United States Department of the Interior
National Park Service

National Register of Historic Places
Multiple Property Documentation Form

This form is used for documenting multiple property groups relating to one or several historic contexts. See instructions in How to Complete the *Multiple Property Documentation Form* (National Register Bulletin 16B). Complete each item by entering the requested information. For additional space, use continuation sheets (Form 10-900-a). Use a typewriter, word processor, or computer to complete all items.

☒ New Submission ☐ Amended Submission

A. Name of Multiple Property Listing

Historic Bridges of the AuSable River Valley

B. Associated Historic Contexts

1. **Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790 – 1948.**
2. **Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840 – 1941.**

C. Form Prepared by

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D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR part 60 and the secretary of Interior's Standards and Guidelines for Archeology and Historic Preservation. (☐ See continuation sheet for additional comments)

J.W. Alden Deputy Commissioner for Historic Preservation June 8, '99
Signature and title of certifying official **Date**

New York State Office of Parks, Recreation and Historic Preservation
State or Federal agency and bureau

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper Date of Action

Table of Contents for Written Narrative

Provide the following information on continuation sheets. Cite the letter and the title before each section of the narrative. Assign page numbers according to the instructions for continuation sheets in *How to complete the Multiple Property Documentation Form* (National Register Bulletin 16B). Fill in page numbers for each section in the space below.

STATEMENT OF HISTORIC CONTEXTS

1. Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1948.

2. Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.

1. Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1948

Introduction

The AuSable River Valley is located in the northeastern part of New York State. Its watershed is 516 square miles in size and includes all or parts of five Essex County towns (Chesterfield, Jay, Wilmington, Keene and North Elba), two Clinton County towns (AuSable and Black Brook) and the incorporated village of Keeseville, which lies in both counties. The AuSable River is 94 miles in length and has three primary branches: the East Branch, which runs from its origins in the town of Keene to AuSable Forks; the West Branch, which runs from its origins in the town of North Elba to AuSable Forks; and the Main Branch, which runs from AuSable Forks to Lake Champlain. The river is also fed by 70 other streams. Topographically, the AuSable River is very diverse. Its headwaters are in the Adirondacks, the highest mountains of the state, and along its course it winds through foothills and farmlands, over rapids and waterfalls and passes through a dozen villages and hamlets. At its upper elevations, it is wild, narrow and rocky and at its mouth it is gentle, meandering and sandy. The name, AuSable, which means "of sand" in French, was given to the river by Samuel de Champlain when he first saw its sandy delta in 1609.

The history of bridges in the AuSable Valley parallels both the history of the evolution of public roads and the railroad and the history of the settlement and development of AuSable River Valley communities. Over the course of the early settlement in this region, between 1790 and 1860, roads usually evolved from foot and horse paths into rough wagon roads. Land transportation was particularly important because, although the AuSable River provided ample water power and could be used for transporting logs, it was not navigable and early settlers relied heavily on horse and ox transportation. While Lake Champlain provided an excellent north/south water transportation system, access into the AuSable Valley's interior mountainous region was limited to ground transportation.

During the AuSable River Valley's settlement period, roads were constructed and maintained by local governments, turnpike companies or private firms or individuals. The Port Kent and Hopkington Turnpike, built between 1829 and 1832, was one of the earliest roads in the valley. It commenced in Port Kent, followed the AuSable River to AuSable Forks and then headed northwest into Franklin County. Another early toll road was the Western Plank Road, a 14-mile road between Black Brook and Franklin Falls built c.1850. Early industrial concerns were also responsible for building roads, often to transport raw materials to the mills and finished products to shipping facilities. The Peru Iron and Steel Company built a road from Clintonville, where its iron business was centered, to Port Douglas where the company had its own wharf. The J. and J. Rogers Company built miles and miles of roads into the interior of Black Brook to connect AuSable Forks to forges in Black Brook and charcoal and wood supplies elsewhere. Much of the other road building throughout the 19th century was done by local governments, who often divided the towns into road districts and relied primarily on the volunteer labor of those within the districts.

The historic AuSable River bridges are also intertwined in the local history of the AuSable Valley. Bridges, in general, provide connections between places and help to tie together a community's social and economic fabric. Bridges are often built because a need exists to have a crossing at a certain location and once the bridge is built it creates an opening or opportunity for other activities (settlement, industry, and agriculture) to occur. A few examples will illustrate this point.

When the state first erected a bridge over AuSable Chasm in 1793, it was for the purpose of carrying a road that would connect several of the towns and villages along the western side of Lake Champlain. But, by making this part of the river accessible, both the bridge and road also created an opportunity for tapping the waterpower and industrial potential of the AuSable Chasm. Within a few years, Matthew Adgate had erected the first saw and gristmills on the river and by 1875 there were iron, starch and textile factories along both banks.

In AuSable Forks, the village was dominated, from the mid-19th century to the 1970's, by the J. and J. Rogers Company, first an iron manufacturing business, and later, a pulp and paper industry. As the village was confined by the branching of the river, it was necessary to build several bridges that would allow the village and its industry to grow. The Main Street Bridge (first a covered bridge, then a lenticular truss, and now a steel truss bridge, not included in this multiple property submission) connected the village center with the main road to Port Kent and the iron mines, forges, wood and charcoal supplies to the north. The Rolling Mill Hill Bridge crossing (first a covered bridge, then an 1879 Pratt through truss and now a steel truss bridge constructed in the 1980's) connected the village center to the Roger's rolling mill. The Jersey Bridge (first a pedestrian bridge, then a 1913 Pratt through truss, then a 1990 steel truss) opened up a new area for residential development near the village center, when the town was growing by leaps and bounds. The Acid Plant Bridge (1904, extant but very deteriorated) carried a small rail line and industrial piping to connect two parts of the Rogers operation which were separated by the river. AuSable Forks, as we know it, is simply unthinkable without it's handful of bridges.

The Beede Farm Road bridges in Keene Valley enabled the bottom land on the eastern side of the East Branch to be developed for agriculture. When large timber stands were cut from the slopes of Wolf Jaws and Gothics, the **Slater Bridge** (included in this multiple property submission) in St. Huberts (moved from its original location in the 1930's) was erected to facilitate access. Countless summer homes in Keene and Keene Valley, their owners an important part of the local economy, are connected to the main road and village centers by such spans as the **Beers, Ranney and Notman bridges** (all included in this multiple property submission.)

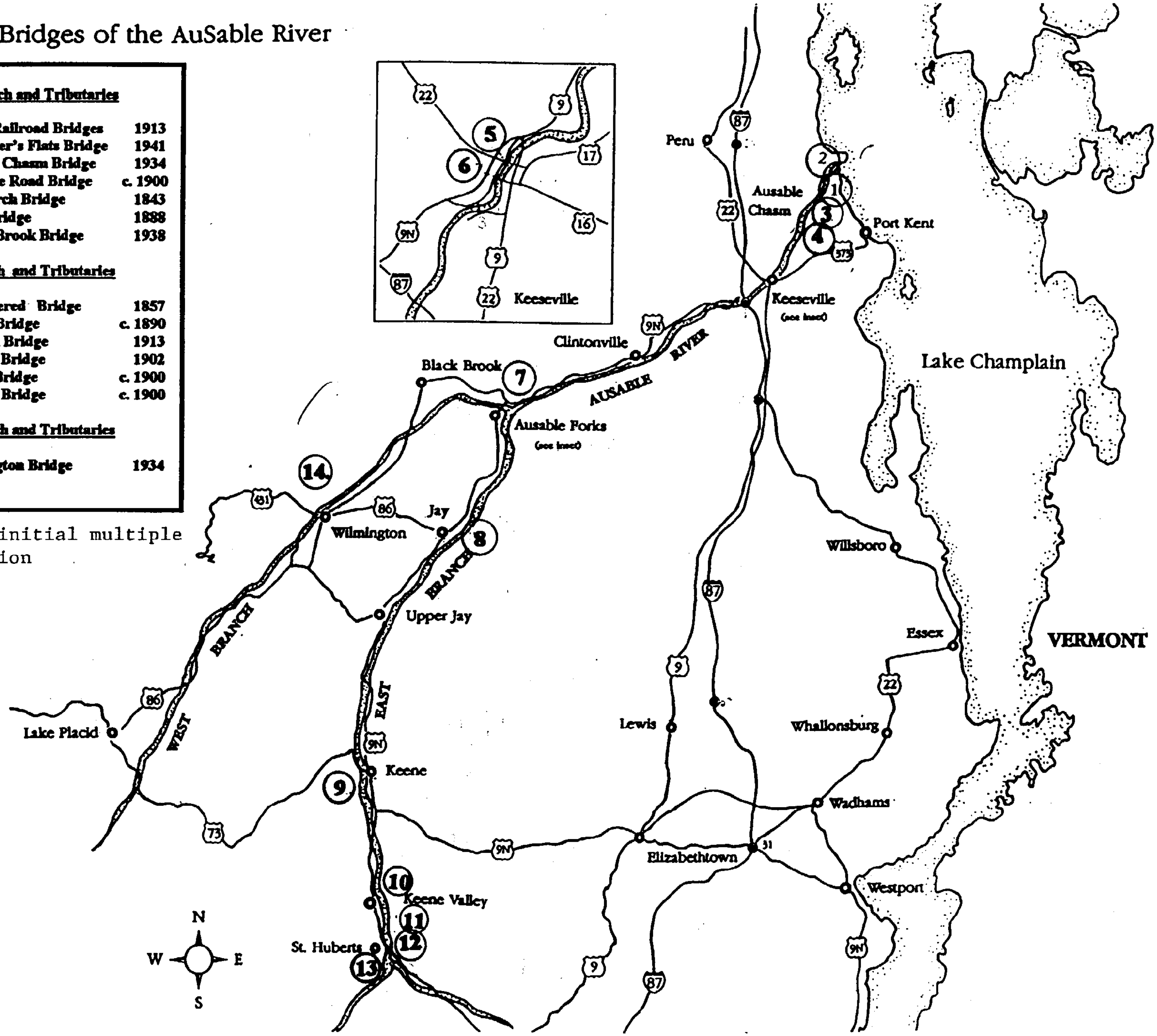
The bridges found throughout the AuSable Valley have been and are an integral part of the social and economic fabric of the region's past and present. With the river and its tributaries winding relentlessly through the area, it is hard to imagine how life could go on as we know it without these important connections. Because the river and its crossings have been such a presence in the day-to-day lives of the communities, the bridges are an important character-defining feature of the AuSable Valley landscape.

The following historic overview of AuSable Valley community history is meant to provide a context for the role of bridges in contributing to the growth and development of the region. The towns and their bridges are described sequentially from those nearest to Lake Champlain, to those furthest upriver.

Historic Bridges of the AuSable River

Main Branch and Tributaries	
1. D & H Railroad Bridges	1913
2. Carpenter's Flats Bridge	1941
3. AuSable Chasm Bridge	1934
4. Old State Road Bridge	c. 1900
5. Stone Arch Bridge	1843
6. Swing Bridge	1888
7. Palmer Brook Bridge	1938
East Branch and Tributaries	
* 8. Jay Covered Bridge	1857
9. Walton Bridge	c. 1890
10. Notman Bridge	1913
11. Ranney Bridge	1902
12. Beer's Bridge	c. 1900
13. Slater's Bridge	c. 1900
West Branch and Tributaries	
14. Wilmington Bridge	1934

*not included in initial multiple property submission



AuSable Chasm

AuSable Chasm is a small hamlet located in both the towns of AuSable and Chesterfield, which are correspondingly located in both Clinton and Essex counties. Located several miles up river from Lake Champlain, the Main Branch of the AuSable River winds through this hamlet in a series of waterfalls that culminate in the dramatic AuSable Chasm, a long narrow gorge, often referred to as the "Grand Canyon of the East".

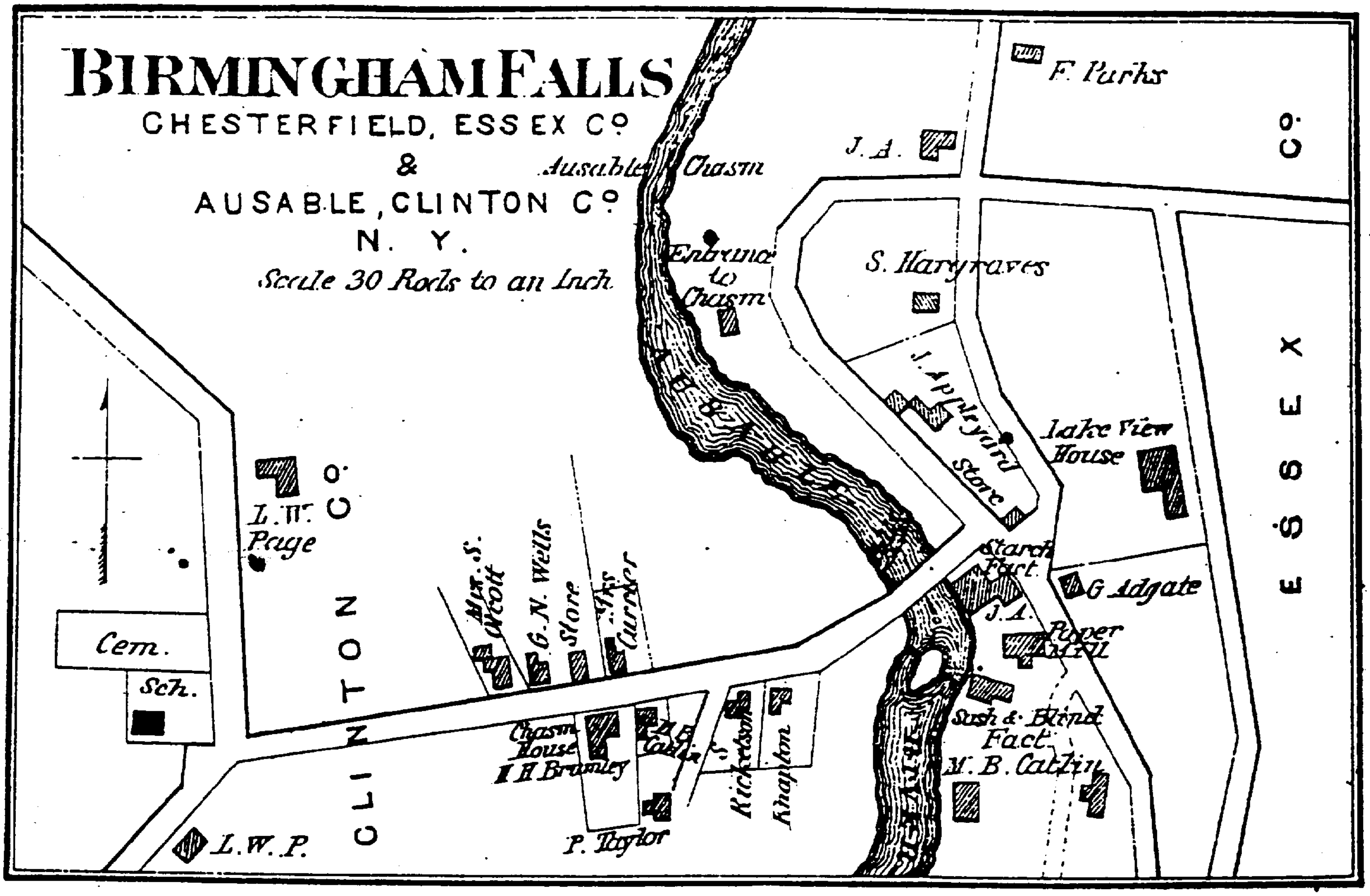
In the early 1790's, Matthew Adgate was given five land grants, totaling 7,429 acres, in the vicinity of AuSable Chasm for his service in the Revolutionary War. Adgate erected a log home near the head of the Chasm and took advantage of the tremendous waterpower at this site by building a sawmill and gristmill. He also cut logs from surrounding forests and rafted them to markets in Canada. This early settlement, then called Adgate's Falls, soon also boasted a blacksmith, wheelwright, and carding mill. As a small industrial community, it prospered by utilizing the river's waterpower and the region's abundant natural resources. At this time, the main crossing over the AuSable River was just downstream from this settlement over "High Bridge," a log and timber bridge built by the state in 1793 under the supervision of Captain Platt Rogers to carry the State Post Road.

In the early 1800's, iron ore was discovered at nearby Arnold Hill and by the 1820's, a forge and rolling mill were established along the river. Edmund and Jacob Kingsland of Keeseville built a six-fire forge there in 1840 and replaced it with a rolling mill in 1852. About this time, the name of the settlement was changed to Birmingham Falls, after the English industrial city. The route of the State Road was also changed so that it passed through the center of the settlement. The first several bridges here were simple wood trusses, which tended not to last long with all the moisture generated by the falls. This type of bridge was eventually replaced by the existing c.1890 iron Pratt pony truss bridge, **the Old State Road Bridge**, in the late-19th century (included in this multiple property submission.)

The AuSable Chasm Horse Nail Works were erected in 1876-77 on the east bank of the AuSable River just below Rainbow Falls. This factory diverted water from the head of the falls through a flume to the top of an upright pipe, 4-1/2 feet in diameter and 53-feet high. The water falling into this wheel pit produced 100 horsepower and the eight men employed there were able to produce 1,000 tons of nails annually. In addition to these industries, other businesses thrived here in the 1870's and 1880's, including a wrapping paper mill, a factory that made chair and mattress stuffing, two starch factories, a paper mill and two pulp mills. By the turn of the century, however, the competitiveness of these industries had diminished and, by 1910, all had closed down.

