

THE HISTORY AND CONSTRUCTION OF THE PATUXENT BRIDGE
NORTH OF BURTONSVILLE ON THE COLUMBIA TURNPIKE.

Thesis prepared by

John T. Dressel

For initiation into
the Beta Chapter of Maryland
Tau Beta Pi

April 27, 1933

THE HISTORY AND CONSTRUCTION OF THE PATUXENT BRIDGE
NORTH OF BURTONSVILLE ON THE COLUMBIA TURNPIKE

Summary.

There is no recorded history of the Patuxent Bridge, this account having been made from statements of the older inhabitants of the region.

The first bridge was of wood, and was in service until it rotted and was no longer safe. For a period of two years the river was forded in the absence of a bridge. The counties then built a series of four wooden bridges, all of which were washed away. In 1883 the counties jointly erected a steel bridge. This structure withstood the Johnstown flood of 1889, and stands today.

The present structure is a two truss steel bridge 164 feet in length, supported by two abutments and a pier, all resting on bed rock. The construction of the bridge was not difficult, requiring but eighteen days for assembling the steel-work. The total construction period lasted about four months.

The probable cost of the structure was \$5,654.31.

The bridge is sound and in good condition after fifty years of service. With proper care its future period of service is indefinite.

THE HISTORY AND CONSTRUCTION OF THE PATUXENT BRIDGE
NORTH OF BURTONSVILLE ON THE COLUMBIA TURNPIKE.

A. HISTORY OF THE PATUXENT BRIDGE.

The history of the Columbia Pike and the bridges that have been used to carry it across the Patuxent is very obscure. According to the older inhabitants this Pike originally connected Washington and Baltimore by way of Ellicott City, passing through Silver Spring. The age of this pike is not definitely known, but men in their seventies have heard their parents talk of this road, and they definitely state that it is older than the Colesville Pike, another road in this territory.

The Columbia Pike apparently was not a popular route. According to one Mr. Cole, age seventy-three, the road was never surfaced with stone over the portion from Columbia to White Oak. Columbia was about four miles from Ellicott City, and White Oak was twelve miles from Washington, so that this unimproved section constituted a large portion of the road, and greatly lessened its importance.

It seems that this pike was not of sufficient importance to warrant the recording of its history. Likewise there appears to be no recorded history of the bridges used on this route at various times to cross the Patuxent. I have been unsuccessful in finding any information on record concerning the bridge, although I have been to the Maryland Historical Society and the Enoch

The first bridge was built at the same spot where the steel bridge now stands. The builders intended to make it a covered bridge, but it was left open. This bridge remained until it rotted and was no longer safe. (This information was handed down to Mr. Murphy by his father, since the road in its old location and the first bridge at the present location existed before the period of his own recollection. He only remembered seeing some of the rotted sills of the old bridge at the site.)

At present a brook runs into the river from the Montgomery side, and is upstream from the pike, its course lying alongside of the present road. The county built a small plank crossing for this brook so that the river could be forded near the present bridge. This ford was known as Moxley's or Murphy's Ford. It was very inconvenient and unsatisfactory, and could only be crossed at times of low water.

For a period of perhaps two years there was no bridge at all, travellers having to cross the brook and ford the river. Following this the counties built a series of four wooden bridges. The first of these was built in 1859 or 1860. This bridge was washed out by high waters at about 1868. Between the washing out of this bridge and the erection of the next, the ford and the brook bridge were used in crossing the river. This has continuously been the method of crossing the river between the washing out of one bridge and the building of the next.

The following two bridges and their period of duration was not recalled. One of these was in use as little as three or four years before being washed away. These bridges were similar to the first. All three were single-span structures about forty-five feet in length and high above the river. The abutments were of loose stone, and very little mortar was used in their construction. When the third bridge was washed away the counties erected another wooden bridge, but one of different nature than its predecessors.

It was the aim of the builders to construct a bridge that would withstand the flood waters. The bridge was built much lower than the others (being but eight feet above the water, according to Mr. Cole's statement.) The builders believed that if the structure were firmly anchored and built low the flood waters would flow over it, carrying away the railings and leaving the bridge itself to offer but little resistance. With this end in view the bridge was anchored to heavy logs by means of iron rods, the logs were embedded in the river banks, and large rocks were placed on the logs. This bridge was shorter than the others, being about thirty-five or forty feet long. This bridge was also washed away, the log abutments being carried away with it. It did, however, stand for a longer period than any of its predecessors of this series.

This was the last wooden bridge built at this point. The counties, evidently discouraged with the successive destruction of four wooden bridges, erected the steel structure which stands today.

steel structure

It occupies the same site as did the very first wooden bridge. (It was built in 1883, according to the name plate on the bridge.) It has never been damaged by flood waters, and was the only bridge from its location to the head waters of the Patuxent River that withstood the Johnstown Flood of 1889. The only expense connected with this bridge since its construction has been periodic painting and repairing of the wooden floor, complete replacement of the floor having been made about three times.

