

An aerial photograph of the Tappan Zee, a large body of water. A large, multi-masted sailing ship is positioned on the left side of the frame. A long bridge, consisting of a trestle section and a long approach, spans across the water. The bridge's approach curves around the right side of the water. The surrounding land is densely wooded.

The TAPPAN ZEE

from the Half Moon

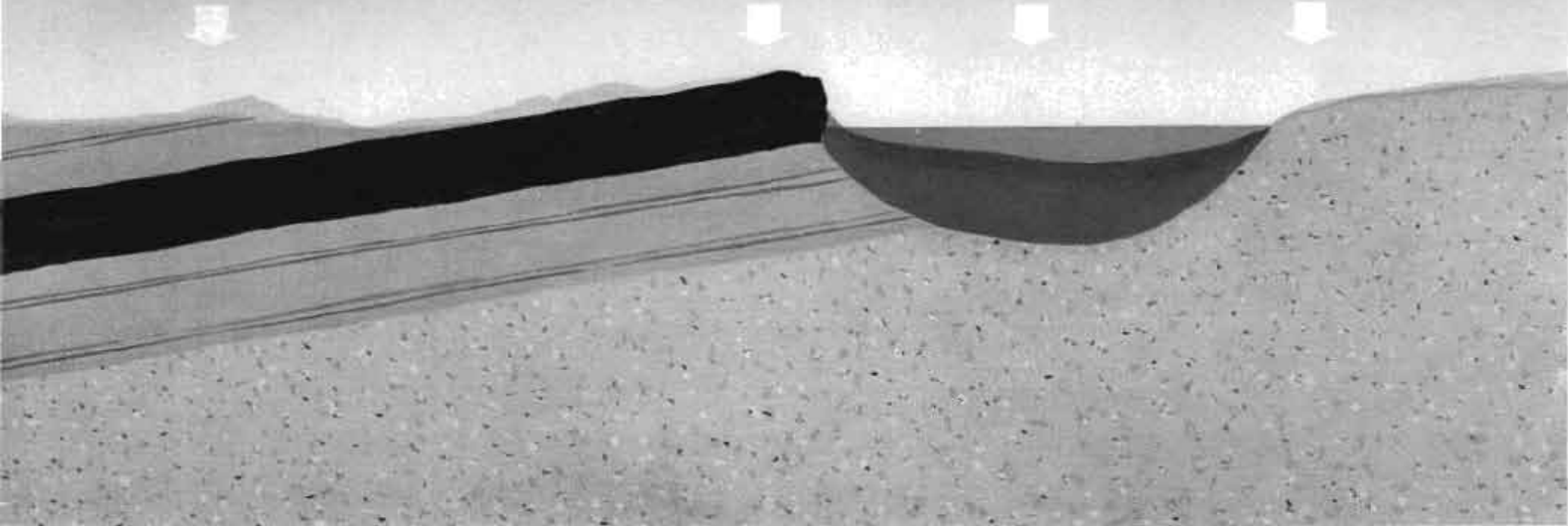
to the Bridge

Sedimentary deposit that overlies a layer of igneous rock, the edge of which forms the Palisades.

The tremendous pressure from an ancient volcano forced sheetlike layers of molten rock outward.

The Hudson River has a great part of its valley filled with the sedimentary wash from upstream and the erosion of adjoining highlands.

Westchester's hills were once volcanic mountains, worn down by millions of years of wind and rain.



The Engineering Problems of This Bridge Began 170 Million Years Ago

The Hudson River, with its majestic Palisades, has been called the world's most beautiful river. It is certainly one of the geological wonders of the world. It is this fact that makes it one of the most difficult rivers to cross, and because it also formed the greatest harbor in the world, one of the most necessary rivers to cross conveniently.

About 170 million years ago, a fault, or slippage of the earth's surface occurred a few miles to the west of what is now the Palisades. Just to the east of this

fault several volcanoes erupted. Their cones have long since eroded away, but so great was their force while they were active that they intruded billions of tons of molten rock, or magma, between the sedimentary layers. It is the edge of one of these layers of magma that now forms the Palisades.

Eventually a stream began to trickle along this edge of hard igneous rock, carrying with it the softer sedimentary deposit and forming the channel of the Hudson River. Much later, only a few ten thousand years

ago, the great glaciers pushed down, cutting deeper into the soft strata. Then, because the Hudson at the Tappan Zee is now in reality an estuary (affected by ocean tides) and not a river, sediment carried down from upstream has been deposited on its bottom to a great depth. And therein lies the major problem of bridging this mighty body of water. Towering cliffs on one shore, rolling hills opposite, and between a valley filled to a great depth with a soft sedimentary deposit, over which flow the waters of the Hudson.

“It Was Only a River After All”



Verrazano, who in 1524, first saw the mouth of the Hudson, described it later as “a great inland lake.”

The Half Moon, Hudson’s ship, was given to him by a Dutch company to search for a short route to China.

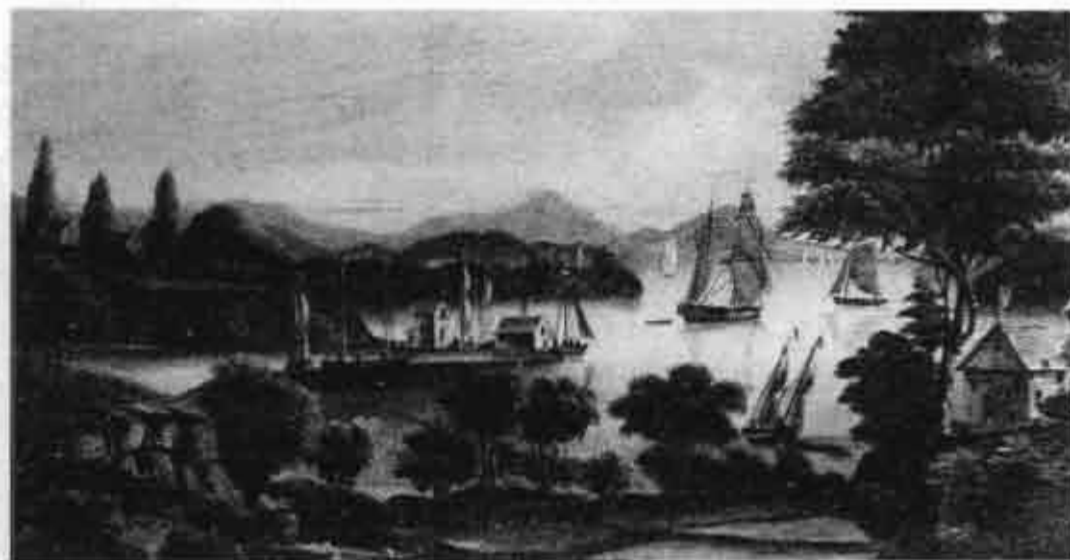


Henry Hudson, English explorer, sailed up the Hudson River on his third voyage to America in 1609.

Henry Hudson, on the Half Moon’s deck, shows his disappointment at not finding a route to the Orient.

Shortly after the discovery of America, a Spanish explorer Verrazano, sailed into New York harbor and became the first white man to see the Hudson River. Although Dutch settlements sprang up around the harbor, it was not until 85 years later, in 1609, that Henry Hudson, commissioned by the Dutch East India Company to search for a northwest passage to the Orient, actually explored the river as far as Albany. As he saw the river widen at the Tappan Zee and also remain salty, he was encouraged to believe that this was actually a strait opening into another ocean on the far side. Upon his return he reported that “It was only a river after all,” not realizing that this mere river was to contribute immeasurably to the westward expansion of America, and that it was to become one of the most important commercial arteries in the world.

This early painting of the harbor at Tarrytown is believed to be the work of T. Chambers. Tarrytown was one of the early Dutch settlements on the Tappan Zee, which gets its name from the Tappan Indians, a warlike tribe that lived on the west shore.



The Tappan Zee Gives Way to Pioneers

Shortly after Hudson's voyage, Dutch settlers from New Amsterdam began to push into the wilderness that is now Westchester. Their progress, though, was not easy. Vicious Indian tribes roamed the area, and ghastly slaughters marked the progress of the settlers during the first half of the seventeenth century. By 1650 a Dutch colony had been established at what is now Yonkers, and a few brave land-seekers had undoubtedly pushed as far north as Tarrytown. Very little is known about these early settlers, but it has been pretty well established that more than three hundred years ago homesteads had been established on the hills overlooking the Tappan Zee.

On August 3, 1776, two British ships—the Phenix and the Rose—engaged five smaller ships in the Tappan Zee in what was the only naval action of any importance on the Hudson River. Because of the superior power of the British ships, the Americans were forced to seek shelter at Dobbs Ferry where the larger ships could not pursue them.



On the morning of September 23, 1780, Major John Andre, a British spy, was captured by three American militiamen near the spot now marked by a monument in Tarrytown. This is undoubtedly the outstanding event of the Revolution in Tarrytown.

Andre Monument stands on the Albany Post Road near the spot where John Paulding, Isaac Van Wart and David Williams, all natives of the Tappan Zee vicinity, rendered their historic service to the great cause of American independence.





