# National Register of Historic Places Inventory—Nomination Form



See instructions in How to Complete National Register Forms Type all entries—complete applicable sections

### 1. Name

historic	Coles County	Highway Bridges	Over the	Embarras River	Thematic	Resources

and/or common

# 2. Location

street	& number	see individual i	nventory forms		not for publication
city, t	own		vicinity of	22 congressional district	22
state	Illinoia	5 code	12 county	Coles	code 029
3.	Clas	sification			
b s s o Xt	listrict	Ownership _X_public private both Public Acquisition in process being considered _//A	Status X_occupied unoccupied work in progress Accessible yes: restricted _Xyes: unrestricted no	Present Use agriculture commercial educational entertainment government industrial military	museum park private residence religious scientific _X transportation other:
4.	Own	er of Proper	'ty	· · · · ·	
name		iple ownership (se		itory forms)	
	& number	·			
city, to			vicinity of	state	
		tion of Lega		on	· · · · · · · · · · · · · · · · · · ·
			s County Clerk		· · · · · · · · · · · · · · · · · · ·
street	& number	P.O. Box 207 Cole	s County Courthous	e	
city, to	ówn	Charleston		state	Illinois
6.	Repr	esentation	in Existing	Surveys	
] title		Historic Sites Rura Survey of Coles Cou		operty been determined el	egible?yes _X_no
date	October	1980	· · · · · · · · · · · · · · · · · · ·	federal _x sta	te county local
depos	itory for su	rvey records Coles C	ounty Regional Pla	nning Commission	
city, to	own Cha	arleston	·	state	Illinois

## National Register of Historic Places Inventory—Nomination Form



4

Continuation sheet	Item number	Page
	6	1

Blakeman Bridge is listed on the Coles County Register of Significant Places, maintained by the Coles County Regional Planning Commission.

Comp, Allan T. and Donald Jackson. "Bridge Truss Types," Technical Leaflet 95 published by the American Association for State and Local History, 1977.

9

Condit, Carl W. American Building (Chicago: University of Chicago Press, 1975).

Hopkins, H.J. <u>A Span of Bridges</u> (New York: Praeger Publishers Inc., 1970).

Smith, Shirley, "Bridges and Tunnels," in <u>A History of Technology</u> (Oxford, 1958).

Wilson, Charles Edward, ed. <u>Historical Encyclopedia of Illinois and History of Coles</u> <u>County</u> (Chicago: Munsell Publishing Company, 1906).

11

4

< . L

Individual bridges were researched by the following students working for the Masters Degree in Historical Administration at Eastern Illinois University: Dan Barringer, James P. Kerr, Linda K. McWorter, Blair D. Tarr. Students were instructed by Dr. Robert Hennings and Dr. Duane Elbert.

# 7. Description

Condition		Check one	Check o
excellent	deteriorated	_X unaltered	_X_ orig
good	ruins	_X altered	mov
<u> </u>	unexposed	V.	

Check one \_X\_ original site \_\_\_\_ moved date

#### **Describe the present and original (if known) physical appearance** GENERAL DESCRIPTION

Coles County is drained by two major watersheds: the Kaskaskia River in the far northwest corner of the county and the Embarras River running roughly north and south along the eastern side of the county. The latter river dominates the county and divides the topography into two major areas: flat or gently rolling cultivated areas to the north and west of the river and rolling or steep forested areas along the river and generally in the eastern and southern portions of the county.

The Embarras River heads in Champaign County, enters Coles County near the northwest corner of East Oakland Township, continues south emerging from the county near the southeast corner of Section 23 Township 11 N Range 9 E. The river flows south and east and joins the Wabash River near Vincennes, Indiana.

The Embarras River valley was the first area of Coles County to be settled. Travelers came from the Wabash River area through Coles County in the 1820s, crossing the Embarras River at the old ford used by Indians near the present Blakeman Bridge. This location was settled originally by the Parkers from Crawford County, who established a mill there. Later owned by Eben Blakeman, the mill was long considered one of the best mills in the country.