By 1900, AuSable Chasm had declined as an industrial community; however, it was able to take advantage of its unique location in other ways. For years, people living in the vicinity had realized what a natural asset the river and chasm were. Two competing companies were organized between 1873 and 1875 to provide tours of the attraction for visitors. Each erected a rustic lodge and a series of steps and bridges that enabled visitors to walk through the chasm to Table Rock. From there a boat ride was available to the chasm basin.

Several inns and hotels enhanced the increasing tourist industry. The Chasm House, built in 1875, accommodated 25 guests and had dining facilities for 100 patrons. The magnificent Lake View House was built in 1874 and enlarged in 1877 and 1879 to accommodate 300 guests. It burned twice in the 1880's and was replaced in 1896 by the famous AuSable Chasm Hotel, which also burned in 1950. Housing that had originally been built by the AuSable Chasm Horse Nail Works became part of the AuSable Chasm Inn in 1924. To this was added seven cabins and a motel in 1939. The tourist facilities at AuSable Chasm have been constantly improved since the company's beginnings. It now has a modern restaurant and gift shop at the entrance building and its walkways, stairs, and bridges are of sturdy metal construction. Approximately 200,000 tourists each season experience one of the "geologic and scenic wonders of the East."



From: Gray's ***New Topographical Atlas of Essex County, New York*** illustrating the hamlet of AuSable Chasm when it was known as Birmingham Falls. Note bridge crossing on map is the current location of the **Old State Road Bridge**.

AuSable Chasm Pulp Mill at Alice Falls
Photo C. 1900

AuSable Chasm Hotel, AuSable Chasm
Photo c. 1940

Until the construction of the Adirondack Northway in the 1960's, New York State Route 9, which ran through AuSable Chasm and over the c. 1890 **Old State Road Bridge**, was the major north-south highway between Montreal and Albany. Vehicular use along this route increased dramatically during the first third of the 20th century, and the **Old State Road Bridge**, a one-lane, light-load structure, and the approaches to it, which twisted in and around AuSable Chasm, became obsolete. To remedy this situation, a new Route 9 bridge, the **AuSable Chasm Bridge** (included in this multiple property submission) was constructed between 1932 and 1934 .

Although the hamlet of AuSable Chasm has changed dramatically since Matthew Adgate first settled here in 1792, there is a continuity to the village's various economic enterprises. The early settlers made use of the river's power to mill flour and lumber and to make iron products, starch, paper and electricity. Through economic necessity and the ingenuity of new entrepreneurs, a tourist industry now flourishes which takes advantage of the river's power in an equally creative way. The two extant historic bridges in AuSable Chasm reflect both of these periods. By its size and location in the middle of the hamlet, the **Old State Road Bridge** exemplifies AuSable Chasm's horse-drawn, pedestrian manufacturing era, while the **AuSable Chasm Bridge** exemplifies the highway architecture of the early automobile era.

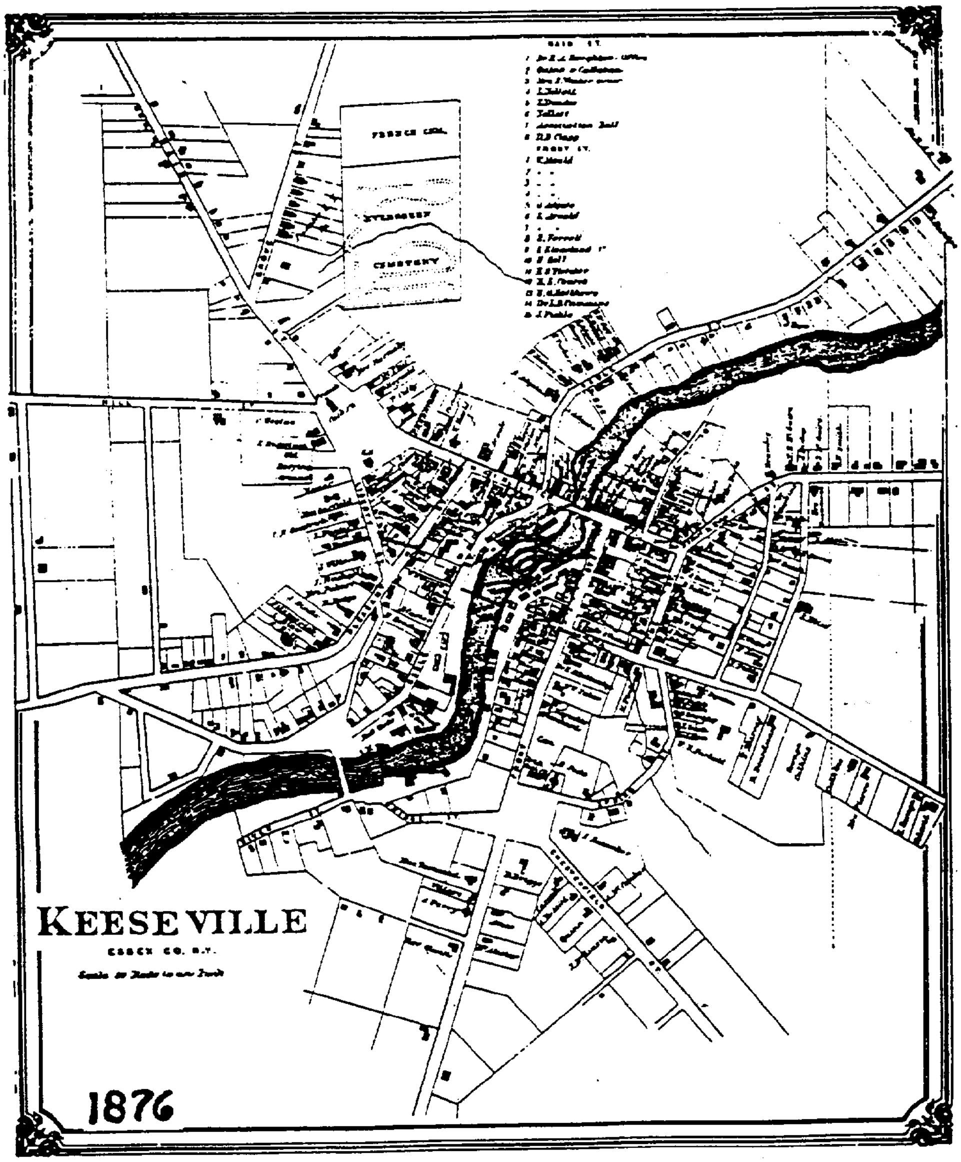
Keeseville

The village of Keeseville is situated on the northeastern fringe of the rugged Adirondack Mountains in two counties, Clinton and Essex. Its most prominent visual feature is the AuSable River, which bisects the village, separating Clinton County on the west bank from Essex County on the east bank in its final plunge toward Lake Champlain to the east

Like the early settlement of AuSable Chasm, the earliest white settlers in the vicinity of Keeseville were attracted to the AuSable River's great waterpower potential and its proximity to timber and rich iron ore deposits. In 1808, Captain Jonathan Bigelow had a dam and sawmill erected on the rapids just above the present location of the existing **Stone Arch Bridge** (listed on the National Register of Historic Places in 1983 as part of the Keeseville Historic District and included in this multiple property submission), thus establishing the beginnings of the village center. Shortly after, Robert Hoyle, an Englishman, and John W. Anderson bought out Bigelow, expanded the lumber business and built a gristmill. The village at this time was known as "Anderson Falls".

In 1812, Hoyle sold his interest in the enterprise to John Keese. Richard Keese, from the nearby Quaker settlement, "The Union", in Peru also joined the enterprise and created the firm Keese, Anderson and Keese. It was the prominence of the Keese family during this period that gave the present name of Keeseville to the community. One of the first ventures of the new firm was the formation of the Keeseville Rolling and Slitting Mill Company in 1816, which capitalized on the Arnold Hill iron deposits and manufactured nails and boiler plates.

From these early industrial beginnings, the village prospered as an industrial and commercial center. The Keeseville Manufacturing Company, E. and J.D. Kingsland and Company, and the Eagle Nail Factory were all early iron manufacturing concerns in the village. A visitor in 1854 commented that "the blows of the monster trip hammer, the ceaseless rumble of the great water wheels, the puffing of great bellows and the clank of machinery are never silent, save on the Sabbath". Another visitor in 1860 described Keeseville as a bustling Adirondack hamlet containing "seven churches, the Keeseville Academy, two extensive rolling mills, three nail factories, a machine shop, an ax and edge tool factory, a cupola furnace, a planning mill, two gristmills and a nail keg factory" with a population of 2,569. In addition to the local enterprises already mentioned, textile manufacturing began as early as 1819 and by 1864 Rufus Prescott's Furniture, Sash, Door and Blind Manufactory employed over 100 persons making furniture, architectural components, fine homes, bridges and industrial buildings.



From: Gray's *New Topographical Atlas of Essex County, New York* (1876) illustrating the location of Keeseville's three 19th century bridges.

The continued prosperity of the local iron industry through and after the Civil War period was largely due to the invention of a horsenail-making machine by Daniel Dodge, a local blacksmith. By 1862, his invention was perfected and put on the market. Where formerly 10 lbs. of nails were produced per day by hand, now 200 lbs. could be easily made with no sacrifice in quality. The AuSable Horse Nail Company in Keeseville manufactured and sold these machines worldwide, employed 200 persons and produced 2000 tons of horse nails annually by 1873.

As new industries began and flourished along both sides of the AuSable River, so too did the village's commercial centers along Main and Front Streets. Stores, stables, churches, hotels, theaters, two banks, doctors'and lawyers'offices, and other establishments in wood frame, brick and stone buildings lined both streets and catered to every need and whim of the populace. The residential areas, which surrounded the commercial and industrial center of the village, included the elegant homes of manufacturers and merchants and both small and modest dwellings of the village's clerks, laborers, tradesmen and artisans.

Although a good deal of the village's 19th century architecture has been lost to demolition and fire over the past 75 years, many fine homes, industrial buildings and commercial structures remain. The AuSable Horse Nail Company buildings (1847), Old Brewery (c. 1850), Grange Hall (c. 1856), and Masonic Lodge (c. 1852), as well as the **Stone Arch Bridge** (1842) were all made of local river sandstone and seem to grow from the riverbanks. The handsome two-story commercial rowblock built by local entrepreneurs, Willis Mould and the Kingsland brothers, is a testimony to the commercial vitality of the village when it was built between 1868 and 1876. The homes of Richard Keese II (1823), Nelson Kingsland (c. 1860), Silas Arnold (1820), Edmund Kingsland and the Prescott family line Main and Pleasant Streets, while equally important, though less impressive homes are found on Beech, AuSable, Vine, Clinton, Liberty and Front Streets. All of the buildings mentioned here, as well as the bridges described below, are listed on the National Register of Historic Places as part of the Keeseville Historic District (1983).

Note on Gray's 1876 map how densely developed Keeseville was. It was an essentially horse-drawn, pedestrian community, in which all the homes, stores, industries, churches, schools and other village buildings were within a small geographical area that was dramatically divided by the AuSable River. Three of the 19th century bridges that connected the two halves of Keeseville remain: the 100' **Stone Arch Bridge** built in 1843, the **Swing Bridge**, a pedestrian suspension bridge built in 1888 (both included in this multiple property submission), and the Upper Bridge, a two-span Pratt through truss bridge built in 1878 (individually listed on the National Register in 1983.) These spans wove together the disparate parts of community life. They also reflect the industrial and architectural heritage of the community and are deeply rooted in the raw materials of the area: timber, stone and iron. They also contribute measurably to the fabric of this picturesque Adirondack village.

AuSable Forks

The hamlet of AuSable Forks in the town of Black Brook is also divided by the AuSable River. It is located at the point where the river forks into its east and west branches.

Late-18th and early-19th century settlement in the vicinity of AuSable Forks centered almost entirely on farming and small-scale mill operations. In 1825, Burt and Vanderworker established a sawmill there, after abandoning their earlier lumber operations at Upper Jay. Iron ore was discovered as early as 1806 at Arnold Hill and later at Palmer Hill. As the potential of these mines became apparent, Burt and Vanderworker turned their efforts to iron manufacturing by building the first forge in AuSable Forks in 1828 and formed the Sable Iron Company in 1834. As in Keeseville and AuSable Chasm, the combination of ingenuity, waterpower and abundant local resources were a great stimulus to development.

The 1830's marked the beginning of extensive industrial and residential development of Black Brook and AuSable Forks. This development was due almost entirely to the emergence of the J. and J. Rogers Company, whose operations in the area would span the next 140 years. James and John Rogers began small-scale commercial operations in Keeseville during the mid-1820's. They were inspired by the new Port Kent to Hopkington Turnpike, which was built between 1829 and 1832 connecting Port Kent, Keeseville, Clintonville, AuSable Forks and Black Brook. This turnpike allowed much easier access to the iron-rich area around AuSable Forks and Black Brook, and facilitated shipment of the iron products to the wharves at Port Kent and Port Douglas on Lake Champlain.

In 1837, James and John Rogers, who had commenced business at Black Brook five years earlier and became the sole proprietors of the forges there, purchased the entire property of the Sable Iron Company. As a result of the Rogers iron operations, the village grew to become one of the largest settlements in the region. By 1860, the Rogers iron operations had grown to include mines at Palmer Hill, and bloomeries, rollings mills and large nail works at AuSable Forks. They also operated sawmills, woodworking mills to manufacture wagons and nail kegs, and blacksmith and machine shops. The company owned and operated farms, boarding houses, hotels, numerous single-family homes, and retail stores.

The village, divided as it is by the forking AuSable River, relied heavily on bridges to connect its various areas together. The Main Street crossing was important because it carried the main road through the valley, which also connected it with the ports on Lake Champlain. The crossing at Rolling Mill Hill connected the main part of the village with the Rogers rolling and slitting mill. The crossing over Palmer Brook carried one of two important roads to the J. & J. Rogers Company mines in Palmer Hill.

Because the Rogers forge operations had originated in the hamlet of Black Brook, this community also benefited from the industrial expansion undertaken by the Sable Iron Company. Like AuSable Forks, extensive iron works were built at Black Brook, and between 1835 and 1860, both village centers developed as "company towns." In 1835, the Rogers Company established a large store in the village of Black Brook, which contained all the necessary articles of life in the mountain community.

Also notable in the Black Brook area economy during this period, and the principal factor responsible for settlement of the town's mountainous and wooded interior, was the need for great quantities of charcoal. Charcoal was the fuel used to feed most of the forges of the J. and J. Rogers Company and its production was as important as the mining of iron ore itself. It was necessary to harvest 1,000 acres annually to keep the forges fed and numerous kilns were established both within the villages of Black Brook and AuSable Forks and also further west along Little Black Brook. In this way, small communities developed in what had previously been a largely uninhabited territory and the tiny outposts of East Kilns, Middle Kilns, West Kilns, Union Falls, Swastika and Garlick Falls. Accompanying the development of these settlements, was the construction of plank roads from these lumber works to AuSable Forks and the hamlet of Black Brook. Except for the Port Kent-Hopkington Road of 1829-32, these were the first significant roads through the Black Brook wilderness.

The extent to which the economic life of this area was ordered by the iron industry is suggested by the Plattsburg Republican's account of the scale and varied operations of the Rogers Iron Company in 1875:

> "The J. and J. Rogers Iron Company make nearly all of the charcoal used in manufacturing their iron from timber cut from their own lands, of which they own some 75,000 acres. To produce this coal, it is necessary to cut the timber from 1000 acres of land per year. Cutting and hauling the wood to the forges makes a large business in itself. This company makes all of their own castings in their own foundry. They also run their own gristmill, lathe mill and shingle mill. They burn lime, make brick, build and nearly own all of the houses in which their workmen live; they make their own wagons and all their own machinery; they have three stores in which they retail $400,000 worth of goods per year; do nearly all of their own teaming; and own and keep thirty-odd miles of plank road in repair and many miles of dirt road in repair. They do farming besides."

In 1870, within the hamlets of Jay, Black Brook and AuSable Forks, and at Palmer Hill and the outlying areas in the town of Black Brook, the J. and J. Rogers Iron Company was responsible for the employment of between four and five thousand men. This almost total dependency of local townspeople on the company is indicated by the fact that 99% of all the industrial goods produced in the town of Jay in 1870 were associated with the Rogers Company, whose sales exceeded $1,000,000 that year.

By 1875, AuSable Forks was a prosperous community of 2000 inhabitants. The residential area of the village had expanded in all directions, including into "the Jersey". The first two bridges to the "Jersey" were pedestrian bridges and the first vehicular bridge was built in 1913. There were three hotels, Presbyterian, Methodist and Catholic churches, several stores and a post office. In 1875, the Rogers company installed a telephone line connecting their office at AuSable Forks with that at Black Brook. This was the second instance in the world of a telephone being installed and used by a large company.

The extensive iron works of the J. and J. Rogers Company benefited tremendously from the advent of rail transportation to the region. In 1868, construction of the 23-mile AuSable branch of the Whitehall and Plattsburgh Railroad was completed from Plattsburgh to a point on the AuSable River known as AuSable Station or "Rogers". In 1875, the railroad was extended three miles west to AuSable Forks, which became the permanent terminus. A major reason for the building of this line was to provide a better means of transporting ore to the area's manufacturing center and finished products to market.

Beginning in the late 1880's, the iron industry began to experience extreme difficulty. The highest quality and most accessible ores at the Arnold Hill and Palmer Hill mines had been depleted. The regional iron operations of the Adirondack-Champlain area were all beginning to suffer from the opening of enormous deposits at Lake Superior. This was further accompanied by a national depression and by a gradual shift towards large industrial corporations.

