

THEODORE BURR'S BRIDGE AT NESCOPEK FALLS

After Matthew R. Stealey, 1828

Courtesy Bureau of Land Records, Pennsylvania Department of Internal Affairs

THEODORE BURR AND HIS BRIDGES ACROSS THE SUSQUEHANNA

BY HUBERTIS M. CUMMINGS*

WHEN he came to Northumberland in the late autumn of 1811 to arrange for his first bridge building on the Susquehanna, Theodore Burr carried with him a clear and unmistakable eminence. Eleven years later, when in November, 1822, he died at Middletown, he left behind him along that same river an assured but rather divided fame. Within the interval, indeed within the first eight years of it, he had built five bridges across the Susquehanna, four in Pennsylvania and one in Maryland. From Port Deposit below the State Line to Northumberland, famous old "Point" at the meeting of the North Branch and the West Branch of Pennsylvania's great inland river, and upstream to Berwick, his

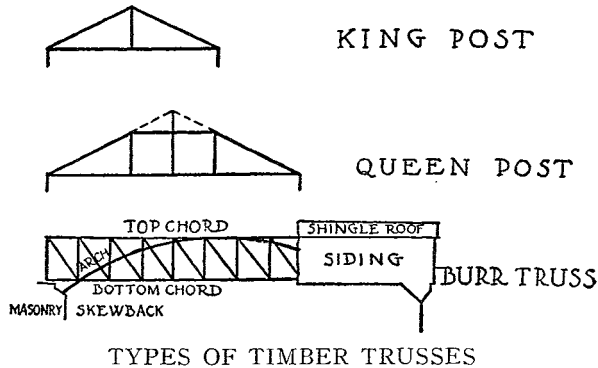
*Dr. Hubertis M. Cummings, author of *Richard Peters* and other works, is well known to readers of PENNSYLVANIA HISTORY, especially for "Song of a River" (April, 1952), "Stephen Hills and the Building of Pennsylvania's First Capitol" (October, 1953), and "Pennsylvania, Network of Canal Ports" (July, 1954). He is at present engaged on a history of the Pennsylvania Canal.

work had been prodigious and his name mighty. For a hundred miles up and down the broad current past Rock Run, past Columbia, past Harrisburg, past Sunbury, men knew him well.

He had done much to deserve renown before he came to the Susquehanna. Connecticut Yankee by birth, born at Torrington on August 16, 1771, son of a miller and mill-builder, he had married at eighteen; had a year later brought his bride, Asenath Cook, to central New York State and set himself up as a millwright at Oxford in the valley of the Chenango. In that part of the country, at the age of twenty-nine in 1800, he took to constructing bridges and built his first bridge across the Chenango. Then, farther from home, he scored a second venture, a drawbridge of total 400-foot length across Catskill Creek, at Catskill, in 1802. By 1806 he had added to this achievement not only a 330-foot bridge across the Mohawk River at Canajoharie but also the first "sizable" bridge across the Hudson River, the "Union Bridge" at Waterford, which would stand for a century, and a second bridge across that river at Fort Miller, near Northumberland, Saratoga County, which would have similar lasting powers. By 1808 he had increased his count to include a bridge over the Schoharie at Esperance; one across the Mohawk River at Schenectady; and—far greater than both these New York State structures—his great inter-state bridge at Trenton, New Jersey, connecting that city with Pennsylvania across the Delaware.

Of this, completed in 1806, an English art critic would say fifteen years afterwards: "It is the only specimen of carpentry that ever impressed me with the idea of grandeur." Beauty of interior construction it certainly had; its five trussed arches in white pine timber spanned from abutment of cut stone to pier of cut stone, from pier to pier, to opposite abutment of the same massive structure in cut stone, a total distance of 1,008 feet across the river; and each of the five ribs of each lofty arch rose from its lower chord line in the proportion of thirteen feet in a hundred. Well could C. A. Bushy call it "as a work of art . . . truly magnificent"—and *that* long before it would have rails laid on its floor to become the first inter-state railroad bridge crossing the Delaware. And well could the Englishman herald Mr. Burr's "mode of constructing wooden arches" as a great improvement in bridge architecture.

For it is true that the Theodore Burr truss, with its subtle interweaving of king posts, truss braces, and braces into sturdy arches of white pine had been gaining, for ten years before he was invited



TYPES OF TIMBER TRUSSES

to the Susquehanna, a handsome repute to the millwright, carpenter, architect.