As more settlers came to the county, other river crossings were developed and new mills, both grist and saw, were built. Stone Quarry Bridge is located near the river crossing on the Paris to Pana trail. Airtight Bridge is near the crossing of the Kaskaskia and Detroit Trace, which cuts through Coles County on a diagonal running northeast to southwest.

By the late 1800s, the western half of the county had surpassed the Embarras River valley in growth, the impetus for this growth coming from completion of the Illinois Central Railroad mainline in the late 1850s. As more of the flat swampy prairie to the north and west of the river was drained, lands were cultivated, and new communities were founded. Meanwhile, the river valley was left largely untouched, with timbering and livestock farming dominant in this area. This shift in county growth accounts for preservation of the bridges at the historic Embarras River crossings.

Only five highway bridges cross the Embarras River in Coles County. Of these five, three are steel and iron through-trusses, one is a concrete earth-filled arched bridge, and a fifth is a contemporary steel and concrete deck carrying Illinois Route 16 between Charleston and Ashmore. A sixth bridge — a steel and concrete structure carrying Route 130 across the river south of Charleston — is under construction at this writing. The four bridges addressed in this nomination well represent the methods of bridge construction common between 1883 and 1914, a period of 31 years during which construction techniques changed tremendously.

Each bridge being nominated was identified in the Illinois Historic Sites Rural Survey of 1980, conducted in Coles County by the Coles County Regional Planning Commission in conjunction with the Illinois Department of Conservation. While several other metal and concrete bridges within Coles County were surveyed during the rural survey, these four bridges were chosen as good representations of bridge styles found in the county and for their relation to the Embarras River and its historic crossings.

(see continuation sheet)

## National Register of Historic Places Inventory—Nomination Form



Continuation sheet	Item number	Page
DESCRIPTION	7	2

The northernmost structure is Airtight Bridge built in 1914 using the Pratt through-truss design. South of Airtight are two more through-trusses — the Quarry Bridge (1883) and the Harrison Street crossing (1898). The southernmost bridge is the Blakeman crossing, built in 1907 in the concrete, arched style.

Following is a brief description of each bridge. See the accompanying bridge inventory forms for detailed information.

#### INDIVIDUAL BRIDGES

#### Stone Quarry Bridge

The Stone Quarry Bridge is so-named because of its proximity to the Charleston Stone Company quarry. This bridge is the oldest in Coles County, built in 1883 by the King Iron Bridge Company of Cleveland, Ohio. Quarry Bridge is a double intersection Pratt pinned through-truss built of steel and iron with a timber deck. The main truss measures 180 feet, with a 16 foot western approach and a 14 foot 10 inch eastern approach. The bridge roadway is 16 feet wide, while the minimum clearance of the span is 17 feet 2 inches. The span has 12 panels.

Quarry Bridge is located on the old Paris to Pana trail, which provided a means of traveling between the City of Charleston and the Village of Ashmore. Costing Coles County \$4000 at the time, Quarry Bridge has withstood the years, although it is showing its age. The bridge has rusted considerably and was rated fair during a recent Illinois Department of Transportation inspection.

<u>Significance</u> Quarry Bridge was important to local transportation in Coles County as a connector between the eastern third of the county and the county seat at Charleston. The bridge is further significant as the oldest Coles County bridge across the river and in the entire county (1883).

Of engineering significance is the bridge's double intersection Pratt design, a design pattern developed by Squire Whipple in 1846. This truss was developed by Whipple as a response to a need for longer spans. The unique characteristic of the truss is the use of long diagonals which extend across two panels rather than one. The truss is also known as the Whipple, Whipple-Murphy, and Linville truss.

The double intersection Pratt truss was widely used in the United States between 1865 and 1885. By 1890, however, the Whipple truss was rarely used. As longer bridges were needed, the double intersection Pratt truss became an expensive design alternative because of the use of the long diagonal bars. Other less expensive variations of the Pratt were used instead.

The only double intersection Pratt truss in Coles County, Quarry Bridge was built at the end of the period during which this style was popular.