Old Dutch Church at Sleepy Hollow was built in 1699 or earlier by Frederick Philipse. It is believed to be the oldest church in New York State, and one of the oldest in the country. It still stands near the Albany Post Road in North Tarrytown.

Vredryk Flypse, whose name was later Americanized to Frederick Philipse, was the first great land holder on the shores of the Tappan Zee. His first purchase in the area, on December 10, 1681, included much of the land that is now Tarrytown. Other purchases in succeeding years put him in possession of lands from Spuyten Duyvil as far north as the Croton River. This great manor was ratified by a grant from Governor Edmund Andros, and was confirmed by a charter in 1693 from their majesties, King William and Queen Mary of Great Britain. For many decades, the manor was operated in much the same manner as those in Europe, with justice being administered by Lord Philipse (there were two successors to the original Frederick) and with each tenant farmer paying tribute to the lord of the manor.



Mill at Philipse' Castle erected by the first Lord of the Manor, and probably the first industry to be established on the Tappan Zee. It is located near the point where the Pocantico River meets the Hudson, and has been restored as a monument to the family that did so much to develop this part of the Tappan Zee commercially.

One of the earliest industries—and certainly one of the most lucrative—on the Tappan Zee was fishing. Both sturgeon and shad were caught and transported to the thriving town of New Amsterdam. This print shows shad fishermen on the Tappan Zee early in the nineteenth century. Note the Hudson River sloop in the picturesque background.





Washington Irving, essayist, humorist, biographer, diplomat, who was the first American to be generally recognized abroad as an American man of letters. Born in New York in 1783, he resided at "Sunnyside" on the Tappan Zee for years before he died in 1859.

"Sunnyside," home of Washington Irving, has been restored and is open to the public as a museum commemorating the life of this great author. This old drawing shows Washington Irving's estate as it appeared in his time, with a glimpse of the magnificent view across the Tappan Zee to the Palisades.

The Legends of the Tappan Zee and its Vicinity...

Undoubtedly the most famous early resident of the Tappan Zee was Washington Irving, whose home "Sunnyside" still stands as a memorial to this first great American man of letters. Two of his most famous stories are "Rip Van Winkle" and "The Legend of Sleepy Hollow," both of which are laid in the region that they have made famous around the world.

Born in New York City in 1783, Irving often visited the Tappan Zee as a child, and early in life determined to make his home here. However, extensive travels in Europe, and later to the far west of the United States, prevented him from doing this until he

was past fifty and ready to settle down.

In 1835, he purchased "Wolfert's Roost," and remodeled it into his home, "Sunnyside." Except for a four year absence during which he served as minister to Madrid, Washington Irving lived at "Sunnyside," and it was here that he produced many of his more serious works: his biography of Goldsmith (1849) and his biography of Washington (1859) completed shortly before his death.

However, Washington Irving will undoubtedly be best remembered when on Halloween the harrowing ride of Ichabod Crane is re-told in homes across our country.



were *Immortalized in the Works of Washington Irving*



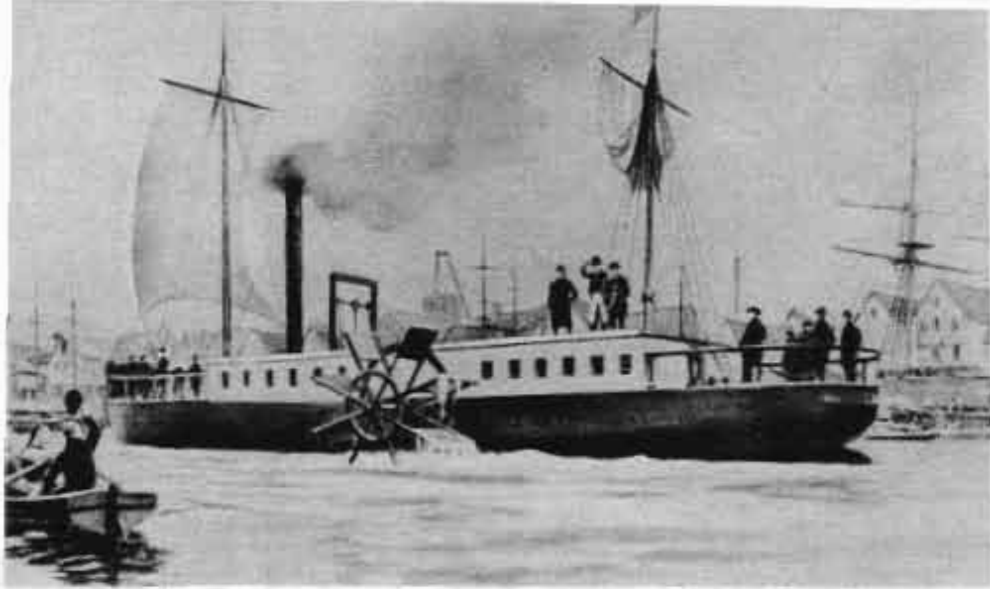
"Just then he saw the goblin rising in his stirrups and in the very act of hurling his head at him. Ichabod endeavored to dodge the horrible missile, but too late. It encountered his cranium with a tremendous crash; he was tumbled headlong into the dust, and

Cunpowder, the black steed, and the goblin rider passed by like a whirlwind." Thus Washington Irving describes the climax of one of the wildest and strangest rides in legend. This old drawing pictures this scene, with the Old Dutch Church in background.

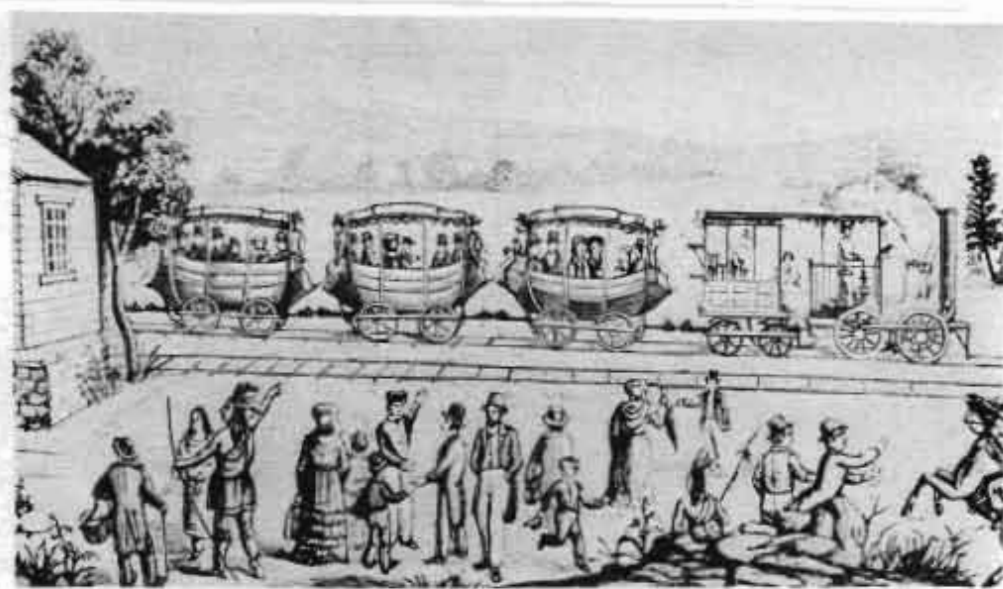


"Rip Van Winkle," another equally famous tale of Washington Irving's, is based on a legend once current in the Catskills of a man who slept for 20 years. Irving's story was first published in London in 1819 in *The Sketch Book of Geoffrey Crayon, Gent.* The two drawings show Rip reading at the village inn prior to his strange adventure, and relating his story at the same spot upon his return. Notice that his long sleep spanned the Revolutionary War, and that the name of the inn has been changed from "George III" to "George Washington."





"Fulton's Folly," or as it is correctly known, "The Clermont," was the first successful steamboat to operate in the Hudson. It was launched in 1807, and for many years carried passengers and freight up and down the river. It was the forerunner of the popular Hudson River Day Boats we see today.

