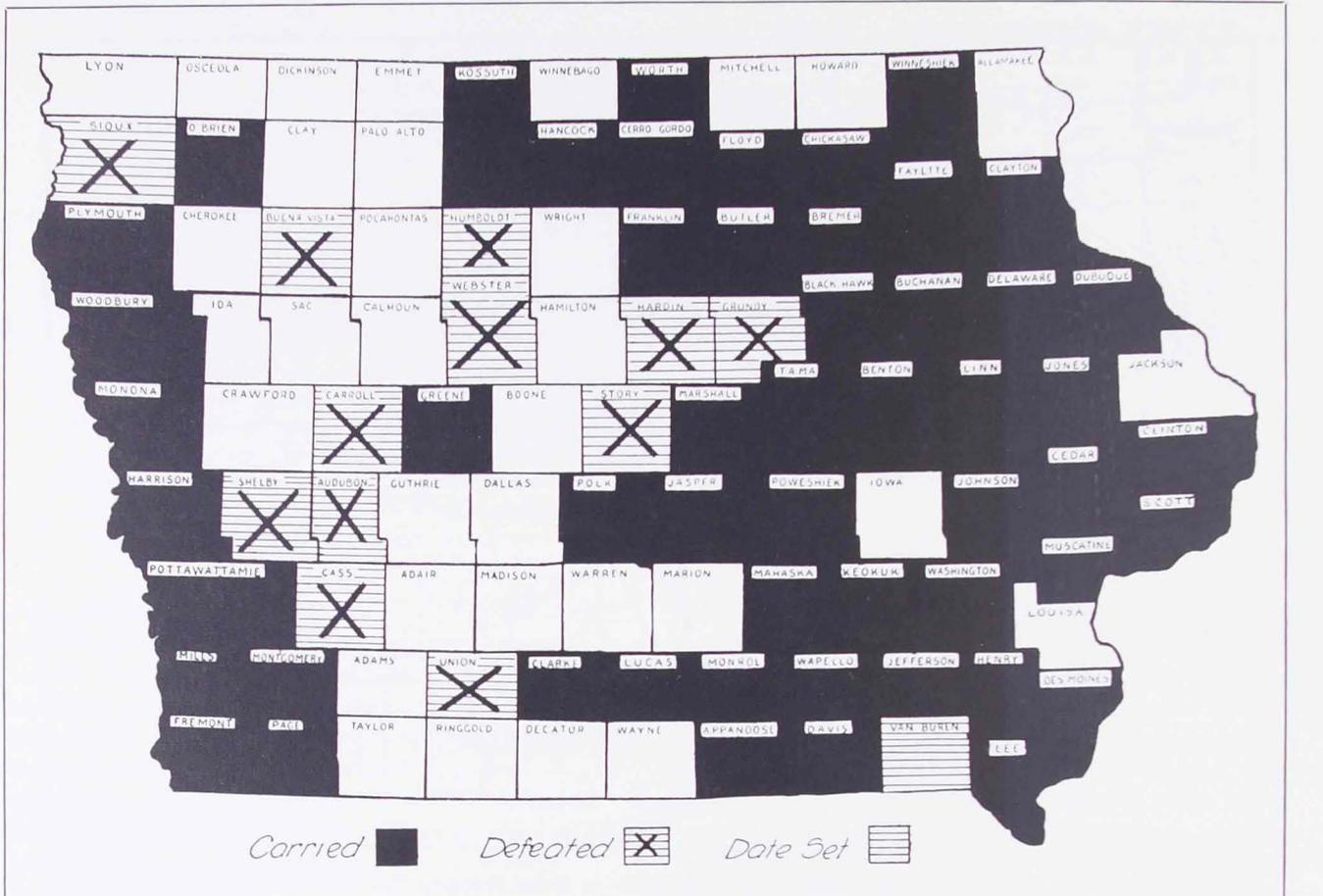
Bonding for highways was discussed in Chapter Four. It was the six-year improvement plan that initiated the \$100 million bonding proposal, endorsed by Governor Hammill as far preferable to the continued use of county bonds. His principal arguments were: (1) that \$5 million in interest would be saved; (2) county bond issues, with only two-thirds of the counties participating, were producing disconnected sections of paved roads instead of a system of

connecting routes; (3) under the county bond plan, the commission could not, in fairness to counties voting bonds, pave gaps in counties not participating; (4) the special election in November, 1928, if successful, would provide funds for construction in 1929 and 1930; and (5) state bonding would provide for a comprehensive state highway program (Fig. 7-8).