## National Register of Historic Places Inventory—Nomination Form



Continuation sheet	Item number	Page
DESCRIPTION	7	3

#### Harrison Street Bridge

Harrison Street Bridge is located on East Harrison Street Road approximately two and one half miles east of the Charleston city limits. East Harrison Street has long served as a link between Charleston and the Village of Westfield, which is located across the county line in Clark County. This bridge is a steel and iron Camelback Parker truss with two pony truss approach spans. The bridge is supported by steel caissons at the truss ends and by masonry abutments. The bridge was built in 1898 at a cost of \$5240 by the firm of Oliver and Alexander. The through-truss has a top chord of five slopes and measures 185 feet. Each pony truss measures 25 feet. The bridge is 16 feet wide and has a treated three-inch plank floor.

Harrison Street Bridge was repaired in 1978 to allow for its continued use. However, the bridge is still only in fair condition, having considerable rust and missing part of its iron railings. In several places the iron railing has been replaced by contemporary materials.

<u>Significance</u> Harrison Street Bridge has long been an important river crossing in Coles County. It was used primarily by persons traveling to north Hutton Township and to Clark County, from which many settlers of Coles County came. Immediately south of the crossing was Rocks Park, started by a Mr. Brown in the early 1900s. The Rocks, so-named for its sandstone cliffs from which stone for the Coles County Courthouse (NR) was drilled, was a popular boating, swimming, and camping area until the 1930s. Construction of Harrison Street Bridge in 1898 made development of the park possible, as it provided a means for persons in the south and eastern part of the county to easily reach the park.

Harrison Street Bridge is the only Camelback Parker truss in Coles County. A newer Camelback was built on Route 130 across the Embarras River south of Charleston in 1927. This bridge was demolished in 1980. The Camelback Parker is characterized by a top chord having five slopes. The truss represents an improvement of the simple Pratt truss invented by Thomas and Caleb Pratt in 1844. The Camelback Parker truss allowed greater standardization of members and better stress distribution. As a most economical truss, the Camelback Parker was widely used in the late 1800s.

#### Blakeman Bridge

Blakeman Bridge is the southernmost Embarras River crossing in Coles County, located approximately 200 feet downstream from the Illinois Route 130 bridge, which is presently under construction. Blakeman Bridge crosses the river in a north-south direction and was built in 1907 by the Mercantile Bridge Company of Paris, Illinois. The bridge replaced an iron through-truss at the same location.

Blakeman Bridge is a triple arch, earth filled, steel reinforced concrete bridge. The total length of the bridge is 257 feet, with a roadway 18 feet 6 inches wide. The spandrels on either end measure 78 feet 6 inches in length, while the center spandrel measures 96 feet. The road surface was originally gravel.

## National Register of Historic Places Inventory—Nomination Form



Continuation sheet	Item number	Page
DESCRIPTION	7	4

The bridge was repaired in 1980 for use as a detour while the Route 130 bridge built in 1927 was being replaced. The bridge was resurfaced with seven inches of precast concrete. Precast gutters were added along the new road surface. Five sections of hand railing on the west side of the bridge were repaired with precast concrete, with forms specially constructed to match the original sections. Ten steel reinforcing rods were added to strengthen the spandrel walls and to prevent further outward movement caused by shifting of the earth fill. The rods penetrate the walls across the width of the bridge. Starshaped plates and nuts hold the rods in place on either end. Three rods were installed on each of the end arches; four were needed on the center arch due to the additional length of the arch and to two cracks in the spandrel walls on the west side of the bridge. With the repairs, the Blakeman Bridge has a recommended load limit of 27 tons, one of the highest in Coles County.