While the nearby community of Clintonville (which had a similar iron industry boom) was almost derelict by 1900, AuSable Forks was spared large population losses during this difficult period of industrial change and decline. The stagnation and desolation associated with the 1893 depression was only temporary. J. and J. Rogers were quick to grasp the fact that iron making by the primitive bloomery process could never again compete with modern steel and iron making technology. This adaptable firm reorganized and switched from iron to pulp and paper making. Thus, the rise of the pulp and paper industry at AuSable Forks lifted the Village from economic depression and averted a large population exodus. The pulp mill was completed by 1901 and went into operation in 1902. The paper mill was completed in 1904. As these highly integrated operations were located on opposite sides of the AuSable's West Branch, it was necessary to have several bridges to connect them. One was an iron truss bridge (still extant) near the "Acid Plant" which carried a narrow gauge railroad called a "googoo" and the other was a short suspension bridge near the paper mill.

The Rogers did well until the 1950's when their softwood supplies began to run low. In 1955, the entire company was sold, and within three years, the pulp mill was closed down. Increased shipping costs, lagging business, and pressure from the state and federal governments over the dumping of toxic waste into the AuSable River caused the paper mill to be closed down in 1971, resulting in the loss of some 250 jobs.

Today, AuSable Forks is still a commercial center for the area and relies on industry (quarrying), tourism, and its proximity to Plattsburgh and Lake Placid for employment. The 1938 **Palmer Brook Bridge,** which is included in this multiple property submission, is located in AuSable Forks.

Jay

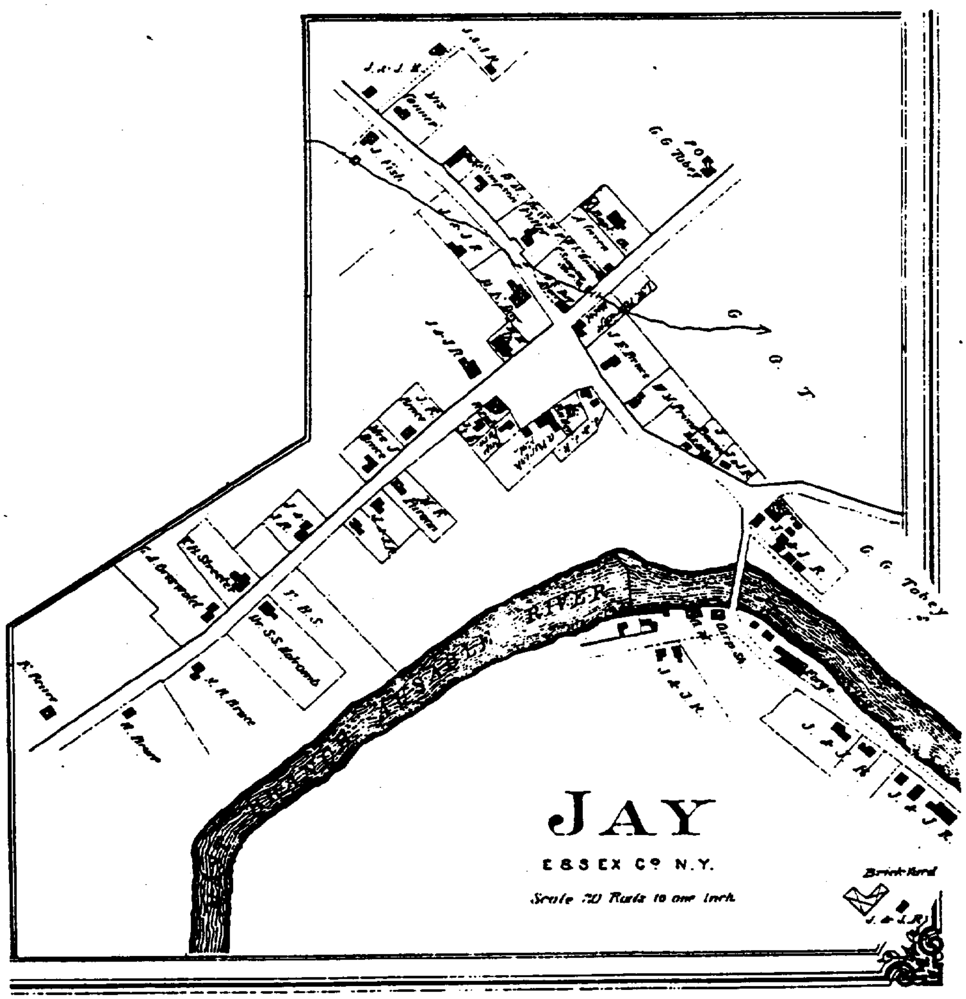
The East Branch of the AuSable River runs through the center of the town of Jay from southwest to northeast. There are three small hamlets in the town: Jay, which is divided by the river near a set of rapids; Upper Jay, located approximately five miles south of Jay; and North Jay, located approximately three miles north of Jay.

In 1796, Nathaniel Mallory moved from Port Douglas to the present town of Jay and established "Mallory's Bush". Here, several settlements were made in various parts of the town by pioneers attracted to the vast timber resources, waterpower and rich promise of veins of iron already discovered at this early stage. By 1798, the first forge had been erected by the Mallorys at a place in the river just below a set of rapids. They also established a sawmill, grist mill and blacksmith shop there. A road in the present town of Jay had been opened by the Town of Willsboro along the AuSable River in 1798, facilitating development of this area. A Baptist Church was organized at Jay about 1798. In response to these settlements, the Town of Jay was divided from Willsboro in 1798, deriving its name from the governor of New York State at the time, John Jay.

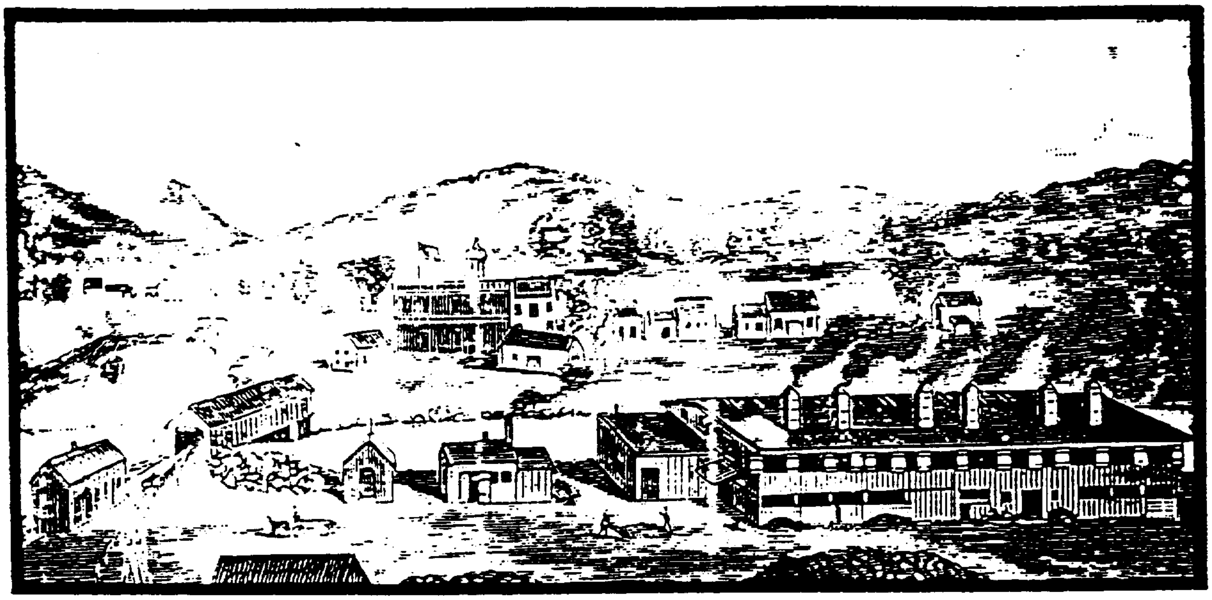
In 1809, the Mallory Forge and mills were taken over and enlarged by the J. and G. A. Purmont Company. Purmont continued the manufacture of iron as well as undertaking an extensive manufacturing and mercantile business. By 1853, the small hamlet of Jay had grown to include a store, clothing works, tannery, wheelwright shop, blacksmith shop, forge and 17 dwellings. A school and post office were established. The first Baptist Church was constructed in 1835 and a Methodist Episcopal Church was erected in 1820, which was replaced by the present brick church in 1850. By 1860, the number of houses had expanded to 50. Development of the industries at Jay clearly would have not been possible without the presence of a reliable and powerful water source. The close proximity of the raw iron and timber resources to the river made early industry and settlement of Upper Jay and Jay possible.

As the industrial and residential areas of the hamlets were located on both sides of the river, a bridge crossing played a very important part in connecting these parts of the community together. An 1839 map of the town shows a crossing at this location and the first covered bridge is known to have built at this site between 1847 and 1848. And yet, life along the AuSable River was not without its perils. In 1856, a severe flood destroyed most of the Purmont forge, manufacturing and mercantile complex. Business was not resumed except to continue a store and gristmill, run by members of the family until the early 1860's. After this flood, in 1857, the Jay Covered Bridge was built. (Although the Jay Covered Bridge was temporarily removed from its site in 1997 because of an emergency situation, contextual information about Jay and the Jay Covered Bridge is provided in this cover document with the expectation that the Jay Covered Bridge will be restored to its original location and will then be nominated to the National Register as a component of this multiple property listing.)

In 1864, the Purmont property was acquired by the J. and J. Rogers Company and became an extension of their AuSable Forks/Black Brook operations. New buildings were constructed and the whole plant, except for the company store, was relocated to the east side of the AuSable River. By 1876, it grew to include a six-fire forge, gristmill, carpenter shop, blacksmith shop and brick yard. The Rogers Company was also responsible for building and managing a number of workers'dwellings between 1864 and 1876. The Beers Map of 1876 shows five new houses on the east side of the AuSable River and 10 existing dwellings on the west side of the river. The company maintained a thriving business at Jay in conjunction with its prosperous operations at Black Brook and AuSable Forks. When the industry collapsed due to the national iron depression of 1892, the Jay plant closed and for the first time in its 100 years of existence Jay became a nearly deserted village.



From: Gray's ***New Topographical Atlas of Essex County, New York*** (1876) illustrating the hamlet of Jay and the location of the Jay Covered Bridge (1857).



From: Nolan's ***Yesterday, Today and Tomorrow: Black Brook and AuSable Forks*** illustrating hamlet of Jay (c. 1850) including earlier covered bridge, forges and Purmont's store.

By the last quarter of the 19th century, the town of Jay had become widely, if not densely settled. The community at Upper Jay remained small, with approximately 20 houses. Between Upper Jay and Jay, a distance of approximately five miles, eight homes were located along the main road, which ran parallel to the AuSable River. Numerous other dwellings were scattered southwest of Upper Jay and on the Jay-Keene Road running south. To the east of where the AuSable River runs from Upper Jay to Jay, approximately 40 homes were located in a narrow corridor traversed by minor roads and streams. In North Jay, a small hamlet approximately three miles north of Jay, 15 homes were situated in a triangular configuration along minor roads built between 1840 and 1870. Some small-scale farming continued to take place in the town of Jay during this period, although most residents relied on some aspect of local iron industry for employment.

From 1880 to 1900, the town of Jay lost almost 30% of its population due to the closing of the J. and J. Rogers iron operations. As a result, the 20th century has been marked by little new growth in the hamlets of Upper Jay, Jay, and North Jay until the rising popularity of the High Peaks region among summer tourists became the principal sources of employment and new residential development late in the 20th century. On either side of the AuSable River, near the Stickney Bridge crossing, two granite quarries have continued operating through the 20th century, being one of two ongoing and viable industries in the town. The wood products industry, having played an important role at Jay from the outset, also continued through the 20th century. Today, the Ward Lumber Company is among Jay's most significant industries and its largest single employer. Tourism is also increasingly playing a larger role in the Jay economy. In the 1950's and 1960's, visitors were attracted by such destinations as the Land of Makebelieve, a very early theme park, and the Paleface Ski Center. Visitors are also attracted to the remarkable scenic quality of the town's natural resources, to its several craft outlets and by the ambiance of its hamlets and rural landscapes. Perhaps the town's greatest single attraction has been, until very recently, the 1857 Jay Covered Bridge, which had a picturesque setting, scenic vistas and excellent nearby river swimming. Currently, plans are underway to restore the covered bridge in its original location.

Like in Keeseville, the AuSable River in the hamlet of Jay simply cuts the village in two. On one side is the village center with its green, stores and churches and the main transportation route through this part of the valley. On the other side is the better agricultural land, the site of the village's 19th century foundry and forges and a large lumber company operation. This bridge crossing, with the adjoining rapids, has both defined the settlement of the hamlet and has been its unifying man-made element.

Wilmington

Wilmington is located along the banks of the West Branch of the AuSable River. In the late 1700's and early 1800's, the towns of Wilmington and St. Armand were part of the town of Jay. Wilmington became its own political entity in 1821 and, for the first year of its existence, was called Danville. When it was discovered that New York State already had a Danville, the name of the town was changed to Wilmington (1822).

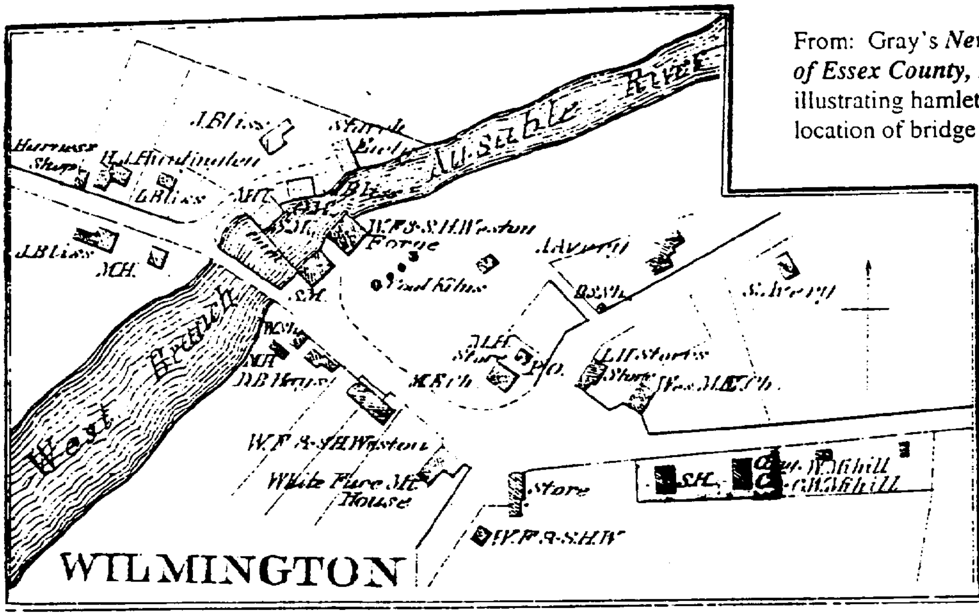
Although many early settlers helped establish the economic and social life of the town, the early history of Wilmington largely centers on the life and work of Reuben Sanford. Sanford was born in 1780, in Woodbury, Conn. and migrated to this part of New York with his wife, Polly, shortly after 1800. In the first quarter of the century, Sanford built and operated a gristmill, sawmill, a potash factory for soap making, and an iron manufacturing business know as the Sanford Iron Works. He also operated the first inn and tavern in the hamlet, which served as a stagecoach stop. The early farmers of Wilmington were able to grow rye as nowhere else in Essex County and much of it was made into rye whiskey in one of Sanford's two distilleries. This product was easily stored and transportable and often took the place of money.

During the War of 1812, Sanford was commissioned a major after he organized and drilled several local companies into a battalion, which served with distinction in the Battle of Plattsburgh. On September 11, 1814, after hearing of the nearing British advance, the American force crossed the Saranac River. Major Sanford seized an ax and chopped the timbers of the bridge, thus preventing the enemy from crossing.

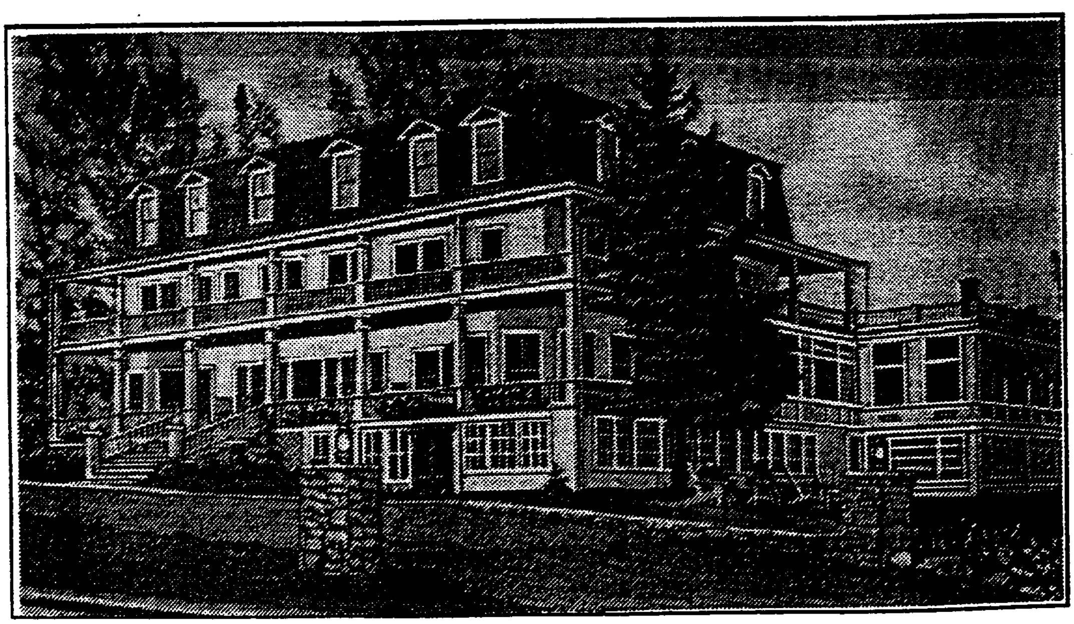
Sanford also served his community in government. His elected and appointed positions included: State Assemblyman (1814-17), delegate to the Constitutional Convention of 1821, first Wilmington Postmaster (1823), and two terms as Wilmington Supervisor, State Senator (1828-32). He died at age 75 in 1855.