Much, of course, had had to happen before he could be professionally received here. Acts of the Pennsylvania Assembly authorizing the incorporation of bridge companies had been necessary. In 1807 first ideas for a bridge across the North Branch of the Susquehanna at Nescopeck Falls in Luzerne County had emanated; in 1809 incorporation of companies to build bridges at Northumberland, at Columbia and at Harrisburg had been authorized and approved.

Commissioners were appointed for enlisting subscriptions to stock. These had busied themselves in the interest of the several companies. By the spring of 1811 they had succeeded enough in that hard-going endeavor to have the Assembly assure a subscription on the part of the Commonwealth of Pennsylvania for \$50,000 for stock in the Northumberland Bridge Company, two similar subscriptions of \$90,000 each for stock in the Harrisburg and the Columbia Bridge Companies, and \$20,000 for the McCall's Ferry Bridge, down river, a new project just come into consideration. In brief, on April 2, Pennsylvania was promising a sum of \$250,000 for the encouragement of bridge-building across the Susquehanna; and four prospective Bridge Companies knew now that to have the State's aid they must find subscribers to stock in designated amounts to warrant their having the privilege of it.

The Northumberland Bridge Company, on the following October 19, was the first one to meet the conditions required of it, and on that date was formally and officially incorporated. On November 19 the Columbia Bridge Company attained to the same distinction. Far more important, the Commonwealth of Pennsylvania and its citizens now had distinctly in mind four bridges across a great waterway which was still being crossed by fording or ferrying, by scow and raft, or by occasional rowboat and canoe. It was a timely hour for bridge companies to close contracts with architects.

Before their incorporation the Northumberland Company had been learning directly of Theodore Burr. Letters had gone forward with inquiries to New York State Bridge Companies. From James Murdock, President of the Mohawk Bridge, and Chauncey Humphrey, of the Schoharie Bridge, had come testimony of the man's "high character" and attestations of his capability, industry and attention. Mr. John P. De Gruchy, their own President, had visited in person with the managers of the Trenton Bridge Company, and received assurances of the same import. There was no doubt in his or his fellow board members' minds when on November 29, 1811, they signed full articles of agreement with Theodore Burr to build them "a Bridge across the North East Branch of the Susquehanna from the town of Northumberland to Shamokin Island and from the same to the Sunbury side of the river."

The meticulously drawn document itself attested "the industry and attention" of the bridge-builder. Materials, modes of construction, dimensions, features, were all most exactly designated as well as dates of payments to be made on the work as it advanced from stage to stage. Piers—there were to be three piers in the water between Northumberland and the island, four in that between the island and Sunbury, although eventually three piers were compounded for here—abutments, and wing walls for the abutment were most scrupulously stipulated for as to foundation, height, length, width, and shape. The white pine superstructure resting on the great cut stone piers and abutments was to be built "according to the plan with four strings of arches, uniting with it Chords, Truss Braces, King Posts and Braces, and all the Timbers necessary." This would accommodate in each of the two really detached and separate bridges two carriage ways, each eleven-and-a-



MODEL OF A TRUSSED ARCH

*By Theodore Burr**Courtesy Pennsylvania Historical and Museum Commission*

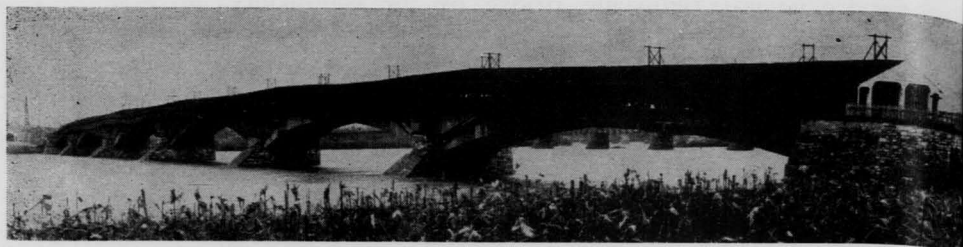
half feet wide, and a foot way of four feet and ten inches between the two. Two tiers of plank flooring would line each, and there would be a clearance of eleven feet and four inches above each floor for vehicles to pass through. The bridge was to be roofed with shingles, and sided with two-inch plank first and then boards of about an inch thick tongued, grooved and planed from the top of the chord to within two feet of the top plate. Every part of it was "to be well and sufficiently secured with iron." Moreover into the articles came also two toll houses, one on the Northumberland, one on the Sunbury side. All work was to be done "in a complete, masterly and workmanlike manner." It was to be commenced in March, 1812, and the structure was to be made passable by January 1, 1814, or at the latest by the first day of 1815.