The state bond issue was declared unconstitutional by the Iowa Supreme Court at a time when the General

Assembly was in session. Legislators voted a resolution aimed at amending the constitution to provide for authorization and issuance of state bonds, also raised the legal limit of bonded indebtedness of counties for primary road improvements, and encouraged additional counties to vote bonds.

Although the county bond programs were not always supported unanimously, five major east-west highways were surfaced entirely across the state including the Lincoln Highway. Two had been completed north and south including the Jefferson Highway.



How Iowa Counties Have Voted on Question of Bond Issues for Hard Surfacing of Primary Roads

Figure 7-6

(Source: Iowa State Highway Commission Service Bulletin, 1927)

Highway Safety Measures

Whereas motor vehicle registrations and regulations were under the jurisdiction of the railroad commission, highway safety was the responsibility of the highway commission, and protection of the public was not neglected during the debates on construction and funding. In 1921, legislative and commission directives were issued relative to glaring headlights.

No lenses could be legally sold unless tested by the commission and approved by the Attorney General. Plain lenses were banned. Homemade glare-preventing devices had been used for some years and if carefully made or adjusted proved satisfactory. Painting a portion of plain glass to obstruct offending rays of light was most common. Some motorists used froth from foaming beer, smearing it over the glass

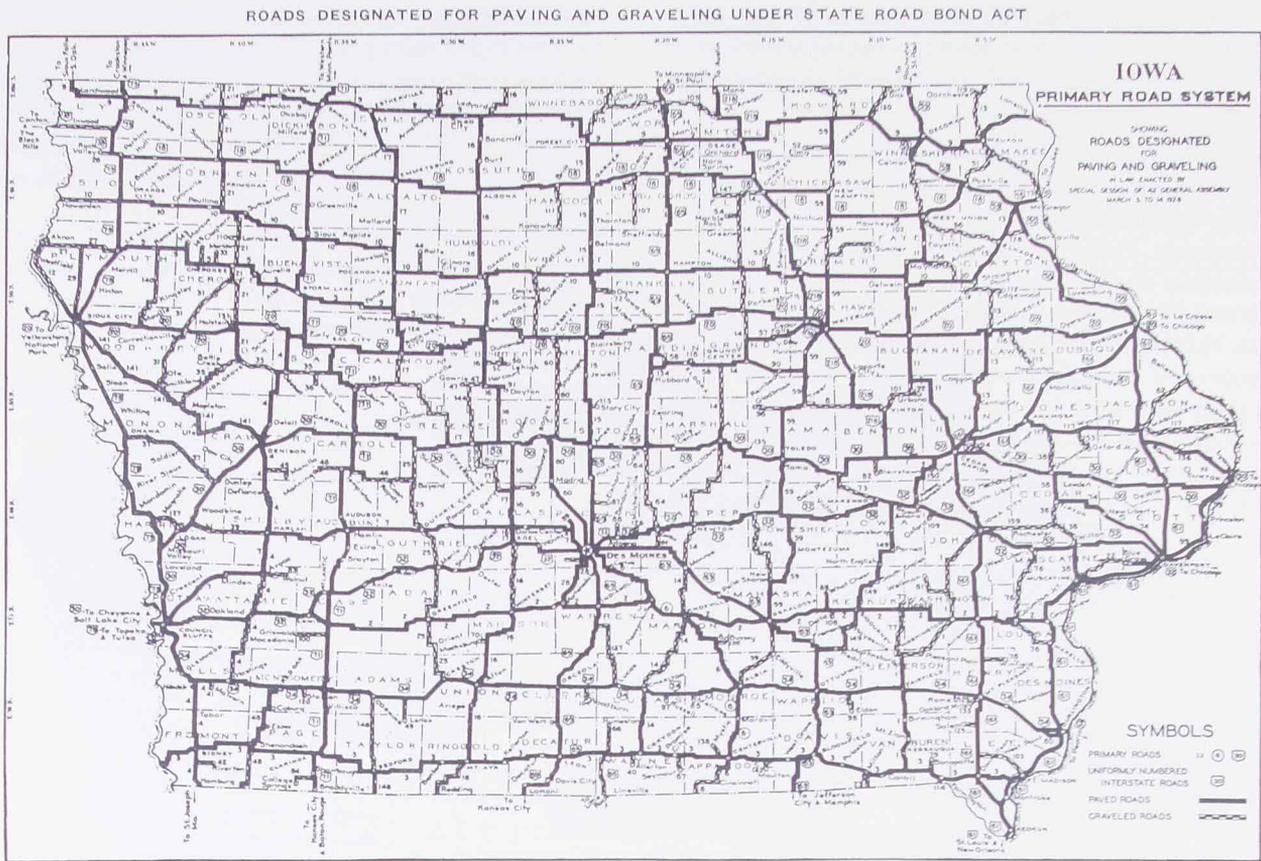


Figure 7-8

(Source: Iowa State Highway Commission Service Bulletin, 1928)

