

United States Department of the Interior
National Park Service

National Register of Historic Places
Registration Form

This form is for use in nominating or requesting determinations of eligibility for individual properties or districts. See instructions in Guidelines for Completing National Register Forms (National Register Bulletin 16). Complete each item by marking "x" in the appropriate box or by entering the requested information. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, styles, materials, and areas of significance, enter only the categories and subcategories listed in the instructions. For additional space use continuation sheets (Form 10-900a). Type all entries.

1. Name of Property

historic name Y Bridge
other names/site number Galena Y-Bridge

2. Location

street & number junction of old highways 43 and 13 N/A not for publication
city, town Galena N/A vicinity
state Missouri code MO county Stone code 209 zip code 65656

3. Classification

Ownership of Property	Category of Property	Number of Resources within Property	
<input type="checkbox"/> private	<input type="checkbox"/> building(s)	Contributing	Noncontributing
<input checked="" type="checkbox"/> public-local	<input type="checkbox"/> district	<u>0</u>	<u>0</u> buildings
<input type="checkbox"/> public-State	<input type="checkbox"/> site	<u>0</u>	<u>0</u> sites
<input type="checkbox"/> public-Federal	<input checked="" type="checkbox"/> structure	<u>1</u>	<u>0</u> structures
	<input type="checkbox"/> object	<u>0</u>	<u>0</u> objects
		<u>1</u>	<u>0</u> Total

Name of related multiple property listing: N/A
Number of contributing resources previously listed in the National Register N/A

4. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this nomination request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.
G. Tracy Mehan III
Signature of certifying official G. Tracy Mehan III, Director Date 4 April 1991
Department of Natural Resources and State Historic Preservation Officer
State or Federal agency and bureau

In my opinion, the property meets does not meet the National Register criteria. See continuation sheet.
Signature of commenting or other official _____ Date _____
State or Federal agency and bureau _____

5. National Park Service Certification

I, hereby, certify that this property is:
 entered in the National Register. See continuation sheet.
 determined eligible for the National Register. See continuation sheet.
 determined not eligible for the National Register.
 removed from the National Register.
 other, (explain:)

Signature of the Keeper _____ Date of Action _____

6. Function or Use

Historic Functions (enter categories from instructions)

TRANSPORTATION/road-related

Current Functions (enter categories from instructions)

TRANSPORTATION/pedestrian-related

7. Description

Architectural Classification

(enter categories from instructions)

Other: open spandrel arch Y bridge

Art Deco

Materials (enter categories from instructions)

foundation concrete

walls N/A

roof N/A

other concrete

Describe present and historic physical appearance.

Opening paragraph

The reinforced concrete bridge at Galena, Stone County, Missouri, State Highway Department structure number H404, known as the Y Bridge, is a structure with five open spandrel elliptical principal spans and ten slab and girder secondary spans. The bridge is called the Y Bridge because the secondary spans of the east end form a fork from two approaches. In terms of both architectural form and detailing the bridge is an example of "classical moderne" a sub-type of the Deco style. The bridge is essentially unchanged from the time when it was built, still maintains its physical relationship to principal historic structures and areas of Galena, and is in an area which continues to possess its natural character. The bridge retains its integrity of location, design, setting, material, feeling, and association.

8. Statement of Significance

Certifying official has considered the significance of this property in relation to other properties:

nationally statewide locally

Applicable National Register Criteria A B C D

Criteria Considerations (Exceptions) A B C D E F G

Areas of Significance (enter categories from instructions)

Transportation

Engineering

Architecture

Period of Significance

1926-41

1926-27

1926-27

Significant Dates

1926-27

1926-27

1926-27

Cultural Affiliation

N/A

Significant Person

N/A

Architect/Builder

Bureau of Bridges,

Missouri State Highway Department

State significance of property, and justify criteria, criteria considerations, and areas and periods of significance noted above.

SUMMARY:

The Y Bridge is significant under criterion A and C as a property type associated with broad demographic and socio-economic events that have made a significant contribution to the broad patterns of American history. The associated areas of significance are:

TRANSPORTATION: The Y Bridge is the most visually impressive and physically imposing public works monument in Stone County. It was constructed during the 1920s good roads movement in Missouri with money from a constitutional amendment that authorized the sale of state bonds for road improvement. The bridge formed a connecting link at the crossing of State 44 and 43 highways as dictated by Missouri's state plan for road development. Construction of the Y Bridge significantly augmented automobile travel into the historic Shepherd of the Hills country. It stood at the northwest entry to the region.

ENGINEERING: The Y Bridge was the longest open spandrel concrete arch bridge in Missouri at the time of its construction--1926-1927. The eccentric but functional design of the bridge is also unique among bridges constructed in the state; only a few examples of this design were constructed in other states, as well.

ARCHITECTURE: In addition to the above, the Y Bridge is an advantageously sited, unified, and early example of "Classical Moderne," a form of the Deco style with a classical order which came to typify much government sponsored building in the thirties and, as such, it possesses high artistic value.

The period of significance for Engineering and Architecture is the bridge's construction date; the period of significance for transportation ends at the 50 year mark.

See continuation sheet

9. Major Bibliographical References

Previous documentation on file (NPS): N/A
 preliminary determination of individual listing (36 CFR 67) has been requested
 previously listed in the National Register
 previously determined eligible by the National Register
 designated a National Historic Landmark
 recorded by Historic American Buildings Survey # _____
 recorded by Historic American Engineering Record # _____

See continuation sheet

Primary location of additional data:
 State historic preservation office
 Other State agency
 Federal agency
 Local government
 University
 Other
Specify repository: _____

10. Geographical Data

Acreage of property 3.3

UTM References

A

1	5	4	5	8	8	4	0	4	0	7	3	1	5	0
Zone			Easting					Northing						

C

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B

Zone			Easting					Northing						

D

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

See continuation sheet

Verbal Boundary Description

See continuation sheet

Boundary Justification

See continuation sheet

11. Form Prepared By

name/title 1. Lynn Morrow and Dr. David Quick
organization Kalen and Morrow date 2 April 1990
street & number P.O. Box 399 telephone 417-546-3761
city or town Forsyth, MO state Missouri zip code 65653

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Y Bridge, Galena, Stone County

Description

The Y Bridge across the James River at Galena in central Stone County served both Missouri state highways 44 and 43. It is on axis with the north side of the square and four blocks east. The bridge itself is of reinforced concrete construction and incorporates 5 principal and 10 secondary spans to carry a deck which is 23 feet wide and which is a total of just under 764 feet long. The abutment on the west end of the bridge and the abutments for each arm of the Y on the east end are all set into steep slopes which descend to the river bottom area in what is a narrow place in the James River valley. The eastern or Y end of the bridge terminates in a restricted area below a bluff just wide enough for the eastern approach spans of the bridge and the roadway which runs perpendicular to the bridge under the face of the bluff. Beyond the west end of the bridge the land rises less steeply, however, the road continuing the axis of the bridge up past the railroad depot to the courthouse square has a considerable grade (see site plan).

The principal spans of the bridge are of fixed (unhinged) open spandrel elliptical arches of two ribs (see photos 1, 2, and 4). Each arch has a span of 100 feet and a rise of 26 feet. Each arch rib springs from the top of the base of the piers which descend below the spring line approximately ten feet to rest on bedrock. The two arch ribs of a single span each carry 8 rectangular columns within the spandrels. The adjacent columns carry girders which connect the columns and which are cantilevered 3'3" beyond them to form the spandrel bents which support the deck between the piers. Above the pier bases and extrados of the arch rings the piers also are divided into two rectangular columns which support girders with cantilevers to form bents. These pier columns are heavier in section than the spandrel columns, are fluted on their outer surfaces, and the underside of the cantilevers are curved outward at their tops. The deck, while supported by the arch bents and pier bents, is isolated from them structurally by means of metal plates although it is bolted through the plates. The deck itself is sectioned by expansion joints over the piers at each end of the principal section of the bridge and by felt joints over the intervening piers. These plates and joints structurally isolate the various elements of the structure of the principal spans of the bridge to serve to allow for expansion, necessary movement and avoid cracking (all the discussion of structural detail is based upon the set of drawing and specifications: "Bridge over James River," Missouri State Highway Department, H404, 1926).

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Adjacent to the downriver side of the second arch pier from the east end of the bridge is a tower form which rises from its own foundation in the river to the level of the bridge deck (see photo 2). This tower contains a stair and equipment to monitor river level.

The abutment and a typical post and girder bent support the deck and the deck girders of the two secondary spans of the west end of the bridge (see photo 3). The intersecting decks and girders of the Y, the unique feature of the bridge, are supported by 7 bents and the two eastern abutments (see photos 5 and 6). The decks of the secondary spans are carried on girders of reinforced concrete which are integral with the decks. These girder and deck structures are separate for each secondary span and rest on plates on the tops of the bents and are bolted to the bents through the plates (see photo 6, upper left to see joint). Each deck section is isolated from the others by felt joints. Again by means of such plates and joints expansion cracks are avoided. Such felt joints are also used at various locations in the railing structure above the deck.

Style and Aesthetics: Classical Moderne

Within its structural type, Y Bridge is very economical in terms of materials, and is elegantly proportioned. Furthermore, it is not without decorative detailing. Each of the six pier bents of the principal spans are fluted on their up and down stream faces (9 flutes). The edges of the deck and the lower rail of the hand railing are treated as a visual unit with moldings top and bottom to create the effect of a frieze which is penetrated at intervals in order that the deck might drain. A broad molding marks the junctures of piers and deck and serves visually as a capital to provide a transition from the vertical pier to horizontal deck and railing. The location of each of the piers are marked at the deck level by a slightly projecting post which takes the form of a console which is also marked by a molding above the top surface of the top rail of the hand railing. The 8 points of support of each of the spandrel column bents which carry the deck load to the arch rings are marked by post-consoles which do not project beyond or above the hand rail. Each of the 9 intervening spaces between top and bottom rail of the handrail is filled with 10 balusters, thus, the railing becomes a balustrade. These details, together with the proportions and locations of the structural elements, establish an overall hierarchy of both visual rhythm and load and support which is fundamentally classical.

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This classical approach demonstrates a well understood integration of formality and function which is appropriate for a structure which itself represents an interaction of local, state, and national support at the governmental level to meet a need which is also local and regional. The Y Bridge clearly fits a stylistic category, "Classical Moderne," a conservative form of Art Deco which "came to the forefront during the depression era of the 1930s...a simplified and monumental modernistic neoclassicism" (Weber, p. 12). This style was for "those clients, often governmental or civic who preferred a dignified modernistic architecture...." (Weber, p. 59). The Y Bridge, therefore, represents an early example of a style which would be so associated with the public works projects of the 1930s that it is sometimes referred to as PWA (Public Works Administration) Moderne (Weber, p. 59), and which dignifies many courthouses and other public buildings constructed in the Ozarks. While Classical Moderne is associated with the PWA in Weber's discussion, its inception clearly precedes the PWA. She uses the Nebraska state capitol building by Bertram Goodhue designed in 1920 as the beginning example (Weber, p. 59-60).

Integrity

The Y Bridge at Galena remains the same as it was when it was constructed. The bridge structure has had normal maintenance and the deck has been periodically repaved. The basic form of the structure of the bridge has not been altered. Relative to other concrete bridge structures in this area from this period its condition is excellent. There has been some erosion of the railing particularly where it was most exposed to weather and road salt (see photo 3). The deck and deck structure shows erosion in areas of great exposure to water and salt as around drain openings, and in a few of these places where reinforcing bars have been exposed, there has been some rusting and spaling. Overall these problems are minor and do not detract from the structural or material integrity of the bridge; they can also be corrected. The basic structure of the bridge is all but unaffected. Integrity of design, material, and workmanship have all been retained in near entirety.

The highways now use a recently constructed bridge some quarter mile upstream so that they avoid downtown Galena, and the Y Bridge has been closed to vehicular traffic although it remains open to pedestrians and in fact serves as a center of interest in a town park. The bridge retains its physical relationship to the

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courthouse square and a great deal of the original feeling of that relationship is retained by the area, as is the natural character of the site. Integrity of location, setting, feeling, and association are also essentially intact.

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Y Bridge, Galena, Stone County

Historic Context

The Missouri Ozarks region is characterized by the rugged land form which is the result of the many valleys eroded away by streams and rivers cutting through the thin soils and the limestone bedrock. These hollows and valleys sometimes spread into fertile bottoms but often take the form of steep ravines.

Travel and commerce in this region were once difficult. In the early days these were often by rivers substantial enough to support navigation. Overland travel of any distance normally followed the ridge tops. Many areas in the Ozarks were almost inaccessible. Although overland travel tended to follow the ridges, early settlement was often in the valleys where there was better soil and also waterpower for the mills which were originally a necessary part of local industry. Galena is located along the James River, a major tributary to the White River. The White River system is the principle drainage of the southern Missouri Ozarks.

Prior to 1851 modern Stone County was James River township of western Taney County. But during the last decade of county formation in Missouri (1851-61) Stone County became a political entity in 1851; two other new White River region counties followed in 1857 (Douglas) and 1860 (Christian) as the White River Hills assumed its modern county configuration (Meyer, pp. 769-71).

Stone County's nineteenth-century settlement was highly dispersed--trails and wagon roads led travelers throughout the expanse of the forested Ozarks. Stockmen pursued an open-range lifestyle supplemented by market hunting and hunting for home consumption. Springfield, located to the northeast, was the market center for the sale of surplus goods and the depot for purchases of manufactured items and common food staples. Springfield wholesalers supplied general mercantiles in Stone County. The famed Wilderness Road sliced its way along the east side of the county crossing White River at modern Kimberling City. It led into Arkansas and carried freighters' traffic to and from Springfield during the New South Ozarks, ca. 1865-1915, (Flanders, 1979); after the railroad crossed the county from the northwest to the southeast the Wilderness Road continued as a primary artery north of Reeds Spring toward Springfield and south from Reeds Spring to Kimberling ferry and beyond (modern highway engineers routed 160 and 13 along the general corridor of the Wilderness Road). An independent, economic self-sufficiency

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prevailed throughout Stone County in the nineteenth century.