This concludes the supplemented text of Mr. Murphy's statement.

Mr. Cole, age seventy-three, was born and raised in this region. Many of the facts given by him concerning the bridge's history substantiate the account of Mr. Murphy. In addition Mr. Cole stated that the wooden bridges were as much as one hundred yards above the present bridge, (Mr. Murphy fixed the location of the last wooden bridge at thirty yards above the present site) and that the road from these bridges joined the present road at a point less than one-quarter of a mile up the hill from the river on the Howard County site. He recalled but three wooden bridges, whereas Mr. Murphy recalled four. He stated that all of the old bridges had log abutments, instead of some having loose stone abutments as related by Mr. Murphy.

Mr. Miles, age seventy-one, recalled but one wooden bridge, which was either washed out or rotted away, after which the piers were raised and the steel bridge erected. This is not

verified by Mr. Murphy, nor by Mr. Cole.

Mr. Murphy, the last-questioned of the three men, definitely denied the raising of the abutments related by Mr. Miles, and also insisted the abutments of the wooden bridges were as he had described them.

In spite of these contradictions between the collected facts, and in view of the far greater number of substantiations, I consider Mr. Murphy's account, together with the relevant facts added to it, a fairly accurate and complete history of the Patuxent Bridge.

B. THE CONSTRUCTION OF THE PATUXENT BRIDGE.

The Patuxent Bridge was built in 1883 by the Pittsburgh Bridge Company. It is a steel highway bridge of two trusses of the modified Pratt type, having a total length of 164 feet and a clearance above water of 24 feet.

DESCRIPTION OF SITE, ABUTMENTS AND PIER.

At the site of the bridge the hills flanking the river slope steeply to the river's bed. On the Howard County site enormous masses of rock crop out of the hillside, making it necessary to sharply turn the approach at this point in order to ascend the hill. The Montgomery County site at this point does not have so much exposed rock. However, the rock is very near the surface, as is indicated by the brook which flows beside the bridge approach,

since at points the water is flowing on bed rock. This formation made it unnecessary to build an abutment on this side, as the bridge rests practically on bed rock. It was only necessary to level off the rock and build it up slightly at the corners, as shown in the accompanying photograph.

It was necessary to build an abutment on the Howard County site, which is also shown by a photograph. Mr. Murphy stated that this abutment was built of large rocks on the outside and was grouted on the inside down to bed rock. The abutment was pointed up with mortar, and through this construction it was made practically as strong as the bed rock itself.

The pier is of similar construction and is set upon bed rock. Mr. Murphy and Mr. Cole agree that the pier was built by Mr. Basgate. Mr. Cole stated that the stone masons received \$1.50 per day and that the middle pier cost \$900.00. The material was obtained by blasting rock on the Howard County side and was locally known as river rock. The dimensions of the pier are given in one of the accompanying sketches. The downstream end of the pier is square, but the upstream end is extended to allow it to be rounded off in a parabolic shape in order to offer less resistance to the water. The result is to make the pier seem eccentrically loaded to a marked degree.

It is of interest here to point out the reason for giving such clearance and length of span to the bridge in crossing a stream of this size.

THE NATURE OF THE PATUXENT RIVER.

The United States Geological Survey maintains a stream gaging station at this point, and accurate records of the river's flow are available. The following information was taken from the Water Supply Paper No. 561, U.S. Geological Survey. The river at this point drains an area of 127 square miles. From 1920 to 1923 was the period of lowest discharge, the mean flow being 100 cubic feet per second. At the time of the Johnstown Flood, on June 1, 1889, the discharge was estimated at 19200 cubic feet per second and the water rose to 18.9 feet above the low water level. From the information obtainable, this was the largest flood in 60 years. No recent discharges have been unusually large, the largest being 5100 cubic feet per second on January 13, 1915 with a rise of 14.6 feet above low water level. The flood of 1889 proved the wisdom of giving the bridge this clearance above low water.

BRIDGE AND ROADWAY.

I have been able to obtain no data on the bridge other than measurements which I have taken myself. A letter written to the American Institute of Steel Construction received the reply adjacent to this sheet. The reply to a subsequent inquiry sent to the American Bridge Company is also given.

The trusses are the modified Pratt type and are identically alike. The single spans (measured with a cloth tape) are 82.2 feet long and are 2.2 feet apart at the middle pier, making a total length of 166.6 feet. The width of the bridge, center to center

of trusses, is 14.8 feet, and the clear width for vehicles is 13 feet. The height of the bridge between rivet lines is 16.15 feet, and the clearance height for vehicles is 13.6 feet. The important dimensions are given in the accompanying sketch.

The panel lengths of the truss are approximately equal. The three vertical columns are built up of 2 channels spaced back to back, and lattice bars on both sides of the channels. (Details of all members are given in the sketches.) The inclined compression members of the truss are composed of 2 channels spaced back to back with a plate on the top and lattice bars on the bottom of the member. The horizontal compression member at the top of the truss is built up in the same manner. The remaining members are in tension, and are composed of round or square rods or rectangular bars.