Commercial Air Service

The Iowa City airport was the first in the state to be used for the Chicago-Omaha mail route, initiated in 1920. The first official consignment on January 8 included 400 pounds of mail for Omaha and meat for a banquet in honor of General John Pershing. On the return trip, the plane carried a hog for the Congress Hotel in Chicago, part of the cargo dispatched on the eastern leg of the flight. It was not until May that the first official consignment of airmail reached Iowa City—a motion picture destined for Maquoketa. Iowa City residents hoped that their airport would be chosen as the permanent intermediate point on this route, but Washington authorities instead chose Des Moines. However, construction of a hangar, lighting beacons and the first airport radio station in Iowa made the facility an important landing site on later transcontinental routes. Because of the loss of a federal lease which had been in effect since 1922, it was transformed into a municipal airport in 1929. In 1930, a contract was signed with the Boeing

Company, giving them free use of the field in return for financial aid.

Airport Construction

When the first transcontinental airmail flight was scheduled in 1921, Des Moines needed an airport. The impending arrival of planes stirred city officials to select a field at Southwest 30th Street and Vandalia Road. The field was the embryo of the present airport. In the early twenties, there was no legislation covering the funding of airports by cities. However, there was authority to fund "parks" outside city limits. So the field was named the "Des Moines Aviation Park," a romantic title with political overtones. On July 1, 1925, Des Moines was listed as a scheduled stop for the first transcontinental mail plane which landed at the Vandalia field, where The Post Office Band welcomed the flight with the "Iowa Corn Song." But fog and flooding on the original site required location of a new field, and a 160-acre tract near Altoona was leased on the James Hanna farm,

eight miles northeast of the city. The field was dedicated in 1927, with Charles Lindberg as the honored guest. A citizens' organization raised \$35,000 for a hangar, lighting, grading, drainage and sanitation.

In 1929, the General Assembly acted to allow cities to levy assessments and provide for bond sales to fund municipal airports. Also authorized were the licensing of aircraft and pilots and establishment of air traffic rules. A bond issue was proposed in Des Moines in the 1930 general election and passed by a margin of 1,000 votes, resulting in a sum of \$200,000 becoming available for the purchase of land and construction of an airport. After studying some 80 possible locations, the site selected was the 160 acres owned by Truman Jones at southwest 21st Street (now Fleur Drive) and Army Post Road. It was chosen because of its location on a hilltop affording natural drainage and reducing fog to a minimum. It offered a clear

approach from all directions, with plenty of space for expansion. A two-lane highway extending four and one-half miles from downtown Des Moines allowed easy accessibility. Actual construction began in 1931 and continued throughout the 1930's.

Postwar enthusiasm for aviation stimulated other Iowa communities to build airports, in part motivated by the Boeing system. By 1931 there were 229 licensed pilots flying 112 airplanes, and 47 airports were registered with the U. S. Department of Commerce. Twenty-two of these were equipped with lighting facilities for night flying, and some of the larger fields had crushed rock runways. The Centerville Airport, opened in 1928, was unique. Its first runway was made from coal shale, mined in the area. It was the only airport in the state, perhaps in the Midwest, which had an orchard and grape arbor and on which cows, sheep and hogs were raised while planes landed and departed (Fig. 7-9) (Table 7-11, 7-12).

Adair, intermediate, lighted
Adel, intermediate, lighted
Algona, auxiliary
Ames, commercial
Atlantic, intermediate, lighted
Battle Creek, commercial
Bedford, municipal
Belle Plaine, commercial
Bloomfield, intermediate, lighted
Boone, commercial
Burlington, municipal
Carroll, commercial
Cedar Rapids, municipal, lighted
Centerville, municipal
Clarinda, commercial
Clinton, commercial, lighted
Council Bluffs, municipal, lighted
Davenport, commercial, lighted
Decorah, auxiliary
Denison, commercial
Des Moines, municipal, lighted
DeWitt, commercial, lighted
Dubuque, municipal
Estherville, municipal
Fort Dodge, commercial
Grand Mound, intermediate, lighted
Grinnell, intermediate, lighted
Ida Grove, municipal
Iowa City, municipal, lighted, surfaced runway
Libertyville, intermediate
Marengo, intermediate, lighted
Mason City, American Legion, municipal
Milford, commercial
Muscatine, municipal, lighted