The glory of war for most Stone Countians was participation in the famous Wilson's Creek battle located northeast of Galena in southwest Greene County and in the Battle of Pea Ridge in northern Arkansas. Locally, history recorded skirmishes involving northern and southern sympathizers, but no significant pitched battles occurred within the county. Certainly Stone County suffered during Civil War, and in the main its settlers supported the Union. In the mid-1860s, they joined the powerful Republican block of counties in southwest Missouri, an alliance that continues.

Nathan Parker's 1867 promotional Missouri book characterized Stone County as a grazing land hopeful of future mineral development which was symbolized by the naming of the county seat Galena. Parker suggested that milling industries "could be profitably established" in the future (Parker, 402) and implied that little significant industry existed in the locale.

Nineteenth-century Stone County, like all Ozarks hinterland counties, enjoyed its self-sufficiency, and a relative life of ease existed for many. The transformation into a cash-based, diversified, capitalist economy did not come in significant measure until the twentieth century. Population remained sparse in comparison to counties to the west and north that were closer to major roads and the market centers of Joplin and Springfield. The demographic distinctiveness of Stone County and the White River Hills in a regional context may be seen in the following figures.

Population Per Square Mile

<u>White River</u> <u>interior counties</u>	<u>1860</u>	<u>1870</u>	<u>1880</u>	<u>1890</u>	<u>1900</u>
Stone	4.5	6.1	8.3	13.4	18.7
Taney	5.2	6.5	8.5	12.2	15.5
Douglas	3.0	4.9	9.6	17.6	20.1
Ozark	3.3	4.6	7.5	13.1	16.3

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Nearby southwest Missouri counties

Barry	10.2	13.2	18.4	29.3	32.6
Christian	9.9	12.1	17.4	25.3	30.6
Lawrence	14.5	21.5	28.9	43.1	52.0
Greene	19.8	32.3	43.2	72.9	79.0
Webster	12.1	17.8	20.8	25.9	28.4

(Switzler, pp. 542-44; Bureau of the Census, 1920, pp. 5-6; compilations by Morrow.)

By the 1890s Stone Countians, prompted by railroad advertisements and the example of neighbors, began to diversify their agriculture into fruit products and to produce timber exports for the still-expanding national and regional system of rail supplied markets. Increasing immigration and capitalist transformation of the countryside by wage labor and market competition led the first Ozarks scholar of the twentieth century to conclude that the "average farmer at the present time [1910] has a smaller net income than he or his progenitor had fifty years ago. This is true of the bottom land farmers as well as the ridge farmers (Marbut, 1910).

The process of the opening of the area began with the building of the railroad which was completed just after the middle of the first decade of the 20th century. But the coming of the railroad itself was just the beginning of the opening process for a town like Galena (for another discussion of the relationship of an Ozark town to railroad and highways, see Quick, Mountain Grove Bandstand, NRHP). To function as a railroad trading center it had to be integrated with the surrounding lands by means of a dependable road system. This meant bridges, among other things; fords were not enough because commerce would be frequently and unpredictably interrupted by floods. Prior fords at Galena were located just south and north of the location of the Y Bridge. The land was rugged and the high water frequent and swift so the bridges needed to be substantial.

The first important bridge crossed the James at Galena. It was a steel one of three spans built in 1910-11. It was a single lane bridge intended mostly for wagons; it would not have been sufficient for any great volume of traffic when the area really opened. It is interesting to note that though many such bridges survive and are impressive reminders of our past, they were not thought of as permanent as was indicated in the engineering

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literature of the time (Thacher, p. 442; Webster and Quimby, pp. 424-26; and Plowden, p. 299). Their wooden decks needed replacement, the steel needed continual maintenance and painting, and if they were no longer adequate in one place they could be moved to another. This was the case with the iron bridge at Galena, though one span was damaged in a flood, the other two were moved upriver to Hootentown where they still exist (McGrath, 1989).

The final phase of the opening of the southern Missouri Ozarks came in the 1920s as a partial result of the Hawes highway law of 1917 and the bond issues which allowed the state to join in a partnership with the federal government and which promised a north-south and an east-west state highway through every county. Of the approximately 61 concrete bridges listed in the Kingshighway Appendix built before 1941 forty were built in Ozark or Ozark border counties (Kingshighway, 1986). If we subtract those in St. Louis, Jackson, and Cole counties only 5 were built outside the Ozarks region. Of the listed concrete bridges built in the Ozarks only one was certainly built before 1920, another, the date is uncertain. Of the remaining 38 the large majority were built between 1920 and 1930. This was the period, in general, when the process of opening to internal commerce, and becoming accessible to the outside, was completed in the Ozarks. The road and highway system were essential for this development. For all the fabled independence of the regional inhabitant it could not have happened without state and federal programs. The local economy could not have supported the capital investment necessary for the massive construction required.

The two state highways for Stone County came to be highway 43, the north-south road which contained parts of the existing White River Road and highway 44, the east-west road which met highway 43 at Galena and which also crossed the James River there. The eastern meeting of these two highways was the Y of the Y Bridge which was intended to serve both highways. Before the Y Bridge, highway 44 had crossed the James by means of the 1910 steel bridge.

The bridge built at Galena in 1926 was one of those which was essential in the good roads movement and the opening of the Ozarks. It is also a fine example of a characteristic type. Many of the forty Ozark area bridges mentioned in the Kingshighway survey were small with overall lengths of less than

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100 feet. Of the bridges over 100 feet many had relatively short span lengths; fifteen, however, had spans of 100 feet or more and of these, seven, including the Y Bridge, were two-ribbed open spandrel elliptical arched structures with main spans of 100 feet and deck widths of 23 feet. Others were similar to the Y Bridge in terms of other architectural stylistic features and details as well. The Y Bridge was a typical Missouri Highway Department bridge of its time in terms of its structural type and decorative use of detail. It was the first of the 100 foot span 23 foot deck bridges to be built (the others were built in 1928, 1929, 1931 and 1932. Kingshighway appendix). Of this category of bridges the Y Bridge is the most impressive, it is the longest in this category and, in fact, the overall length of only one of the Ozark bridges is greater. This is the bridge over the White River at Branson which is larger in all its major dimensions with greater span length and deck width as well. However, this bridge was built for the federal and not the state highway system, and its site does not retain as much integrity. The Y Bridge is of course unique among concrete Missouri State Highway Department bridges of its time because of its Y feature (note Kingshighway appendix). Consequently, we may state the Y Bridge is both representative of an important type and is a superlative example of that type.

The Y Bridge is significant because it is at once impressive in scale, monumental in form and, unique in its Y configuration. It is at the same time a very clear example of the structures which were so important in the transitional step in building the transportation system which opened the Ozarks to regional and state commerce and even national prominence in the tourist industry. Cited as it is adjacent to railroad and depot and on axis with the north side of the Galena courthouse square, the relationship between road, railroad, and local development is still clearly to be seen from the bridge. A pedestrian standing on the Y Bridge can also see the pylons of the iron bridge that the Y Bridge replaced just downstream, and looking upstream can see the modern highway bridge which allows traffic to bypass the center of Galena. The opening and the closing of this chapter of "Opening to the Outside" in Ozarks local history is all visible from one point.

TRANSPORTATION:

The master event that transformed lifestyles was the construction of the White River Division of the Iron Mountain and Southern Railway, 1901-06, that provided service from Carthage,

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Missouri, to Batesville, Arkansas (Myers-Phinney in Kalen and Morrow, p. 17). The railroad elevated land prices and brought regional and national markets within reach of most who wished to engage cash economies. Local entrepreneurs in timber and fruit created new cash-based labor opportunities. The new railroad towns of Crane, Galena, and Reeds Spring represented local centers of capital formation and concentrations of diverse merchandising and a modest number of professional families.

Business transformed the traditional local trade into surplus and export trade although many families still chose self-sufficient lifestyles. By 1907 livestock (especially cattle, swine, and sheep) and forest products (hardwood lumber, ties, fence and mine posts, and walnut logs) dominated the cash economy in Stone County--stock accounted for 44% of dollar value and timber for 38% of dollar value. A distant, but increasingly important enterprise for the next generation, was canning fruit and vegetables. Although in 1907 the dollar value for canning was only 5%, canning provided short seasonal employment for dozens of families, especially women and children; in 1907 over a million pounds of canned fruit left the county on rails (Surplus Products, 1908, p. 114).

All the while Stone County was still one place in Missouri where speculators or immigrants could still purchase government land, the presence of which allowed some families to easily persist in open-range lifestyles (Surplus Products, 1909, p. 115). Open range, supported by the majority of the politically active citizens, and the rugged topography of the forested Ozarks did not allow for a widespread or thorough development of Stone County land into improved farms. By 1910 only 58% of the land was classified as a farm. A relative comparison of the same counties used to demonstrate demographic distribution follows:

Per Cent of Land Classified as a Farm

Stone	58	Barry	70
Taney	56	Christian	73
Douglas	66	Lawrence	91
Ozark	60	Greene	90
		Webster	80

(Bureau of Labor Statistics, 1918, pp. 496-98.)

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Movement across Stone County quickened. The railroad economies needed roads and access across waterways. Locals and newcomers in the discussions of development entertained visions of bonanza mines and resort spas. Promoters "knew" that if transportation routes and exploration proceeded minerals and tourists represented the next "cash crops."

As early as 1879 Col. W. F. Switzler drew attention to caves in Stone County. Pioneers had used one near Galena as a frontier site for saltpetre, but Switzler paid most attention to the "Bottomless Pit" (Marble, later Marvel Cave) in southeast Stone County. Its "echoless depths" were already "well known among curiosity-seekers in adjacent country" (Switzler, pp. 550-51). The huge success of Eureka Springs, Arkansas, after 1879 drew state and national attention to Ozarks waters and promoters encouraged the development of spas throughout the Ozarks. In Stone County the results were the hamlet Ponce de Leon and the short-lived Town of Galena Medical Springs (Back Tax Book of the County of Stone, 1894, p. 41). More importantly, the national press attracted Canadian W. H. Lynch, who envisioned a great new Victorian spa, Marble City, replete with public parks, a grid street layout, fashionable homes, mineral waters, and tours of the great cave (see Stone County Deed Book H, p. 606, for plat). Despite considerable promotion by Lynch, including a Congressional bill in 1911 to make Marble Cave and adjoining lands into a National Park, travelers did not begin to frequent his natural wonder in any appreciable numbers until the good roads movement of the 1920s (NPS reference in Bureau of Labor Statistics, 1914, p. 490).

Victorian Springfieldians had floated the James River in fashionable group outings since the early 1880s, but the railroad created new marketing opportunities for such arcadian experiences in the Ozarks. At the turn of the century Charley Barnes invented the Ozarks john boat and he and his brothers capitalized a float business that became legendary in southwest Missouri and nationally known (see discussion by Myers-Phinney, "Roads, the River, and Recreation," Kalen and Morrow). Following the impoundment of Lake Taneycomo in 1911-13 the traffic of floaters and resorters along the James River increased dramatically. By 1920 the Barnes brothers built an automobile garage on the Galena square, Charley Barnes became a local politician and promoter in the Ozarks Playgrounds Association, and other Stone Countians owned and developed resort camps among the growing number of camps on James River.

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The construction of Stone County's first modern bridge in 1910-11 may have excited Lynch's vision of attracting travelers to Stone County's most famous natural landmark. Certainly the Republican administration in Missouri headed by Governor Herbert Hadley (1908-12) brought increasing attention to the Ozarks with its regular promotional tours by rail and buggy on land and by boat and float trips on the rivers. The Republican efforts helped spawn a special "Missouri 'Booster' Edition" prepared by the Missouri Bureau of Labor Statistics (Bureau of Labor Statistics, 1914). In this expensive and unusual publication by state government each county had its distinct section of text supplemented with a county map. For Stone County, it described the foremost industry in the county as timber and the growing cannery economy (later to export to national grocery chains such as Kroeger and Safeway); drew attention to the pride of the county--a new \$12,500 bridge at Galena across James River; and publicized float trips for men and women from Galena to Branson. Crane, the largest of Stone County's railroad towns, formed a new commercial club in 1911 with Dr. H. L. Kerr as President (Bureau of Labor Statistics, 1914, pp. 488-90).

Stone County's move toward road and bridge development was inextricably intertwined with parallel movements in tourism and modernization--movements that were not always complementary to each other. Dam impoundments and the generation of electricity gripped the imagination of many. An irony in Stone County was that bridge building became stalled in the face of an uncertain industrial future on James River.

In 1906 General William H. Standish, one of the early twentieth-century newcomers and promoters of Stone County, and Boston capitalists submitted a proposal to Congress (H.R. Bill 10550) "To Declare James River in Stone County, Missouri, Unnavigable." The basis for this proposal, which was later approved, was that commerce by boat could not exist above Forsyth, Taney County, located on White River many miles downstream from the confluence of the James and White Rivers in Stone County, and that the James and upper White Rivers should be "turned over to electric power uses, and that they should be dammed...." Moreover, this waterway, as demonstrated by a map sponsored by promoters and the railroads, was used principally as an inducement for people "to come to Galena and Branson" to float the rivers.

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Standish, a lawyer and engineer, later visited the New Jersey laboratory of Thomas A. Edison in 1908. Standish envisioned electric-powered freight wagons for the Ozarks and the James River valley where users could charge storage batteries with electric power from a James River dam (Current Wave, 10 December 1908).