The trusses are tied together at the top by angles placed back to back and running between the vertical columns, while the ends are tied together with built up members similar to I beams, using lattice bars for the web and angles for the flanges. The whole is made rigid by rods as shown in the sketch. The trusses are kept at right angles with the top by means of braces formed from angles placed back to back.

The floor is supported by transverse beams at the panel points. A plate is used for the web and angles back to back form the flanges.

The spans rest on 24 inch square by 9 inch deep granite

blocks carrying iron bearing plates. The weight of the span is transmitted from the truss through 3 inch diameter pins to pairs of angles set back to back on the bearing plates.

The roadway of the bridge is a wooden floor of planks 3 inches in thickness and from 9 to 12 inches in width. The floor is supported by 3 inch by 10 inch joists, spaced 25 inches center to center. Guard rails and curb rails are 3 inches by 8 inches .

ERECTION.

The following is from a statement by Mr. Murphy:

The steel and cement were shipped to Laurel by the B. & O. Railroad, and were then carried by Mr. Murphy to the bridge with teams of horses.

No difficulties were encountered in constructing the bridge. Wooden trestles were built across the stream and the members of the bridge were placed in position on the trestles and then bolted and riveted in place.

The assembling of the bridge took from 15 to 18 days. The work on the abutments and pier required from 4 to 6 weeks. The total period required for complete construction, including the time spent in waiting for the steel, was about 4 months. There is no other statement to substantiate nor to contradict this account.

COST.

The bridge was built jointly by the two counties. No record of its cost could be obtained at Rockville, the county seat of Montgomery County, nor at the office of the county engineer, Mr. Harry Shaw.

An account of the cost of the bridge was found after an extensive search through the Howard County records at Ellicott City. No description is given of the account other than in the title "Bridge Account of 1883." This record extends from June 5, 1883 to May 7, 1884. Payment to the Pittsburgh Bridge Company was made in two installments; \$1798.50 on February 19, 1884; and \$1460.00 on March 4, 1884; total \$3258.50. Mr. Bathgate (probably the Mr. Basgate spoken of by the older inhabitants) received \$646.00. The sum of the itemized payment amounted to \$5654.31, although no total appears in the record. This is the probable cost of the structure, although it cannot be definitely stated as such.

The bridge today appears to be as sound as when first built. The steel work has been kept painted and the abutments are in good condition. Having already served for half of a century, the future period of service may be said to be indefinite.

BIBLIOGRAPHY

The Nature of the Patuxent...United States Geological Survey
Water Supply Paper No. 561
Cost of Bridge..... Howard County Commissioners Records
Mr. Murphy
Accounts by inhabitants..... Mr. Cole
Mr. Miles

Sources of information investigated, lacking
desired data:

Maryland Historical Society, Baltimore
Ellicott City Times Newspaper
Enoch Pratt Library, Baltimore
Andrew Carnegie Library, Washington, D.C.
Congressional Library, Washington, D.C.
Montgomery County Commissioners at Rockville
Montgomery County Engineer's Office
American Automobile Association

Note. The Geological Survey Paper was found in the
Carnegie and Pratt Libraries

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.

Engineering Department
1050 Leader Building
Cleveland, Ohio



Telephone: CALEDONIA 5-7376
Cable Address: AMINSTEEL

EXECUTIVE OFFICES: 200 MADISON AVENUE
NEW YORK, N. Y.

April 18, 1933

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Mr. John T. Dressel
3228 Ash Street
Mt. Ranier, Md.

Dear Sir:

In reply to your letter of April
13, regarding the history of the Patuxent
River Bridge, on which you are working, I
advise that the Pittsburgh Bridge Company
that constructed this bridge in 1883 was
merged with the American Bridge Company in
1900.

In accordance with the usual prac-
tice in bridge shops it may be taken for
granted that all drawings, calculations, etc.
of the Patuxent Bridge that were in the pos-
session of the old Pittsburgh Bridge Company
have long ago been destroyed.

It might, however, be worth your
while to write Mr. Richard Khuen, Jr., Chief
Engineer of the American Bridge Company, at
Frick Building, Pittsburgh, who might be able
to give you further information regarding the
bridge in which you are interested.

Very truly yours,

A handwritten signature in dark ink, appearing to read "Frankland".