Sanford was by no means the only enterprising and resourceful 19th century settler in Wilmington. Amos Avery (1798-1892) was the village blacksmith, Richard Owen ran a distillery and Leonard Owen operated a gristmill. Sanford's iron business was bought by Weston and Nye who continued to operate it profitably for some time. They also opened stores in Wilmington and Keene. In 1877, Ira Storrs converted his store into a hotel and, in 1882, L. M. Bliss opened the Bliss House.

Like the progress of other AuSable Valley towns in the 19th century, Wilmingtonians carved a settlement from the wilderness by exploiting the abundant natural resources (iron, wood, fertile soils, and waterpower) that were at hand. Gradually land was cleared and farmed; wood was cut for lumber; small industries converted ore into iron, rye into whiskey, potatoes into starch, and ashes into potash. Log cabins gave way to frame houses, churches (Methodist Church, 1833; Congregational Church, 1841), schools, stores and inns were built, so that by 1900, Wilmington was a well-established community.



From: Gray's ***New Topographical Atlas of Essex County, New York*** (1876) illustrating hamlet of Wilmington and location of bridge crossing



Postcard of Whiteface Mountain House in Wilmington , c. 1930 (AuSable Forks Free Library collection)

The turn of the century, however, marked a change in Wilmington's development. The agriculture and industry that had sustained the town had become largely unprofitable. But, like the shift from industry to tourism that occurred at about the same time in AuSable Chasm, the residents began to capitalize on the great natural beauty of the valley and the surrounding mountains. Around 1900, the Everest family built the Whiteface Mountain House, which was renowned for decades for its setting, food and service. It was torn down and replaced by a gas station in the mid-20th century. The Olney Homestead became the Wilmington Inn and was run for years by Preston and Lottie Weaver. The Sportsman's Inn was established after World War II by Carl and Bertha Steinhoff and catered particularly to fishermen and hunters.

The 1930's, 40's and 50's brought further changes to the area. In 1935, the Whiteface Veterans Highway, a toll road that winds its way up Whiteface Mountain from Wilmington, was opened for traffic at the cost of 1.25 million dollars. Between 1934 and 1935, the old iron bridge that spanned the West Branch of the AuSable River in Wilmington was replaced by the current **Wilmington Bridge** (included in this multiple property submission). A new dam was also built near the bridge, which created a wide area of the river suitable for boating, swimming and skating.

1947 saw the beginning of another new industry in the area. The State of New York opened a ski center on Marble Mountain, which operated for almost 10 years. In 1958, the state built a new ski center on Little Whiteface, which has been developed and improved ever since. In 1980, the Winter Olympic Games were held in and around Lake Placid and the alpine events took place at Whiteface Mountain.

In 1949, Julian Reiss of Lake Placid realized a dream. He built Santa's Workshop on the Whiteface Mountain Memorial Highway, and created a magical world of fun and fantasy that has been enjoyed ever since by young and old alike.

The ski center, Memorial Highway, Santa's Workshop and High Falls Gorge have collectively made Wilmington a very popular tourist destination. Motels and restaurants have sprung up over the past several decades to meet the demand for food and lodging. The town has thus been successful in making the transition from an agricultural and iron/wood industry base economy to one that centers on tourism.

The importance of the bridge crossing in Wilmington has changed over time. In the 19th century it marked the center of industrial and agricultural activity in the center of the hamlet. Surrounding it were water-powered mills. As the economic focus of Wilmington changed in the 20th century, the current **Wilmington Bridge** became a gateway to the new Wilmington, home to Olympic caliber skiing, a road to the summit of Whiteface Mountain and dozens of motels and restaurants catering to tourists.

Keene

The East Branch of the AuSable River has its origins in the mountains in and around the town of Keene, an area characterized by rugged terrain and narrow winding valleys. Here the AuSable River can be complex and temperamental. In places it plunges through narrow rocky channels and in other locations it is shallow and meandering. The river meanders from one side of the narrow valley to the other and has dozens of smaller streams joining it, making a patchwork of lands isolated by the river. Due to the steep terrain, most settlement has been and is concentrated in narrow valleys between the mountains. The town of Keene is made up of two principal settlements: Keene (Center) and Keene Valley, each with a distinct history.

Keene (Center)

The history of Keene (Center) bears many similarities to the settlement of other AuSable Valley hamlets. Early settlers were attracted to the area because of its inexpensive land, waterpower, timber and iron resources which promised prosperity to those with strong backs, ingenuity, and patience. David Clemmens and John Gibbs cleared land and planted crops here in the early 1790's, but lived here only seasonally. Benjamin Paine was the first man to settle and stay in the town. His daughter, Betsy, was the first child born here in 1795. Paine was followed by scores of others including Timothy Panghorn, Benjamin Wells, Thomas and Thaddeous Roberts, Thomas Taylor, Robert Otis, Phineas Norton and James and Alva Holt. William Wells built and operated the first store and Zadock Hurd built an addition to his log dwelling in which he ran an inn for two decades.

In the 1820's, the discovery of iron in the area sparked a tremendous flurry of industrial activity along the AuSable River and its tributaries. By mid-century there were forges owned by David Graves, Joseph and Alden Hull and Jacob and Mason Kingsland of Keeseville, grist mills run by Nathaniel Sherburne and Israel Kent, and sawmills operated by Noah Heald and Sylvans Wells. While the products of the grist and sawmills were primarily

for local consumption, the iron was exported (often to AuSable Forks for further refining) and was an important part of Keene's economy until the 1890's.

In 1856, a dam built by the state at the outlet of Lower AuSable Lake gave way, creating a catastrophic flood in the valley. All of the bridges and most of the mill sites in this part of the valley were destroyed and most were not rebuilt. This was a setback for the iron industry in Keene and eliminated many of the marginal operations. W.F. and S.H. Weston (from Colchester, Vermont) bought up many of the best mine sites (along Walton Brock) and successfully operated an iron business (primarily making boiler plate) there until about 1890. The Weston dam was later bought in 1912 by Wallace Murray. He installed an electrical turbine and supplied electricity to Keene residents until 1924 when power lines reached the area.

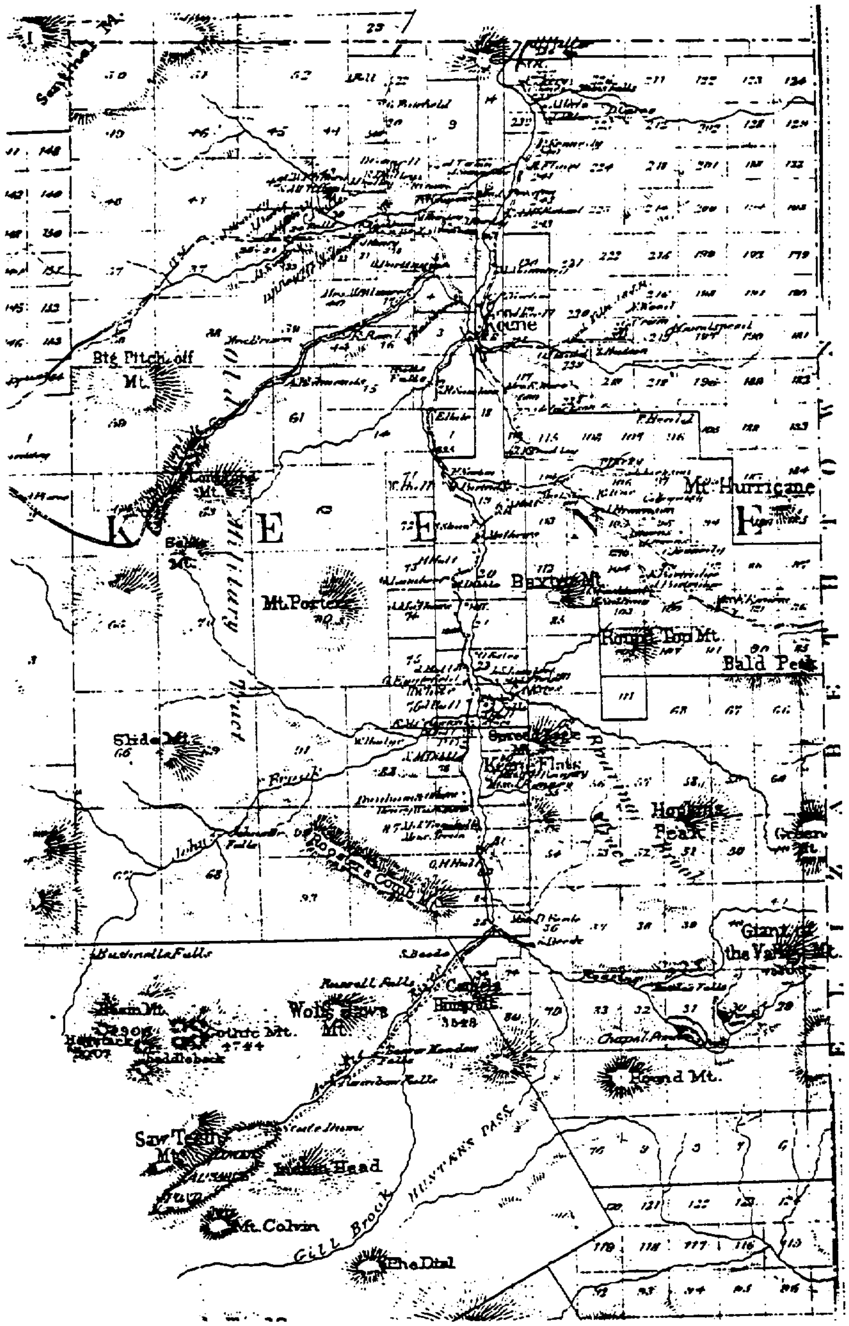
With the decline of iron industry in Keene, the town's economy relied more heavily on logging and wood products. Several markets were available for wood but one of the best was the J. and J. Rogers Company in AuSable Forks, whose pulp and paper mills required a constant supply of softwood.

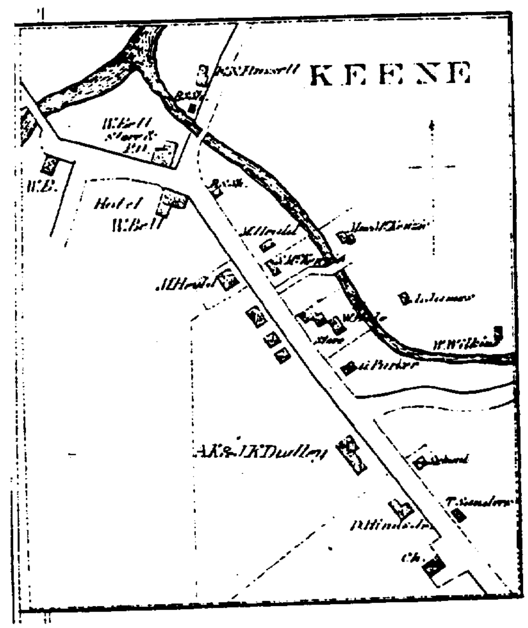
Beginning in the late 19th century, the area became an increasingly popular destination for seasonal visitors. Scores of homes and cottages were built by local building contractors, A.C. Trumbull and George Holt. Several inns and hotels were erected, the best known being the Owl's Head Inn and Hurricane Lodge.

Keene Valley

Keene Valley (known as Keene Flats until 1883) did not have the same economy based on wood and iron products that Keene (Center) did. Its earliest settlers were Harvey Holt Smith and Orlando Beede, who farmed the narrow bottomland along the river. This part of the valley remained sparsely settled through the mid-19th century and only 13 families and one business are shown on the 1858 J. H. French map of the area.

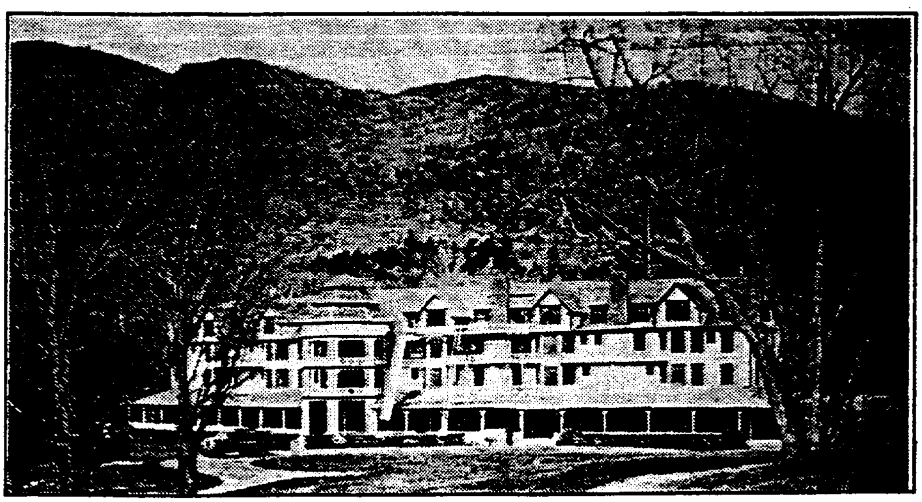
Keene Valley's boom began in the 1850's and 60's, when the valley started to become a popular summer resort. The first people to "discover" the valley's magnificent scenery and uncompromised air were artists including Frederick Perkins, John Fitch and R. N. Shurtleff, who came to paint and draw and who boarded with local families. As word of the valley's majesty spread, other people followed and by 1872 the first true hotel was built. By 1900, there were three large hotels in Keene Valley: St. Huberts Inn, Tahawus House and the Adirondack House, which could accommodate 200 guests altogether.





From: Gray's ***New Topographical Atlas of Essex County, New York*** (1876) illustrating town of Keene and hamlet of Keene.

Elm Tree Inn, Keene
Photo. c. 1960



The AuSable Club (formerly the St. Hubert's Inn), St. Hubert's
c.1960

During the 1880's and 90's, many visitors bought their own land and built cottages and summer houses. This created a huge demand for lumber, builders, guides, livery stables, produce and caretakers. One of the people who responded to this demand was Eli Crawford. During the 1870's he operated a sawmill, planar and shingle mill on John's Brook and in 1882, he built a steam-powered mill near the Keene Valley Country Club. This facility ran 24 hours a day during the building boom. Crawford also ran a hotèl and store. By the end of the 19th century, the population had risen to 1400 and the valley was planted "edge to edge" in crops.

By 1910, the automobile began to change how the area was used. Because there were not as many long-term boarders, several of the hotels closed, others burned and were not rebuilt. As trucking made it possible to import lumber and produce, the local farming, logging and millwork industries declined, which resulted in the abandonment of many farms and homes. Since that time, the population in Keene has stabilized and the economy continues to be based on providing services to seasonal visitors.

Perhaps nowhere else in the AuSable Valley are bridges as important in making day-to-day travel, commerce and communication possible as in Keene. The AuSable River traversing the rugged terrain and narrow winding valleys makes it nearly impossible to move through the area without crossing many bridges. In travelling between the north and south ends of the town on Route 73, one has to cross 11 bridges, and access to many of the summer homes is possible only by crossing at least one publicly-owned and one privately-owned bridge. Five of the bridges included in this multiple property submission are in Keene: the c.1900 **Slater Bridge**, the 1902 **Ranney Bridge**, the 1890 **Walton Bridge**,and the 1913 **Notman Bridge,** and the c.1900 **Beer's Bridge.**

2. Evolution of 19th and early 20th century rural bridge design and construction 1840-1941

Introduction

The historic bridges of the AuSable River Valley collectively tell much of the story of the evolution of 19th and early 20th century rural bridge design and construction. This evolution can be viewed in at least three distinct phases.

The first phase (1840-1860) involves the construction of bridges using native materials, local labor and building practices, which were either traditional, as in stone arch construction, or vernacular, as in wood truss construction. This phase is represented by the **Stone Arch Bridge** (1843) in Keeseville and the Jay Covered Bridge (1857).

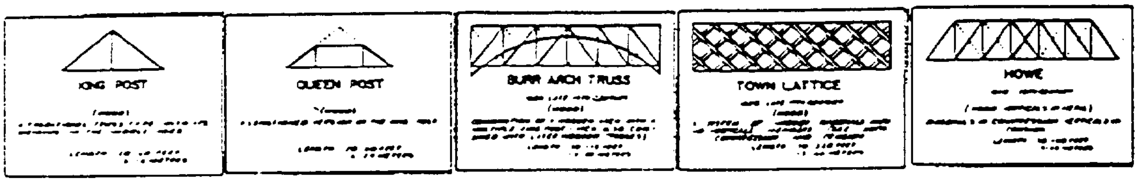
The second phase (1860-1900) was a period when there was a tremendous amount of innovative design and construction, using first cast and wrought iron and, later, steel components. During this period there were dozens of bridge types available to the p ublic, each championed by competing designers and manufacturers. These bridges were also typically fabricated by a company some distance away, transported to the site by rail or boat and erected at the site by the manufacturer's bridge erection specialists. This period is represented by: the **Old State Road Bridge** (c. 1890) in AuSable Chasm, the Upper Bridge (1878) and **Swing Bridge** (1888) in Keeseville, and the **Walton** (c.1890), **Beer's** (c.1900) and **Ramsey** (1902) bridges in Keene.