New Albin, intermediate, lighted
Newton, intermediate, lighted
Oakland, intermediate, lighted
Ottumwa, American Legion, commercial
Rockwell City, municipal
Scranton, auxiliary
Shenandoah, auxiliary
Sidney, intermediate, lighted
Sioux City (Steven's So. Dak.)
Tipton, intermediate, lighted
Waterloo, commercial, lighted
Wesley, commercial
Winfield, intermediate, lighted



* As reported by the U. S. Dept. of Commerce, February 7, 1931.

Figure 7-9

Iowa Airports, February 7, 1931.

Iowa airports registered with the Aeronautics Division of the United States Department of Commerce, with type of airport and equipment.

Airline Service and Routes

Commercial airline service began when a single-engine Boeing mail and passenger biplane carried one person —Jane Eads, a 20-year-old reporter for the Chicago Herald—who flew from Maywood, Illinois to Iowa City in 1927. Boeing was the predecessor of United Air Lines and had been awarded the Chicago-San Francisco air mail route. The passenger was to fly the entire distance. Des Moines was a scheduled stop but was not able to handle night flights, thus the landing at Iowa City. The plane, piloted by Ira A. Biffle of Lincoln, Nebraska, Lindberg's first instructor, flew from Iowa City to Omaha where pilot and plane were changed, and with additional intermediate stops, Miss Eads and the mail arrived in San Francisco about 24 hours later (Fig. 7-10).

The principal lighted route was a section of the Transcontinental Airway from New York to San Francisco. It entered Iowa near Clinton, proceeded southwest and west through Iowa City and Des Moines and left the state near Council Bluffs. Three daily scheduled planes each way were operated by Boeing with regular stops at Iowa City and Des Moines. National Air Transport, a subsidiary of United, flew the lighted airway route from Chicago to Dallas through the Davenport-Moline-Rock Island Airport to St. Joseph and Kansas City. Other subsidiaries of United which began operations in 1926 were Varney Air Lines, Pacific Air Transport and Boeing Air Transport, consolidated in 1928. A third lighted airway from Omaha to Kansas City and St. Louis, flown by American Airways, passed along the east side of the Missouri River near Glenwood and Sidney.

Table 7-11

Distances, times and fares from Davenport to selected cities served by the United Air Lines.*

From To	Davenport-Moline		
	Distance, miles	Time Hours and minutes	Passenger fare
Chicago	152	1:15	\$10.00
Kansas City	275	2:35	17.00
Tulsa	492	4:55	29.50
Oklahoma City	601	6:00	36.50
Dallas	813	8:23	46.00

* Data from special report by United Air Lines, July 15, 1931.

Early Operations

Boeing operated 25 planes, each costing \$25,000. The A, B and C models cruised at 105 miles per hour powered by one nine-cylinder, 425-horsepowered Pratt Wasp engine. The company received \$1.25 per pound for flying mail the first 1,000 miles, and 15 cents for each additional 100 miles. The first transcontinental flights required about 23 hours and initially carried two passengers and 1,600 pounds of mail. The passenger seats were often reserved for mechanics, but public response made necessary the addition of two more seats which were always sold. In 1930, Boeing began using the 80 and 80A planes from

Table 7-12

Distances, times and fares from Iowa City and Des Moines to selected cities served by the United Air Lines.*

From To	Iowa City			Des Moines		
	Distance, miles	Time Hours and minutes	Passenger fare	Distance, miles	Time Hours and minutes	Passenger fare
San Francisco	1,828	19:10	\$151.50	1,727	18:10	\$142.50
Salt Lake City	1,136	12:10	94.00	1,035	11:10	85.00
Omaha	231	2:11	19.50	130	1:11	11.00
Chicago	202	2:15	17.00	303	3:15	25.50
Cleveland	520	7:25	36.75	621	8:25	45.25
New York	938	9:10	76.50	1,039	10:10	85.00

* Davenport is served by the United Air Lines through an airport located at Moline.

the Des Moines airport, the latter type a tri-motored plane with capacity for 18 passengers. The 80A was also the first to use stewardesses who were registered nurses, following the suggestion of Ellen Church, a native of Cresco, who was hired as Chief Stewardess. The women were paid \$125 per month. Church resigned after 18 months and resumed her nursing career. During the 1930s a number of Iowa women from Iowa and Des Moines were employed as stewardesses on major airlines.