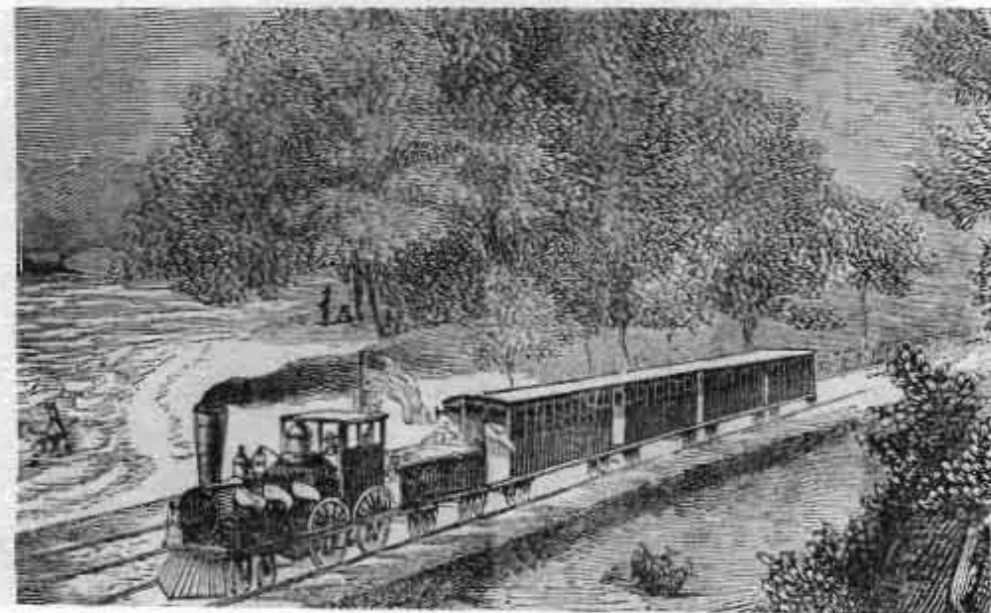


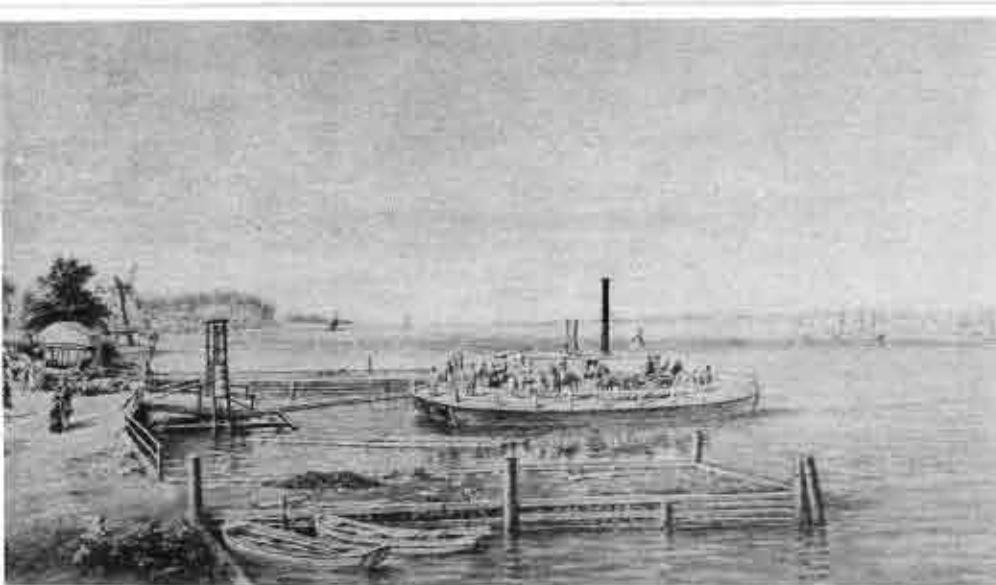
The "Dewitt Clinton," although it did not actually operate in the Hudson valley, was built at the West Point Foundry in 1831, and was taken from there to Albany, from which point it ran along the Mohawk to Schenectady. This old drawing shows this famous train on one of its early runs.

The Tappan Zee was a Natural Highway for American Expansion

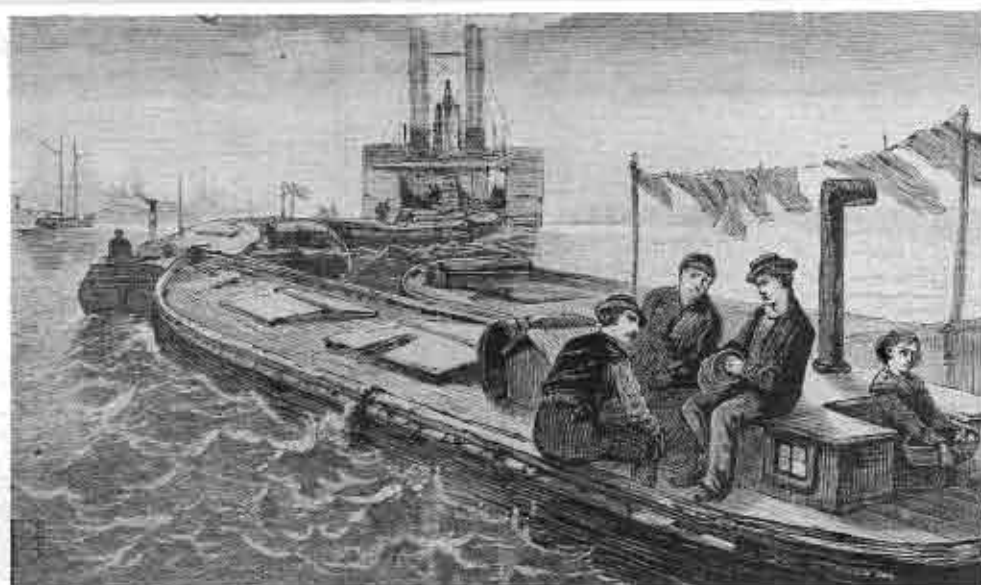
The great port of New York was a mecca for emigrants who were to settle the West. And the first great highway to the interior was the easily navigated waters of the Hudson River. Its eastern shore, because it offered a natural "water level" route, was soon developed for overland transportation. King's Highway, later known as the Albany Post Road, was an important route for stage coaches. Couenhoven's Inn, at Main Street and the Post Road in Tarrytown, was a well-known overnight stop for stage coaches in those days, and General George Washington stopped there overnight in 1783 on his way to witness the evacuation of New York by the British.

In 1849, the Hudson River Railroad, between Peekskill and New York, began operation. This was later to become the New York Central, whose contribution to American progress could fill many books. Here is an early train chugging along beside the Hudson.





Robert Fulton built many steamboats for commercial and government use. This ferry boat built by Fulton operated on the Hudson somewhat south of the Tappan Zee, and was actually a combination of two boats fastened together with the engine and water wheel placed between them.



With the advent of steam power and the opening of the Erie Canal, barge tows became more and more important on the Tappan Zee. Here one is being towed by a side-wheeler late in the 19th century, with the famous Hudson River sloop, the steamboats' predecessor, in the background.

The first bridge to span the Hudson River was the railroad bridge at Poughkeepsie. It was built in 1889. This is a drawing of Poughkeepsie in that period with the bridge in the background. Later came the Bear Mountain Bridge (1925) and the George Washington Bridge (1932).



Commuting to New York from the villages of the Tappan Zee has been going on for a century, as evidenced by this commutation ticket from Tarrytown dated May 4, 1857. In those days, commutation tickets were sold only for the entire year.

HUDSON RIVER RAILROAD COMPANY.

Commutation No. 228. *New York, May 4, 1857.*

Received of *William Gaan*

One hundred & fifty Dollars in full, for Passage money for one seat in the WAY PASSENGER CARS of the Hudson River Railroad Company; stopping at the Station House at *Tarrytown* — between that Station and the City of New-York from this date to the *30th* day of *April* 1858.

This Commutation is to be used only by the above named person, and is under no circumstances transferable; and the Company are, by consent of the above named, released from any obligation to respect the Commutation in case of any temporary or permanent transfer, loan or use of this Certificate; it is confined to the WAY PASSENGER CARS; it is subject to the general rules, control and regulation of the trains by the Company, and the ordinances of the Common Council of the City of New-York, in regard to the travel in the streets of that City; and confers no privilege of transportation of any kind of goods, express matter, &c., other than ordinary personal baggage of domestic value, and no return of any part of the sum above received will be made in consequence of the inability of the above named to use the privilege.

THE Commutation Ticket to be shown to the Conductors in the Cars, Each Train, and wherever required.

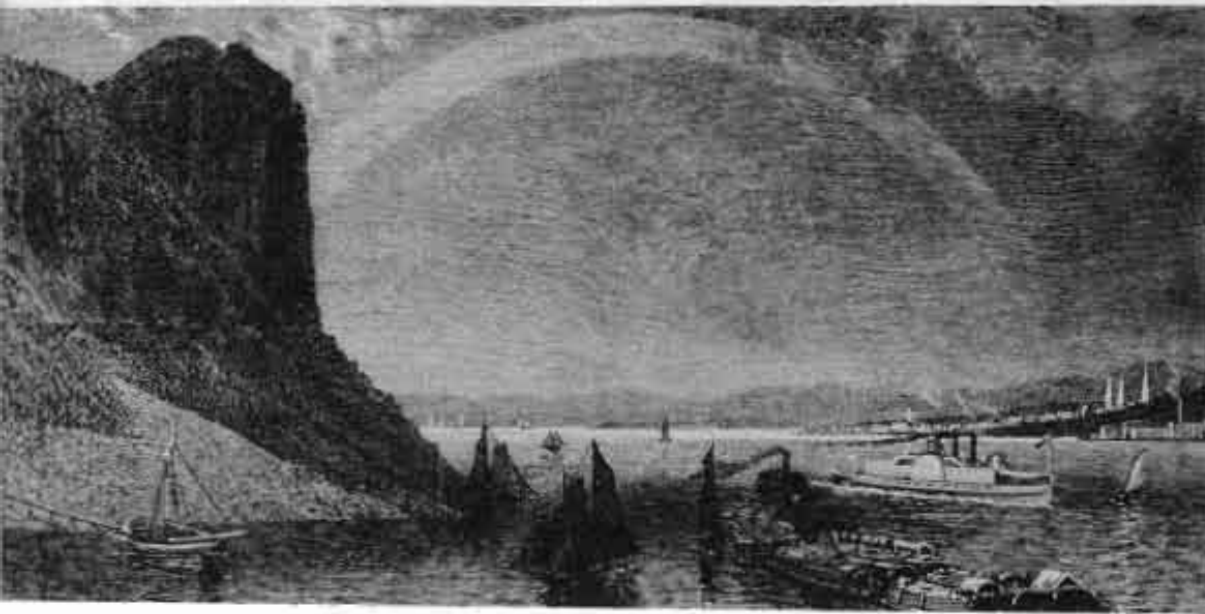
N.B.—This privilege is to be forfeited without repayment of the above sum, or any part thereof, upon any infringement of these rules.