F. H. Frankland
Director of Engineering Service

FHF:S

STEEL *insures strength and security*



Looking Upstream from the Montgomery County Side



Looking Upstream from the Howard County Side



Looking Upstream from the Montgomery County Side



Looking Upstream from the Howard County Side



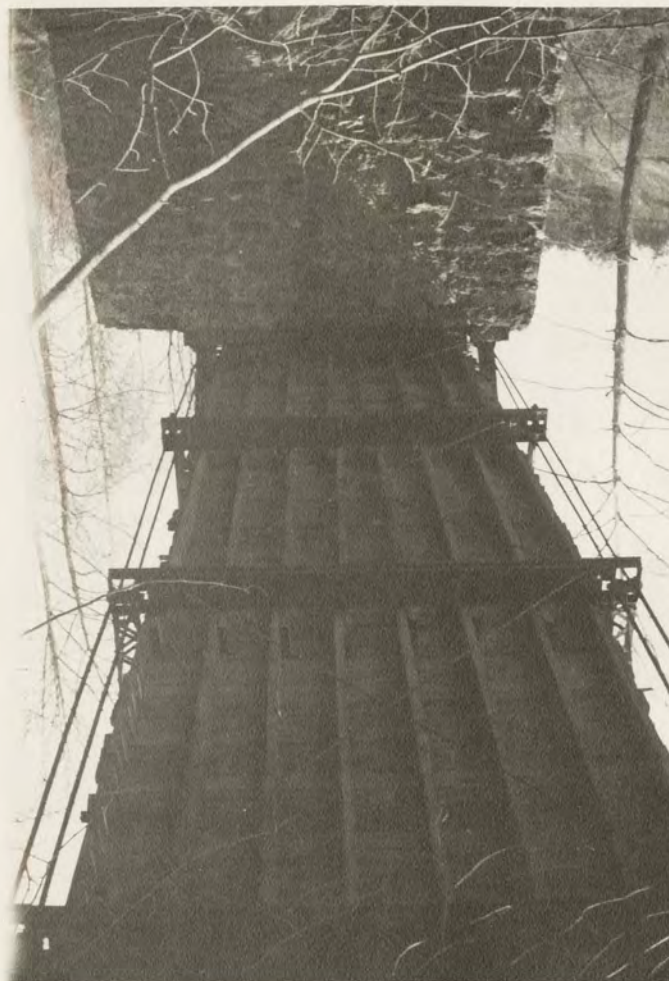
Abutment on the Montgomery County Side
Looking Up-stream



Abutment on the Howard County Side
Looking Up-stream



Portal of Bridge, Looking from the
Howard County Side



Bottom of Road Floor



Center Pier of Bridge, Looking Upstream from the
Montgomery County Side

PATUXENT BRIDGE ON THE COLUMBIA PIKE, MD.