A few days before Burr began work at Northumberland, on February 28, 1812, Letters Patent were issued to the Nescopeck Falls Bridge Company to construct their bridge opposite Berwick on the Susquehanna. By the end of that year the architect from Oxford, New York, was occupied with problems of construction of two bridges: at Northumberland and Harrisburg; and, as a stockholder in the Columbia Bridge Company owning two hundred shares, he was interested now to see first progress made on

the Columbia-Wrightsville Bridge by the contractors, Messrs. Jonathan Walcott and Henry and Samuel Slaymaker, who were erecting it on his arch and truss plan. In 1813, he added to his round of employment and interests a third and a fourth bridge, upstream at Nescopeck Falls and downstream at McCall's Ferry. By 1815 all four structures had been completed except the one at Harrisburg, which was to wait until late in 1816 to become first passable, and to early in 1817 for its finishing touches. In that last year, after actual construction of four Susquehanna bridges in the five previous years, he began his labor of two years on his bridge at Rock Run below the Pennsylvania Line in Maryland. This ultimate achievement of Burr's on the Susquehanna, having in all eighteen 200-foot trussed arch wooden spans, eight between the west shore and a first island, two between that and a second island, and eight more between that and the east shore, and a total length of 4,170 feet, was to be performed in two years. For the years between 1812 and 1818 Burr's trussed arch had been an increasing triumph.

Through his employment of it there stood now his two bi-partite bridges at Northumberland and Harrisburg, the first on its six piers and four abutments; the second on its nine piers and four abutments, but different in that its carriage ways and its two outside footways rose far higher in the arched spans, revealing a surprisingly lofty position for the chords of his arches and an undulant grace in the entire superstructure which suggested, beneath shingled roof and clap-boarded sides, what would have been its wholly beautiful intricacy of diagonal lines and soft curves in timberwork, dared it only to have remained exposed to the weather.

In a similar beauty, without the interruption of a Shamokin or a Forster's Island, extended the Walcott and Slaymaker bridge at Columbia across the river to Wrightsville, built with his plan of arch in twenty-seven 200-foot spans for a total length of 5,690 feet, its twenty-six dressed stone piers cutting the water below into fine bars of light and shadow. And as delicately lovely, if there be any truth in draftsman Matthew R. Stealey's drawing of it in 1828, was the blade-like pattern of Burr's bridge at Nescopeck Falls, springing from shore to shore over the tops of its five planked piers—only ones built of wood in Pennsylvania by the architect—in one swift gesture of parallel lines, of chords and roof beams.



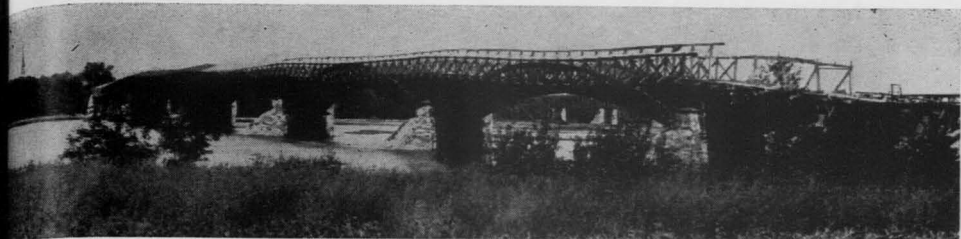
WESTERN SECTION OF BURR'S BRIDGE AT HARRISBURG, 1889

Courtesy Historical Society of Dauphin County

Most remarkable of all was his bridge at McCall's Ferry, crossing the Susquehanna at its narrowest point below Columbia, its one pier and two abutments ready in October, 1813—its two trussed arches, one of 360-foot length, one of 247-foot length, hoisted sectionally from floats ranging the river banks into position in January-February, 1815, in a feat of engineering hitherto unparalleled in America, the very recounting of which became epic as Burr wrote to Reuben Field, old friend and fellow bridge-builder at Waterford, New York, scene of his own early exploit in the Union Bridge over the Hudson in 1804. Ten weeks had been required to get the longer arch upon the floats, its length paralleling the shore. Then came the running of ice between the narrow banks of the river and a perilous wait until the stream had frozen across. Followed the high adventure of raising all from the surface of the ice and, by its aid, the closing success in February.