Wm. Gaan Ticket.

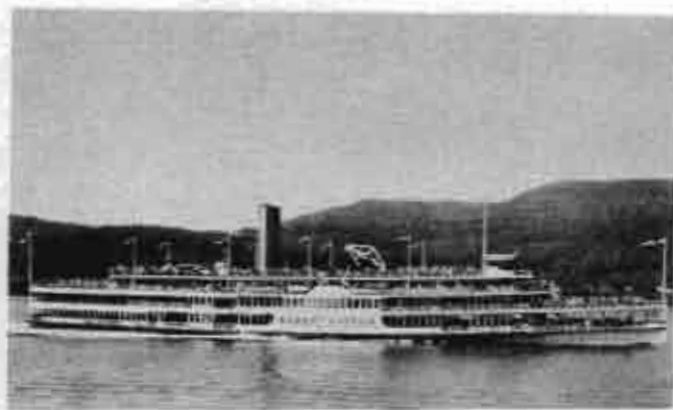
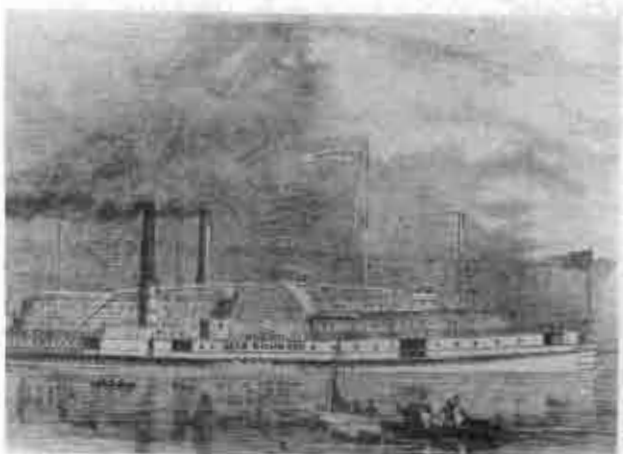
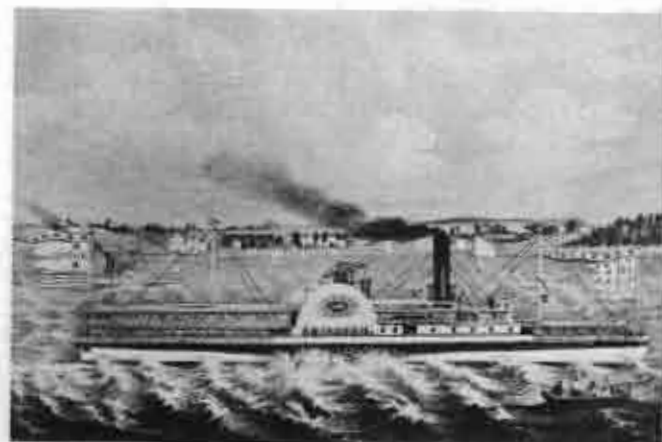
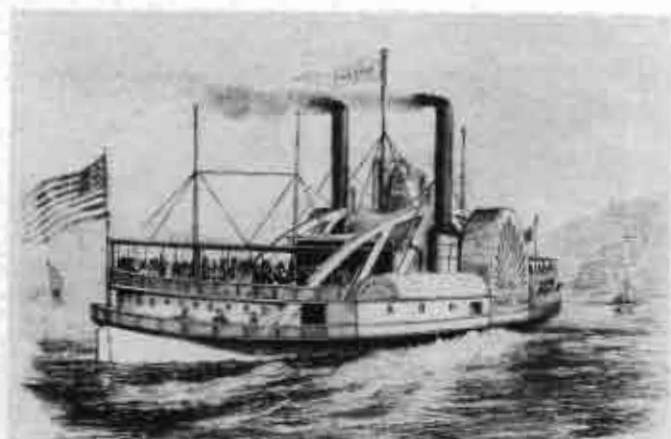


Grand saloon of the steamer "Daniel Drew" . . . renowned in the late nineteenth century.

The Coming of Steam Brought a New Look to the Beautiful Tappan Zee



For more than a century the white sails of sloops dotted the Tappan Zee, carrying passengers and freight between the many cities and towns on the Hudson. Then came the Hudson River day and night liners that were renowned for their luxury, obsoleteing the smaller craft. The woodcut above of the village of Sing Sing, now Ossining, shows the Tappan Zee in 1854. The view on the left, 25 years later, shows the picturesque sailboats diminishing in number. Hudson River Day Liners still provide an unsurpassed view of the Hudson Valley. Many of the more famous ships are shown here, with three (bottom of the page) that are still in operation.

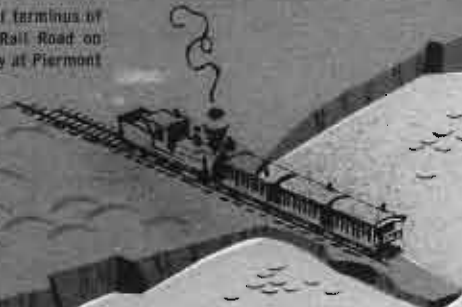


Historical Map of the TAPPAN ZEE

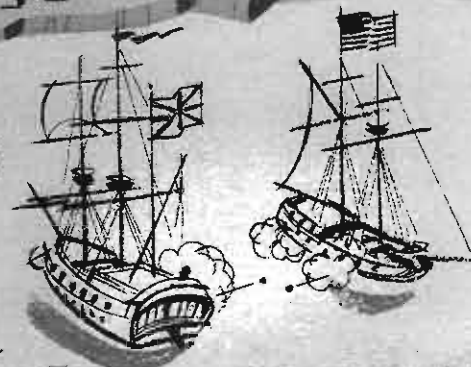


Tappan Indians
warlike early residents
of the Tappan Zee

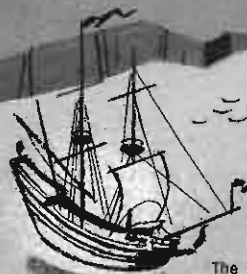
Original terminus of
Erie Rail Road on
causeway at Piermont



Battle of Tappan Zee
August 3, 1776



The "Half Moon"
sailed up Tappan Zee
in September, 1609



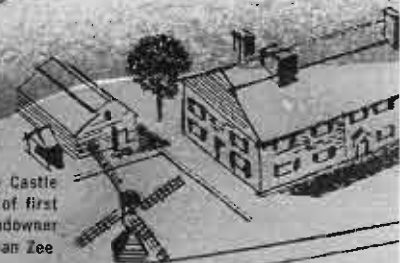
Tappan Zee Bridge
dedicated 1955



The "Turtle" . . . first
American submarine, sunk
in Tappan Zee in 1776



Philipse Castle
home of first
great landowner
on the Tappan Zee

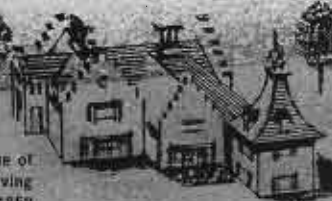


Old Dutch Church
erected by Frederick Philipse
late in 17th century

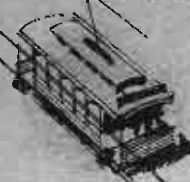
Dobbs' Ferry . . . early
means of crossing
the Tappan Zee



Sunbyside . . . home of
Washington Irving
from 1835 to 1859



Trolley line to
White Plains replaced
stage coaches
in late 1890's

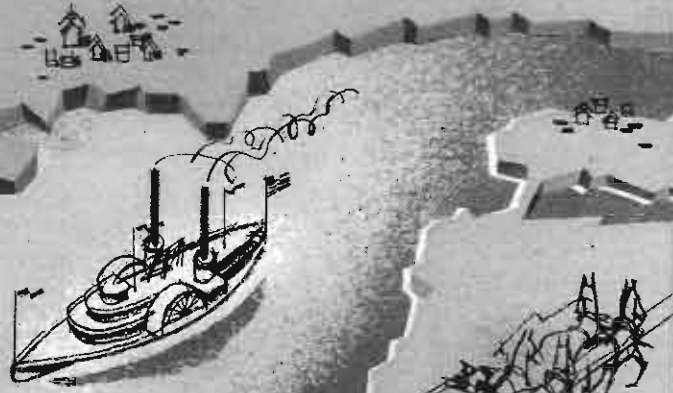




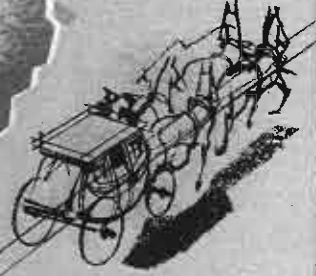
First flight from Albany to New York by Glen Curtiss in May, 1910