The third phase (1900-1941) is a period when bridge design and construction became highly standardized, when manufacturers used a limited number of tried and true designs, when steel construction for truss bridges was universal and when a limited number of manufacturers dominated the market. This period is represented by the two **D&H Railroad Bridges** (1913) and the **Carpenter's Flats Bridge** (1941), all near **AuSable Chasm,** and the **Slater's Bridge** (c. 1900) in Keene. During this same period, there was a new, parallel interest in the aesthetic possibilities of bridge design. Bridges of this type were designed to be sensitive to their setting and often used native materials to enhance their picturesque appeal. The **Notman Bridge** (1923) in Keene, **the AuSable Chasm Bridge** (1932) and the **Palmer Brook Bridge** (1938) are all of this type.

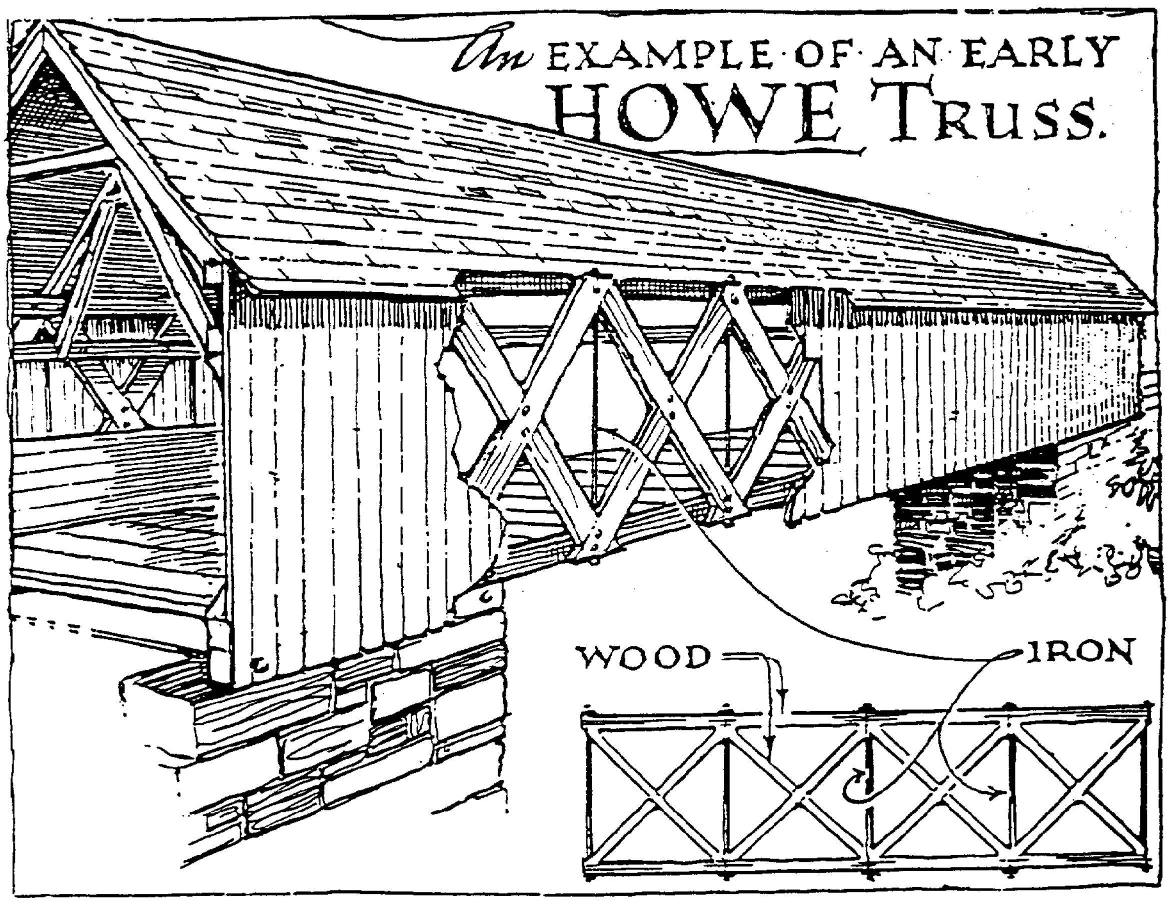
A. The Early Bridge Era: Bridges of Wood and Stone (1840-1860)

1. Wood Bridges

The abundance of wood, the speed at which a wooden bridge could be constructed and the availability of a labor force to construct them, made wooden bridges the preferred choice for bridge building in America from the Colonial era until the 1860's. And since most of the rural road bridge building during the mid-19th century was the responsibility of town governments, they in turn relied heavily on local expertise and local resources. Most early wood bridges were simple Kingpost or Queenpost trusses, which were easy to fabricate and erect, and could be used for crossings up to 50 feet long. For wider crossings, these trusses were erected in a series, supported by masonry piers or cribbing between spans (like the first Upper Bridge in Keeseville). Some were covered by boards ("weather boarding") to protect the trusses from the deteriorating effects of weather (like one of the early AuSable Chasm bridges) to protect the truss from weathering. No trusses of these types survive today in the AuSable Valley.



Historic American Engineering Record drawings of simple wood truss bridge types.



Drawings by Eric Sloane from Allen's *Historic Upstate Bridges* showing details of a typical Howe truss bridge (1983).

In 1812 (patented 1817) Theodore Burr invented what is now known as the Burr truss, which consists of a simple parallel chord truss and wooden arch, usually roofed and sided. This enabled the bridge builder to create a much longer span without piers (a 190 foot Burr truss span once crossed the Mohawk at Schenectady and a 364 foot span crossed the Susquehanna at McCall's Ferry, Pennsylvania in 1815).

The next major improvement in wooden truss design was patented by Ithiel Town in 1820. His "Town Lattice Truss" was a latticed web parallel chord truss, given its rigidity by the top and bottom chords and by the trunneled pinning of the lattice. These bridges were also usually covered. Town promoted his designs, which gained widespread acceptance and were widely built, by distributing pamphlets and other means.

A further improvement was made in 1840-41 by William Howe. His wooden truss design consisted of wooden top and bottom chords, wooden diagonals and wrought iron tension rods. This design made the best use of each material (wood in compression and iron in tension) and lightened the weight of the truss. In the United States, more Howe Truss spans were built that any other wood truss type. Covered bridges of this type are known to have been built in Keeseville (Upper Bridge site between 1856-1875), AuSable Forks (Main Street, crossing 1860-1890 and the Stickney Bridge crossing), and at Upper Jay. The Jay Covered Bridge, built in 1857 and temporarily removed from its site in 1997, is the only bridge of this type still in existence in the valley. Contextual information is provided for wood truss bridges with the expectation that the Jay Covered Bridge will be restored in its original location and will then be added to this multiple property listing.

By the 1860's and 70's the popularity of the wooden truss was giving way to the stronger, lighter, more economical metal trusses which were capable of spanning even wider crossings. As is typical with the dissemination of many new ideas and innovations, the use of metal trusses was found earliest in more populated areas and in fields (i.e. railroad building) where the greater demand existed. For this reason, the construction of wooden bridges continued in some rural areas for smaller crossings, perhaps as late as 1890.

2. Stone Bridges

The use of stone for bridge building is thousands of years old. In northern New York, although stone was plentiful, stone bridges are extremely uncommon. Stone construction took more time and required skilled craftsmen that weren't always present. It was also not until after the end of the War of 1812 that this part of New York State was really settled and, by that time, there were several tried and true wood truss designs and wood was quite abundant.

Stone masonry bridges consist of one or a series of stone arches constructed of rubble, ashlar, or a combination of both. The ashlar can be found in a number of stone faces and cuts, including rough-cut, rock-faced, coursed or random. The most common stone types include fieldstone, limestone and granite. Typically the arch is round, semi-circular or segmented.

The rugged masonry bridges built by county artisans, like the ones found in northern New York in Keeseville, Sackett's Harbor and Woods Falls, are usually constructed of fieldstone or granite, laid in irregular courses. The arch itself consists of a ring or band of shaped stone, often a different color to accent the arch, called the voussoirs. Gravel and pavement overlaps the entire structure to form the road surface. Masonry construction also took advantage of indigenous materials but demanded more time than timber bridge construction and required different skills. The only true stone masonry bridge over the AuSable River is the 1843 **Stone Arch Bridge** (listed on the National Register of Historic Places in 1983 as part of the Keeseville Historic District and included in this multiple property submission) in Keeseville, which was built under the supervision of Soloman Townsend. As Keeseville had an abundance of river stone and a tradition of masonry construction (mills, residences, churches, commercial building), Townsend presumably utilized a crew of skilled masons.

The absence of stone bridges elsewhere in the valley was probably due to both a lack of skilled local labor and that they were slower and more expensive to build.

It was not until the early 20th century that stone became more popular when used as a facing on concrete bridges. This was the early highway era when designers strove to accentuate the picturesque in the landscape.

B. The Early Iron Bridge Era (1860-1900)

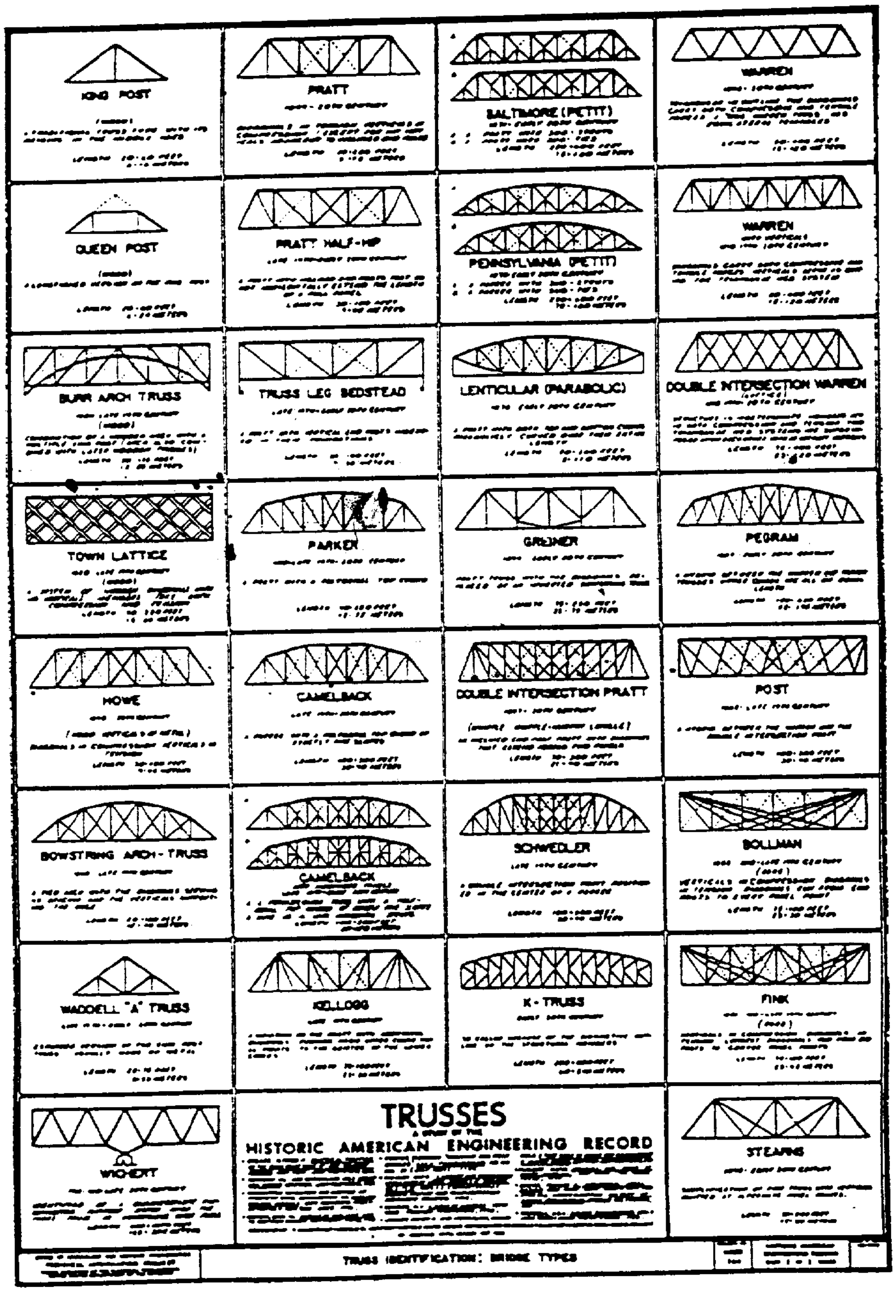
Up until the 1860's, wood and stone dominated bridge building in New York. In the 1860's, iron works began supplying prefabricated cast and wrought iron truss members that could be manufactured in the factory, shipped (by rail) to the site and assembled using pin connections. The earliest of these bridges (railroad pioneered their use) utilized wrought iron for tension members and cast iron for compression members. Cast iron eventually proved to be unsuitable and was phased out of bridge construction. The first all wrought iron bridge in the United States was constructed in 1859 and the first all steel bridge was built in 1879 on the Chicago and Alton Railway. By 1895, most bridges utilized steel and pneumatic field riveting.

After the Civil War, to meet the tremendous demand for bridge construction, there was a great proliferation of bridge engineers and manufacturers, resulting in the creation of hundreds of firms. Even though the Pratt and Warren truss continued to dominate the field, there was a great deal of experimentation in design. New truss forms were an important marketing tool that enabled the patent holder to offer certain truss types exclusively. A good example of this is the Berlin Iron Bridge Company's lenticular or parabolic truss bridges, which were extremely popular and widely built in the 1880's and 1890's. The c. 1890 **Walton Bridge** (included in this multiple property submission) in Keene is of this type.

Bridge manufacturers were concentrated in the industrial regions of the Northeast and Midwest where there was optimal access to materials, labor and transportation. The fabricating shops bought rolled wrought iron (channels, plate and angles), punched holes for the necessary pins or rivets and shipped the entire disassembled bridge to the buyer. Various arrangements were made for assembly. Some companies had their own erecting crews that traveled from site to site and, in other cases, the buyer would make their own arrangements for abutment and bridge construction. Manufacturers of the 19th century AuSable River bridges include: Murray, Dougal and Company; Berlin Iron Bridge Company; King Iron Bridge and Manufacturing Company; and the Canton Bridge Company. These companies sold their projects via sales agents who dealt directly with town governments or other buyers.

Metal truss bridges consist of one or a series of spans constructed from prefabricated members. The members vary in size according to the design requirements of the crossing. The iron and/or steel pieces are interconnected in a series of triangles or panels to form the bridge. Each member is either in compression or tension, depending on its placement. Bridges are identified by their particular configuration of tension and compression members, including the placement of vertical and diagonal members and the shape of the top and bottom chords.

All metal truss bridges share some common characteristics. Each has a floor system, usually made up of a combination of plate girders, rolled I-beams, cross bracing and, originally, a wood deck. The bottom chord usually consists of a box girder or channels or angles with stay plates. Verticals and diagonals are made up of paired angles, paired T-sections, I beams, paired channels, usually braced by lattice bars. Counters are usually round adjustable (turnbuckle) tension rods found both in the truss panels and as bracing between the top chords and bottom chords. In general, pre-1895 metal trusses are usually wrought iron and pin connected. After 1895, they are steel and have riveted construction. The most recent all steel truss bridges have all-welded connections.



Historic American Engineering Record drawing showing the variety of 19th and early-20th century bridge designs. (1976)

Metal trusses fall into three basic kinds: through truss, pony truss and deck truss. The through truss is designed to carry loads at or near the level of the bottom chord. The through truss has lateral bracing between the top chords and, thus, the traffic passes through the structure. The pony truss is designed to carry lighter loads at or near the level of the bottom chord but has no lateral bracing between the top chords. A deck truss carries the roadway at or near the level of the top chord.

There are at least 20 metal truss types found in the United States but the most common from this period, nationally and regionally, are the Pratt, Warren, Whipple (Bow String) and Parker trusses. The Pratt truss was patented by Caleb and Thomas Pratt in 1844. It consists of parallel top and bottom chords with vertical members acting in compression and diagonal members acting in tension. The Warren truss was patented by two British engineers in 1848. Its simple and compact design consists of parallel top and bottom chords with diagonals alternatively placed in tension and compression, giving the impression of a series of triangles. In general, prior to the turn of the century, the diagonals in tension were thin eye bars. In the 20th century it became standard practice to use stiff, heavy diagonals exclusively. In other respects, the truss members are similar to those described for Pratt trusses. Like the Pratt truss, the basic Warren truss was modified to carry heavier loads and support longer spans by using a polygonal top chord.

Metal truss bridges from this period are represented by: the **Old State Road Bridge** (c. 1890) in AuSable Chasm, the Upper Bridge (1878) in Keeseville and the **Walton** (c. 1890), **Beer's** (c.1900) and **Ranney** (1902) bridges in Keene, all included in this multiple property submission.

Much less common in occurrence during this period was the construction of suspension bridges, which has a surprisingly long history. Simple, primitive pedestrian suspension bridges are thought to have been built and used in China, Japan, India, Tibet, Mexico and Peru as early as the first century AD. They were made from vines, rope, wood or hides. European explorers in South America first saw a primitive bridge of this type in 1848. Early European adaptations of this type are known to have existed in Italy in 1515 and in France in 1595. The use of iron suspenders in Europe occurred as early as 1615.