In 1928, the Des Moines Register and Tribune purchased a five-place Fairchild cabin monoplane, one of eleven used over a 30-year period, and became the first newspaper to own and operate a commercial

airplane. It began active service under the name "Good News," selected through a statewide contest in which thousands of people participated. In the first two years of flying, the monoplane became quite familiar in Iowa and neighboring states. It landed at 45 Iowa cities, seven in Missouri, two in Nebraska and one each in Illinois, Minnesota and Wisconsin: 1,114 flights with only four forced landings. The plane was used primarily for news gathering but also promoted interest in and development of aviation whenever possible. The pilot was Charles Gatschet, a veteran flyer who flew the first seven aircraft. George Yates was the photographer and flew in all eleven planes.

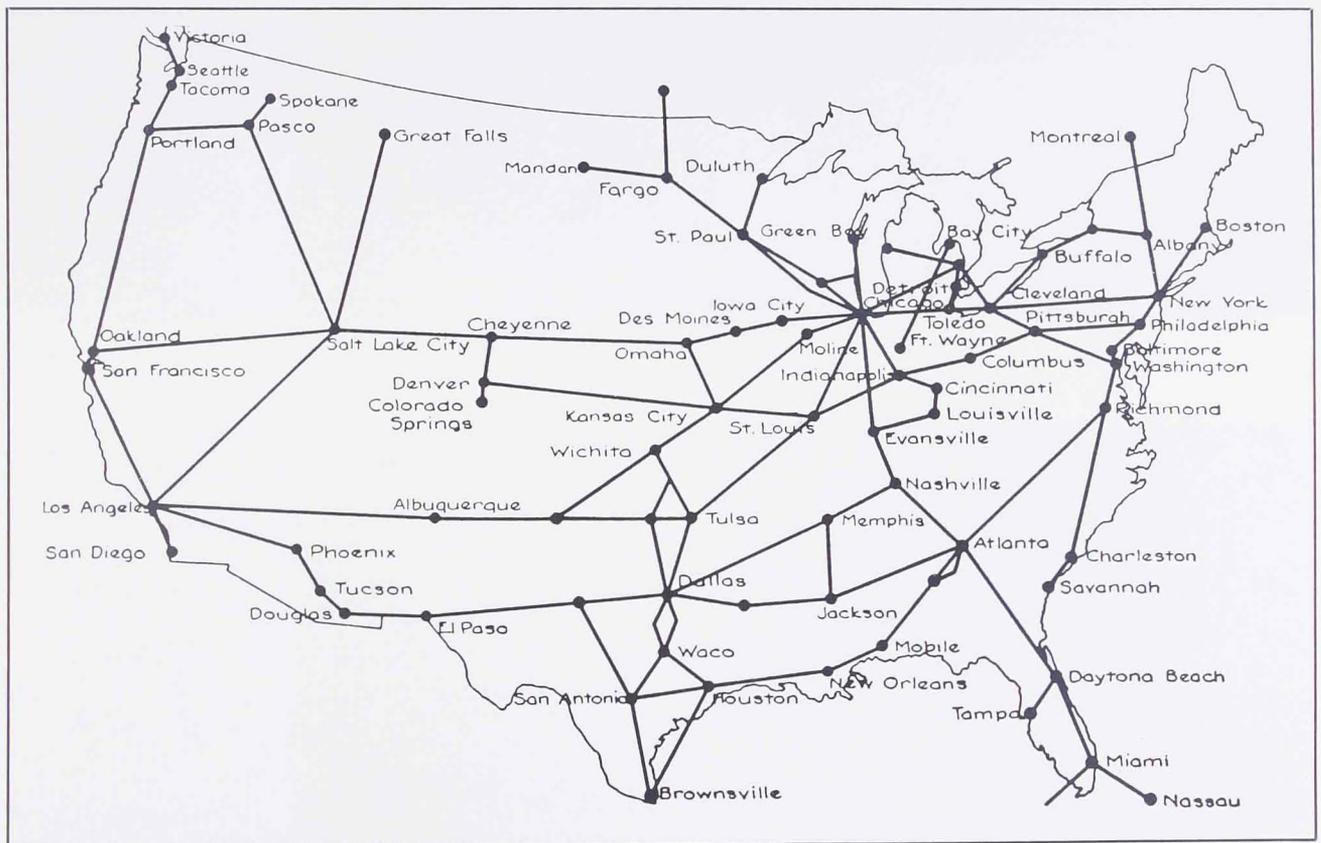
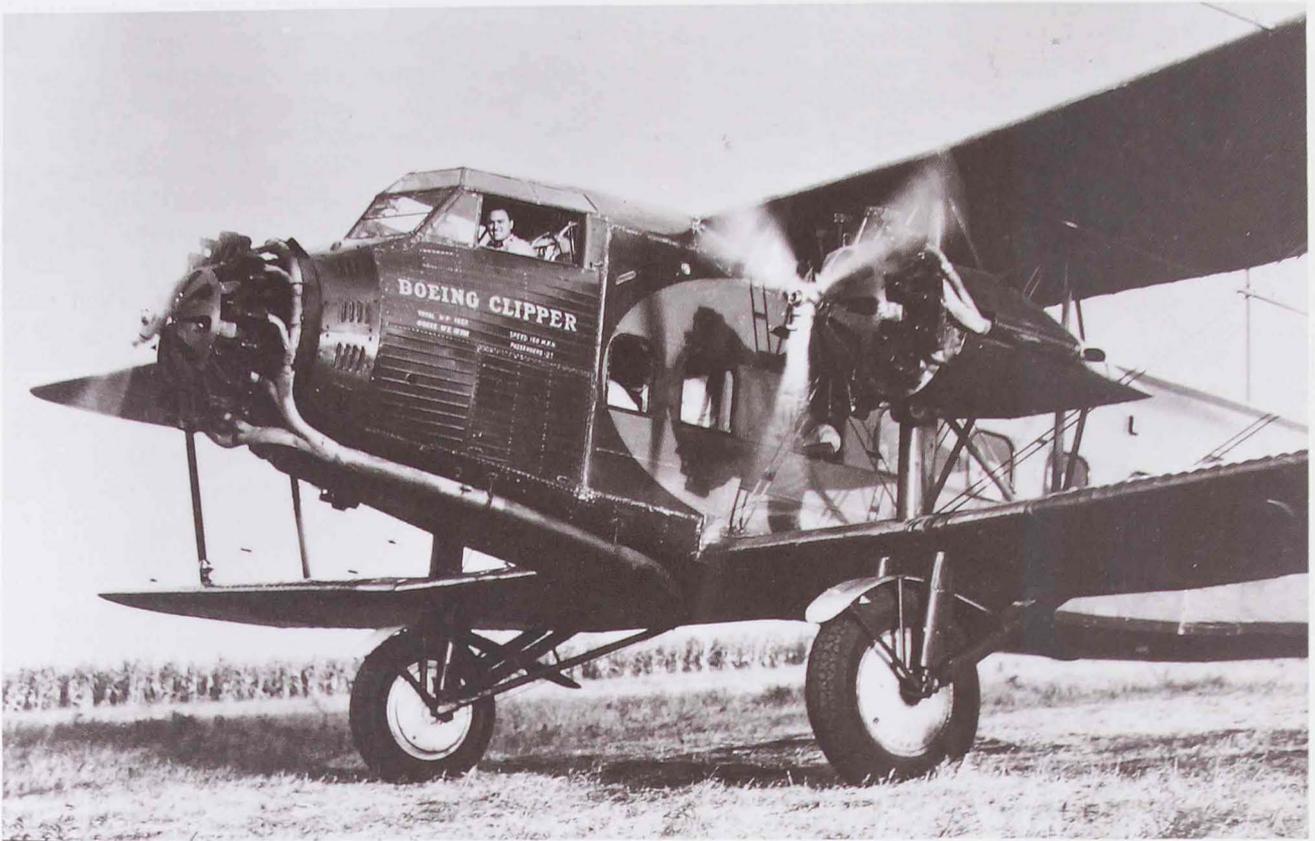
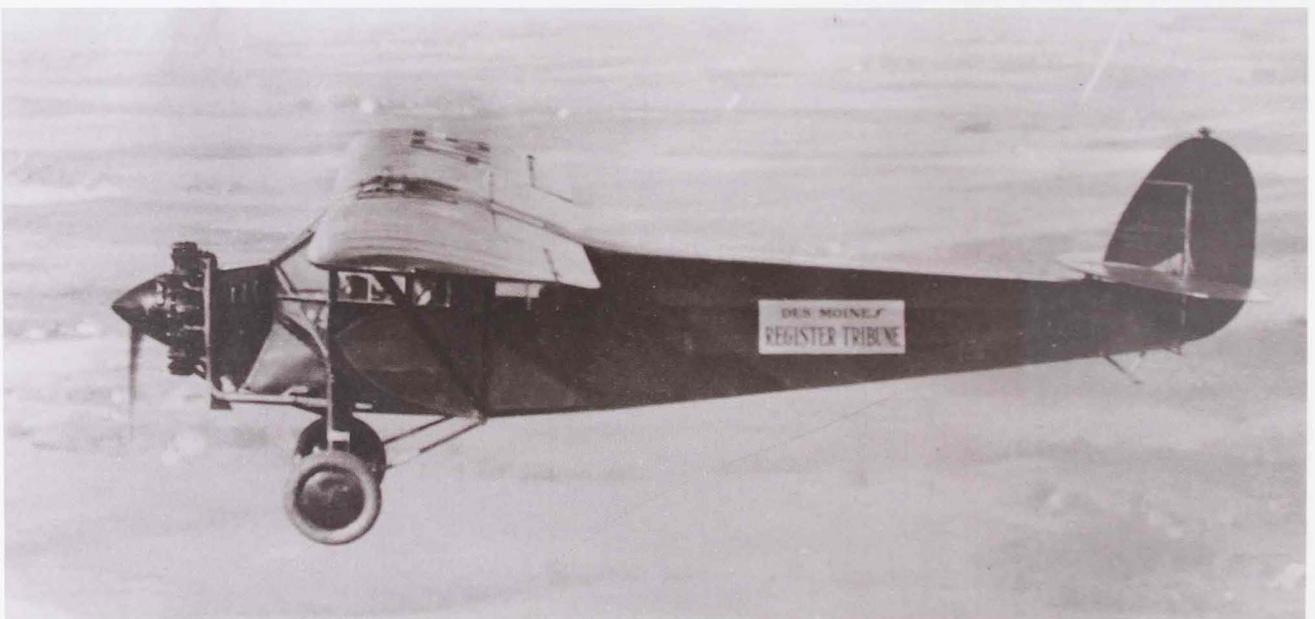