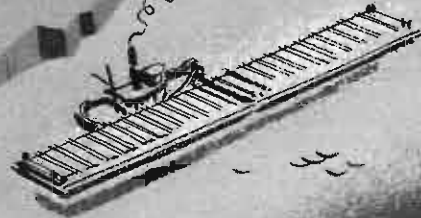
Early Tappan Zee industry . . . brick kilns at Haverstraw



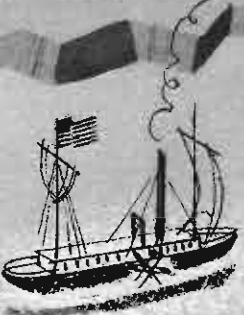
Hudson River Day Liners still picturesque sight on the Tappan Zee



Stage coaches principal means of transportation between New York and Albany in 1700's



Barge tows important to commercial development of Tappan Zee for a century



Fulton's "Clermont" launched in 1807

Sing Sing, New York State penitentiary



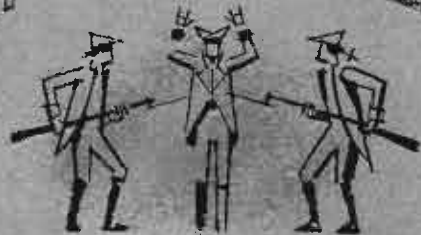
Hudson River Rail Road, now New York Central, began operating in 1849



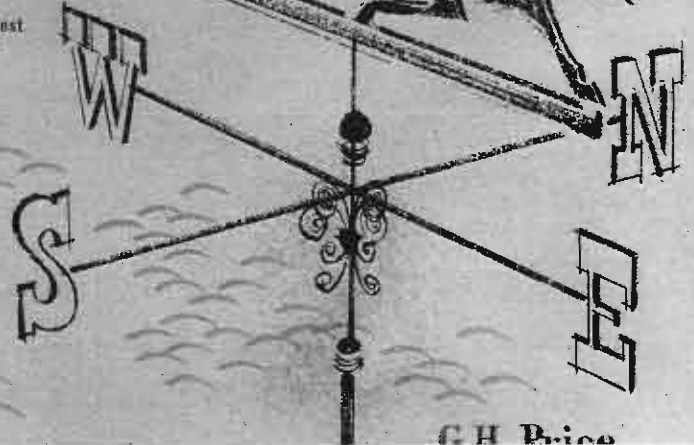
Silver mines at Ossining, one of earliest Tappan Zee industries



Ichabod Crane pursued by headless horseman through Sleepy Hollow



Capture of Major Andre by local militiamen September 23, 1780



The Tappan Zee bridge is actually a floating bridge

On the opening page of this book, it was shown how the engineering problems of building a bridge across the Tappan Zee were created. Now we will show you how these problems were met.

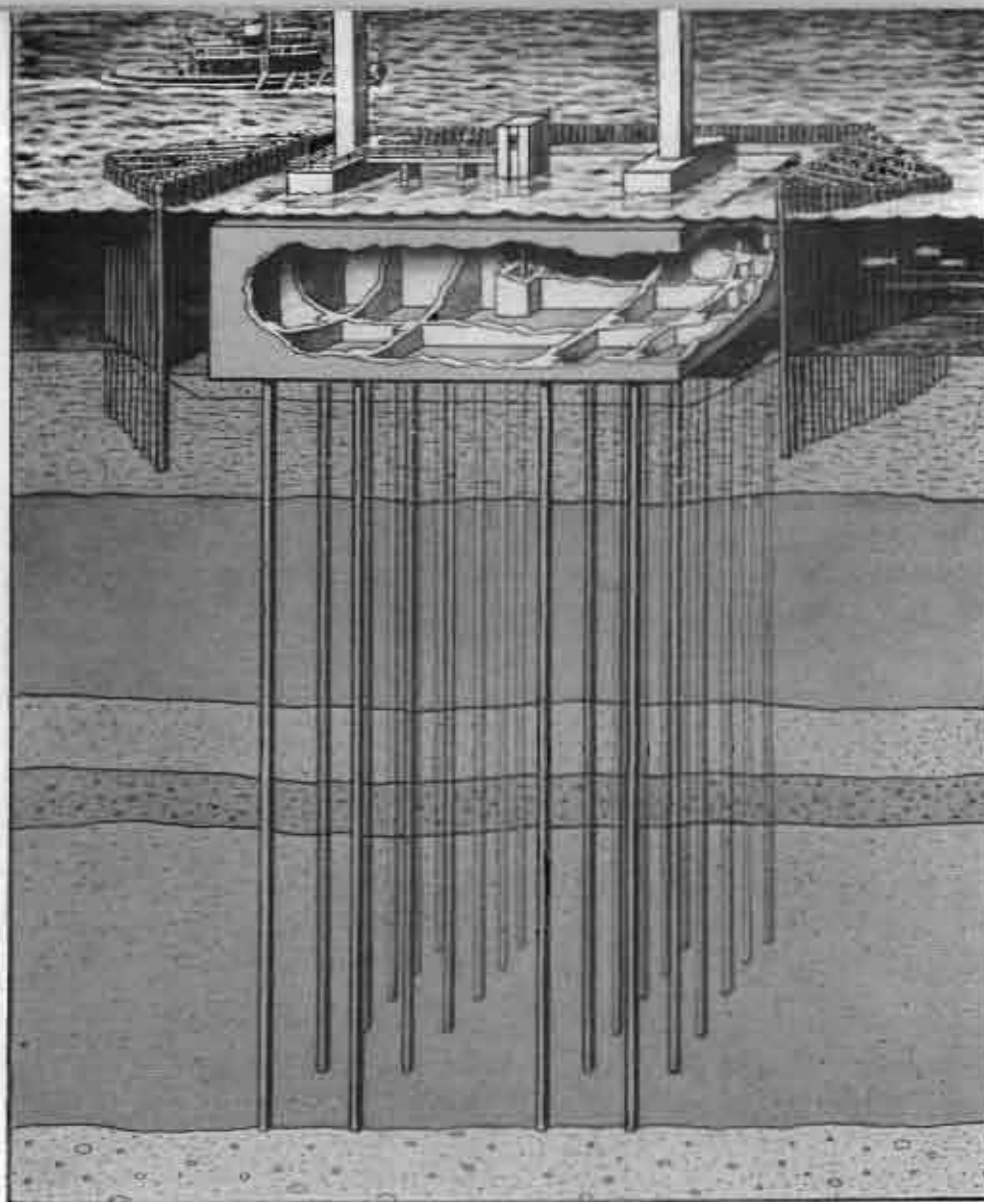
But you may ask, "Why, if so many problems presented themselves, was the bridge built where it is?" There were several things that motivated the selection of its site. First, the huge system of modern highways, of which the New York State Thruway is a part, is primarily constructed for peacetime transportation. However, such a road system is important to the military in planning the possible defense of our nation from enemy attack. For this reason it was highly desirable not to have this new bridge too close either to the George Washington or the Bear Mountain bridges.

Second, this bridge is a vital connecting link between the new New England Thruway, the New York Thruway and the New Jersey Turnpike. As such, its ideal location should be at just about where it is.

Third, a natural cut in the Palisades at Nyack offers an easier approach than either to the north or south.

And last, had the bridge been farther south it would have come under the control of the Port of New York Authority, a fact that did not seem particularly advisable to the New York Thruway Authority whose responsibility it obviously is.

So, the ideal site having been chosen, engineers went to work on the problem of



supporting the bridge and, if possible, avoid sinking the thousands of pilings to bed rock that would normally be called for through the silt and sedimentary deposit that covers the bed of the Tappan Zee.