Burr was jubilant; his bridge crossed the river. It was a structure 32 feet wide. The wings of its single pier spread eleven feet eight inches on each side, which gave it a base of 55 feet. The wings at each abutment spread 17 feet each, producing a base of 66 feet. The altitude, or rise, was 31 feet. The chord of its 360-feet-4-inches arch was 376 feet. Everything about it was titanic. Burr himself declared "This arch is, without doubt, the greatest in the world." He knew well enough that the span of Lewis Wernwag's "Colossus of Fairmount," across the Schuylkill at Upper Ferry, built three years before and hitherto unexceeded, was only 340 feet. Rightly the McCall's Ferry Bridge belonged to the consummate score of its architect.

But the strength of the trussed arch, however perfectly calculated for distance and burden, was not the strength of water and



WESTERN SECTION OF BURR'S BRIDGE AT HARRISBURG, 1902

with roof and sidings removed for demolition

Courtesy Historical Society of Dauphin County

ice in flood. Ice, which had helped Burr erect his ninth wonder of the world in 1815, destroyed it for him on March 3, 1818, before his bridge at Rock Run, Maryland, was completed. There was wormwood in the wine of his latest success.

But this was not the first time of his having to drink from the poisoned chalice. For four years at least, distinguished performances had ridden for him in harness with chagrin.

In September, 1814, his bridge at Northumberland had been ready for the official State viewers to approve and enable the Bridge Company there to receive the last quarter installment of its \$50,000 from the Commonwealth; and yet in that same month President De Gruchy was complaining bitterly that Mr. Burr had sent six of his principal carpenters down to McCall's Ferry with completion of the Northumberland structure nine months "behind." Furthermore there had been many problems. Advances had to be made by the Company to Mr. Burr's clerk to pay Mr. Burr's workmen in October, 1814. Other advances he had had to depend on. By December, 1815, he was owing the Board \$1,950.25 and having to admit, when on his way to a visit back at home at Chenango, that he could not pay then on his bond to them for \$6,000 due last November.

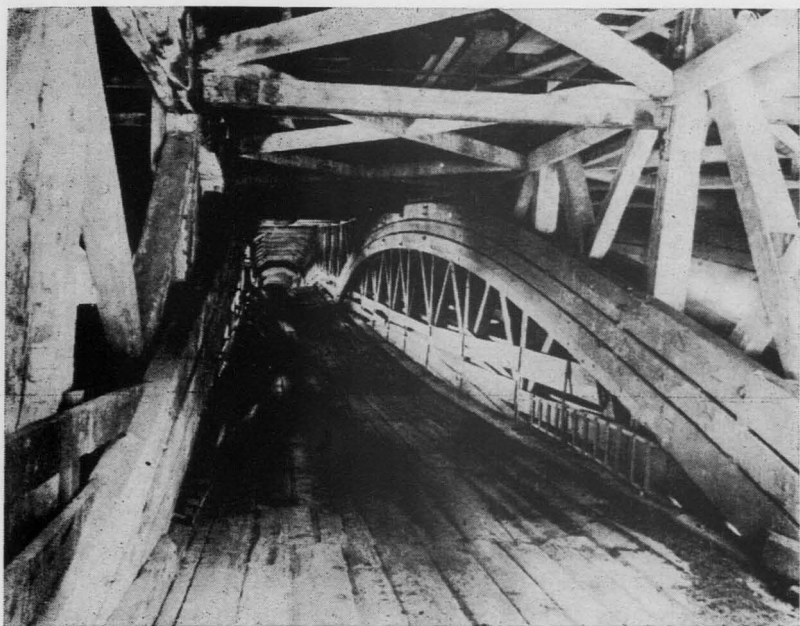
His credit had also become dubious with the Harrisburg Bridge Company. To them he had kept appealing for funds. To their President Thomas Elder he lamented that his men and his sub-contractors acted "as if the Devil was in them," believing that he was withholding from them money to which he was entitled from the State. He was "in bondage the world throughout—a free man in exile." And he did not strengthen his case by asking, as he did, for further advances from the Harrisburg group. Nor did it help

him to appeal in December, 1816, to those gentlemen to exert their goodness with the Legislature of the State—wherein he had now all but completed four bridges over the Susquehanna—to enable him to continue living in it. Money furnished him to meet the demands of labor or of contractors supplying timber and iron on this bridge had too often gone to meet the demands of labor and contractors on that one. Ineptitude in business had dogged the architect.