<u>Significance</u> Blakeman Bridge is located at one of the oldest river crossings in Coles County and at the site of the county's first settlement. Benjamin Parker from Crawford County started a mill at this location in the 1830s on the east side of the river. In the 1850s the mill was moved to the west side and purchased by Eben Blakeman. Blakeman ran a saw and grist mill here until the 1880s. The first bridge built at the site was a wooden bridge, later replaced by an iron bridge, which appears on the 1876 Coles County Plat map. Remnants of this bridge can still be seen under the Blakeman Bridge during periods of low water. The Blakeman crossing has historically been a gathering spot for persons in Hutton and Charleston townships. The crossing was the scene of many early social and religious activities, including icy baptisms.

Blakeman Bridge is one of only four earth filled, steel reinforced, concrete arch bridges in the 12 East Central Illinois counties which comprise Illinois Department of Transportation District 5. Two of the others are triple-arched bridges, both in Vermilion County. A small single arch concrete bridge is located in Lafayette Township, Coles County. A single arch, stone bridge is located in Clark County.

Blakeman Bridge is a product of the era of experimentation with metal reinforced concrete construction. The concrete arch bridge was first introduced in the United States in 1871. Most concrete bridges between 1871 and 1910 were massive structures faced with stone. Stone facing was used not only for aesthetic reasons but also because builders were unsure of the structural stability of concrete. Stone-faced concrete arches were built as late as 1902. Most reinforcement of arches before 1900 was accomplished with wire mesh; reinforcing with iron was relatively unfamiliar. In the mid-1890s, E. Lee Heidenreich introduced use of two-way bar reinforcing. Heidenreich's system was used after 1900 for concrete bridges along the Illinois Central Railroad line.

Most widely adopted was the Melan system invented by Viennese engineer Joseph Melan and patented in 1894. In this system, steel I beams were bent to the shape of the arch axis and laid parallel near the undersurface of the arch. Concrete served as a protective coating as much as a structural support. The first Melan bridge was built in Rock Rapids, Iowa, in 1894. Experimentation in reinforced concrete construction continued in the period 1900-1910, including work by David Molitor on a three-hinged arch of concrete for a bridge with a single span of 236 feet. However, most bridges during this period were plain concrete, built in very heavy, Roman forms. Use of reinforcing was rare and irregular in

## National Register of Historic Places Inventory—Nomination Form



Continuation sheet	Item number	Page
DESCRIPTION	7	5

this period; advances were not made until after 1910. Blakeman Bridge well represents this experimental period in bridge construction. It is an unusual example of steel reinforcement in a conservative era when pure Roman concrete bridges were popular.

#### Airtight Bridge

Airtight Bridge is the newest of the bridges being nominated, built in 1914 by the Decatur Bridge Company and designed by Claude L. James. The bridge is located in a beautiful setting, with a large hill on the east side of the river and a forested area on the west. The bridge is located at what was once known as Willow Pond Ford and is the only crossing of the river in the northern half of the county.

Airtight Bridge is a Pratt through-truss, constructed with steel chords and a concrete floor. The bridge is constructed with eight panels, and is pinned and riveted. As is characteristic of the Pratt truss, vertical members and the top chord act in compression, and the lower chord and diagonals act in tension. The two center panels on either side have double diagonals.

Airtight Bridge is 188 feet long with a deck width of 15 feet 7 inches and a minimum clearance of 13 feet 7 inches. The span is comprised of the large through-truss, one pony truss on the west side of the river, and a steel beam on the east.

According to local folklore, there are two explanations as to why the bridge is referred to as Airtight. One explanation is that the crossing is located in a valley surrounded by hills. Air tends to settle and stagnate in this basin. Others say that in trying to climb the steep hill on the east side of the bridge, old automobiles would become "airtight" because of the position of their gasoline tanks and would have to back up the hill to make the grade.

The bridge is in fair condition, with a load limit of eight tons.

<u>Significance</u> Airtight Bridge is significant as the only river crossing in Coles County between Quarry Bridge and the north county line, a distance of approximately 12 miles. Airtight has linked the east river area with the prairie to the north and west for 67 years.