Their solution is shown in the accompanying diagram, prepared by Madigan & Hyland, the bridge's designers. A relatively few pil-

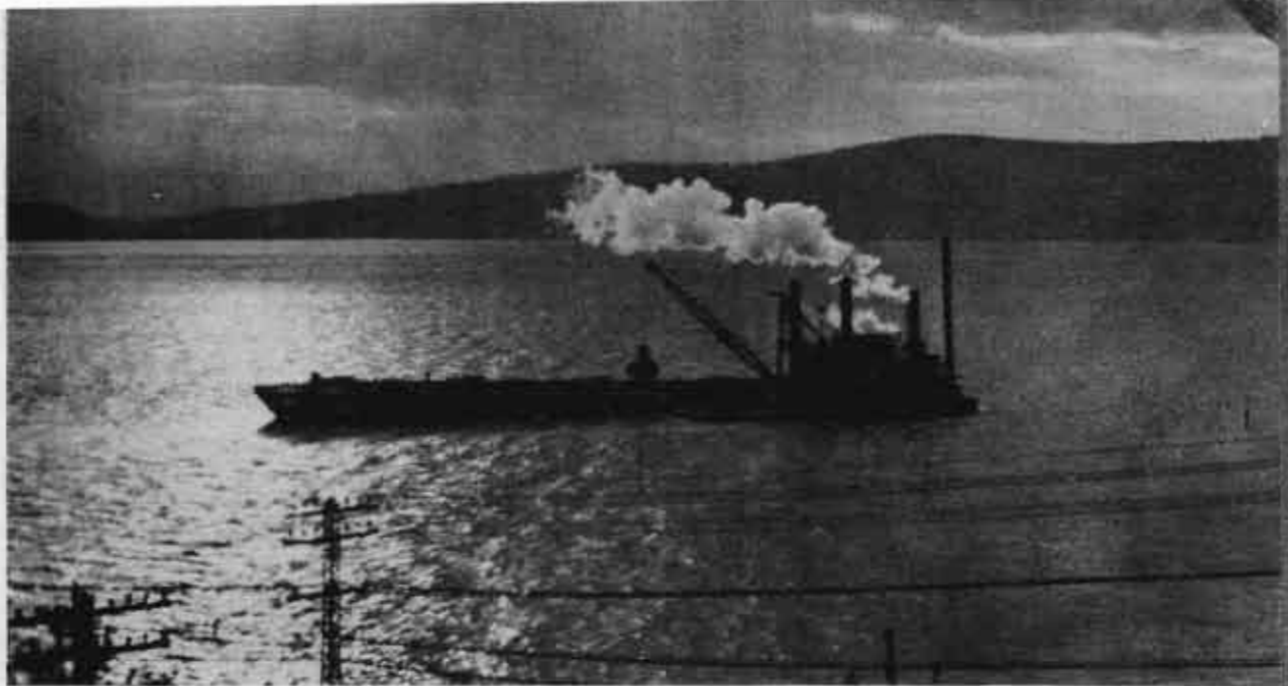
ings were driven down to bed rock. Then huge reinforced concrete caissons were built upstream and sunk on top of the pilings. It is their buoyancy that supports about 55% of the dead load of the bridge.

On these caissons—or watertight concrete boxes—piers, clearly shown in the diagram, were erected that carry the bridge structure.

The old and the picturesque gives way to the new bridge

For many decades the Tappan Zee has been noted for its beautiful estates. It was one of these, the Luke Estate, that stood directly in the path of the easterly approach to the new bridge. This property had, a short time before, been purchased by the Phelps Memorial Hospital Association as a site for a new hospital. The site of this hospital was changed to its present location between North Tarrytown and Ossining, and work on the bridge commenced. It was certainly sad to see one of the countryside's most beautiful landmarks destroyed, but such sad events are one of the inevitable results of progress.

In 1958, dismantling of the Luke Mansion begins



First step in bridge construction was to take soundings of the bottom of the Tappan Zee

Only a few remnants of its glory remain as the bridge progresses across the Tappan Zee





Ice that piled up against the piers was a major difficulty in construction of the bridge

The bridge begins to take form. Chevrolet and Fisher Body plants are seen in foreground



Prefabrication of sections sped up bridge construction

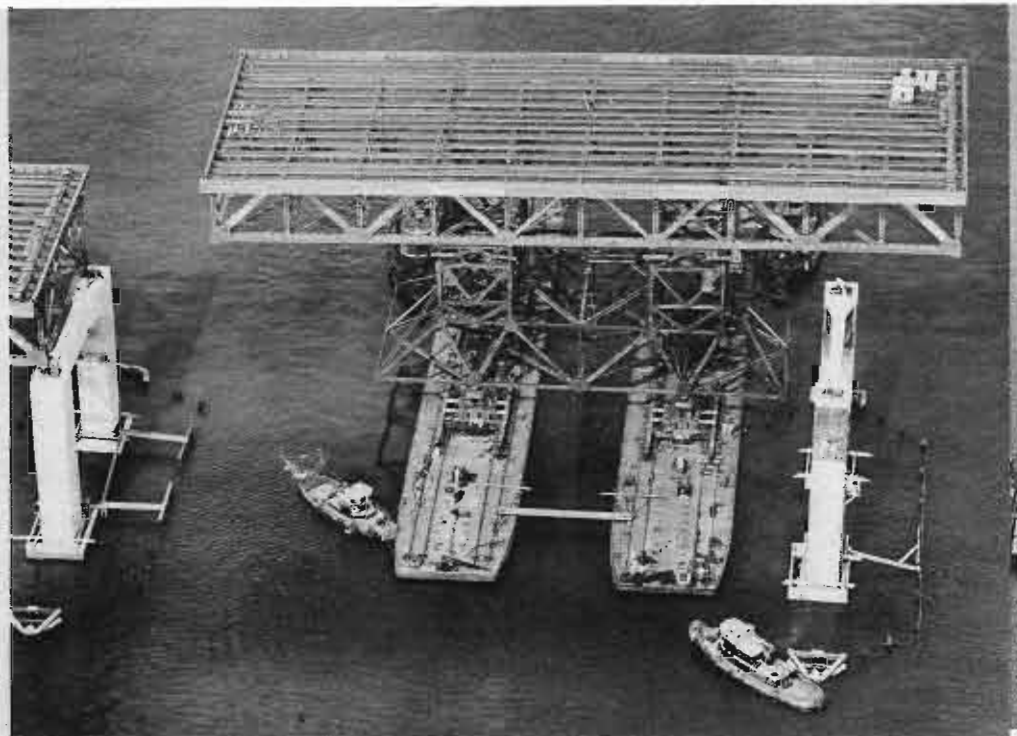
For a great deal of its length — almost three miles — the Tappan Zee Bridge is a causeway resting on piers. These piers of reinforced concrete support the huge steel truss sections that were prefabricated upstream and floated into position. Exact conditions of the tide were necessary as these trusses were floated downstream and then gently dropped into place by the receding tide. Imagine the delicacy of maneuvering that was called for as these trusses, each larger than a football field, with only a few inches of tolerance permitted between success and failure.

The two views on the left show the piers inching across the Tappan Zee. The top view also illustrates the serious ice conditions that had to be faced during the three years of construction. In the bottom view, the Chevrolet and Fisher Body plants, for many years the principal industry of the Tappan Zee, can be clearly seen, as well as the New York Central. The accessibility of both water and rail transportation was an important factor in locating these plants in North Tarrytown.

The views to the right show the construction of the trusses at Haverstraw and the delicate job of dropping them into place on the piers. Note the falsework on the barges that support the trusses. The height of this, of course, had to be varied to conform with the height of the pier upon which the particular truss was to rest. The view at lower right shows work on the center span beginning, as the construction of the causeway approaches proceeds.



*Bridge trusses being built at Haverstraw to be floated downstream, placed on piers
Almost ready to be set down. Note men standing on the piers waiting for contact*



*Gigantic trusses dwarf the tugboats that carefully jockey them into position
Steelwork for the center span begins, with one of the pieces of falsework in place*





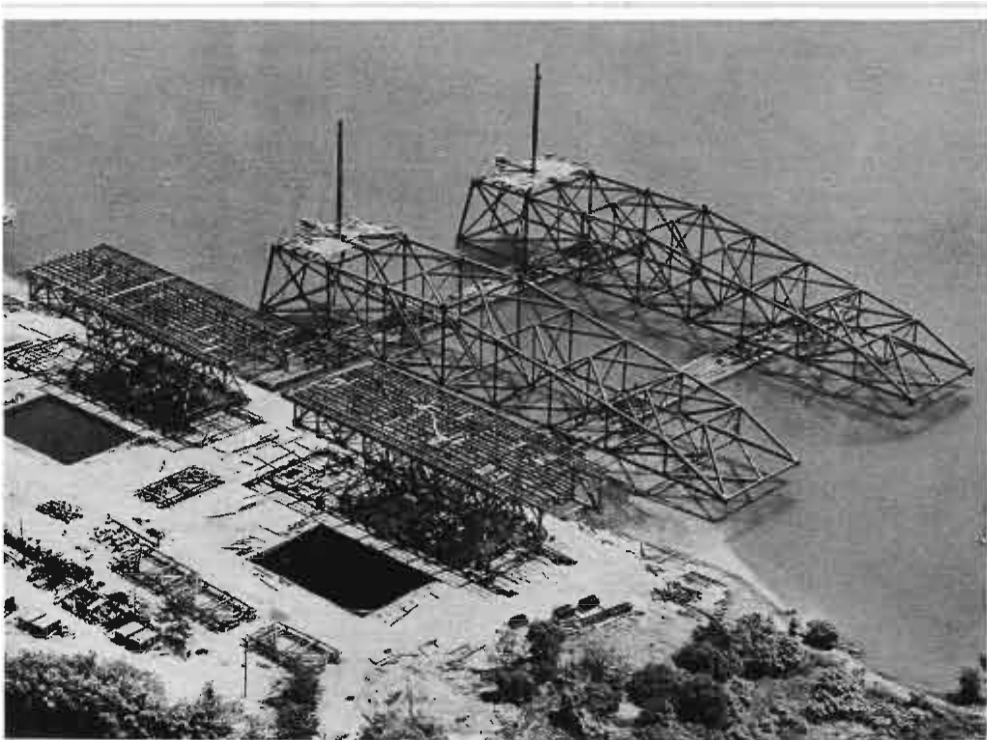
A steel pier to support the main span is almost completed

The causeway finished...the span begins

It was necessary to complete the long causeways from both shores before major work began on the center span so that material could be trucked out to it. Of course it was impossible to "float" a prefabricated truss down the New York Central, so this last gap was bridged by inching girders out from both sides. The two views below show this last gap being bridged. Next wooden forms were built under the floor, and the concrete roadway poured.