A consortium of eastern investors planned a regional scheme of at least three dams--one above Forsyth (Ozark Beach dam built in 1911-13), one above Branson (future Table Rock), and one on James River (White River Leader, 5 March 1915). As the first dam neared completion at Powersite, Boston investors and the Amberson Construction Company of Boston, who had the Ozark Beach dam contract, began "talking up" further projects. They promoted the region in the Wall Street Journal, but ominous signs in Europe, a lack of necessary legislation from Congress, and tight money stalled the promotional rhetoric (WRL, 5 March, 9 and 30 May 1915).

Standish, however, had already begun his James River dam. The project was to be a tunnel dam at a great horseshoe bend on James River called Virgin Bluffs. Amberson Hydraulic Company joined Standish's White River Construction Company to begin excavation in February 1913. After several injuries to laborers and engineering mishaps, the eastern investors discontinued financial support in July 1913, but rumors of resuming the work continued for several years (Springfield News-Leader, 23 November 1958).

The same year, 1913, the Stone County court ordered the county highway engineer to develop plans for four steel bridges across James River and Flat Creek; soon the court changed that order to six bridges--four across James River and two across White River in southern Stone County. Local politicians who advertised for bids discovered that their money would fund only two bridges and chose locations across James River at Jamesville north of Galena and Cape Fair south of Galena (McGrath, 1989). However, none were built as the county court was caught in a catch-22 situation. Rumors floated around Stone County that construction companies were proposing to build dams in the near future. Thus, the court said it was willing to accept bids, but would not award contracts for some time. Under these circumstances the representatives of bridge companies would not submit bids which produced a stalemate for local transportation in the face of the uncertain direction of modernization (Stone County Court Record Book H, pp. 261-62).

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At the same time it was obvious to all that the tourist industry, though seasonal, had joined other expanding commercial ventures in Stone County. Tourists sometimes spoke more loudly than locals in demanding better roads, bridges, and modern amenities. The good roads movement of the teens, however, managed completely by county governments with modest treasuries witnessed only occasional advances in improved transportation.

The excitement over the impoundment of Lake Taneycomo served as an incentive for the regional construction of bridges (Galena, 1911; Branson, 1913) and the founding of promotional groups who called for more engineers and construction work. Crane established its vocal Commercial Club in 1911 and in 1913 Coin Harvey began the most vocal and influential group of White River regional boosters who kept the good roads movement in the public eye during the teens (Kennan, pp. 299-316). The Ozark Trails Convention of 1913, held in nearby Neosho, was attended by over 300 delegates including Missouri Governor Elliot Major. Ozark Trails proclaimed itself in accordance with the Third American Road Congress recently held in Detroit, Michigan. More importantly for southwest Missouri, the Association announced support for the creation of an effective State Highway Department in Missouri. It endorsed a proposed amendment to the Constitution of Missouri for a tax to support road construction; it recommended that the state highway department be given the authority to establish a uniform class of roads and bridges; and it recommended that plans and specifications for all bridge work costing over \$2,000 be approved by the state highway department (Bureau of Labor Statistics, 1914, pp. 123-25). The proposed tax amendment gained popular support, but in November 1914 the Missouri legislature denied the tax as it had a previous proposal in 1910.

Affluent urban tourists continued to motor into Galena and Branson--towns on opposite sides of Harold Bell Wright's fabled Shepherd of the Hills country. Wright provided a master stroke in creating an everlasting romance for the locale--a feat much appreciated by local promoters (see Quick, "Old Matt's Cabin," NRHP). Galena, located at the apex of the region represented the entry point into the Shepherd of the Hills for travelers from the Tri-State mineral region near Joplin, visitors from Kansas, and Kansas City. Those who took the week-long trip by water on James and White Rivers through the Shepherd of the Hills often stopped the fourth day at the mouth of Indian Creek to hike up to Lynch's Marble Cave.

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But automobiles received attention, too. The Branson White River Leader announced in summer 1914 that the first automobile ever had crossed historic Dewey Bald--it was a Cadillac from Kansas (WRL, 31 July 1914). Fearless motorists, ready for a challenge throughout the teens, came through Galena on poor roads and continued southeast to assault the rough ledge rocks and glades to achieve the noteworthy feat of ascending Dewey Bald. The Stone County court was not oblivious to the regular summer traffic southeast from Galena to Reeds Spring and Marble Cave. By 1914 local authorities had improved a county road that ended at the county line in the center of the Shepherd of the Hills country hoping that Taney County would extend a road from Branson northwest to meet the Stone County road (WRL, 16 January 1914; Taney County finally improved a road northwest of Branson to Stone County in 1926, the year the Y Bridge became a reality).

Meanwhile, Springfieldians clamored for access to the Shepherd of the Hills along the old Wilderness Road. Jesse Tolerton, known statewide in the Hadley administration as head of the Missouri Game and Fish Department and as an influential Republican negotiator, led the Springfield Club as it held public meetings along the road to encourage political attention for road improvement (WRL, 16 and 23 October 1914; 10 September 1915).

The state wielded a modest and mostly ineffective hand during the teens. The first state effort to provide funds and expertise for Missouri road improvement was the province of the Board of Agriculture, 1907-17 (Bleckschmidt, 36 ff.). The Board held a series of good road conventions and significantly publicized the split log drag (Maitland drag), the invention of a Holt County farmer. The effective drag received national attention as "the Missouri idea" and was copied as a model in several states. The inventor, D. Ward King, became elected as president of the 1907 good roads convention and helped bring wider attention to the movement (Nunn, pp. 48-49).

It took promotional groups on the national level, especially the American Automobile Association, to exert pressure that eventually got the federal government and subsequently state governments to assume responsibility for road improvement. Missouri Congressman D. W. Shakleford joined the new federal Committee on Roads and co-authored the Federal Highway Aid Act of 1916 (Paxson, pp. 242-43). Although World War I slowed prompt action, the federal act required that the states establish highway departments much to the applause of Coin Harvey and his associates.

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In 1917 Missouri outdoorsman and politician Harry B. Hawes responded to the feds by introducing the bill now known as the Hawes Act--the first really modern road law in Missouri--which created the Missouri Highway Department, shifted the primary responsibility for roadbuilding from the counties to the state, and provided for an initial State Road System (Bleckschmidt, p. 41). The first important duty and accomplishment of the highway department was to plan a road system. They unveiled the first official map in 1918, but the department did not have any money to implement the transportation vision; thus, initiation of road projects was still left to individual counties. The counties did have some equipment--trucks and tractors--allotted to them as federal aid following World War I, but the equipment also required money for maintenance (Official Manual, 1919-20, p. 193). In Stone County promoters tried to get auto owners to pay \$1 per month for road upkeep (Stone County News-Oracle, 12 May 1920).

A few counties floated bonds to finance road projects in Missouri. Stone County was the only southwestern Missouri county that passed countywide road bonds while numerous road districts in other southwest Missouri counties also passed (see map in Kalen and Morrow, p. 33a). The Stone County court, nervous about the bonds, sent Galena attorney Rufus Scott to Chicago to consult with a bond attorney to validate the constitutionality of the measure. However, the failure of many counties and districts throughout Missouri to vote bonds was an additional signal for the need of far-reaching legislation. The result was a campaign to "Get Missouri Out of the Mud" and finally the passage of a constitutional amendment to authorize the sale of \$60 million in state road bonds--a landmark event that had statewide ramifications throughout the 1920s.

The highway department now had a state plan and state money. With the bonds approved the Missouri General Assembly held a special summer 1921 session and passed the Centennial Road Law which gave the highway department comprehensive authority in hiring professional engineers, letting contracts, approving designs, and maintaining the road system (Nunn, p. 78). The state plan assured each county at least one improved north-south road and one east-west road. Promotional groups had used named highways--named for tourist travel--as road designations throughout the teens and into the 1920s. Locally, names like the Wilderness Road, White River Trail, Tourist Trail, Ozark Trail, and others lingered, but the public quickly adopted official state numbering systems during the 1920s. In Stone County the primary highways became 43 (modern 13) and 44 (modern 248) both

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crossing at Galena.

Road and tourist maps of the 1920s located and often promoted Galena. One group that kept Galena in the public press was the Ozarks Playgrounds Association--historically a successor network to the Ozark Trails Association. Joplin Rotarians founded O.P.A. in 1919 and in 1920 their director was Eli Ashcraft, prominent newcomer and contractor in Galena. Ashcraft constructed the Stone County courthouse (on the National Register of Historic Places), built new sidewalks and culverts in Galena and at the Missouri Pacific railroad depot, did remodeling on the Ozark Beach dam, developed his own James River resort camp, and attended O.P.A. meetings in Joplin with Charley Barnes, C. E. Scott, Tom Yocum, W. D. Craig, and others--all intimately associated with local tourism in float fishing and Galena prosperity in general. These and others also promoted a Lake Taneycomo Trail from Joplin to Galena (SCNO, 15 June and 30 November 1921).

Ashcraft's construction in concrete masonry added a "permanent look" to Galena. In 1920 the Barnes brothers made concrete blocks and built a large Ford agency garage on the east side of the square (SCNO, 28 January 1920). The garage fit well into the Barnes Boating Company as urban customers wanted to store their new automobiles in safety at the garage while on James River float trips. Later the Barnes Company bought a new 1925 truck, lengthened the bed, and advertised quicker return trips to Galena as they hauled john boats and customers from Branson to Galena. Occasionally, customers such as the regular Muelbach parties from Kansas City, had the Barnes' brothers hire others to drive their new Hudsons to Branson at a designated time rather than make the return trip in the truck (Barnes interview).

Also in 1920 the Crouch-Warren Lumber Company of Collins, Missouri, established a new business near the depot (SCNO, 6 October 1920). H. J. Warren moved to Galena with his family to manage the business. He advertised pattern book house plans for Galena builders and became the supplier for the town's brisk building activities during the 1920s. Included were all the buildings on the east side of the square, the 1921 high school, and homes and businesses that were financed during the expanding business climate in Galena.

The White River Division of the Iron Mountain Railway created large scale float maps with Galena designated by a large

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star in the center (Wiley Collection). The railroad assembled information to encourage tourists to embark on a wilderness safari at Galena and return from Branson to Galena by rail. This kind of promotion continued following the 1917 acquisition of the line by Missouri Pacific. The railroads advertised the "international fame" of historic sites within "A Famous Triangle"--the borders being Galena-James River-White River-Branson-and the rail line from Branson-to Reeds Spring-to Galena. Promoters and locals alike took pride in another Harold Bell Wright publication in 1920, The Recreation of Brian Kent. The Galena News-Oracle said that Wright "very correctly describes the beauties and thrills to be enjoyed along the James River. . .and cabins like Auntie Sue's and a few 'Hillbilly' girls like 'Judy' are still to be seen" (SCNO, 31 March 1920). The romance of Galena, James River, and the White River Hills continued unabated.

The urban elites as tourists, who brought much attention to the region and to themselves by their presence in an Ozarks Arcadia, continued to come during the 1920s. They were joined by a large number of professional people and middle class Americans who could afford railroad excursions and Ford flivvers. They included novelists, journalists, naturalists, and painters; educators like Otto Rayburn who brought students from Kansas; scientists like Fred Prince and others who explored Marble Cave; and cultivated urban folks who imported the ethic of the "True Sportsman" into the Shepherd of the Hills region. The large game in the Ozarks had all but entirely disappeared by 1900. Locals from Stone County who killed a deer in Taney County and brought it to Galena in 1921 astonished residents who had not seen a deer in Galena in over twenty years (SCNO, 14 December 1921). Thus, the float trips and emphasis on fishing adventures on James River held a special attraction for sportsmen as fishing in the early twentieth century Ozarks was the symbolic outdoors activity. The Barnes brothers, Tom Yocum, J. D. "Jeff" Scott, "Big Hoss" Jennings, and other Galena-based guides refined the float experience to an art for appreciative urban tourists.

These true sportsmen in the 1920s welcomed another emerging professional on the river--the game warden. The game warden and true sportsmen convinced promoters such as the O.P.A. to support conservation. Local conservation groups founded chapters of the Izaak Walton League, made group trips involving a dozen or more boats to resorts on the James and White Rivers, and provided additional progressive copy for columns in the local press. Soon

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promoters, merchants, and guides held common memberships in the O.P.A. and with the Waltonians. Waltonians lobbied the public through the local press for conservation of fish in the rivers. Drawn by the increasing attention to the Shepherd of the Hills region conservationist-sportsmen from 1920 onward always comprised an important part of the population on the rivers.

The prominence of Galena-based guides as the best in the business was shown in a dramatic event in 1926. Keith McCanse, veteran Ozarks outdoorsman, appointed Missouri Game and Fish Department Commissioner in 1925, and the most prominent conservationist and Ozarks promoter of the 1920s, organized a float trip in southeast Missouri on Current River for Kansas City and St. Louis businessmen and politicians which included Senator George H. Williams and St. Louis Cardinals' owner Branch Rickey. McCanse instructed Herb Barnes of Galena to bring john boats and camping gear on a truck to Current River to lead this group on a multiple-day float trip. The Barnes guide and tour, developed on James River and in the Shepherd of the Hills country, was the best in Missouri (SCNO, 18 August 1926).

By 1922 the only bridge in Stone County over either river was still the steel bridge at Galena completed in 1911. The highway department, armed with money and the 1921 Centennial Road Law, chose Stone County as an appropriate place to spend some the first bond money. The site was at the Wilderness Road crossing which also served as a regular camping spot for the third day out from Galena on the Galena-Branson float. The Kimberling ferry made its last trip in December 1922 and Stone County had its second bridge (Table Rock Gazette, May 1978).