Iron suspension bridges were built in America before any other kind of iron bridge. James Finley of Fayette County, Pennsylvania designed, patented and built the first iron chain suspension bridge in 1801. Eight similar bridges are said to have been erected the same year and about forty more were built prior to 1808. In 1816, Josiah White and Erskine Hazard built a 408-foot wire suspension bridge over the Schuylkill River in Philadelphia, the first of its kind anywhere in the world. American suspension bridge design and construction was furthered during the 19th century by Charles Ellet and John Roebling who continued to improve and enlarge the span length and load carrying capacity of suspension bridges. Ellet's 1847-49 bridge at Wheeling, West Virginia was 1010 feet long and the longest in the world at the time. John Roebling designed and built scores of suspension bridges, culminating (with his son, Washington Roebling) with the Brooklyn Bridge (National Historic Landmark, 1964), completed in 1883.

Suspension bridges are of two basic types; those with towers on the shore and cables loaded only between the towers, and those with towers in the river or valley and cables loaded over both central and end spans. The basic components of a suspension bridge include: the towers from which the cables are suspended; the cables or suspenders (earlier bridges had chains) which are anchored in the ground and from which the bridge deck is suspended; and the deck which is usually stiffened by some sort of secondary truss mechanism.

Suspension bridges, especially in rural area, were far less common than wood and metal bridges in the 19th century. A study of old North Country bridges in upstate New York by Richard Sanders Allen reveals the existence of only five suspension bridges, ever, in this area. Crossing the AuSable River is only one suspension bridge - the 1888 **Swing Bridge** in Keeseville, which is included in this multiple property submission and already listed on the National Register of Historic

Places as part of the ***Keeseville Historic District*** (1983). This bridge was built to give industrial workers easy access to the iron, wood and textile mills, which lined both sides of the AuSable River.

C. Steel Truss Bridges in the Early 20th Century (1900-1941)

After about 1900, metal bridge building in rural areas became much more standardized, as the entire bridge building industry became more consolidated (see the story of the American Bridge Company below). Almost universally, bridges were made from heavier, rolled steel members, had riveted or welded connections, had steel grate or concrete decks and were of a few standard truss designs. Although it is easy to view these metal bridges as less interesting, they were an outgrowth of the earlier period, which was full of so much experimentation and innovation, and should be seen as an embodiment of their own era.

In the AuSable River Valley, this period is represented by the two **Delaware & Hudson Railroad Bridges** (1913) and the **Carpenter's Flats Bridge** (1941) near AuSable Chasm and the **Slater's Bridge** (c. 1900) in Keene, all included in this multiple property submission.

D. The Early 20th Century Picturesque Tradition (1900-1938)

For a variety of reasons, by the turn of the century there was a new and widespread interest in landscape and building design, which harmonized with and accentuated the natural landscape. In the United States, the origins of this date back to the second half of the 19th century to the writings of Andrew Jackson Downing, the work of Frederick Law Olmstead, the "American Park Movement," and others who pioneered and promoted this aesthetic. While the vast majority of small rural bridges built during this period were ordinary, functional spans of steel and/or concrete, some bridge designs incorporated this new aesthetic. This was particularly true for bridges located in dramatic natural settings, in or near parks and along parkways, to name a few examples. Perhaps some of the best known work of this type was done during the Depression by the Works Progress Administration (WPA) and in our National Parks by the National Park Service.

In the AuSable River Valley, there are four bridges that are of this ilk. The earliest of these bridges is the 1913 **Notman Bridge** in Keene Valley. This sixty-two foot stone-faced, concrete arch bridge was built to provide direct access to the Notman family cottage on a knoll above the river. This graceful, simple bridge design was meant to create a picturesque river crossing and approach to the cottage. It is very much in the rustic tradition that predominated seasonal home design in the Adirondacks at the time. The 1932-34 **AuSable Chasm Bridge** is located in a most dramatic gorge setting. In response to this site, the bridge designers (New York State Department of Public Works) chose to design and erect a magnificent 222 foot, steel arch span, which simply seems to leap across the chasm. The design further accentuates the site by using local sandstone and granite in the abutments and arched approach spans. In all, this is a design that is most sensitive to the site and it actually accentuates the bridge's picturesque setting. The 1934-35 **Wilmington Bridge** over the West Branch of the AuSable is 160 feet overall, with two 70-foot reinforced concrete, stone faced arch spans. It was built to complement the nearby Whiteface Veterans' Memorial Highway, a winding, picturesque road to the top of Whiteface Mountain. The bridge's graceful arches and stone facing, like the highway design, are what make the structure blend with its rugged, picturesque setting. On a much smaller scale, is the **Palmer Brook Bridge** in AuSable Forks, a small stone-faced, concrete arch bridge built in 1938 under the auspices of the Works Progress Administration. All four of the bridges described above are included in this multiple property submission.

E. Manufacturers, Fabricators and Builders

The following are the known manufacturers, fabricators and builders of the bridges included in this multiple property listing. Included are manufacturers and fabricators of metal truss bridges and builders of wood, stone, concrete and steel bridges over the AuSable River and its tributaries.

1. American Bridge Company

The American Bridge Company, formally organized by J. P. Morgan and Company, was incorporated in New Jersey on April 14, 1900. In less than a year, most of its stock was purchased by United States Steel Corporation, which thereafter operated it as a subsidiary. The creation of the American Bridge Co. presents a classic example of turn-of-the-century monopolistic big business practices. In order to dominate this market, American Bridge purchased twenty-four bridge fabricating companies within its first year, which represented fifty percent of the nation's fabricating capacity at the time. The twenty-four companies acquired in 1900 were:

American Bridge Works, Chicago, Illinois
Berlin Iron Bridge Company, Berlin Connecticut
Buffalo Bridge and Iron Works, Buffalo, NY
Edge Moore Bridge Works, Wilmington Delaware
Elmira Bridge Company Ltd., Elmira, New York
Gillette-Herzog Manufacturing Company, Minneapolis, Minn.
Groton Bridge and Manufacturing Company, Groton, NY
Hilton Bridge Construction Company, Albany, New York
Horseheads Bridge Construction Company, Albany, New York
Keystone Bridge Works, Pittsburgh, Pennsylvania
(from Carnegie Steel Co. Limited)
Lafayette Bridge Company, Lafayette, Indiana
Lassig Bridge and Iron Works, Chicago, Illinois
Milwaukee Bridge and Iron Works, Milwaukee, Wisconsin
(from J. G. Wagner Company)
New Columbus Bridge Company, Columbus, Ohio
Pencoyd Iron Works, Philadelphia, Pennsylvania
(A. and P. Roberts Company)
Union Bridge Company, New York, NY (Plant at Athens, Pennsylvania)
Wrought Iron Bridge Company, Canton, Ohio
Youngstown Bridge Company, Youngstown, Ohio

Within the next several decades, American Bridge also acquired:

Toledo Bridge Company, Toledo, Ohio (1901)
Detroit Bridge and Iron Works, Detroit, Michigan (1902)
Koken Iron Works, St. Louis, Missouri (between 1912 and 1916)
Virginia Bridge and Iron Company, Roanoke, Virginia (1936)

Eight of the purchased firms were in New York and operated collectively as Empire Bridge Company, a subsidiary of American Bridge Company. Another subsidiary, American Bridge Company of New York, was responsible for all contracts and sales and took charge of all erection projects until December 1913. American Bridge Company opened a huge new fabricating plant in 1903 in Ambridge, Pennsylvania and began decommissioning many of the older plants it had acquired in 1900. The new plant was three times larger than the prior record holder for plant size.

American Bridge Company's size and resources enabled it to bid on any steel bridge work in any state, and to usually underbid its competition. Its ability to dominate the market in this way greatly altered the competitive situation in the nation's bridge industry. Other firms, mostly concentrated in the Midwest, were less and less able to compete on a nationwide basis and were reduced to operating primarily within their home regions. Another change brought about by American Bridge Company's market dominance was the standardization of truss design. Throughout the 19th century, the industry was characterized by scores of innovative designs, each with some intrinsic appeal. The American Bridge Company relied on standard tried-and-true trusses, which forced conformity within the industry. Today, the American Bridge Company is the nation's largest structural fabricator and continues to fabricate and manufacture steel bridges.

AuSable River bridges known to have been fabricated by American Bridge Company are the **Carpenter's Flats Bridge** (1941) and the two **Delaware and Hudson Railroad Bridges** (1913) near Port Kent, all included in this multiple property submission

2. Berlin Iron Bridge Company

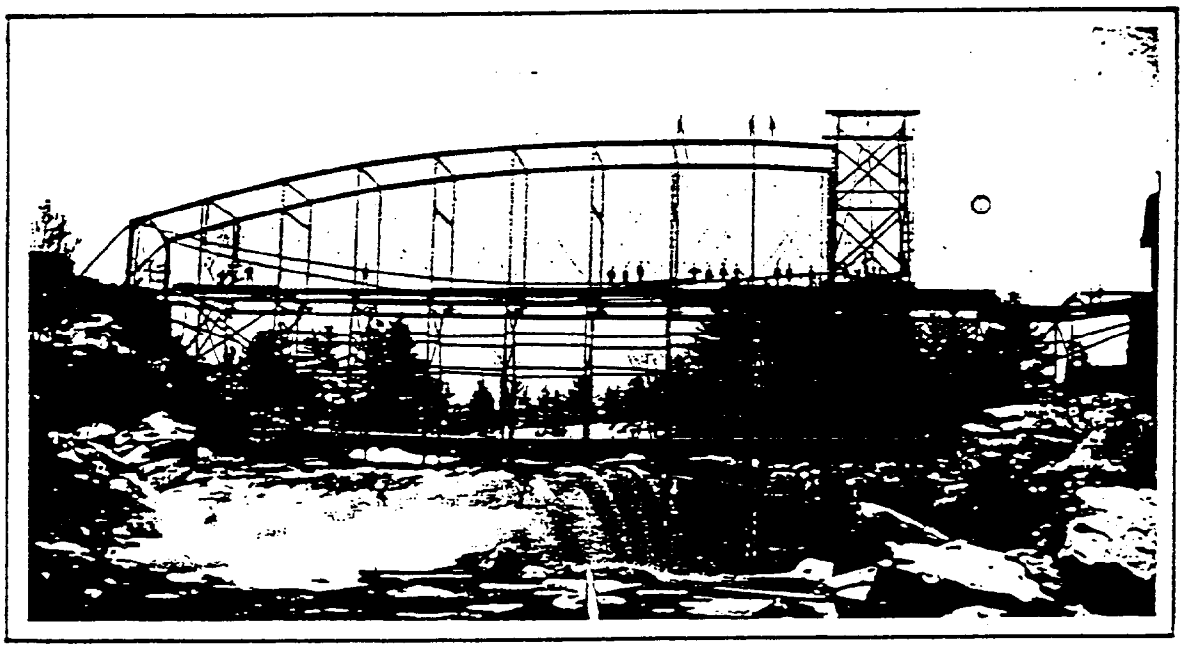
The Berlin Iron Bridge Company of East Berlin, Connecticut was formed in 1883. It had evolved from a series of iron manufacturing businesses (American Corrugated Iron Co., 1868; Metallic Corrugated Shingle Co., 1871; and Corrugated Metal Co., 1873) which made corrugated iron, fireproof shutters and doors, and iron roof trusses. In the late 1870's, the Corrugated Metal Company bought the rights to William O. Douglas's patented lenticular bridge truss design and entered into the bridge fabricating market. By 1883, most of its business was in bridge fabrication and its name was changed to reflect this.

While Berlin Iron Bridge Company (BIBC) did manufacture bridges of other designs, it primarily built lenticular truss bridges. Hundreds were fabricated between 1878 and the late 1890's and sold as far away as San Antonio, Texas. BIBC grew to become the largest structural fabricator in New England and was acquired by the American Bridge Company in 1900. The East Berlin factories were eventually dismantled and moved to the new plant in Pennsylvania.

AuSable River bridges know to have been fabricated by BIBC included the **Swing Bridge** (1888) in Keeseville and a lenticular truss (c. 1890) in Keene, known as the **Walton Bridge**, both of which are included in this multiple property submission. The **Swing Bridge** is a 237-foot suspension pedestrian bridge, of which only approximately ten were built by BIBC and of which there is only one other known survivor (Milford, N.H.). The **Walton Bridge** was originally erected for the Western Plank Road Company in the Town of Black Brook (Clinton County) and was moved to the Keene site in 1925. BIBC also fabricated a railroad trestle bridge over the AuSable Chasm (erected 1889-90 and demolished in 1931) for the Keeseville, AuSable Chasm and Lake Champlain Railroad Company.

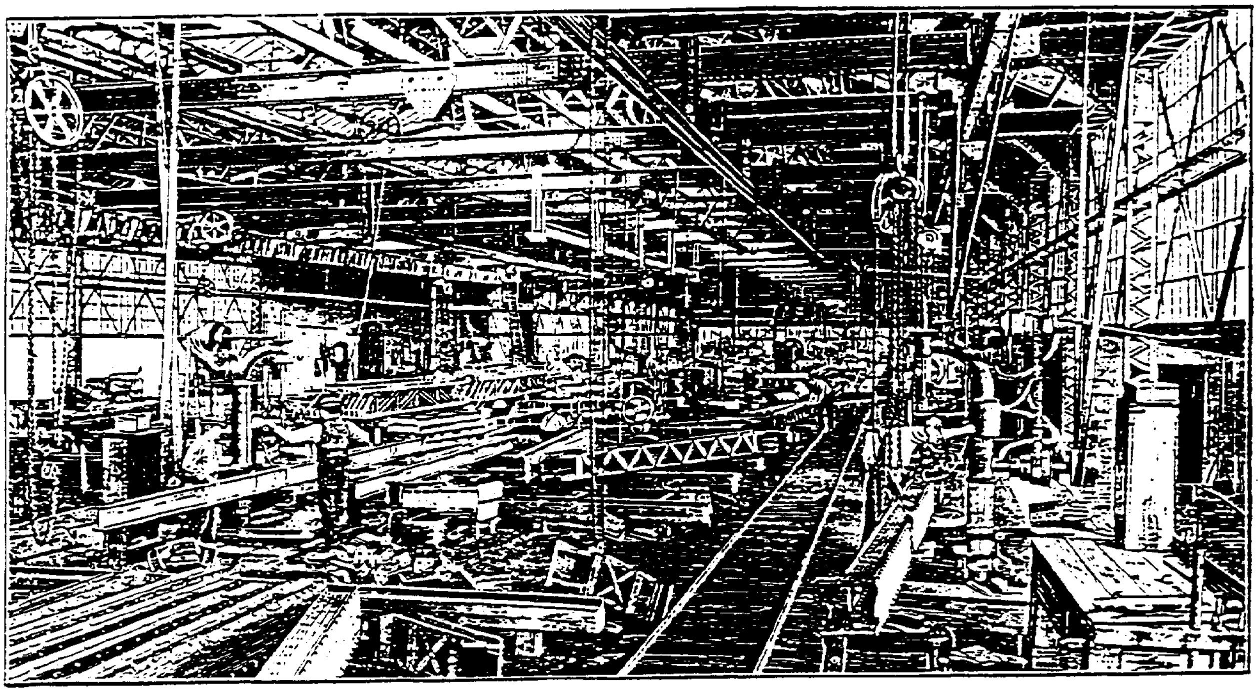
3. Canton Bridge Company

Canton Bridge Company of Canton, Ohio was organized in 1876 and, for its first fifteen years, fabricated and erected bridges mainly in its immediate region. After a new infusion of capital in 1891, Canton Bridge Company was able to broaden its geographical service area and undertake projects in other areas such as New York State. The company also



Erection of a Berlin Iron Bridge Company lenticular truss

From: *A Directory of American Bridge Building Companies, 1840-1900* by Victor Darnell (SIA)



A well-appointed bridge shop of the 1890s. The 80-by-400-foot building—itself presumably a product of the firm's works—was entirely of iron and glass with no wood used. The capacity was 1,000 tons of finished work per month. (Berlin Iron Bridge Company, East Berlin, Connecticut)

From: *A Directory of American Bridge Building Companies, 1840-1900* by Victor Darnell (SIA) produced turntables and other iron work. In 1925, the company was bought by Massillon Steel Joist Co., and the two operated independently for four years. In 1929, the two merged into the MaComber Steel Company.

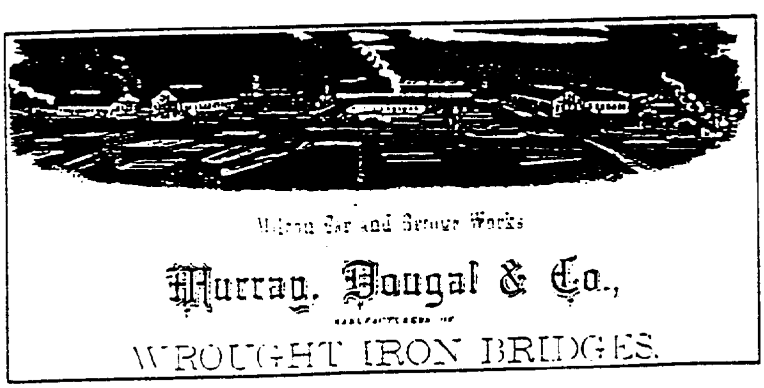
The only known AuSable River bridge to have been built by Canton Bridge Co. is the 1902 **Ranney Bridge** south of Keene Valley, which is included in this multiple property submission.

4. Murray, Dougal and Company

The firm of Murray, Dougal and Company of Milton, Pennsylvania was established in 1864 by Samuel W. Murray, William P. Dougal, Charles D. McCormick and John McCleery for the purpose of building all types of railroad freight cars. Also know as the Milton Car Works, Murray, Dougal and Company was recognized as a leading producer of tank cars for the fledgling petroleum industry concentrated in western Pennsylvania. Samuel Murray was a pioneer in tank car building, having received the first United States patent for a railroad tank car in the 1860's. During the 1870's, Murray, Dougal and Company began fabricating and erecting iron bridges. It is not known exactly when or why the company began this type of work or how successful they were in competing for contracts. Bridge contract announcements in engineering periodicals during the late 1870's mention bridges being erected by Murray, Dougal and Company in Virginia, Pennsylvania, New York and Connecticut. During the late 1870's, when the company was erecting bridges and building railroad cars, the Milton plant employed as many as 400 people, but no records delineate how many worked in the bridge shops and how many built railroad cars.