In the meantime, falsework, or temporary steel frameworks to support the span while under construction, had been built upstream. The views on the right show these pieces of falsework ready to be loaded on barges for floating to the bridge location, and in position with the steelwork beginning to take form. In the photo below left, again notice the tremendous ice floes that not only hampered work but at times actually endangered the piers. During the severe winter of 1953-1954, several steel-hulled tugs were employed, working around the clock, to keep these floes broken up and moving with the current.

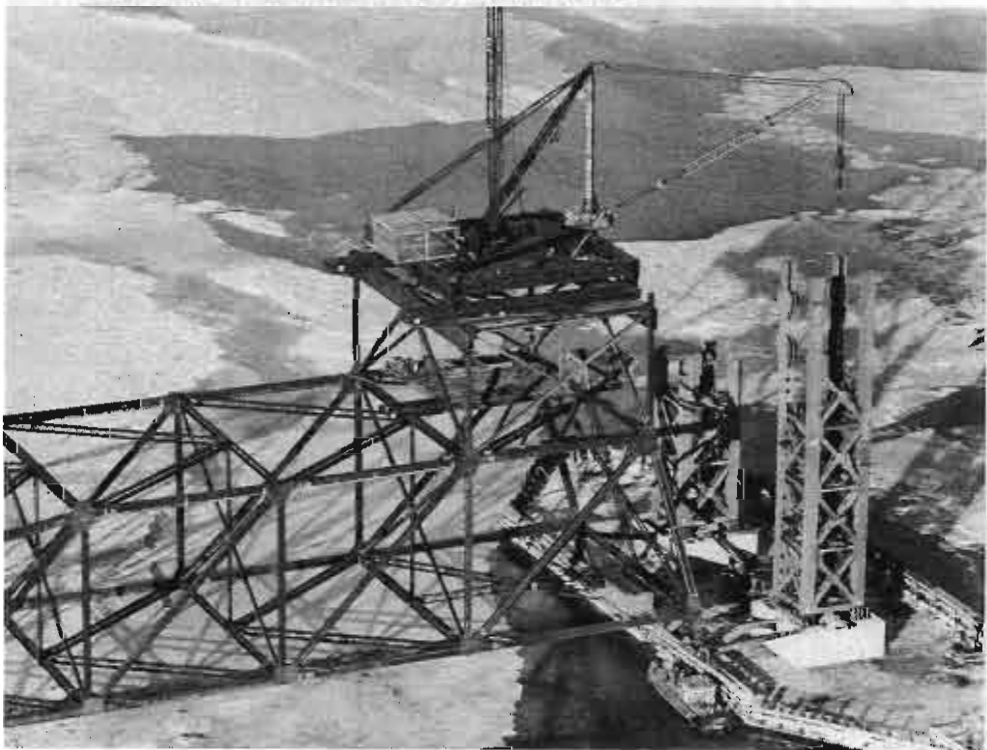


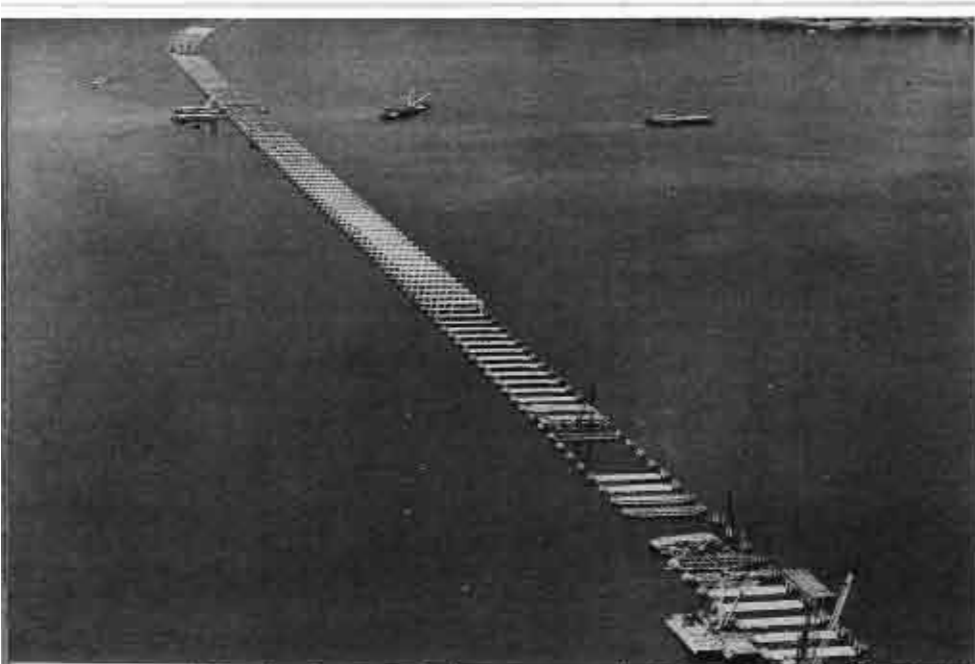


*Center span falsework ready for floating downstream to the bridge location
A close-up of the falsework showing how the derrick atop it aids the steelwork*



*Falsework in place and the construction of the steel under-supports progresses
Now the span begins to take shape, balanced securely on the steel falsework*





The piers to support the causeway stretch out from the Nyack side

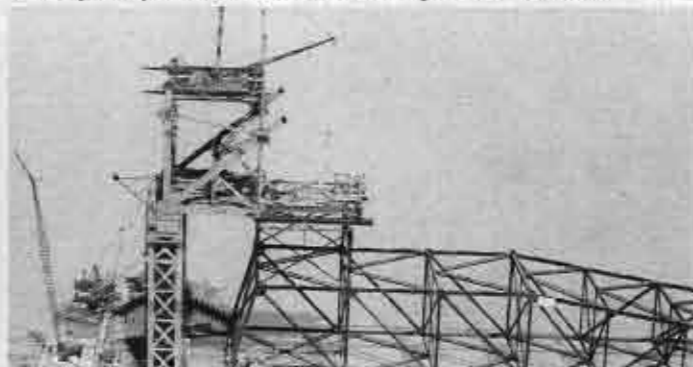


Concrete has been laid on one side of the causeway

The first piece of steel goes into place



The pier finished . . . and the span is started



First one end, then the other for balance

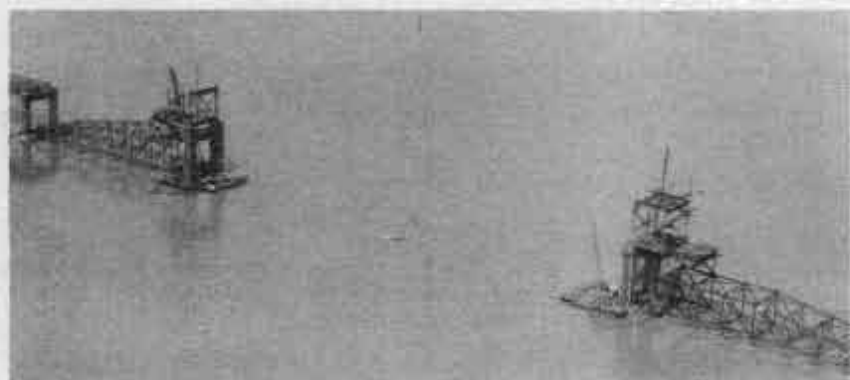
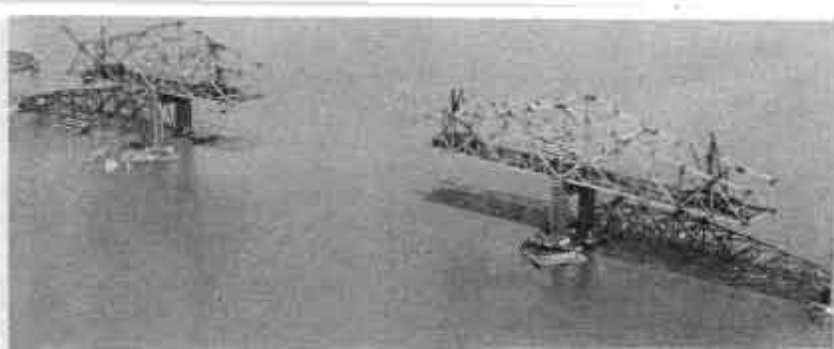