Local optimism in transportation improvements ignited a brief hope for a state park in Stone County. The Waltonians backed the idea and Keith McCanse came down from Jefferson City and personally looked over the Shepherd of the Hills country in Stone and Taney counties. The area met his criteria for selection--abundant water, natural beauty, and legendary association. Ironically, tourism in the Shepherd of the Hills region had already escalated land prices beyond that of other Ozarks regions that met McCanse's criteria and the commissioner dropped the plan (SCNO, 22 September and 10 November 1926. Local promoters later renewed Lynch's proposal to the Department of Interior for a Shepherd of the Hills National Park. The feds debated the issue, but soon faced with the economics of the Depression, dropped the proposal in 1932).

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The vacation crop of a "bungalow population" continued to come to Galena and motor beyond into the Shepherd of the Hills. Many arrived on a rail excursion, others took regional bus services into Stone County, and a few locals provided taxi touring. The "cave mania" of the 1920s brought additional people through Galena and in 1921 state representative Waldo Powell opened Fairy Cave Park south of Reeds Spring. By 1926 he entertained over 5,000 visitors annually (SCNO, 24 August 1921 and 15 September 1926).

Work on Missouri road improvement appeared irregularly in progress maps and reports in local newspapers. Petroleum companies joined promotional groups like the Automobile Association of America and the Ozarks Playgrounds Association in issuing road maps, but auto travel throughout the state was still uncertain and an adventure. Urban journalists contributed their own travelogs for tourists in special Sunday features. In one, the Automobile Club of Kansas City provided a generalized map for a "Two Day Motor Trip to the Ozarks and Return" accompanied with detailed milepost directions. On the return trip from Branson motoring into Galena the guide warned "narrow, dangerous road with sharp drop to James River and to retaining wall. Approach to bridge here is very sharp. Use all possible care. Most dangerous point of trip, particularly so if approached at dawn or dusk" (Kansas City Star, 13 June 1926).

Entering the James River by boat at Galena had long been a delight, but crossing the James River at Galena in automobiles had become a hazard known throughout the state. By spring 1926 while the state still had some bonds to sell out of the original \$60 million approved (and encouraged by the 1925 two cents state tax per gallon on gasoline) division highway engineer H. P. Moberly came to Galena and announced that a contract would be negotiated that year for a new bridge across James River (SCNO, 7 April 1926). Contractors in 1925-26 had already made considerable improvements on the central portion of the north-south highway 43 through Stone County. In fact, Galena and Crane businessmen hired local sign painter J. F. Lynly to paint and place a new sign in Lawrence County at the intersection of 43 and 16 saying "Short Cut to Lake Taneycomo by Way of Crane, Galena and the Shepherd of the Hills Country" (SCNO, 7 April 1926).

The old talk of dams on James River had disappeared with dam proponents focusing on White River; thus, Stone Countians lobbied for a new bridge for the increasing automobile traffic. Companies submitted bids but the process dragged on for months.

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The Galena News-Oracle corresponded with chief engineer B. H. Piepmeier about the project. Piepmeier replied in September

we are working at the present time working up the bridge design for this structure....This is a very complicated structure to design inasmuch as it involves the construction of a "Y" connection between Routes 43 and 44.

(SCNO, 15 September 1926)

The state first awarded the contract to nearby Republic Construction Company, Republic, Missouri. However, Republic figured their estimate with native gravel (creek or river gravel), but the state demanded crushed rock. The next closest bidder was Koss Construction Company of Des Moines, Iowa, a publicly confirmed bidder in November. Koss had just laid concrete slabs from Springfield to Carthage on what would become Route 66 the following year. George Koss, president and general manager, notified the News-Oracle that he would use local labor as much as possible. The company had also just finished a bridge across the Grand River in Lansing, Michigan, and workmen were busy shipping equipment to Galena with supervising personnel to follow in late December. Mr. W. F. Mason, recently returned from the construction of a bridge across Niagara River, Buffalo, New York, came to be superintendent of construction for Koss (SCNO, 15 December 1926).

Important transportation links into the Shepherd of the Hills country were made in the mid-1920s. In late 1925 and early 1926 improved state roads created two "circuits" for auto touring. One was the Lake Circle Drive (pieces of 65, 76, and 78) around Lake Taneycomo and the other was the circuit of highways 43 (south from Galena through Oasis) to 65 (near Branson) and 44 (connecting 65 to Galena) that offered to Missourians and other travelers unique scenic tours. As with the "float tours" Galena was an important entry from the northwest to both of these circuits (WRL, 18 June and 12 November 1925). In early 1926 Missouri began furnishing state road maps with the purchase of automobile license plates (WRL, 11 February 1926) and the concrete highway connecting the two most important regional cities--Joplin and Springfield--opened in late 1926. Small concrete bridges spanned lesser Ozarks creeks in the Shepherd of the Hills country helping to create the circle drives, but locals and tourists alike anxiously awaited the public works monument across James River at Galena.

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Equipment, lumber, and personnel poured into Galena in December 1926 and the following January. The superintendent hired laborers and work proceeded unhindered until the famous spring 1927 flood. The high water not only flooded the valleys but also washed out the Kimberling bridge and submerged construction equipment at Galena. The Barnes brothers' garage and mechanics worked quickly in overhauling the flooded equipment in order to forestall a long delay (Barnes interview). The Y Bridge became one of the first Missouri bridges constructed with the use of standard shop drawings produced and controlled by the Bureau of Bridges, Missouri Highway Department (formerly, steel companies submitted drawings that had to be checked by the highway department; Official Manual, 1927-28, p. 603-05). Apparently the job proceeded unusually well as Koss finished in November 1927 some six months ahead of the anticipated schedule.

In November the News-Oracle and other local newspapers announced that a grand opening ceremony was being planned. Dr. H. L. Kerr of Crane acted as chairman for the program of V.I.P.s. Galena women served dinner to the crowd which was followed by a concert of combined bands from Galena and Crane. Three highway engineers, a superintendent of the Missouri Pacific railroad, and local and regional politicians addressed the 3,000 strong crowd all assembled on the "Y" of the bridge. Ozarks orator Dr. Dewey Short gave the concluding and dedicatory address. Short concluded his speech with a special plea for further development of the tourist industry in Stone County. He declared that the continuing possibilities of tourist dollars flowing from improved transportation made the local tourist industry stand beside the cow, the fruit, and the hen in local importance (SCNO, 23 November 1927 and Springfield News-Leader, November 1927).

The Y Bridge stood at the nexus of one of the numerous connecting links in Missouri's first state plan for roads (see map in Official Manual, 1923-24, p. 680). Nationally it represented another landscape feature that underscored the increase in automobile registration from 8 million in 1920 to 23 million in 1930 and the transition of gasoline sales from general stores to gas stations and the movement of billboards from railroads to the highways (Scott and Kelly, p. 40, and Jakle, pp. 121 and 135). The year 1927 seemed a good time to celebrate Stone County so businessmen and farmers contributed to a booklet to be distributed at the Missouri state fair. Author and resort developer Dr. A. L. McQuary compiled a promotional guide to the county. It included normal boosterism but also brought attention

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to the local settlers as "home-loving and home-protecting descendants of Scotch-Irish," the twenty-two tomato canneries in Stone County, the "mecca for tourists" at Galena--the port of entry for over twenty tourist camps on James River, and the magnificent reinforced concrete Y Bridge (McQuary, 1927).

All looked promising for Galena and Stone County. Between the bridge and town local investors built a new gas station, tavern-grocery store, and fisherman's camp. These immediate results remained modest and within a short time the Depression began. Galena continued as a rural service center with five grocery stores on the square during the Depression (there is only one today). Downriver at Branson in 1932 the highway department constructed the last major link in the federal highway 65 corridor--a concrete arch bridge across Lake Taneycomo.

The Y Bridge allowed easier access into the Shepherd of the Hills country by auto where travelers spent time in motor courts, hotels, restaurants, boating on Lake Taneycomo, and after 1932 viewing a monumental arch bridge across White River. The Lake, located on the southeast edge of the Shepherd of the Hills, increased its role as the geographic center for capital investments in the tourist trade. By 1935 Jim Owen had hired Charley Barnes to build a fleet of three dozen Ozark john boats to be stationed in Branson, moved Barnes to a home in Branson, and reoriented the tourist flow of James River float trips from Branson to river entry at Galena to end of trip at Branson. Jim Owen packaged a standardized hillbilly experience on the river that made him a household word in Ozarks tourism. With the center of float fishing in Branson, Galena's notoriety in tourism declined although tourists still had their pictures taken on Y Bridge, an imposing Ozarks corridor structure, and several camps thrived until construction of Table Rock dam during the 1950s.

Ironically, the failure of the Standish dam on James River preserved float fishing for decades and insured the construction of the Y Bridge. The James River remained free-flowing, but for most, the appeal of primitive river camps was lost--it resided mainly in the memory of former Arcadians lured to Galena in a different time. The good roads movement, and the resulting Y Bridge, got people through Galena faster than ever to a tourist center developed with legendary associations and impounded water in the White River valley.

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Engineering:

ARCHITECTURE: The practical art of designing and constructing buildings and structures to serve human needs.

ENGINEERING: The practical application of scientific principles to design, construct, and operate equipment, machinery and structures to serve human needs (NRB 16, pp. 66, 67).

The National Register treats "engineering" and "architecture" as separate categories, however, it is clear that using the National Register definitions stated above much of engineering is subsumed under architecture. In a common dictionary the first definition of architecture pertains only to buildings, however, the following three do not exclude a great number of other structures, "A structure or structures collectively...A style and method of design and construction: Byzantine Architecture...Any design or orderly arrangement perceived by man: the architecture of nature." In the case of the Y Bridge most of the argument for significance within the category of "engineering" also applies to "architecture" and in order to limit verbiage what is said in the section ENGINEERING should be considered as said in the section ARCHITECTURE as well (American Heritage Dictionary, architecture).

Structure of the Y Bridge

To understand the structural nature and significance of the Galena Y Bridge it is necessary to understand something of the history of the developing technology of reinforced concrete up to the second World War and how the United States stood within that history. The development of this material and technology was largely European, the United States remained conservative and lagged behind. The Y Bridge represents a fine and refined example of the final phase of one tradition of technology to which engineers in the United States remained devoted while at the same time it was constructed well after the beginning phases of another tradition had begun in Europe.

This other new tradition was exemplified by the designs of such masters as the Swiss engineer Robert Maillart who was much influenced by the work of Francois Hennebique and who was a pioneer in the use of the "integral" structure, or the French engineer Eugene Freyssinet who was responsible for the

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development of the pre-stressed structure. The 5 arched principal spans of the Galena bridge are fixed (hingeless) and the structure is conceived as completely funicular, "arches in which all of the material is subject to direct compressive forces" (Hopkins, p. 249). That is the 100 foot arched ribs are structurally independent of the columns they support, and those columns rise to support an again independent girder and slab road bed. In this system each element functions separately. This system, which has its roots in the earliest stone arched structures, is in contrast to the hinged arch structures, called integrated structures, designed by Maillart and others in Europe wherein the arch, the boxed or partly boxed spandrels, and the deck all function as a single structural unit, usually hinged at the spring and the crown to accommodate movement due to expansion, and in which the structural members together function like a flattened arch, but within which the individual elements also partly function as beams. In these structures each principal element is subject to bending as well as compressive forces. The unhinged concrete arch is also in contrast with pre-stressed concrete bridge structures in which the elements of the principal spans are girders which have been stressed during the prefabrication or the on site construction process in a manner which would counteract the loads upon the completed structure.

Outline history of concrete arch bridges

In the latter 19th and 20th centuries, engineering practice in the United States relied primarily on ferrous metal trusses for most bridge construction involving longer spans. However, both arch and concrete technologies have far longer histories of use in structures than does metal. Apparently concrete was used as early as 2450 B.C. while both the Sumerians and the Egyptians used the arch long before the Romans. It was the Romans who combined archuated forms with a natural form of hydraulic cement to create the basis for their public architecture, although they would continue to build their great multi-span archuated structures such as aqueducts of stone (Historic Highway Bridges in Pennsylvania, p. 155, and Kingshighway, p. 19-21).

After the Roman Empire the use of concrete fell into disuse until it was revived by the English in the 16th century, although it was not until 1824 that an Englishman, Joseph Aspdin developed an artificial cement. An American, David O. Saylor, patented a type of Portland cement and built the first cement plant in the United States almost 50 years after Aspdin's work (Kingshighway, p. 20). The first concrete bridge in the United States dates to

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1871. This was the Cleft Ridge Park Bridge, designed by John Goodridge, a modest pedestrian bridge in Prospect Park, Brooklyn, New York (Thacher, p. 430, and Plowden, p. 29). This bridge and numbers of the other early concrete bridges built in the United States were not reinforced, but simply masses of concrete. Concrete which was less expensive but similar to stone in its great compressive strength was used to imitate stone in bridge construction in the United States. Certainly, this was the attitude which was transmitted to Missouri. An example of the early use of the concrete arch in Missouri was to be found in the approaches on the Missouri side of a bridge over the Mississippi at Thebes, Illinois; there were six arch spans of 65 feet and one span of 100 feet (Thacher, p. 437). The early concrete arched bridges often were finished to duplicate the appearance of stone (Steinman and Watson, pp. 271-72). The idea that concrete was to emulate stone structurally persisted in engineering practice in the United States much longer.

In an important introductory paper to the session dealing with "Concrete and Concrete-Steel" at the International Engineering Congress, Saint Louis, 1904, "Concrete and Concrete-Steel in the United States," Edwin Thacher discussed the development of concrete and concrete steel bridges in the United States through 1904 and indicated some of its relationship to European practices. He stated that there was one major difference between concrete arch bridges in the United States and those constructed in Europe and Great Britain: "Those in Europe and Great Britain are all three-hinged arches, and those in the United States are all fixed arches" (Thacher, p. 437). This is important because throughout the history of the use of concrete in bridge building the U.S., at least prior to the second World War, avoided the use of the hinged arch. In Europe the hinge had already been introduced in stone masonry bridges as a means of dealing with expansion. However, it came to be an early step for the development of the integral structure which would carry bridge design beyond the ancient arch form.