Figure 7-10
Air transportation lines in the United States, mid 1920s.



Boeing Clipper (Model 80A).
(Courtesy: Des Moines International Airport)



Des Moines Register & Tribune "Good News I".
(Courtesy: Des Moines International Airport)



Karen Keen aircraft at Leeds Airport in Sioux City, 1920.
(Courtesy: Sioux City Public Museum)

Revival of River Transportation

The need for a renaissance in inland waterway programs was clearly outlined in the Transportation Act of 1920: "It is hereby declared to be the policy of Congress to promote, encourage and develop water transportation service and facilities in connection with the commerce of the United States and to foster and preserve in full vigor both rail and water transportation."¹¹

The Inland Waterways Corporation

In 1924, the Inland Waterways Corporation was created, federally owned, organized and capitalized similar to the railroad companies. It would operate the Federal Barge Service and would attempt to demonstrate to commercial shippers the economic feasibility of river transportation, develop suitable

techniques, routes and equipment, and encourage private enterprise to enter water transportation. Despite an expenditure of \$175 million on various Mississippi River improvements, by 1924 not one common carrier barge line was operating on the river. Capitalization of the corporation was increased to \$15 million and responsibilities expanded by the Denison Act of 1928. The act practically forced the railroads to establish through routes and joint rates with barge lines on the Mississippi and its tributaries. It was repealed by the Transportation Act of 1940, but not before it had developed the rail-barge routes and

¹¹ 41 Statutes at Large, part 1, section 500 (1920).

rates. The corporation was to continue operations until an adequate navigation channel had been achieved, terminals built and private companies were willing to provide service. Then, the Secretary of War could lease or sell the equipment. The Barge Line was transferred to the Department of Commerce in 1939 and sold to a private corporation in 1953—the Federal Barge Line, Incorporated.

The Federal Barge Line operated only south of St. Louis until 1926 due to shallow water depths and lack of terminals on the Upper Mississippi. This changed, however, when a Minneapolis-St. Paul group formed the Upper Mississippi Barge Line Company and requested service. In 1927, an agreement was reached whereby the private group would build a fleet of towboats and barges to be leased to the corporation and operate north of St. Louis. Three of the towboats were built by the Dubuque Boat and Boiler Works and one, the *S. S. Thorpe*, took three 500-ton barges of sugar to Minneapolis in August, 1927.