The mills of the gods had been grinding slow for Theodore Burr even before McCall's Ferry Bridge crashed or Rock Run Bridge in Maryland was completed. Eight years before he died he had become a controversial figure in Pennsylvania. His work on four bridges had vastly prospered the facilities of transportation and travel. As the result of his toils Western Counties had been connected with Eastern Counties in the State. Conestoga wagons with their burdens of goods, and stage coaches with their clusters of passengers flowed to and fro over the Susquehanna. Drovers guided their herds of cattle onwards to Lancaster or Philadelphia without the perils of fording or ferrying. Traders in the fore era to canals and railroads had at their command, and used, a new avenue to seeing the expanding growth of their country. The bridge builder had labored effectually. But Burr's career had gone into anti-climax.

Even about his death, which came at Middletown in November, 1822, hangs obscurity. It is commonly written of him that he died there—whether by disease or accident no one will venture to say—at the age of fifty-one; and it is said he was at the time superintending the construction of a bridge across Swatara Creek. But no official papers of Pennsylvania reveal any record of a bridge actually being built across that creek at either Middletown or Portsmouth, at its junction with the Susquehanna, during 1822. What Burr was constructing on the Swatara, if anything, cannot clearly be known today. His last enterprise in Pennsylvania, if it was any enterprise at all, was an undistinguished one. We know no more of it than we know of his place of burial. No grave in Middletown, and no grave anywhere in a Susquehanna river town is marked for him. Mystery has closed about his ending.

But the mills of his destiny kept grinding on after his death. Today the Minute Book of the Northumberland Bridge Company informs us how, in the spring of 1824, Mr. Silas Marsh of Oxford,



INTERIOR OF THE WESTERN SECTION OF
BURR'S BRIDGE AT HARRISBURG: LEFT SIDE OF FIRST SPAN

Courtesy Historical Society of Dauphin County

New York, son-in-law and administrator of his estate, compounded with that Board. For the \$6,000 bond still owed to them by Theodore Burr that executor released to the Company all the claims of Burr's heirs to the 400 shares of Bridge Company stock, originally valued at \$10,000 and once regarded as proper compensation for the architect's directing of construction. One great debt at the least was thus cancelled, without apparent dishonor attaching to the transaction. The Capital Stock of the Company was reduced from \$90,000 to \$80,000.

In later years certain members of Theodore Burr's family became innkeepers at Northumberland. Eventually, by reason of their residence in that town, the model of a trussed arch now owned by it came into the possession of the Historical and Museum Commission of Pennsylvania. It survives as symbolic, but modest, index to a brilliant achievement in bridge history. In its fragile combination of chords, trusses, king posts, and arch with carriage and foot ways, it exhibits the secret of great bridges in

the century after Burr of wood, of iron, of steel. Like a simple but eloquent paragraph it offers preview to a whole thesis of structural engineering.

The name of the designer of it is not an especially famous one in the middle of the twentieth century. It does not rank with the names of the Wernwags, the Nicholas Powers, the Stephensons, the Roeblings, in the history of bridge-building. Yet those who look on the Eads Bridge over the Mississippi River at St. Louis, the Hell Gate Bridge at New York City, the Sydney Harbor Bridge in Australia, behold in the gigantic steel trussed arches of those magnificent viaducts a practice in construction which, in the shape of white pine timbers, Theodore Burr first brought into Pennsylvania.

Wood is not a material, however, to resist water indefinitely or fire at all. Flood and weather, wind, rain and sun, are none of them its friends when, worked into braces and arches, it rises athwart the courses of streams. Four years before his death Burr's bridge at McCall's Ferry had perished; ten years after it flood had done for the Columbia Bridge, fruit of his genius in arch and truss; and four years later, in the winter of 1835-1836, for the slender fair Bridge at Berwick. In March, 1846, a great freshet in the Susquehanna carried away the eastern half of the famous "Camel-Back" bridge at Harrisburg. Only two of Burr's masterpieces on that river survived into the first years of the twentieth century, that at Northumberland and the western half of the structure at Harrisburg. It was the handicap of Theodore Burr that he did not have at command in his lifetime materials worthy of his genius for fabricating.