In his paper Mr. Thacher explained that, in 1894, Mr. Fr. von Emperger had read a paper before the American Society of Civil Engineers in which he brought the subject of concrete-steel bridges "prominently before American engineers." Thacher states that prior to the time of von Emperger's paper, "no concrete-steel bridges of any importance had been built in the United States" (Thacher, p. 437). In his paper Thacher discussed a number of systems of reinforcing concrete, including the early Monier system of using wire mesh, and Melon system in which iron

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or steel beams are embedded in the concrete arch which was patented in the U.S. in 1893 and to which Thacher credits most of the "concrete steel" bridges built up to 1904 (Thacher, p. 438). Thacher does not mention W. E. Ward's use of reinforcing rods in 1871-72, S. Bissels patent of a reinforcing system in 1881, or the Alvord Lake Bridge in San Francisco's Golden State Park by Ernst Ransome (Plowden, p. 298). It was Ransome who first introduced twisted-bar reinforcing which is universally accepted today (Kingshighway, p. 21). Nor did Thacher mention Francois Hennebique. The remainder of the paper made clear that though the author saw some clear advantages in the use of concrete-steel including aesthetic ones he did not clearly comprehend the potential of concrete which he discussed mostly in terms of how it protected the steel, was permanent and nearly maintenance free, and could be easily molded for aesthetic treatment.

The Thacher paper makes two points clear: one, the U.S. engineers were conservative, avoiding such tested European developments as the three hinged arch; and two, they very likely did not completely understand the potential of the new material, reinforced concrete. Nonetheless, in 1909, the Walnut Lane Bridge was completed in Philadelphia which had a clear span of 243 feet, supposedly the longest concrete span in the world to that time. The Walnut Lane Bridge also used a fixed arch. The engineers had considered the use of a three hinged arch and rejected that idea for a number of reasons including aesthetic ones. These engineers had rejected the steel truss as well, also for reasons of aesthetics and because they considered concrete more permanent. They believed in effect that hinged arches were unnecessary in arches, the rings of which had so much rise stating, "Hinges have their field of usefulness in flat arches where changes in length or arc caused by variations in temperature cause more vertical movement at the crown than they do in arches with considerable rise" (Webster and Quimby, p. 461). They also believed that to introduce hinges would have made a thickening of the quarters of the rings of the ribs and marred its elegance of proportion.

The 19th century was a time when cut stone masonry bridge construction and technology was advanced to a point of perfection, and it was into this tradition that reinforced concrete was introduced. Early long span reinforced concrete bridge designs emulated those of stone masonry arched forms.

The final development in stone bridge design was the use by M. Paul Sejoure, the celebrated French bridge

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Y Bridge, Galena, Stone County

engineer, of two separate arch ribs, side by side, with the roadway carried on columns. This arrangement was first used in Sejoure's Pont Adolphe over the Petrusse at Luxembourg (1879-1903). It was daring design with a span of nearly 280 feet, the longest in the world at the time. The roadway was built of reinforced concrete supported on stone columns over the arches. This bridge was copied in concrete by the designers of the Walnut Lane Bridge in Philadelphia and the form is now commonly used in bridge construction....

The construction of bridges with separated stone ribs and concrete roadways marked the beginning of the end of stone bridge construction. The next step was the replacement of the stone masonry of the arches with concrete, producing the all-concrete bridge...(Whitney, p. 191).

It should be noted that an explanation of all aspects of the calculations, design, and construction of the Walnut Lane Bridge were presented in the 1909 meeting of the American Society of Civil Engineers and were published in Transactions and Engineering News where they could have had a major impact on United States bridge design (Webster and Quimby, p. 497).

In the United States engineers chose to refine and elaborate this essentially conservative bridge building tradition derived from the stone masonry arch when they built in concrete during the greater part of the first half of the 20th century. The Y Bridge at Galena falls within the tradition of the Walnut Lane Bridge. It is both strikingly economical in the use of material while at the same time conservative in terms of structural type. By the use of two rib arch rings and open spandrels with the roadbed carried on columns, the amount of concrete has been reduced to a minimum within the system, while that system itself is a continuation of the archuated masonry type in concrete. Furthermore, the Y Bridge is hingeless; it depends on expansion joints and plates between the structural elements to accommodate dimensional changes. This again indicates the conservative approach to concrete bridge design which was at the time characteristic of engineering in the United States.

Today it is generally accepted that modern reinforced or ferro-concrete construction was originally pioneered in Europe largely through the work of Francois Hennebique a French stone mason who after a long period of experimentation patented a

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Y Bridge, Galena, Stone County

system of bar reinforced concrete construction in 1892. Hennebique organized an international system of licensees to carry out his designs. He, through the large number of structures using his system and over which he had design control, amassed a great deal of empirical data on successful design forms and dimensions (Billington, Maillart, p. 9-10). The development of these reinforced concrete construction methods first took place in Europe where the theoretical basis of engineering practice was augmented by both experience and empirical data derived from testing. Certainly this was the case with both Hennebique and Maillart. Engineers in the U.S. were generally lacking in this experience and distrustful of this data, consequently when they sought to build in concrete they tended to use those forms they understood and for which they could make mathematical calculations (Billington, Maillart, p. 99-100, and Billington, The Tower and the Bridge, p. 163).

The relative backwardness of the American engineer was so pronounced in 1916 that a chapter "European vs. American Practice" was included in Reinforced Concrete Construction and in which the statement appears:

In the design, manufacture, and erection of the typical American structures, the steel truss and girder, we excel and reign supreme without a rival--but there our supremacy ends. In fact, in the design and construction of bridges in reinforced concrete, foreign practice is far in advance and the European engineer in this is still our master, and we have much to learn from him (Hool and Thiessen, p. 609).

The structural form of the Walnut Lane Bridge came to be the standard to follow by builders of longer span concrete bridges in the United States, that is open spandrel, ribbed fixed arch spans above which the deck is supported on columns.

Of necessity, because of its site, the Y Bridge also had considerable rise to the span of its arches and the same justification of the use of the hingeless arch would apply there as well although the clear span was much less than at the Walnut Lane bridge. Nonetheless, engineers in the United States had clearly chosen to refine this conservative arch technology which by means of ribs and construction practice they had refined to its most economical form. That this conservative approach would continue for some time after the construction of the Y Bridge is indicated in an important report from 1935. In this report, which demonstrated the determination of U.S. engineers to work

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from calculations, each of the test structures was an open spandrel elliptical reinforced concrete arch, no other example form or type of model was considered (Morris et al, p. 1429). The innovations of Maillart and Freyssinet were ignored even though some of the ideas of European engineers had been introduced to the U.S. as early as 1916 (Hool and Thiessen, vol. III, "European vs. American Practice"). And in 1930 Conde B. McCullough had become "the first American to use Freyssinet's method [pre-stressed concrete] in the construction of the Rogue River Bridge at Gold Creek" (Plowden, p. 319).

If we think in terms of the world wide history of bridge construction, the Y Bridge conforms to a conservative rather than a progressive engineering type and as such is significant as an excellent example of engineering practice in the United States at the time of its construction.

ARCHITECTURE:

"Architectural form. Applied ornamentation proper is not resorted to in the design of concrete bridges to the extent that it has been in connection with steel bridges. It is not so necessary with the former since they lend themselves readily to artistic treatment without it.

The main and often sole effort of the European engineer for aesthetic effect is placed, as far as possible, in the pleasing arrangement of main lines, forms, and masses of the structure. . . ." (Hool and Thiessen, v. 3, pt. 7, pp. 648-49).

The preceding quotation indicates that within engineering practice at the time of the construction of the Y Bridge fundamental aspects involving the basic conception of the form of a work of engineering were considered as architectural; the following section will indicate that this conception still has importance. The preceding section on engineering should be applied to the argument for the significance of the Y Bridge as architecture as well.

Style and Aesthetics: Classical Moderne

Within its structural type, Y Bridge is very economical in terms of materials, and is elegantly proportioned. Furthermore, it is not without decorative detailing. Each of the six pier bents of the principal spans are fluted on their up and down stream faces (9 flutes). The edges of the deck and the lower

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rail of the hand railing are treated as a visual unit with moldings top and bottom to create the effect of a frieze which is penetrated at intervals in order that the deck might drain. A broad molding marks the junctures of piers and deck and serves visually as a capital to provide a transition from the vertical pier to horizontal deck and railing. The location of each of the piers are marked at the deck level by a slightly projecting post which takes the form of a console which is also marked by a molding above the top surface of the top rail of the hand railing. The 8 points of support of each of the spandrel column bents which carry the deck load to the arch rings are marked by post-consoles which do not project beyond or above the hand rail. Each of the 9 intervening spaces between top and bottom rail of the handrail is filled with 10 balusters, thus, the railing becomes a balustrade. These details, together with the proportions and locations of the structural elements, establish an overall hierarchy of both visual rhythm and load and support which is fundamentally classical.

This classical approach demonstrates a well understood integration of formality and function which is appropriate for a structure which itself represents an interaction of local, state, and national support at the governmental level to meet a need which is also local and regional. The Y Bridge clearly fits a stylistic category, "Classical Moderne," a conservative form of Art Deco which "came to the forefront during the depression era of the 1930s...a simplified and monumental modernistic neoclassicism" (Weber, p. 12). This style was for "those clients, often governmental or civic who preferred a dignified modernistic architecture...." (Weber, p. 59). The Y Bridge, therefore, represents an early example of a style which would be so associated with the public works projects of the 1930s that it is sometimes referred to as PWA (Public Works Administration) Moderne (Weber, p. 59), and which dignifies many courthouses and other public buildings constructed in the Ozarks. While Classical Moderne is associated with the PWA in Weber's discussion, its inception clearly precedes the PWA. She uses the Nebraska state capitol building by Bertram Goodhue designed in 1920 as the beginning example (Weber, p. 59-60).

Comment needs to be made concerning the stylistic treatment of the Y Bridge. As was explained in Section 7, "Style: Classical Moderne," the Y Bridge conforms to the type "Classical Moderne," a sub-category of "Deco." This presents us with some of the semantic irony that adheres in stylistic analysis of 20th century architecture and design. "Classical Moderne" contains

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the term "moderne" and in the National Register system of Stylistic classification "Deco" is subsumed under "modern." However, Deco is a decorative style which existed at the same time as the anti-decorative concepts of modernism. The Y Bridge is not stylistically modern, just as it is not modern in terms of the structural concepts it represents. The bridge was a product of the period we call modern, it was the result of the economic forces and developments which characterize that period, and was constructed of the materials and by the techniques which resulted from the avant-garde approach of that period. However, the aesthetic form of the bridge, both structural and decorative, expresses a different, more conservative, set of values. Now that we are entering a period some call "Post-Modern" this other aesthetic and its value base is becoming more intelligible.

Not long ago when modern concepts dominated aesthetic thinking such an approach as the one used for the design of the Y Bridge would simply have been considered wrong by many people. David Billington's idea of a "Structural Art" was a clear expression of that ideology. An example, Billington described the Zouz Bridge by Maillart and stated, "it was the first serious attempt in the history of concrete structures to build a bridge of reinforced concrete by connecting all parts together, both physically and visually" (Billington, Maillart, p. 26). Billington is expressing that essentializing modernist sort of thought which strives for a complete unity between form and structure and within the forms themselves. It is an aesthetic which opposes elaboration and is fundamentally anti-decorative. It is a physical and technical expression which is also intentionally devoid of cultural referents.

Billington then goes on to describe a bridge by Emil Morsch which he clearly indicates that he finds wrong-headed in its design and which in terms of its parts could almost be a description of the Y Bridge.

The Morsch design was a masonry bridge in which the deck carried the roadway loads, the columns carried the deck loads, and the arch carried the column loads. The structure consisted of three parts piled on top of each other, each part well designed out of reinforced concrete, but the whole still conceived along lines not essentially different from the Roman Pont du Gard built nineteen centuries earlier (Billington, Maillart, p. 26)

In the Y Bridge the addition of other classical decorative

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elements, flutes, balusters, etc. elaborate the already repetitive character of the chosen structural type. These details further break down the already rhythmic character of the arches and columns, and give them a more human and comfortable scale while at the same time establishing an overall sense of monumental order. This order, together with the details, evoke a sense of the ancient and continuing tradition of classical design. This type of order and its classical referent are expressive of an ideology different than modernism. It was an ideology appropriate to a government sponsored project and one which would have been reassuring for the conservative inhabitants of an area which was undergoing great social and economic change.

It might also be added that, if we compare the Y Bridge with the highway bridge that recently replaced it, the Y Bridge appears fitted into the existing landform of its site and it was much less destructive of its location.

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Y Bridge, Galena, Stone County

Boundaries are contained in local deeds (files #4842-4844, book 184, pp. 1794-1799) in Recorder of Deeds office, Stone County courthouse, Galena, Missouri. A summary follows:

Commencing at the SW corner of section 6, township 24N, range 23W, thence N27 55'43"E, 1520.37 feet; thence N62 04'17"W ahead which equals N68 10' West back 772.02 feet; thence S07 40'E back which equals S01 48'E ahead 363.7 feet; thence on a curve deflection left, with a 295.2 foot radius 245.27 feet to a point which is centerline station 906+89.27 (which is the point of beginning of the centerline hereinafter described) from said point said centerline extends on a curve, deflection left with a 295.2 foot radius, from a tangent bearing S49 38'E, 40.23 feet to station 907+29.5; thence S57 30'E, 40.3 feet to station 907+69.8; thence on a curve, deflection right, with a 955.4 foot radius 209.2 feet to station 909+79.0; thence S44 57'E, 194.0 feet to station 911+73; thence S40 35'E, 332.2 feet to station 915+05.2; thence on a curve deflection right, with a 955.4 foot radius 202.2 feet to station 917+07.4; thence S28 27'E, 54.0 feet to station 917+61.4; thence on a curve deflection right, with a 302.9 foot radius 216.0 feet to station 919+77.4 feet; thence on a curve deflection left, with a 250.8 foot radius 428.5 feet to station 924+05.9; thence S89 37'E, 0.27 feet to station 924+06.17.