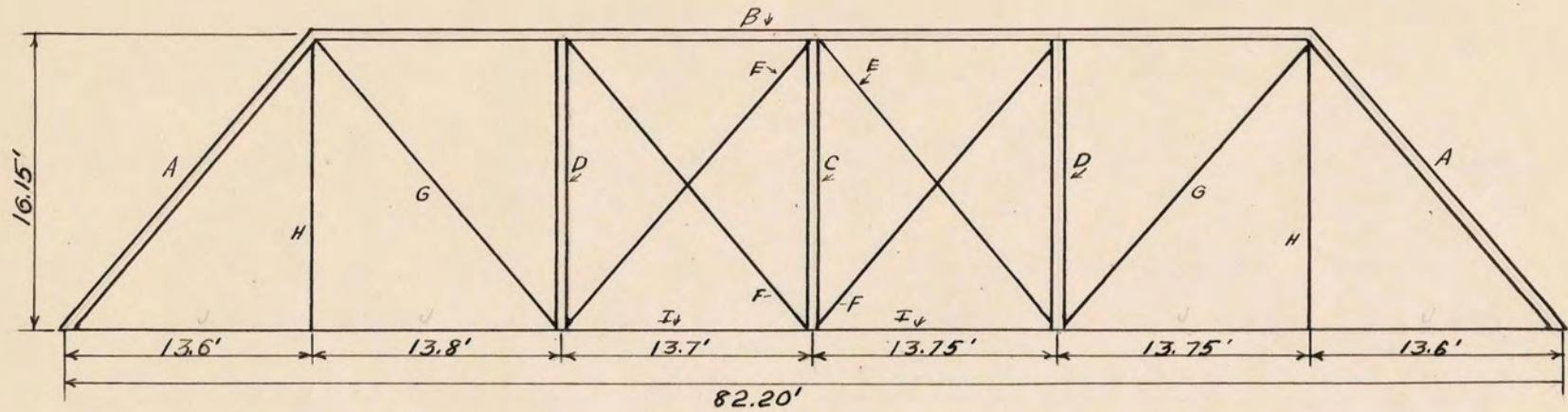


Fig. 1

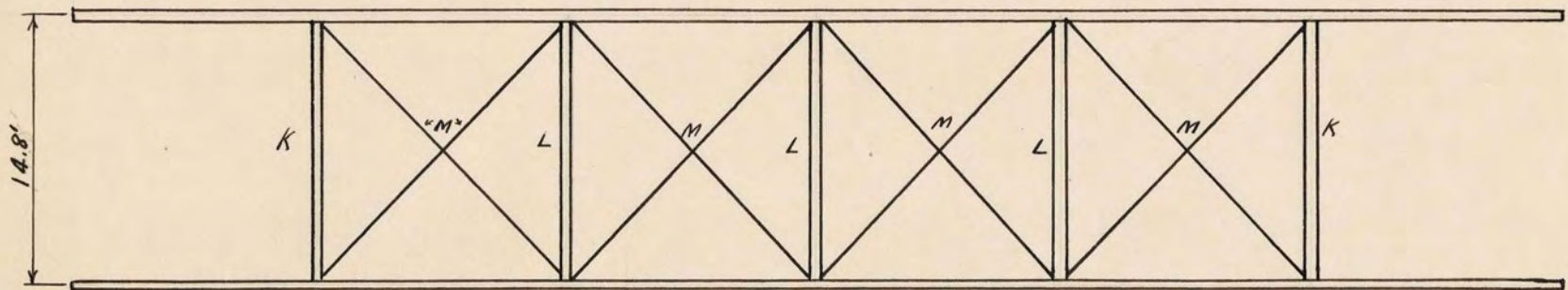


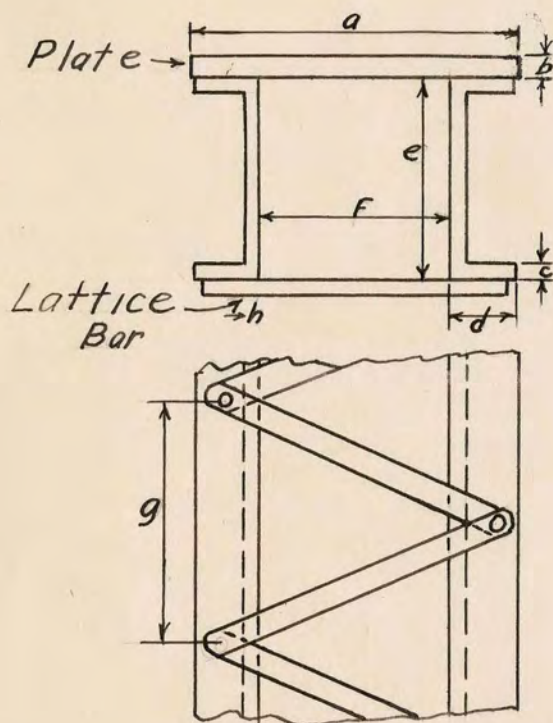
Fig. 2

SCALE 1"=10'

SIDE AND TOP VIEWS OF SINGLE TRUSS

DESCRIPTION OF MEMBERS

See Figs 1 & 2



MEMBER A

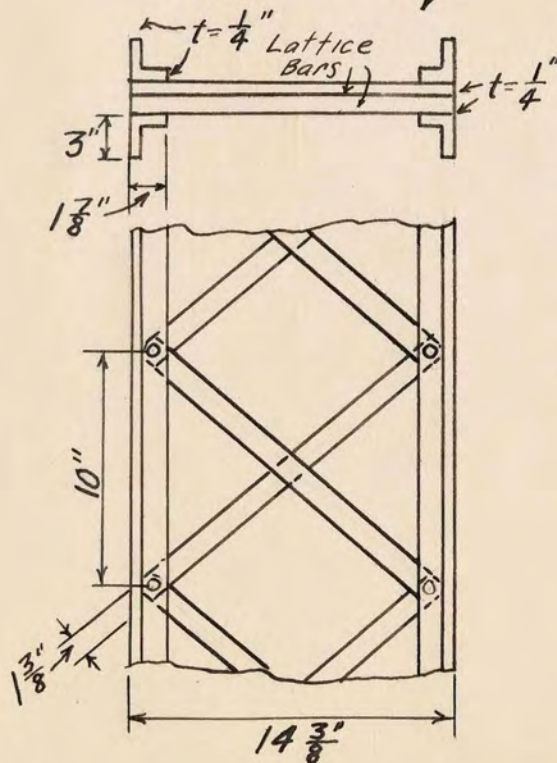
MEMBER B

a	10"	10"
b	$\frac{1}{4}"$	$\frac{1}{4}"$
c	$\frac{1}{4}"$	$\frac{1}{4}"$
d	$1\frac{3}{4}"$	Duplicates $1\frac{3}{4}"$
e	6"	6"
f	$6\frac{1}{4}"$	$6\frac{1}{4}"$
g	12"	12"
h	$2" \times \frac{1}{4}"$	$2" \times \frac{1}{4}"$

MEMBER C MEMBER D

a, b	Lattice bars top and bottom	
c	$\frac{1}{4}"$	$\frac{1}{4}"$
d	$1\frac{5}{8}"$	$1\frac{5}{8}"$
e	4"	5"
f	$6\frac{3}{16}"$	$6\frac{5}{16}"$
g	12"	12"
h	$1\frac{1}{2}" \times \frac{1}{4}"$	$1\frac{1}{2}" \times \frac{1}{4}"$