Today, bridges erected by Murray, Dougal and Company are relatively rare in comparison to the more familiar names of the King Iron or Berlin Iron Bridge companies. One of the reasons for the paucity of surviving Murray, Dougal and Company bridges is due to a fire that destroyed the bridge shop, the car shop, and a large part of Milton, ennsylvania on May 14, 1880, after which, the company did not rebuild the bridge shops. Again, no records survive to indicate why the company did not resume building bridges. Perhaps this line of business was smaller, less profitable, and more competitive than railroad car manufacturing. The Milton, Pennsylvania car works plant was rebuilt and the company continued to operate between 1880 and 1889 under the name Murray, Dougal, and Company, Limited. In March of the latter year, Murray, Dougal and Company was one of thirteen railroad car manufacturers joined together to form the American Car and Foundry Company (ACF). American Car and Foundry Company, with headquarters in Earth City, Missouri, continues to operate the Milton plant for the production of railroad cars.

The Upper Bridge in Keeseville, which is already individually listed on the National Register of Historic Places (1983), was built by Murray, Dougal and Company in 1878.



Letterhead of Murray, Dougal & Co. (1877)

5. Other Manufacturers, Fabricators, and Contractors

George Burt of AuSable Forks was awarded the contract in April, 1857 to build the single-span, Howe truss (covered)

New York State Department of Public Works, later the New York State Department of Transportation, designed many of the State owned bridges in this area and built many of them with their own bridge crews.

C. L. Smith built the stone-faced, concrete-arched **Wilmington Bridge** in 1934-35.

Burr M. Stark (Hadley, NY) was general contractor for the New York State Route 9 **AuSable Chasm Bridge** (1932-35).

Solomon Townsend (Keeseville) was contractor for the **Stone Arch Bridge** in Keeseville (1843).

ASSOCIATED PROPERTY TYPES

1. Stone Bridges
2. Wood Truss Bridges
3. Metal Truss Bridges
4. Suspension Bridges
5. Steel Arch Bridges
6. Concrete Bridges

1. Stone Bridges

Description

The use of stone for bridge building is thousands of years old. In northern New York, although stone suitable for building was plentiful in some areas, stone bridges are extremely uncommon. Stone construction took more time and required skilled craftsmen who were not always present. The abundance of wood, the speed at which a wooden bridge could be fabricated and erected, and the availability of a labor force to do so, made wood construction the preferred choice for highway bridge construction through the 1860's. In the 1860's and 70's, cast and wrought iron, and later all wrought iron bridges, were preferred for their strength, durability and economy. Stone construction was simply never able to fare well against these other bridge types. It was not until the early 20th century that stone became more popular when used decoratively as a facing on concrete bridges. This was the early highway era when designers strove to accentuate the picturesque in the landscape.

Stone masonry bridges consist of one or a series of stone arches constructed of rubble, ashlar or a combination of both. The ashlar can be found in a number of stone faces and cuts, including rough-cut, rock-faced, coursed or random. The most common stone types include fieldstone, limestone and granite. Typically, the arch is round, semi-circular or segmented.

The rugged masonry bridges built by county artisans, like the ones found in northern New York in Keeseville, Sackett's Harbor and Woods Falls, are usually constructed of fieldstone or granite, laid in irregular courses. The arch itself consists of a ring or band of shaped stone, often a different color to accent the arch, called the voussoirs. Gravel and pavement overlaps the entire structure to form the road surface.

The condition of stone bridges depends largely on the amount of maintenance they receive and the degree to which they have no been overburdened by heavy traffic loads. Stone bridges can suffer from exposure to road salt, extreme temperature changes, pollution, water infiltration and the weight and vibrations from increased traffic.

In the AuSable River Valley, this category of bridge is represented by the 1843 **Stone Arch Bridge** in Keeseville.

Significance

Stone bridges of the AuSable River Valley are significant resources in two contexts: (1) they reflect the settlement, community development and the development of land-based transportation systems in the AuSable River Valley and (2) within the context of the survey area, they are representative of the gradual evolution of 19th and early 20th century rural bridge design and construction. They meet National Register Criterion A for their contribution to and association with broad patterns of our history, particularly the history of transportation and National Register Criteria C because they embody the distinctive characteristics of bridge design in the last half of the 19th and first half of the 20th centuries.

Like all of the bridges in this multiple property submission, stone bridges were essential in linking roads together over gorges, streams and rivers, therefore, making it possible to conduct commerce, travel for pleasure and for everyday life to take place. It is impossible to imagine that the 19th century iron industry in the region or the agricultural economy or the 20th century tourist industry could have ever developed without a well-developed network of roads and bridges throughout the valley. Whether erected to unite two halves of a village separated by the river or to carry an important highway to the next community or both, these bridges wove together the fabric of everyday life the region.

Stone bridges, more than any other bridge type, reflect both the availability of stone as a resource and the construction skills of local stone masons, thereby making them the most vernacular bridge type. The AuSable River itself, particularly in the Keeseville-AuSable Chasm area, has long provided an abundant source of stone. Its Potsdam sandstone, easily quarried from the river's banks, was used widely throughout the region for building entire buildings, foundations and chimneys, bridges and landscape features. The availability of this material, combined with the skills to use it, resulted in a concentration of largely vernacular stone structures in the AuSable River Valley.

Registration Requirements

In general, to qualify for registration stone bridges should have been built before 1948 and the original design and features of the structure should be intact. Important elements that should be intact include the bridge's overall design and its original stonework. Additions such as sidewalks, railings, guard rails and new road surfaces, which do not compromise the bridge's overall historic integrity, are acceptable. The bridges should be capable of functioning, but need not be in use for carrying vehicular traffic. Under National Register Criterion A (for transportation history), a stone bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941*. Under National Register Criterion C (for engineering significance), a bridge should be a contributing component in the listing's theme of the *Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.*

2. Wood Truss Bridges

Description

Wood truss bridges typically consist of two parallel trusses, which span the river or portion of the river. The trusses are made up of short, but usually heavy, individual components that are fastened or joined together in one of the configurations described below. This results in the creation of a rigid frame, which in turn supports the structural system that carries the road surface. The trusses may be exposed to the elements, partially covered or "weatherboarded," or completely covered as in a "covered bridge."

The abundance of wood, the speed at which a wooden bridge could be constructed, and the availability of a labor force to construct them, made wooden bridge building the preferred choice for bridge building in America from the Colonial era until the 1860's. Most early bridges were simple Kingpost or Queenpost trusses, which were easy to fabricate and erect, and could be used for crossings up to 50 feet long. For wider crossings, these trusses were erected in a series, supported by masonry piers or cribbing between spans. Some were covered by boards ("weather boarding") to protect the trusses from the deteriorating effects of weather.

In 1812 (patented 1817), Theodore Burr invented what is now known as the "Burr Truss," which consists of a simple parallel chord truss and wooden arch, usually roofed and sided. This enabled the bridge builder to create a much longer span without piers (a 190-foot Burr truss span once crossed the Mohawk at Schenectady and a 364-foot span crossed the Susquehanna at McCall's Ferry, Pennsylvania in 1815).

The next major improvement in wooden truss design was patented by Ithiel Town in 1820. His "Town Lattice Truss" was a latticed web parallel chord truss, given its rigidity by the top and bottom chords and by the trunneled pinning of the lattice. These bridges were also usually covered. Town promoted his designs, which gained widespread acceptance and were widely built, by distributing pamphlets and other means.

A further improvement was made in 1840-41 by William Howe. His wooden truss design consisted of wooden top and bottom chords, wooden diagonals and wrought iron tension rods. This design made the best use of each material (wood in compression and iron in tension) and lightened the weight of the truss. In the United States, more Howe Truss spans were built that any other wood truss type.

By the 1860's and 70's, the popularity of the wooden truss was giving way to the stronger, lighter, more economical metal trusses which were capable of spanning even wider crossings. As is typical with the dissemination of many new ideas and innovations, the use of metal trusses was found earliest in more populated areas and in fields (i.e. railroad building) where the greater demand existed. For this reason, the construction of wooden bridges continued in some rural areas for smaller crossings, perhaps as late as 1890.

In the AuSable River Valley, this category of bridge is represented by the 1857 Jay Covered Bridge. However, because it has temporarily been removed from its site, the Jay Covered Bridge cannot be included in the multiple property submission at this time.

Significance

Wood truss bridges of the AuSable River Valley are significant resources in two contexts: (1) they reflect the settlement, community development and the development of land-based transportation systems in the AuSable River Valley and (2) within the context of the survey area, they are representative of the gradual evolution of 19th and early 20th century rural bridge design and construction. They meet National Register Criterion A for their contribution to and association with broad patterns of our history, particularly the history of transportation and National Register Criteria C because they embody the distinctive characteristics of bridge design in the last half of the nineteenth and first half of the twentieth centuries.

Like all of the bridges in this multiple property listing, wood truss bridges were essential in linking roads together over gorges, streams and rivers, therefore, making it possible to conduct commerce, travel for pleasure and for everyday life to take place. It is impossible to imagine that the 19th century iron industry in the region or the 20th

Diagram 7

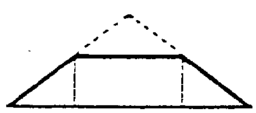
KING POST

(WOOD)

A TRADITIONAL TRUSS TYPE WITH ITS ORIGINS IN THE MIDDLE AGES.

LENGTH: 20-60 FEET
6-18 METERS

Diagram 8

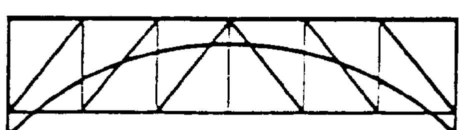


QUEEN POST

(WOOD)

A LENGTHENED VERSION OF THE KING POST.

LENGTH: 20-80 FEET
6-24 METERS



BURR ARCH TRUSS

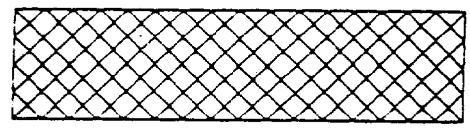
1804-LATE 19TH CENTURY

(WOOD)

COMBINATION OF A WOODEN ARCH WITH A MULTIPLE KING POST. (ARCH ALSO COMBINED WITH LATER WOODEN TRUSSES).

LENGTH: 50-175 FEET
15-50 METERS

Diagram 9



TOWN LATTICE

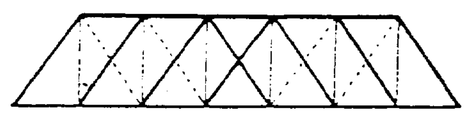
1820-LATE 19TH CENTURY

(WOOD)

A SYSTEM OF CROSS-HATCHED WOODEN DIAGONALS WITH NO VERTICALS.

LENGTH: 50-220 FEET
15-60 METERS

Diagram 10



HOWE

1840-20TH CENTURY

(WOOD, VERTICALS OF METAL)

DIAGONALS IN COMPRESSION, VERTICALS IN TENSION.

LENGTH: 30-150 FEET
9-45 METERS

Diagram 11

From: ***Bridge Truss Types: a guide to dating & identifying***. by Comp and Jackson (NPS) century tourist industry could have ever developed without a well-developed network of roads and bridges throughout the valley.

Wood truss bridges, like other bridge types in the valley, expanded transportation routes and commerce within the community, between communities and within the region. Because they were "hand made" they also reflect the construction skills of local builders, who typically worked with known truss designs and used the materials (wood, cast and wrought iron) which were at hand. Given the susceptibility of wood truss bridges to deterioration and their general obsolescence, those that do survive are rare indeed.

Registration Requirements

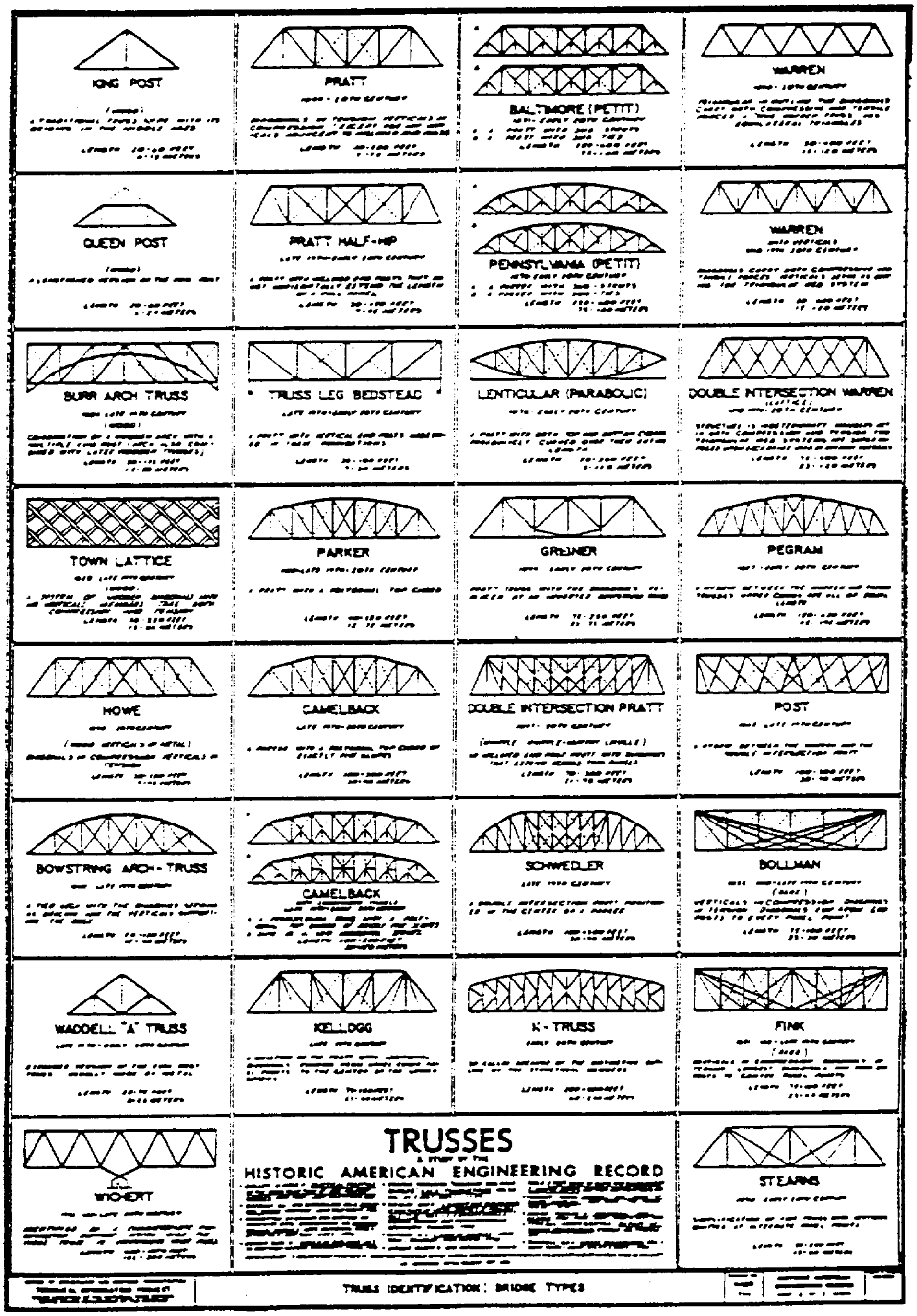
In general, to qualify for registration wood truss bridges should have been built before 1948 and the original design and features of the structure should be intact. Important elements that should be intact include the bridge's overall truss design and structure. Additions such as guard rails and new road surfaces, which do not compromise the bridge's overall integrity, and a moderate amount of in-kind replacement of roofing, siding and other surface components, is acceptable. Wood truss bridges may have had structural reinforcement since they were originally built and, where the bridge has been structurally reinforced, the original truss structure should be intact. The bridges should be capable of functioning, but need not be in use for carrying vehicular traffic. Under National Register Criterion A (for transportation history), a bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941*. If a wood truss bridge has been moved from its original site, its new location and setting must be similar to its original location and setting. Under National Register Criterion C (for engineering significance), a wood truss bridge should be a contributing component in the listing's theme of the *Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.*

3. Metal Truss Bridges

Description

Up until the 1860's, wood and stone dominated bridge building in New York. In the late 1860's, iron works began supplying prefabricated cast and wrought iron truss members, which could be manufactured in the factory, shipped (by rail) to the site and assembled using pin connections. The earliest of these bridges (railroads pioneered their use) utilized wrought iron for tension members and cast iron for compression members. Cast iron eventually proved to be unsuitable and was phased out of bridge construction. The first all wrought iron bridge in the United States was constructed in 1859 and the first all steel bridge was built in 1879 on the Chicago and Alton Railway. By 1895, most bridges utilized steel and pneumatic field riveting.

Metal truss bridges consist of one or a series of spans constructed from prefabricated members. The members vary in size according to the design requirements of the crossing. The iron and/or steel pieces are interconnected in a series of triangles or panels to form the bridge. Each member is either in compression or tension, depending on its placement. Bridges are identified by their particular configuration of tension and compression members, including the placement of vertical and diagonal members and the shape of the top and bottom chords.