The widths of right of way on said left or northeasterly side of said surveyed centerline are as follows: 30 feet from station 906+89.27 to station 924+06.17. The widths of right of way on said right or southwesterly side of said surveyed centerline are as follows: 30 feet from station 906+89.27 to station 906+06.17. Also all of Block 15 in the original town of Galena located in lot 2 SW1/4 section 6, and in the NW1/4 NW1/4 section 7 all in township 24N, range 23W, which lies northeasterly of the northeasterly side of the parcel described in paragraph 2 above.

Parcels described in paragraph 1 and 2 above contain a total of 3.33 acres, more or less.

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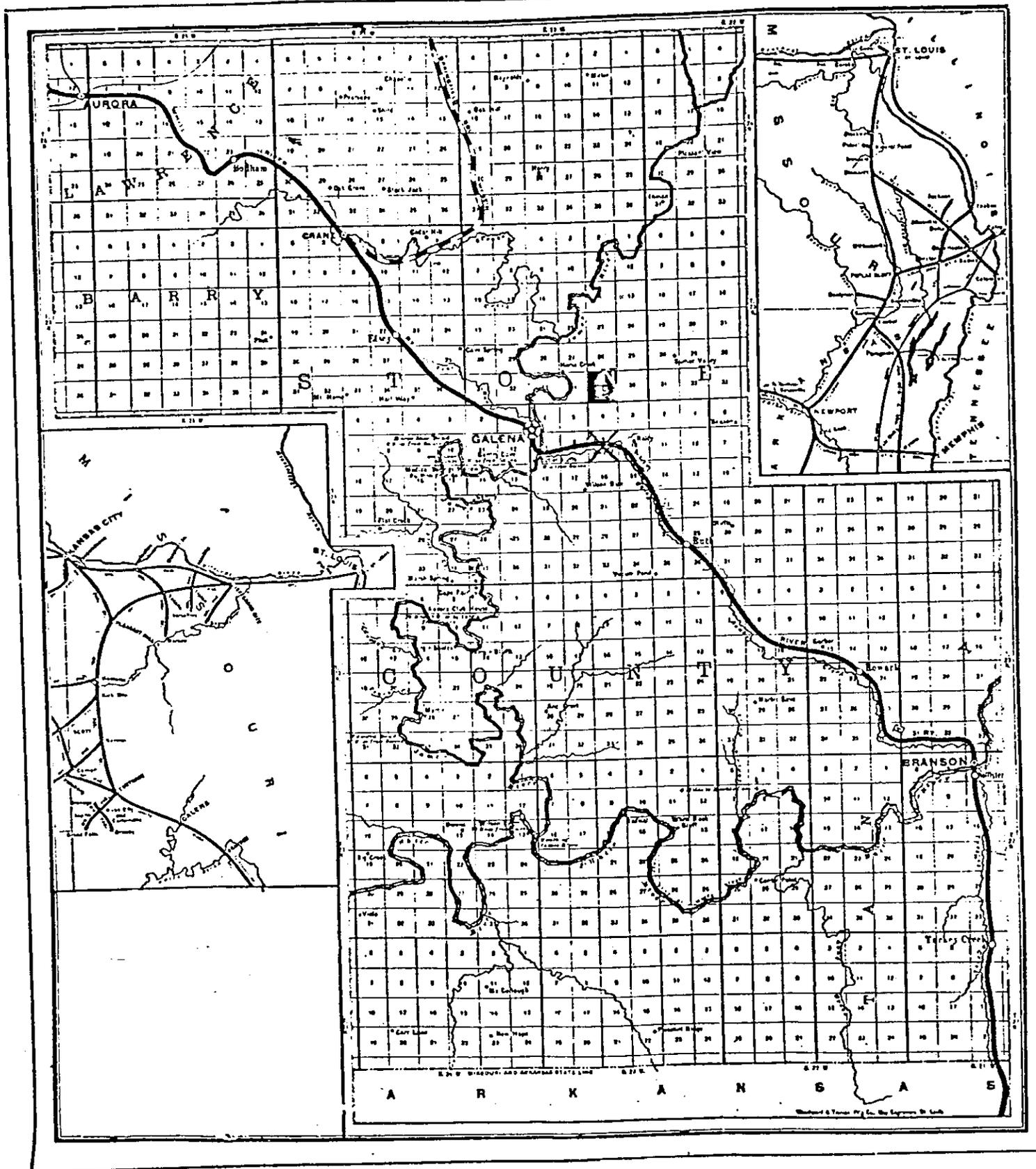
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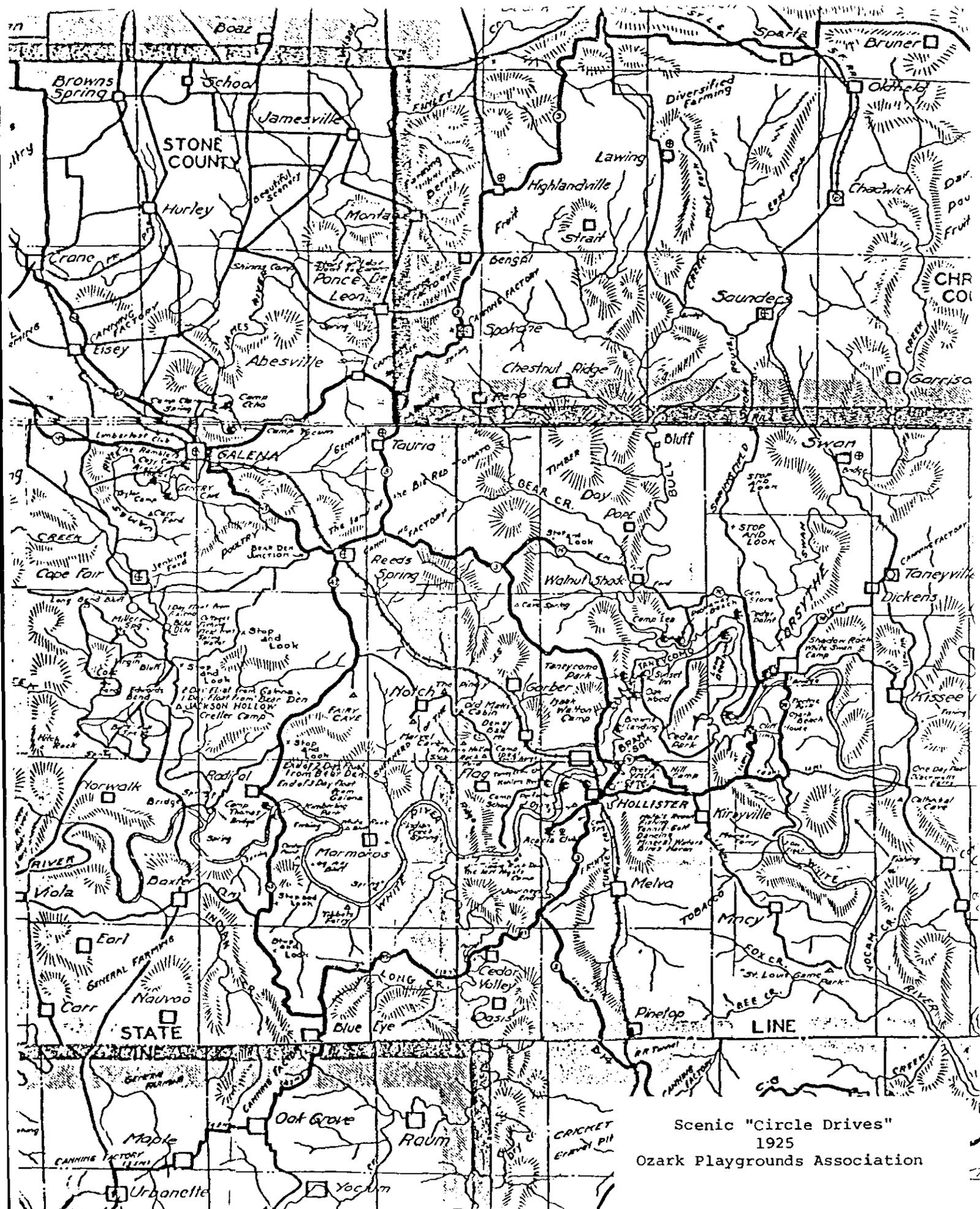
Y Bridge, Galena, Stone County

2. Beverly A. Fleming
Historic Preservation Coordinator
DEQ, Kansas City Regional Office
3800 S. Elizabeth Avenue, Suite G
Independence, Missouri 64057
Date: March 22, 1991
Telephone: 816-795-8655
Editor of Items 7 and 8.

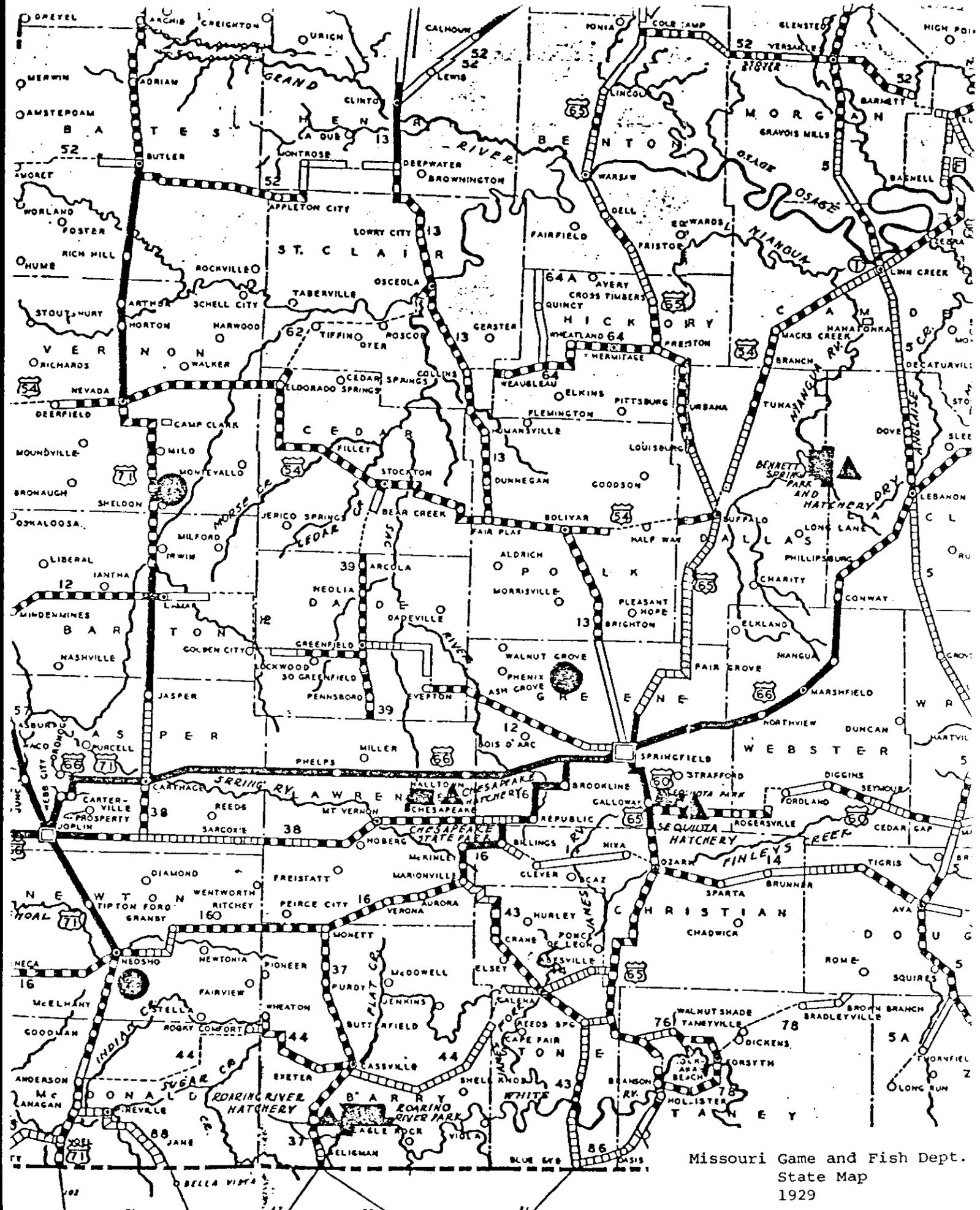
3. Steven E. Mitchell
National Register Coordinator
and State Contact Person
Department of Natural Resources
DPRHP/Historic Preservation Program
P. O. Box 176
Jefferson City, Missouri 65102
Date: April 4, 1991
Telephone: 314/751-5368