MEMBER K



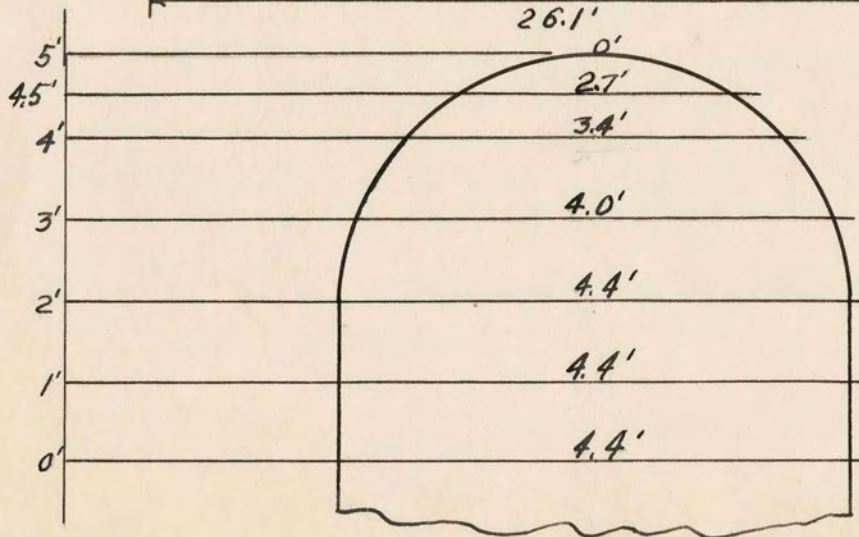
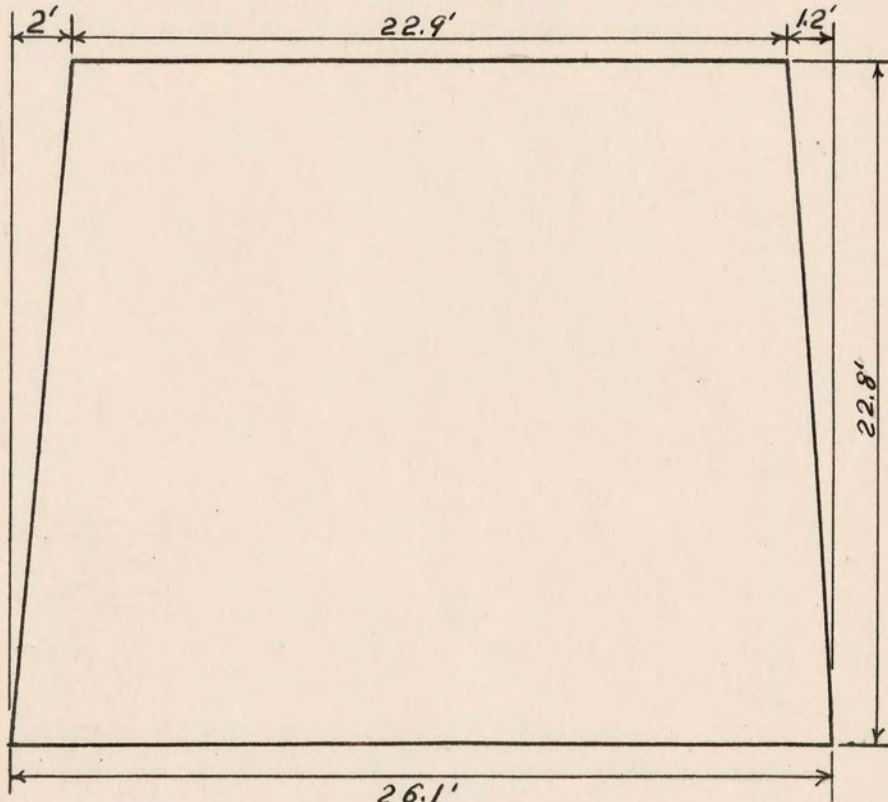
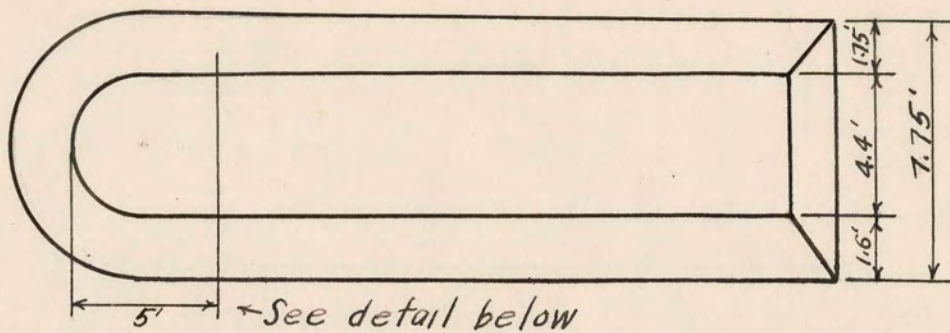
MEMBER L

Two angles, $1\frac{3}{4}" \times 3" \times \frac{1}{4}"$, $1\frac{3}{4}"$ legs back to back