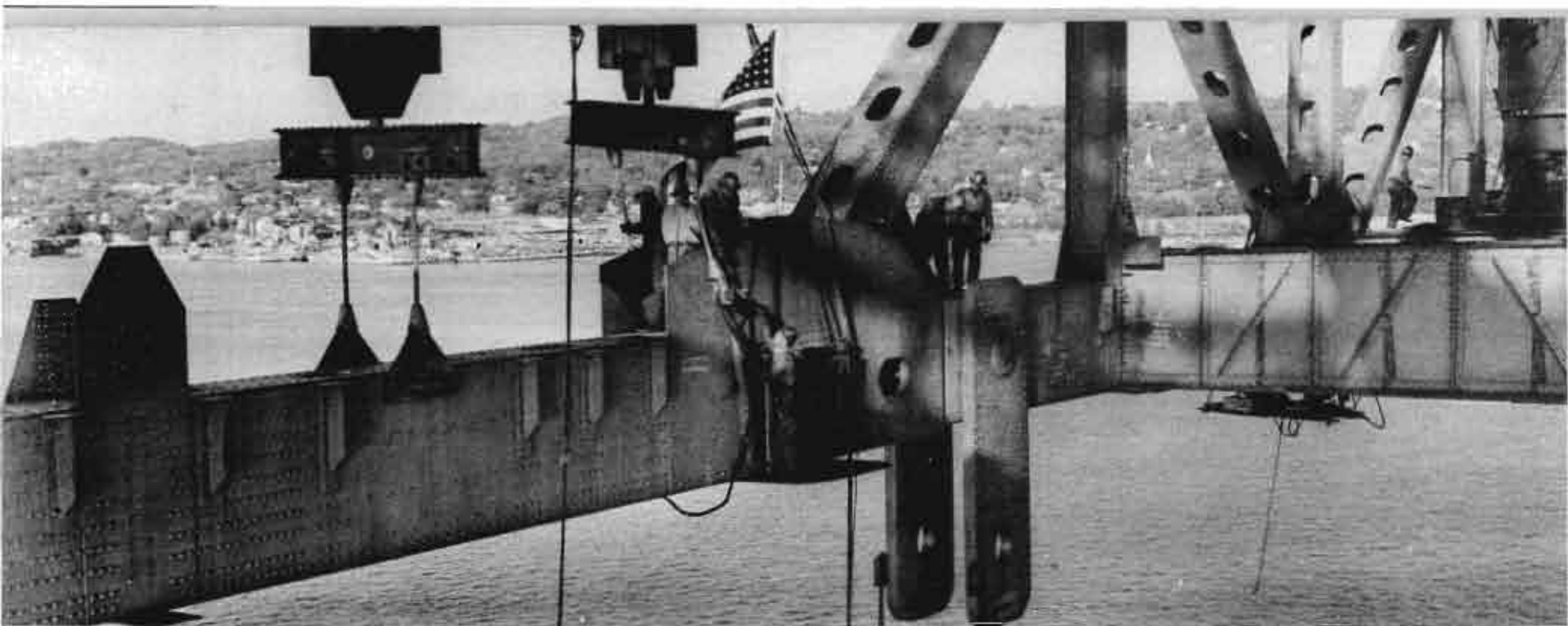
Almost ready to join the causeway from Tarrytown



And step by step, the Tappan Zee is bridged

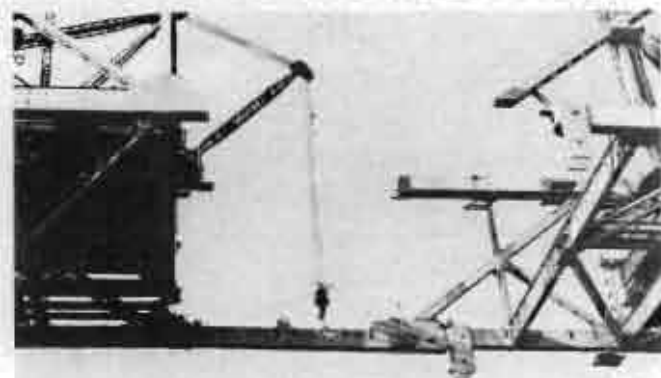
The interesting series of photographs on the right shows the growth of the center span, covering a period of several months, taken from almost exactly the same location. These photographs, as well as a majority of those used in the latter part of this book, are part of the careful photographic record made by the American Bridge Division of the United States Steel Corp. Notice in the bottom photograph on the right that one piece of falsework has already been removed, and that the barges are ready to float the second away.





Final linkage

And at last the two shores are joined, with the piece of steel that links Westchester and Rockland Counties slipping into place on September 29, 1955. The American flag is hoisted to mark this momentous event. The completion of the paving and the installation of the lighting was all that remained to be done. As a contribution to safety, the most up-to-date lighting was specified. Two hundred and fifty-eight General Electric mercury vapor lamps are used, providing the greatest concentration of over-water illumination in the world. On December 15, 1955, after dedication by the Governor of New York, the bridge became part of the glorious history of the Tappan Zee.





Approach from west shore under construction



Approach from Tarrytown showing toll gates

Ready for traffic—a view from the New York Central tracks at Tarrytown



Prepared by
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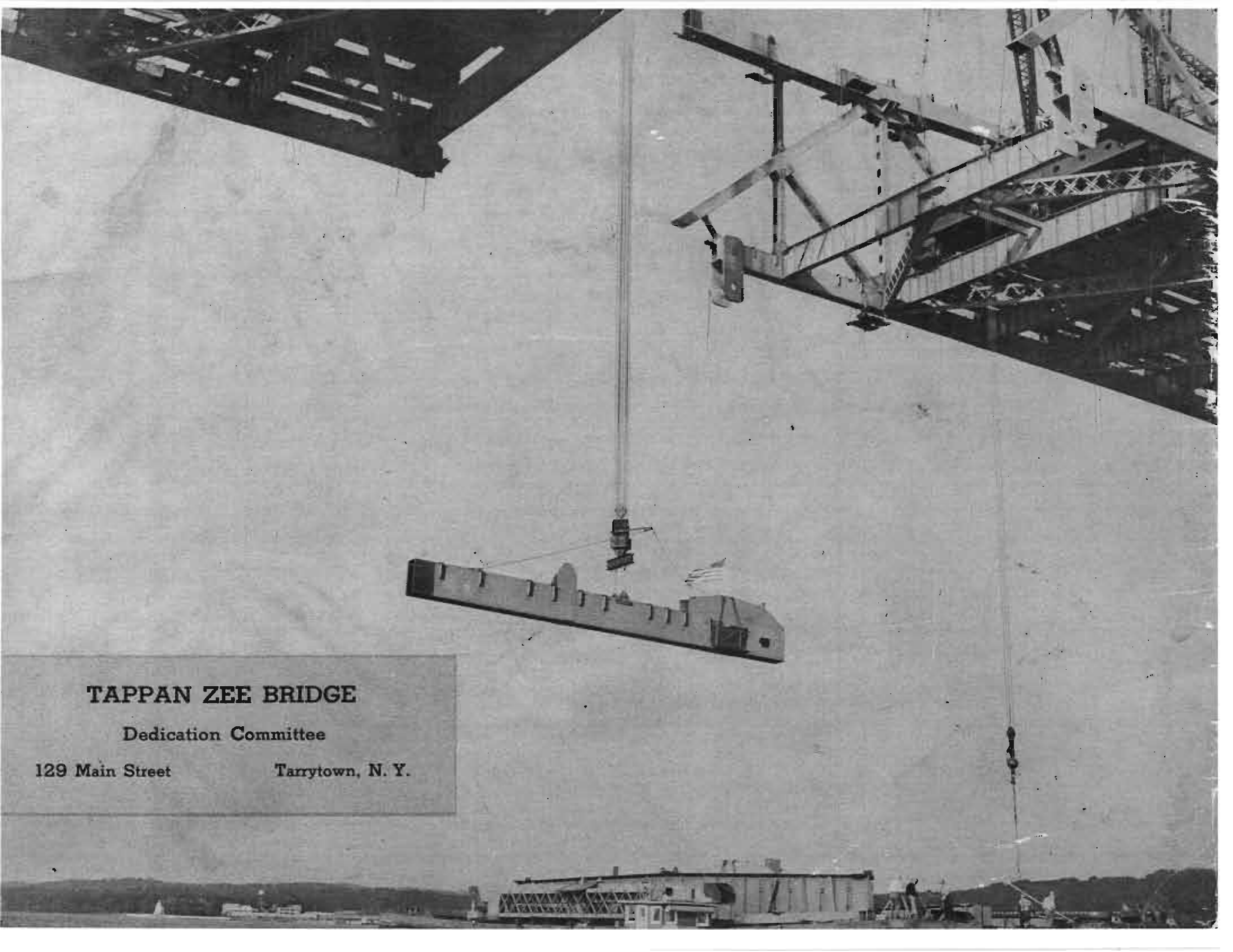
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