GALENA TO BRANSON FLOAT
 promoted by
 Missouri Pacific Railroad



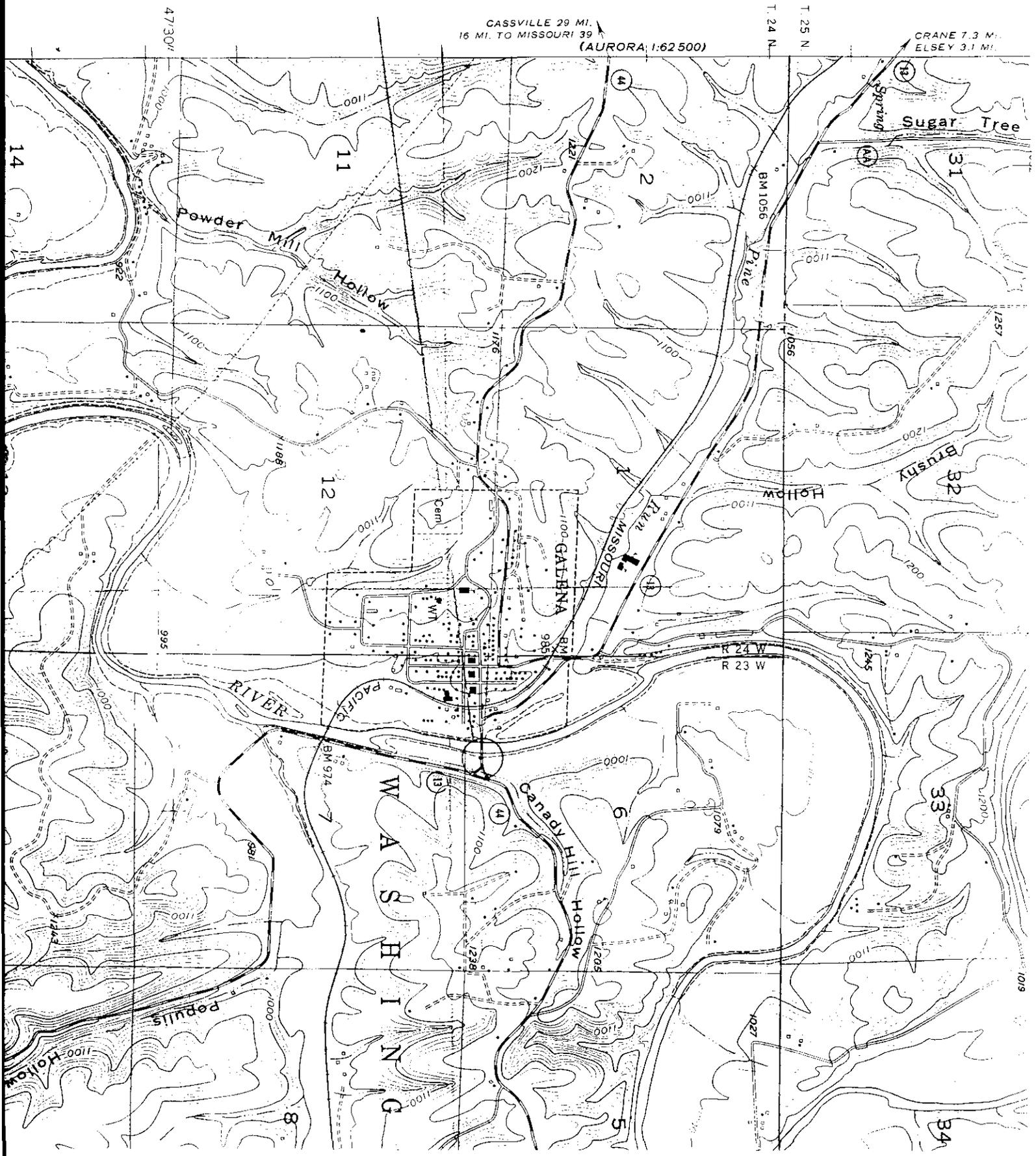
Scenic "Circle Drives"
 1925
 Ozark Playgrounds Association



Missouri Game and Fish Dept.
 State Map
 1929

Y Bridge
junction of old highways 43 and 13, Gallena Stone County, Missouri
15/458840/4073150

N →



Y Bridge
Galena, Missouri
Photographer: David Quick
Date: December, 1988
Res. loc: Kalen and Morrow
Post office Box 399
Forsyth, Mo. 65653

View looking North



2

Y Bridge

Galewa, Missouri

Photographer: David Quick

Date: December, 1988

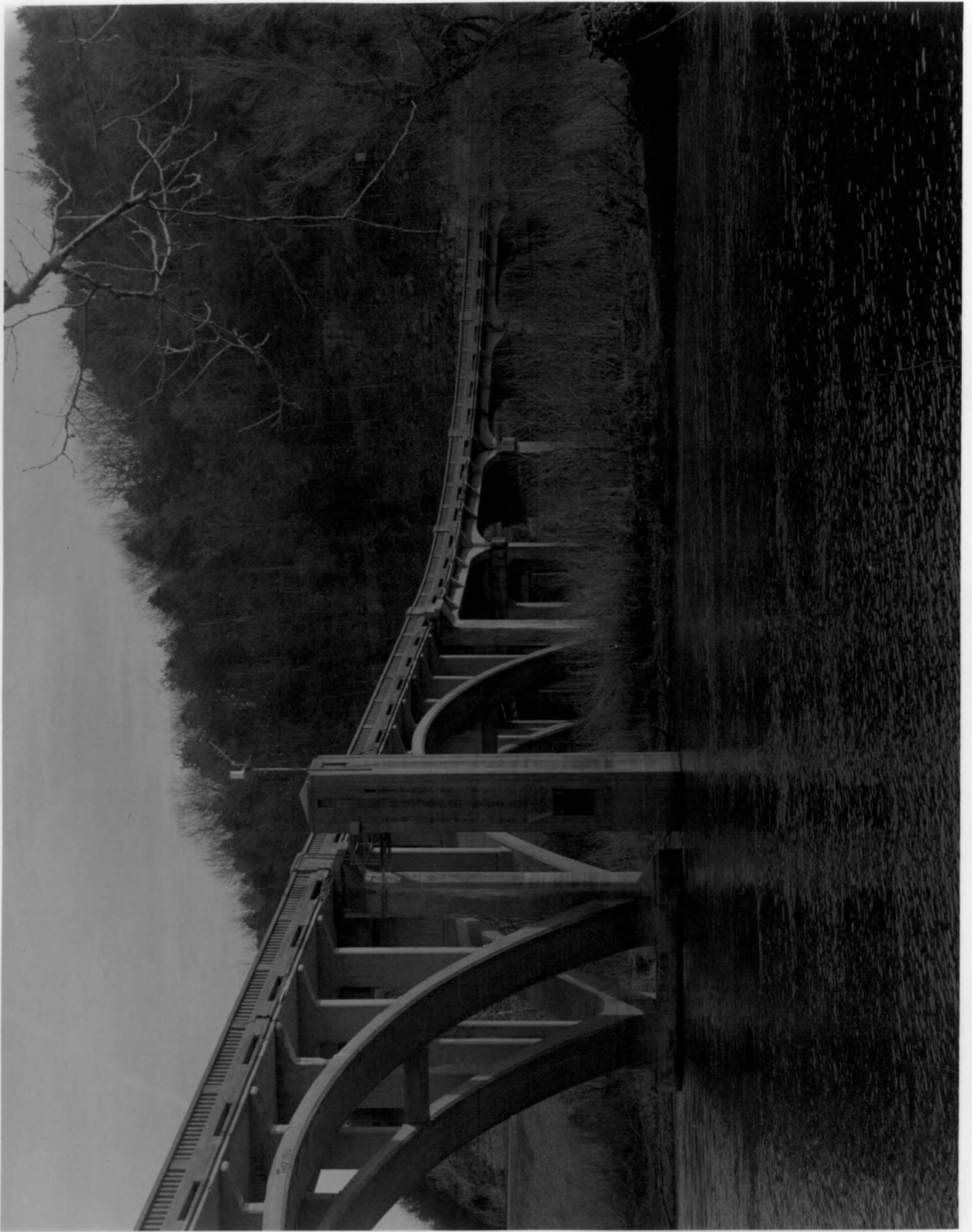
Neg. loc.

Kalen and Morrow

Post Office Box 399

Forsyth, Mo. 65653

View looking Northeast



3

Y Bridge

Galeana, Missouri

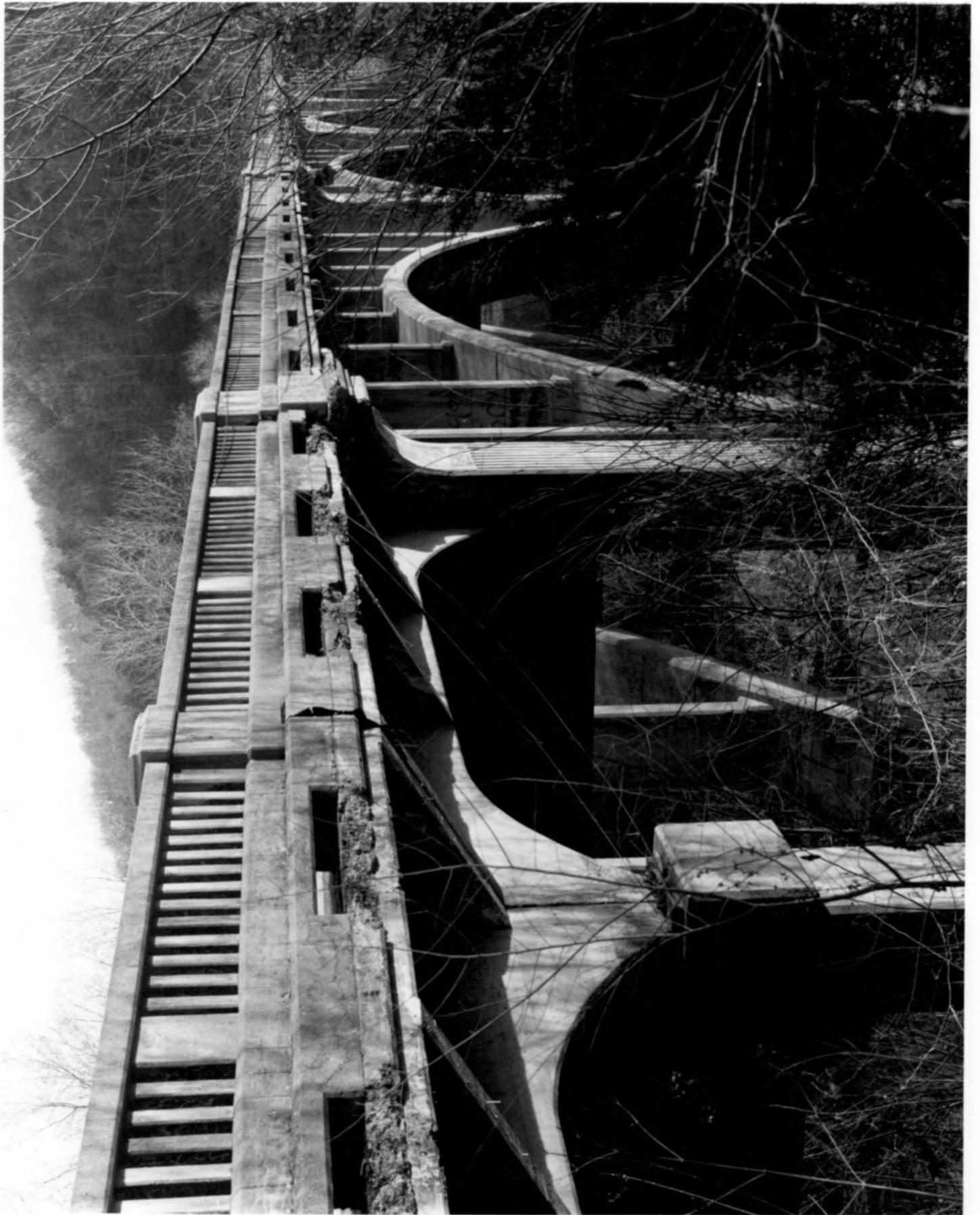
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Post office Box 399

Forsyth, Mo. 65653

View looking East



4.