The semi-weekly service above St. Louis was unable to handle the demand for cargo space, especially in the grain trade. Traffic rose from 14,061 tons in 1927 to 119,648 tons in 1928. Northbound cargoes consisted of coal, coke, sisal, sugar, coffee, iron products, agricultural implements and bagging and burlap. Southbound, corn, wheat, barley, rye and other agricultural products were the important freight commodities. In 1928, the corporation purchased the leased boats from the Upper Mississippi Barge Line.

Terminals, Towboats and Barges

In addition to navigable channels, proper terminal facilities and suitable floating equipment had to be provided. New terminals were opened at Dubuque and Burlington in 1928. The Dubuque terminal was turned over to the Federal Barge Line, whereas, the Burlington facility was a municipal terminal which could handle most of the commodities shipped on the river. Other Iowa cities had no terminals or limited facilities for handling specialized freight. The third and largest terminal on the eastern border of Iowa was built at Rock Island in 1931, after approval of a bond issue for \$300,000. The city had been selected to represent the Quad Cities area by the corporation and was expected to make the region a great industrial center.

By 1928, barges with a 500-ton capacity were redesigned to carry 1,000 tons on the six-foot channel of the Upper Mississippi and 2,000 tons on the nine-foot channel of the lower river. The use of a standard

design meant less expensive construction and avoided transshipment at St. Louis. In 1929, three new towboats were built for different sections of the river; 1,000-horsepower boats for the six-foot channel between St. Louis and Minneapolis, more powerful ones for the eight-foot channel between St. Louis and Memphis and larger ones for the lower river to New Orleans. Such towboat names as the *Mark Twain*, the *Huck Finn*, the *James W. Good* and *Patrick J. Hurley* were well known in river movements.

The corporation made meaningful advances in towboat engineering technology, replacing paddle wheels with propellers and steam with diesel engines. Propellers required deeper drafts than were available on the Upper Mississippi so a tunnel stern design was adopted in which the propeller was located inside a spoon-shaped recess on the bottom of the boat, with part actually above the water surface. With the propeller operating, vacuum action filled this tunnel. Another propeller was added for maneuverability in shallow water. These innovations made water transportation more competitive and were quickly adopted by private commercial carriers when they entered river transportation. A 6,000-horsepowered boat could move tows of 40,000 to 50,000 tons as compared to a 6,000-horsepowered locomotive hauling 150 cars of 50 tons for a total of 6,000 tons. In the 1920s and 1930s, the corporation was the only source of technological innovations in water transportation.

Missouri River Developments

Progress toward development of a navigable channel on the Missouri was slow despite the fact that by the 1920s, water transportation was generally considered economically viable for commercial traffic. In 1927, Congress ordered a study of a possible nine-foot channel from St. Louis to Kansas City. Congress also directed that a comprehensive examination of river use, including flood control and navigation, be undertaken in the late 1920s. From 1900 to 1927, five severe floods had occurred on the Missouri and more would occur in later years. The result of the study was the start of construction of the Fort Peck Dam in 1933, located about 175 miles north of Bismark, North Dakota.

Summary

Railroads, aided by federal legislation in 1920 which returned them to private ownership and resulted in changes in regulatory policy, recovered fairly rapidly

from their wartime experience. During the decade, mileages operated in Iowa remained relatively constant, freight revenues and earnings showed steady growth, but passenger traffic fell as the result of highway competition. The depressed agricultural sector, further impaired by large increases in freight rates, detracted from the general prosperity of the state and was responsible for congressional action for relief through rate adjustments. The challenge to the railroads was not confined exclusively to highway rivalry but also to air and water transportation development sponsored and supported by federal legislation.

While these circumstances and conditions were important to Iowa, they were not the overriding issues facing the state. "Getting out of the mud" was the principal problem to be addressed and was the focus of highway interests and legislators. Despite the fact that Iowa lagged behind other Midwestern states in permanent highway improvements, Iowans bought automobiles in record numbers, and motor buses and trucks appeared by the hundreds. To alleviate confusion, commercial vehicles were controlled and supervised by the railroad commission and for motorist convenience, primary roads were marked by state and federal standardized symbols and numbers. The basic policy question centered upon planning and financing decisions to speed construction of hard-surfaced highways. Voiding of a state bonding plan by the Iowa Supreme Court spurred counties to greater efforts for primary road funding and improvements.

Commercial air service began with airmail and passenger traffic at the Iowa City and Des Moines airports, both of which were on transcontinental routes. River transportation on the Mississippi was revived by creation of the Inland Waterways Corporation which operated the Federal Barge Service. On the Missouri, studies concerning channel depths as well as river use for flood control and navigation were underway and would provide the basis for further river control.

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