Airtight Bridge is an example of a simple Pratt truss. It is representative of the improvement and sophistication of trusses in the years following their invention in the 1840s. The Pratt truss as developed in 1844 by Thomas and Caleb Pratt was a rather simple structure with vertical members in compression and diagonals in tension. As the Pratt was put to greater use, as loads increased, and as length requirements increased, engineers designed larger and more complex structures. Not fully understanding the science of bridge engineering, bridge builders thought that to be stronger a bridge needed additional members. Thus, bridges such as Quarry Bridge (double intersection Pratt) and Harrison Street (Camelback Parker) were common in the period 1865-1890. As knowledge increased and as steel replaced iron as the principal building material, engineers realized that additional members were redundant, at best just stabilizing factors. The improved steel version of the through-truss — of which the Airtight Bridge is a fine example — returned to the simple Pratt design as conceived by Thomas and Caleb. By the 1920s and 1930s,

## National Register of Historic Places Inventory—Nomination Form



а

Continuation sheet	Item number	Page
DESCRIPTION	7	6

the improved steel trusses and reinforced concrete spans supplanted the small yet complex iron and steel truss as the predominant bridge type.

#### SIGNIFICANCE

widely built between 1865 and 1885, many with a combination of iron and a new material — steel. The Quarry Bridge (1883) is a fine example of the late use of this type of through-truss in Coles County.

8

Another common means of strengthening and improving the truss was to replace the straight top chord with a polygonal chord. By making the top chord members uniform in size, it was now possible to prefabricate this type of bridge and to quickly and inexpensively construct it on site. The Camelback Parker, with its five slopes, is the most common type of Camelback truss. The Harrison Street Bridge (built 1898) is a good example of this type. The Camelback design was used well into the 1900s in all-steel bridges.

While trusses were being perfected in the late 1800s, some engineers were beginning to construct concrete bridges as an alternative to iron and steel. The first concrete bridge in the United States was constructed in 1871. As concrete bridges became longer, reinforcement became necessary. The first iron and steel reinforced bridges were built in the early 1890s. The major impetus to building reinforced concrete bridges came in 1894, with the patenting of the Melan system, which was characterized by steel I beams bent to the shape of the arch and laid in parellel series near the undersurface of the arch. Despite this breakthrough most concrete bridges built from 1890 to 1910 were pure concrete, lacking metal reinforcement but often having stone facings for support. Whereas Europeans were widely building the reinforced concrete bridges, Americans were rather conservative before 1910 and continued to build pure concrete structures. Blakeman Bridge (1907) was one of the experimental concrete reinforced bridges built before 1910 in the United States. Having withstood 75 years of use, Blakeman Bridge stands as a rare testimony to American daring and ingeniuity in bridgemaking during the early 1900s.

After 1910, reinforced concrete and all-steel trusses were perfected and became more common. Most post-1920 bridges were designed very scientifically, with the underlying structural system well understood. The simple Pratt truss was recognized as the most durable of the trusses built in the 1800s; engineers now realized that extensive use of eyebars and secondary counterties was redundant. In short, designers were not recognizing and designing simple forms. Airtight Bridge is representative of this era of construction. The newest structure in the thematic group, Airtight Bridge is the simplest in form.

# 8. Significance

Specific dates 1883, 1898, 1907, 1914Builder/Architect see inventory forms

#### Statement of Significance (in one paragraph)

#### SIGNIFICANCE

The four bridges in this thematic group are important for their historic contributions to the Coles County transportation network and as examples of the changing technology in bridge construction between 1883 and 1914.

As described previously, each of the nominated bridges is located near historic riverfords and in the case of Blakeman Bridge, at the first settlement in Coles County. The bridges facilitated continued migration of persons from Indiana and points south into Coles County and linked the eastern, forested areas of the county to the newly-drained prairies in the late 1800s and the early 1900s.

Until recently, through-trusses and reinforced concrete bridges were common to Coles County. Since 1979, however, 45 bridges have been replaced, including many examples of the types of bridges represented in this group. Recognizing this loss, the Coles County Road and Bridge Committee has expressed support for preservation of these four bridges. If wider and stronger bridges are needed at any of these four locations in the future, the Committee has agreed to route the existing roadway around the historic bridge.