Y Bridge

Gale na, Missouri

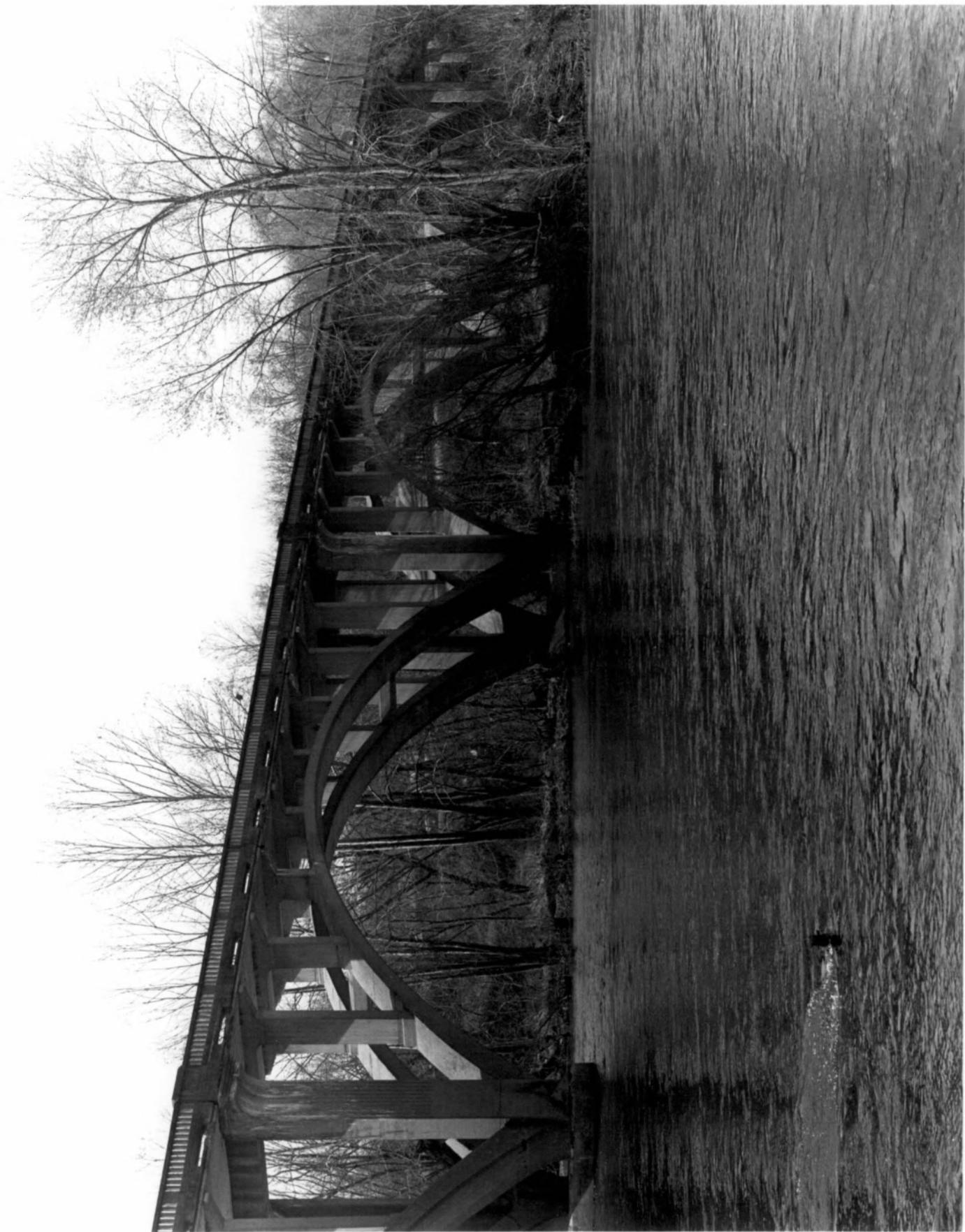
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Forsyth, Mo 65653

View looking Southwest



5

Y Bridge

Galena, Missouri

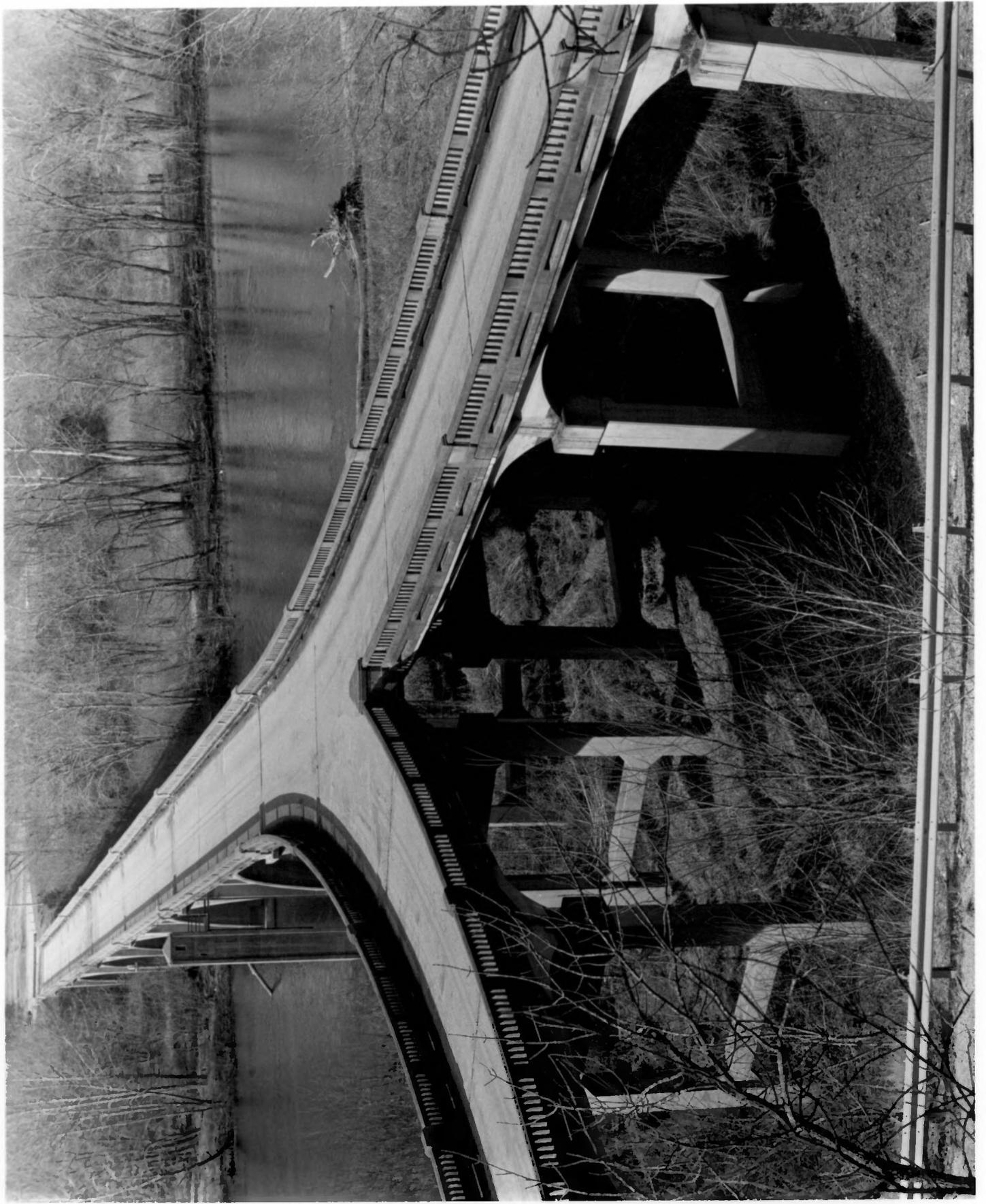
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View looking west



6

Y Bridge

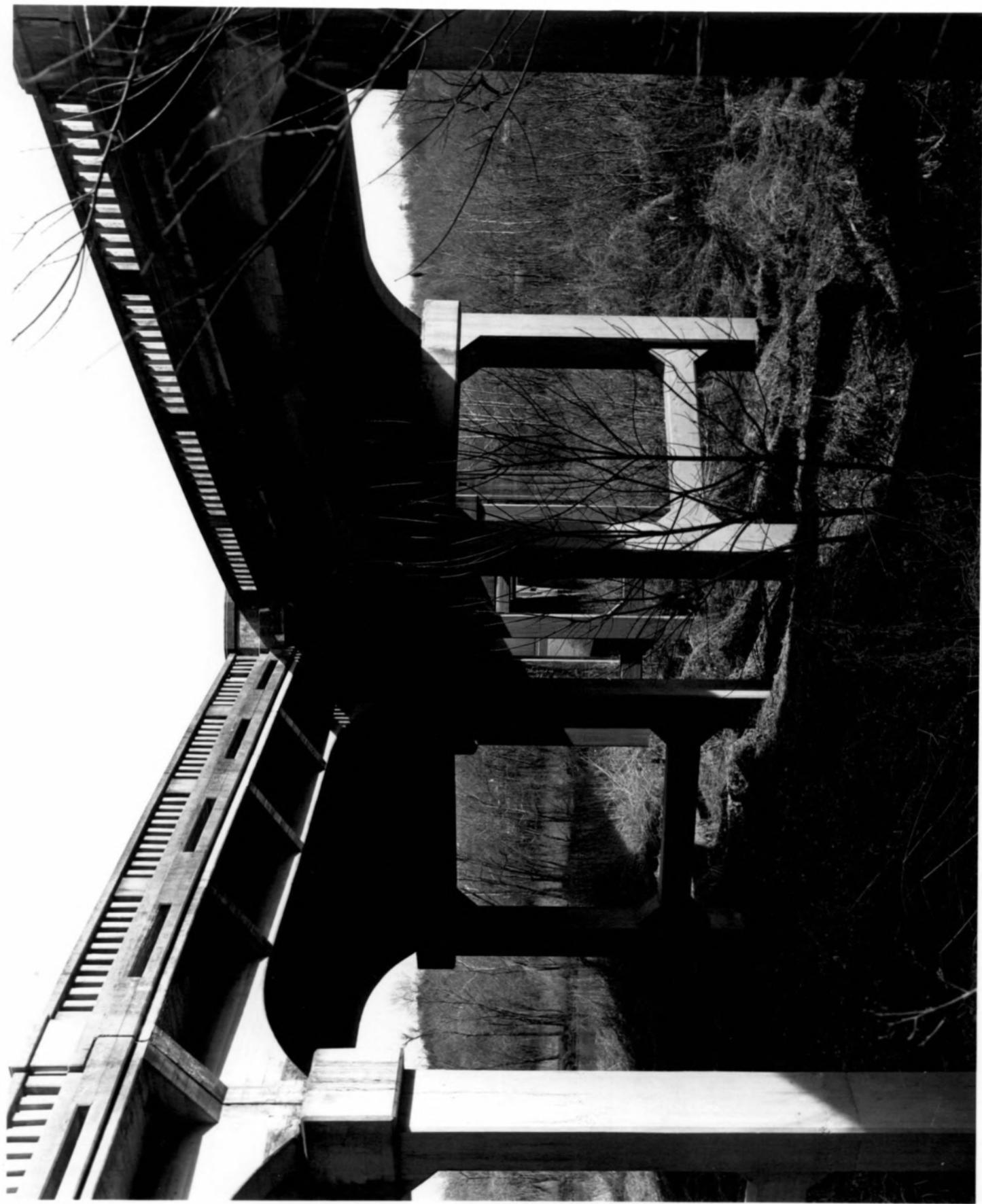
Galena, Missouri

Photographer: David Quick

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Post Office Box 399

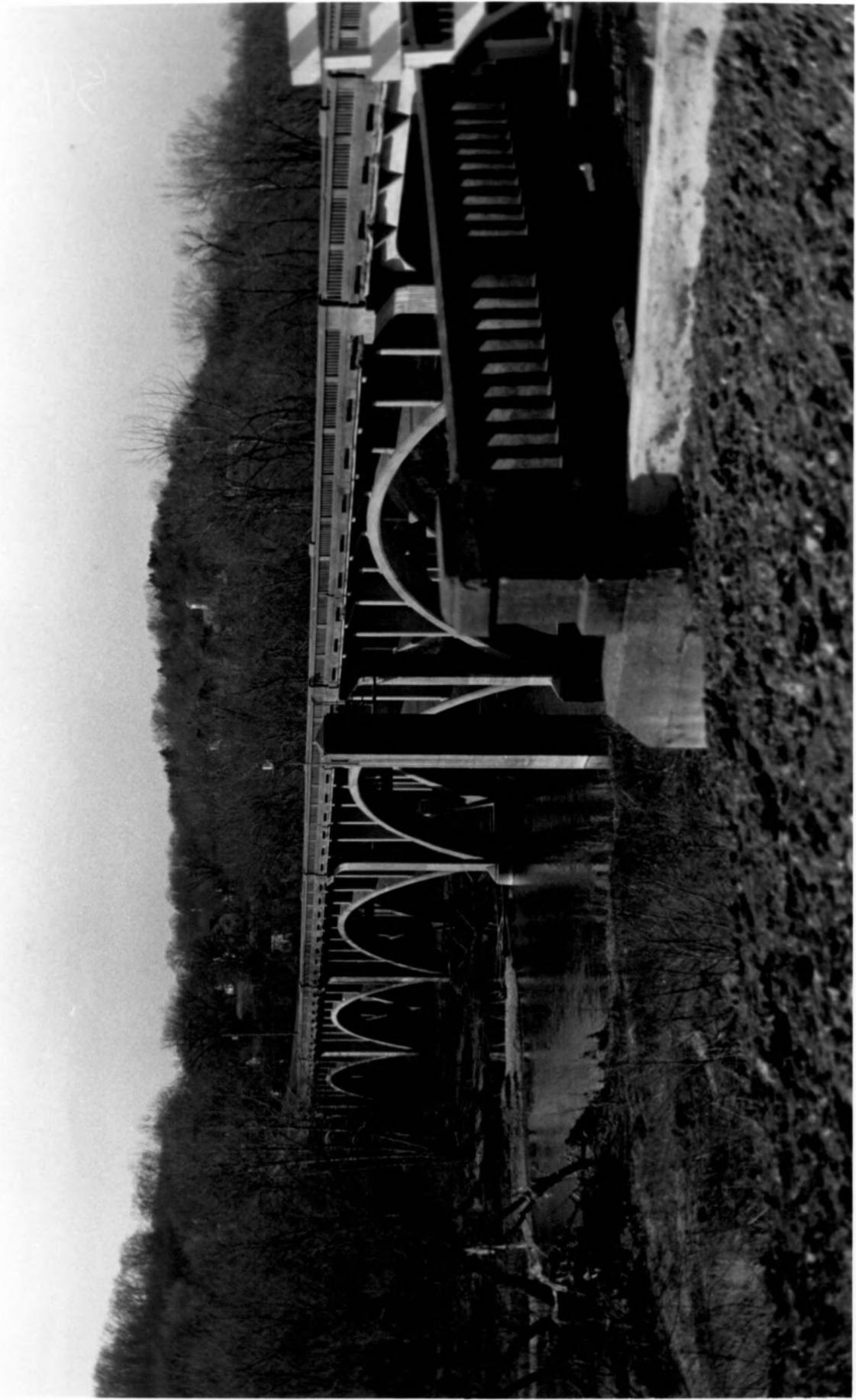
Forsyth, Mo. 65653

View looking west, Under Deck



EXTRA

PHOTOS









Ref



HISTORIC "Y" BRIDGE IN GALENA, MO.

— Completed 1927 —