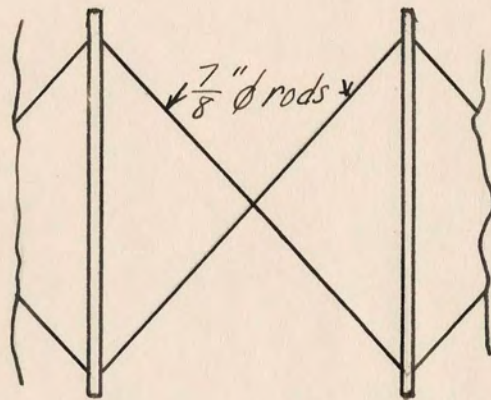
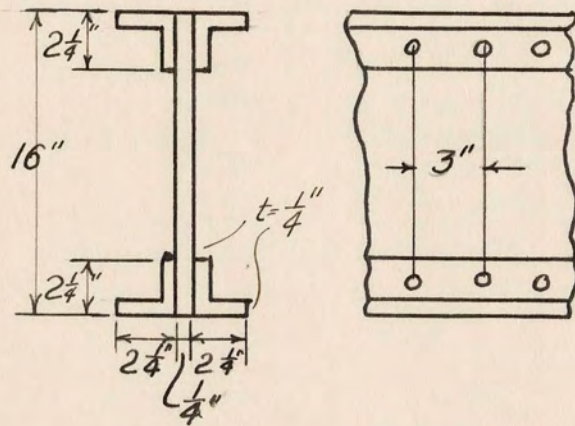
TENSION MEMBERS

Member	No. of rods	Size
E	1	$\frac{3}{4}" \phi$
F	1	$1\frac{1}{8}" \phi$
G	2	$1\frac{1}{8}" \phi$
H	2	$\frac{7}{8}" \phi$
I	2	$\frac{3}{4}" \times 2\frac{1}{2}"$
J	2	$1\frac{1}{4}" \phi$
M	1	$\frac{3}{4}" \phi$