The historic bridges and fords serve as starting and terminating points for the many canoeists who use the Embarras River for recreational purposes. Scenic trips are organized each year, with hundreds participating.

Each of the four bridges being nominated is of a different type of construction. Represented in the nomination are the Pratt through-truss, double intersection Pratt throughtruss, the Camelback Parker through-truss, and the reinforced concrete-arch bridge. Each type was common to the late 1800s and early 1900s American landscape. Taken as a group, the bridges reflect the advances made in bridge construction between 1883 and 1914. During these three decades, many changes in bridge engineering occurred. The approach to designing bridges became much more scientific. Through experience engineers learned to calculate load bearing requirements and to design their structures accordingly. Materials used in construction changed, as did the process of erecting a bridge.

The predominant bridge type in the 1800s and the early 1900s was the metal truss bridge. Many different types of trusses were invented in the United States early in this period, but the most common and durable truss was the Pratt truss, characterized by vertical members acting in compression and diagonals acting in tension. Visually, the vertical compression members were posts or beams, and the diagonals were thin eyebars.

Most of these simple trusses were built between 1850 and 1870; none from this era exist in Coles County today. As traffic became heavier and as spans became longer, the Pratt truss was improved to meet these needs. The unknowing engineers believed that to make bridges capable of carrying the heavier loads over longer distances, additional supports would be necessary. A variety of these new, complex bridge types were invented, including the Baltimore, Pennsylvania, Kellogg, and Double Intersection Pratt. The latter type was

(see continuation sheet)

9.	Major	<b>Biblio</b>	graphical	References
----	-------	---------------	-----------	------------

• ]

3. Major Biblio	ugraphical ne	FICICIICE3		
Bridge files, Coles Co The Charleston and Mat (Dallas: Taylor Pub Coles County Board of	toon Bicentennial Comm lishing County, 1976)	nissions. Histor	y of Coles County,	1876+1976
10. Geograph	ical Data			
Acreage of nominated property	each less than one ac	re		
Quadrangle name			uadrangle scale	
	NDIVIDUAL INVENTOR			
A		B Zone Easting	Northing	
c	1   1   1			. 1
Verbal boundary description	and justification	· · ·		
see individual invento	ry forms			:
List all states and counties	for properties overlapping	state or county bou	ndaries	
state	, code cou	nty	code	· ····
state	code cou	nty	code	
11. Form Prep	ared By			·
	1, Preservation Planne	r	. î . Pr	
organization Coles County I	Regional Planning Comm	ission <sub>date</sub> 6	/30/81	
street & number Box 471, 7.	D1 Monroe	e A − 50 2 telëphone. ¿	(217)348-0521	2
clty or town Charleston	C	state	inois	,
12. State Hist	oric Preserva	tion Office	er Certifica	tion
The evaluated significance of this		· · · · · · · · · · · · · · · · · · ·		
national As the designated State Historic 665), I hereby nominate this prop according to the criteria and proc State Histo <u>ri</u> c Preservation Office	erty for inclusion in the Nation edures set forth by the Herita	ational Historic Preserv nal Register and certify	that it has been evaluated	
		<u> </u>	91.1	<u> </u>
title Anerta For HCRS use only Thereby certify that this pro	perty is included in the Natio	nal Register	date 7 75 8	
Keeper of the National Register	prest for atten		date	

CP 0 938 835

· · · · ·

.

te	· ·	Tupo of Portion	Decision
mination		Type of Review Entered in the	
Airtight Bridge		- National Register	ACCULATE TATTCHTHE
Blakeman Bridge		Substantive Review	Accept, Beth Grovena
Harrison Street Bridge		Retional acelero.	Delous Byus "
Stone Quarry Bridge		·····································	Helmen Byun
		-	ž
	•	-	•
		-	
		_	•
~		-	
		<del>.</del>	
•		-	
		-	
•		-	
		-	
•		-	
•		_	·
•		_	
•			
		-	*****
		-	
		-	
		-	
•			