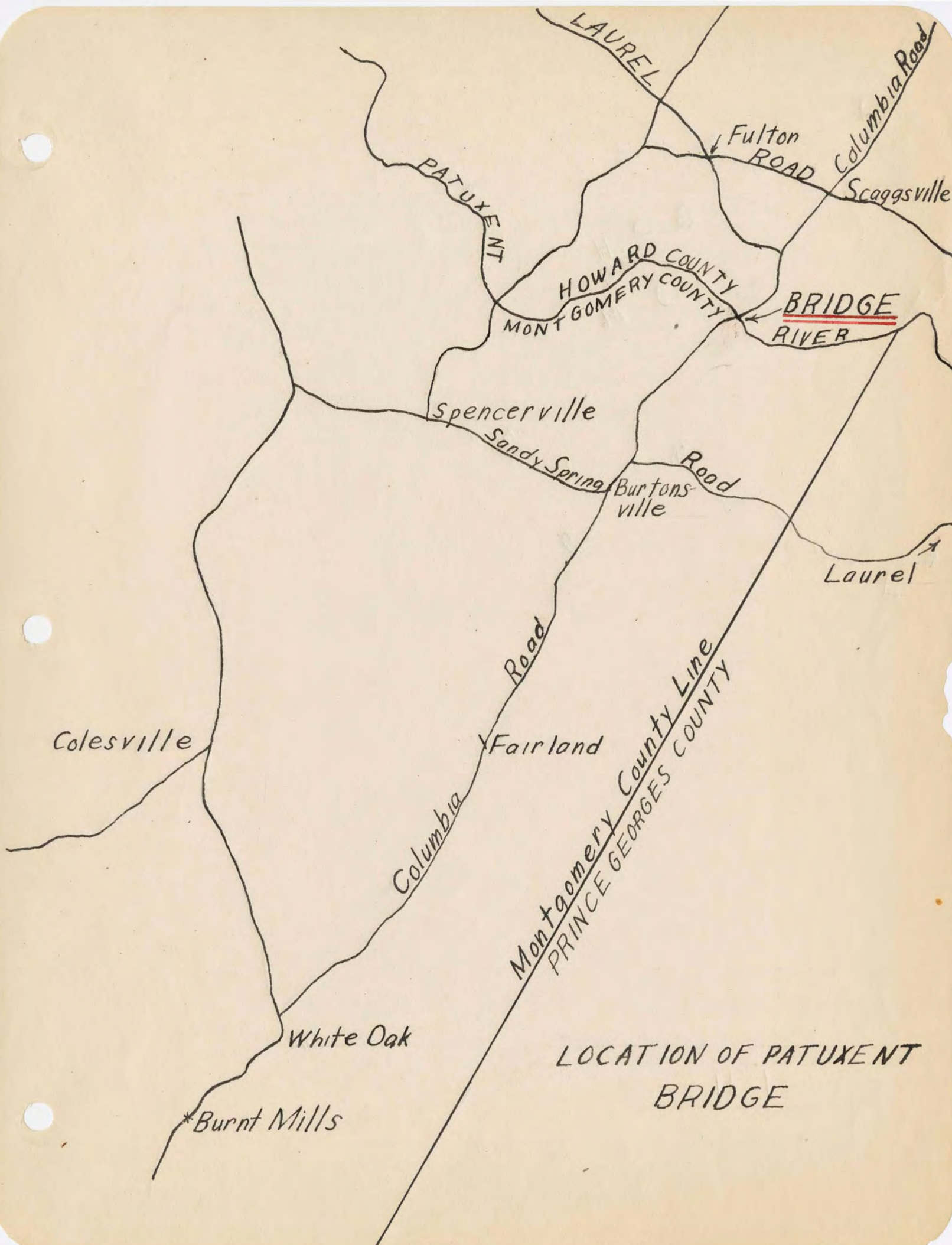
DETAILS OF PIER



BEAMS SUPPORTING FLOOR JOISTS



Top view showing rods holding beams
in vertical position



LOCATION OF PATUXENT
BRIDGE

American Bridge Company

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

Frick Building,

Pittsburgh, Pa.

RICHARD KHUEN, JR.,
CHIEF ENGINEER.

1933 April 21

Mr. John T. Dressel
3228 Ash St.
Mt. Rainer, Maryland

Dear Sir:

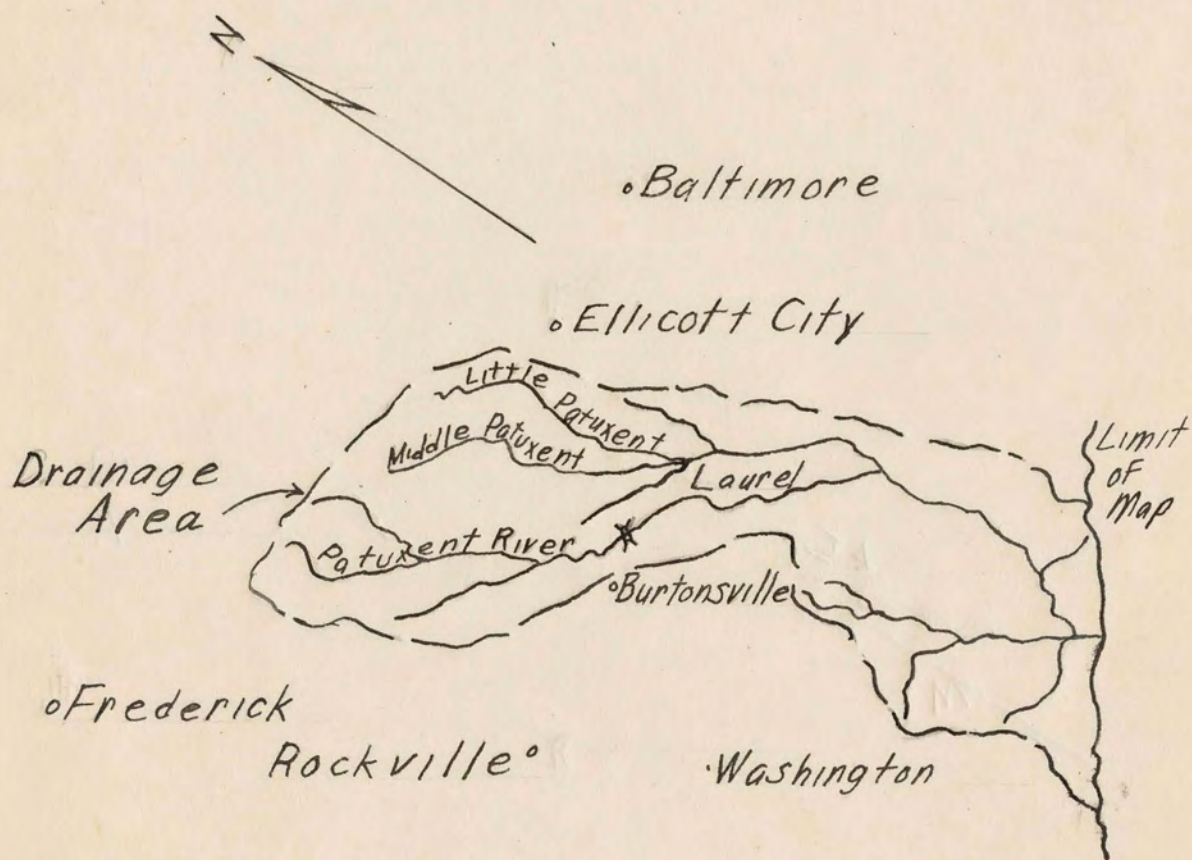
Receipt is acknowledged of your letter of April 19
with reference to your thesis on "The History and Construction
of the Patuxent Bridge North of Burtonsville on the Old Columbia
Turnpike."

As this bridge was built a long time before the American
Bridge Company was formed, we regret very much that we have no
record or any information on this bridge in our files.

Yours very truly,

Richard Khuen Jr.

Chief Engineer



UPPER PATUXENT RIVER AREA