Historic American Engineering Record drawing showing the variety of 19th and early 20th century bridge designs (1976)

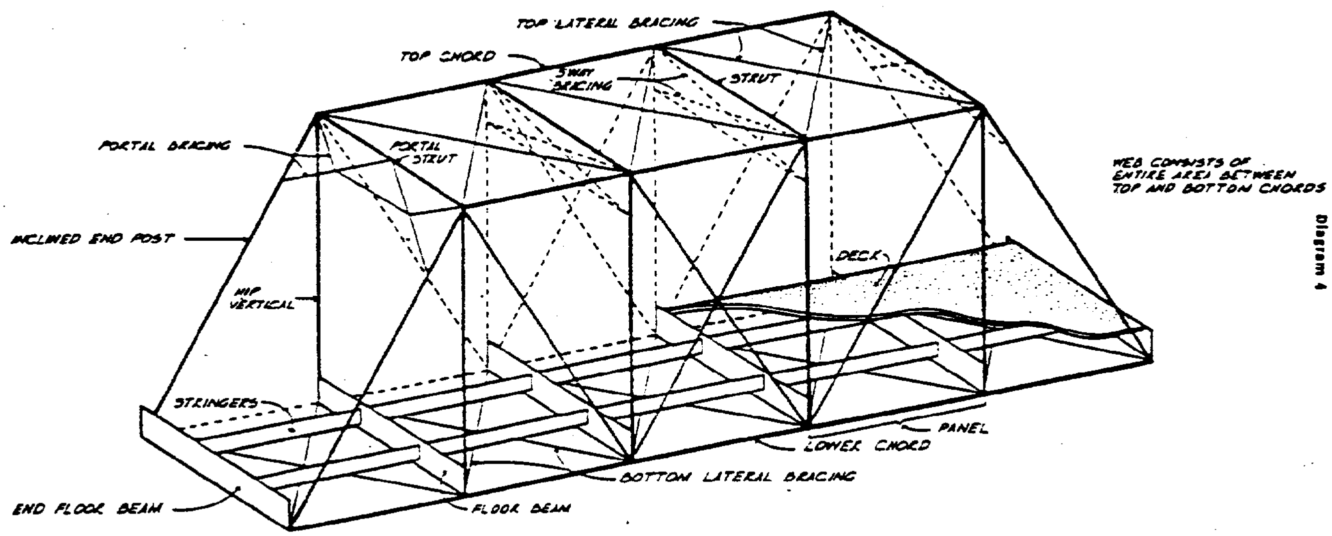


Diagram 4

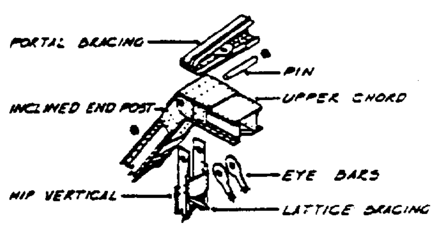


Diagram 6

PINNED CONNECTION

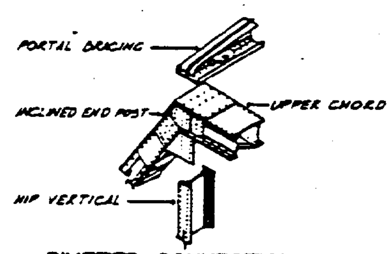
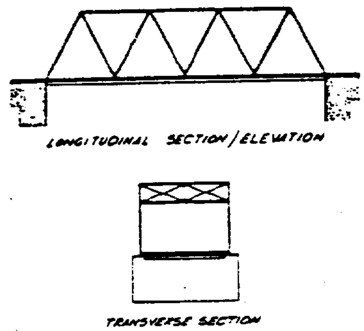


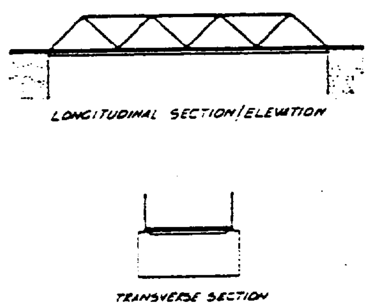
Diagram 5

RIVETED CONNECTION

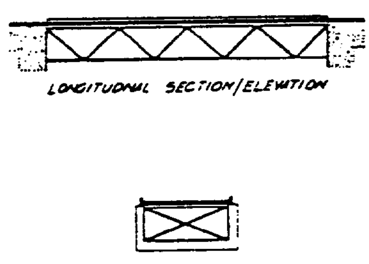
From: *Bridge Truss Types: a guide to dating & identifying* by Comp and Jackson (NPS)



THROUGH TRUSS
Diagram 1



PONY TRUSS
Diagram 2



DECK TRUSS
Diagram 3

From: ***Bridge Truss Types: a guide to dating & identifying*** by Comp and Jackson (NPS)

All metal truss bridges share some common characteristics. Each has a floor system, usually made up of a combination of plate girders, rolled I-beams, cross bracing and a steel grill, wood or concrete deck. The bottom chord usually consists of a box girder or channels or angles with stay plates. Verticals and diagonals are made up of paired angles, paired T-sections, I beams, paired channels, usually braced by lattice bars. Counters are usually round adjustable (turnbuckle) tension rods found both in the truss panels and as bracing between the top chords and bottom chords. In general, pre-1895 metal trusses are usually wrought iron and pin connected and, after 1895, they are steel and have riveted construction. The most recent all steel truss bridges have all welded connections.

Metal trusses fall into three basic kinds: through truss, pony truss and deck truss. The through truss is designed to carry loads at or near the level of the bottom chord. The through truss has lateral bracing between the top chords and, thus, the traffic passes through the structure. The pony truss is designed to carry lighter loads at or near the level of the bottom chord but has no lateral bracing between the top chords. A deck truss carries the roadway at or near the level of the top chord.

There are at least 20 metal truss types found in the United States but the most common regional types are the Pratt and Warren trusses. The Pratt truss was patented by Caleb and Thomas Pratt in 1844. It consists of parallel top and bottom chords with vertical members acting in compression and diagonal members acting in tension. The top chord is typically a box girder made up of a top plate and channels with a latticed underside. The bottom chord of the earlier Pratt trusses are forged eye bars and later are paired angles or channels with stay plates. Verticals and diagonals consist of paired angles with lattice and eye bars on earlier bridges and rolled I-beams on later types. Counters, where found, are round tension rods with turnbuckles. The floor system typically consists of I-section floor beams and stringers and a steel grate, wood or concrete deck. The top and portal bracing is usually fabricated from angles and lattice and the sway bracing are iron rods. The span of Pratt trusses ranges between 25 ft and 150 ft. with the pony truss used for shorter spans and the through truss used for longer spans.

The Warren truss was patented by two British engineers in 1848. Its simple and compact design consists of parallel top and bottom chords with diagonals alternatively placed in tension and compression, giving the impression of a series of triangles. In general, prior to the turn of the century, the diagonals in tension were thin eye bars. In the 20th century, it became standard practice to use stiff, heavy diagonals exclusively. In other respects, the truss members are similar to those described for Pratt trusses. Like the Pratt truss, the basic Warren truss was modified to carry heavier loads and support longer spans by using a polygonal top cord.

Significance

Seven of the 14 bridges included in this multiple property submission are of this type: **Walton Bridge** (1890), **Old State Road Bridge** (c.1890), **Beer's Bridge** (c.1900), **Ranney Bridge** (c.1900), **D&H Railroad Bridges**, (1913), **Carpenter's Flats Bridge** (1941), and **Slater Bridge** (c.1900.) They represent a number of truss types, from a simple, single-span pony truss to a multispan through truss. Collectively, they represent 63 years of American bridge design and construction history. They include some of the earliest Pratt truss bridges found in New York, a rare lenticular truss bridge and an assortment of other small spans particularly suitable for rural use.

Metal truss bridges of the AuSable River Valley are significant resources in two contexts: (1) they reflect the settlement, community development and the development of land-based transportation systems in the AuSable River Valley and (2) they are a part of the gradual evolution of 19th and early 20th century rural bridge design and construction. They meet National Register Criterion A for their contribution to and association with broad patterns of our history, particularly the history of local transportation systems and they also meet National Register Criteria C because they embody the distinctive characteristics of bridge design in the last half of the 19th and first half of the 20th centuries.

Registration Requirements

In general, to qualify for registration, metal truss bridges should have been built before 1948 and the original design and features of the structure should be intact. Important elements that should be intact include the bridge's original truss design and construction. Additions such as railings, guard rails and new road surfaces, which do not compromise integrity are acceptable. The bridges should be capable of functioning, but need not be in use for carrying vehicular traffic. Metal truss bridges may have had structural reinforcement since they were originally built and, where the bridge has been structurally reinforced, the original truss structure should be intact. Under National Register Criterion A (for transportation history), a bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941*. If a metal truss bridge has been moved from its original site, its new location and setting must be similar to its original location and setting. Under National Register Criterion C (for engineering significance), a bridge should be a contributing component in the listing's theme of *the Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.*

4. Suspension Bridges

Description

The construction of suspension bridges has a surprisingly long history. Simple, primitive pedestrian suspension bridges are thought to have been built and used in China, Japan, India, Tibet, Mexico and Peru as early as the first century AD. They were made from vines, rope, wood or hides. European explorers in South America first saw a primitive bridge of this type in 1848. Early European adaptations of this type are known to have existed in Italy in 1515 and in France in 1595. The use of iron suspenders in Europe occurred as early as 1615.

Iron suspension bridges were built in America before any other kind of iron bridge. James Finley of Fayette County, Pennsylvania designed, patented and built the first iron chain suspension bridge in 1801. Eight similar bridges are said to have been erected the same year and about 40 more were built prior to 1808. In 1816, Josiah White and Erskine Hazard built a 408-foot wire suspension bridge over the Schuylkill River in Philadelphia, the first of its kind anywhere in the world. American suspension bridge design and construction was furthered during the 19th century by Charles Ellet and John Roebling, who continued to improve and enlarge the span length and load carrying capacity of suspension bridges. Ellet's 1847-49 bridge at Wheeling, West Virginia was 1,010-feet long and the longest in the world at the time. John Roebling designed and built scores of suspension bridges, culminating (with his son, Washington Roebling) with the Brooklyn Bridge, completed in 1883.

Suspension bridges are of two basic types; those with towers on the shore and cables loaded only between the towers, and those with towers in the river or valley and cables loaded over both central and end spans. The basic components of a suspension bridge include: the towers from which the cables are suspended; the cables or suspenders (earlier bridges had chains) which are anchored in the ground and from which the bridge deck is suspended; and the deck which is usually stiffened by some sort of secondary truss mechanism.

Suspension bridges, especially in rural areas, were far less common than wood and metal bridges in the 19th century. A study of old North Country bridges in upstate New York by Richard Sanders Allen reveals that only five suspension bridges were ever built in the Adirondack region.

Significance

Only one suspension bridge exists in the AuSable River Valley, the 1888 **Swing Bridge** in Keeseville. A bridge of this type is a significant resource in two contexts: (1) it reflects the settlement, community development and the development of land-based transportation systems in the AuSable River Valley and (2) it is part of the gradual evolution of 19th and early 20th century rural bridge design and construction. Bridges of this type meet National Register Criterion A for their contribution to and association with broad patterns of our history, particularly the history of land-based transportation systems and they also meet National Register Criteria C because they embody the distinctive characteristics of bridge design in the last half of the 19th and first half of the 20th centuries.

Like all of the bridges in this nomination, suspension bridges were essential in linking roads together over gorges, streams and rivers and, therefore, making it possible to conduct commerce, travel for pleasure and for everyday life to take place. It is impossible to imagine that the 19th century iron industry in the region or the 20th century tourist industry could have ever developed without a well-developed network of roads and bridges throughout the valley. Since the only suspension bridge in the AuSable River Valley is a pedestrian suspension bridge, it should also be noted that bridges were also important pedestrian transportation links.

Registration Requirements

In general, to qualify for registration suspension bridges should have been built before 1948 and the original design and features of the bridge should be intact. Important elements that should be intact include the bridge's overall suspension design and components, including the towers, cables or suspenders and secondary deck truss. Additions such as railings, guard rails and new deck surfaces, which do not compromise the bridge's overall historic integrity, are acceptable. The bridges should be capable of functioning, but need not be in use for carrying vehicular traffic. Under National Register Criterion A (for transportation history), a bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941.* If a suspension bridge has been moved from its original site, its new location and setting must be similar to its original location and setting. Under National Register Criterion C (for engineering significance), a bridge should be a contributing component in the listing's theme of the *Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.*

5. Steel Arch Bridges

Description

The arch has been used in bridge construction for thousands of years and so it is not surprising that, as soon as the technology was developed to produce cast and wrought iron components, engineers would design arch bridges using iron. The earliest iron arch bridge, the 1776 cast iron arch bridge at Coalbrookdale, England, was also the earliest iron bridge of any kind: This 100-foot span was designed by Pritchard and built by Abraham Darby at his Coalbrookdale iron works. In 1808, the first wrought iron arch bridge was built in Europe, though this type did not gain much in popularity until the 1850's. One of the first steel arch spans in America was the 1869-74 St. Louis Bridge over the Mississippi River designed by Captain James Eades. This steel arch bridge has a center span of 520-feet and two side spans of 502-feet arch. Steel arch bridges seem to lend themselves especially well to crossings where long spans are necessary.

Like masonry arch bridges, steel arch bridges work on the principle that the load of the roadway is transferred onto and carried by the arch to its piers or abutments. Although the steel arch is the main structural and visual element of the bridge, the arch is often complimented with decorative stone and concrete components.

Significance

Steel arch bridges are rare both in this region and elsewhere. The 1932-34 **AuSable Chasm Bridge** represents this category in the AuSable Valley. Like all of the bridges in this multiple property submission, steel arch bridges were essential in linking roads together over gorges, streams and rivers and, therefore, making it possible to conduct commerce, travel for pleasure and for everyday life to take place. It is impossible to imagine that the 19th century iron industry in the region or the 20th century tourist industry could have ever developed without a well-developed network of roads and bridges throughout the valley. Therefore, they are significant resources because they reflect the settlement, community development and the development of land-based transportation systems in the region. As a synthesis between the principles of ancient bridge design (masonry arch bridges in compression) and late-19th and early-20th century technology (steel fabrication), they are also part of the gradual evolution of 19th and early 20th century American bridge design and construction. They meet National Register Criterion A for their contribution to and association with broad patterns of our history, particularly the history of land-based transportation systems and they also meet National Register Criteria C, because they embody the distinctive characteristics of bridge design in the last half of the 19th and first half of the 20th centuries.

Registration Requirements

In general, to qualify for listing, steel arch bridges should have been built before 1948 and still have their original core design and features intact. The bridges should be capable of functioning but need not be in use for carrying vehicular traffic. The bridges may have had structural reinforcement since they were originally built. Where the bridge has been structurally reinforced, the original structure should be intact. Additions such as sidewalks, guard rails and replacement decking, which do not compromise the bridge's overall historic integrity, are acceptable. Under National Register Criterion A (for transportation history), a bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941*. If a steel arch bridge has been moved from its original site, its new location and setting must be similar to its original location and setting. Under National Register Criterion C (for engineering significance), a bridge should be a contributing component in the listing's theme of the *Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941*

6. Concrete Bridges

Description

The development of concrete bridges initially evolved out of masonry arch bridge construction techniques. While the stone and mortar construction was substituted by reinforced concrete (Portland cement, 1875) construction, the all-important use of arches to carry the loads and span distances remained. Concrete bridges had the advantage of being cheaper to construct and did not require skilled stone cutters and masons.

The development of reinforced concrete technology at the end of the 19th century opened up all kinds of possibilities for bridge building with concrete. The Melan technique, named for its Austrian inventor, involved embedding I-beams in the cast concrete. The Ransome technique, which placed steel bars only in areas of tension, was the forerunner of modern concrete bridge construction. While most early concrete bridges also utilized arch construction, reinforcing concrete bridges with steel eventually made it possible to construct "flat" (unarched) bridges, which were particularly suitable for short crossings. These bridges typically have reinforced concrete beams or girders which support the bridge deck.

Concrete arch bridges are of two basic types: closed spandrel and open spandrel. Closed spandrel bridges have spandrels (the area between the arch ring and the roadway) which are solid concrete (often faced with stone). All three of the concrete arch bridges included in this multiple property submission, the 1913 **Notman Bridge**, the 1934-35 **Wilmington Bridge** and the 1938 **Palmer Brook Bridge**, are of this type and are stone-faced. The approach spans of the 1932-34 **AuSable Chasm Bridge**, the primarily span of which is a steel arch, are also of this type. This type of bridge often has decorative details such as pilasters, parapets, recessed panels, plaques, coping, string courses and stanchions with finials.

Open spandrel bridges, a far less common form, are typically used for long spans over deep gorges. In this type, much of the space between the ring of the arch and floor of the roadway is left open. This form results in considerable savings in materials and has great potential for creative design.

Construction of both types of concrete arch bridges begins in the same way. The piers and abutments are cast and then forms are built for the arch itself. In closed spandrel bridges, the space between the arch and the roadway is filled with concrete or earth. In open spandrel bridges, the deck is supported by columns or arcades that are built on top of the main arch.

Concrete bridges are subject to deterioration from pollution, road salt, lack of cyclical maintenance, increased loads and extreme temperature changes. The most common cause of deterioration is from chloride (road salt) contamination, which causes spalling, and cracking.

Significance

Concrete bridges are relatively common type and are found throughout the region, state and country. They are historically significant under National Register Criteria A for their contribution to the broad patterns of our history, particularly our land-based transportation history and they are also architecturally significant under National Register Criteria C for embodying the types, forms and methods of engineering and construction which are associated with late 19th and early 20th century rural bridge building.

Like all of the bridges in this nomination, concrete bridges were essential in linking roads together over gorges, streams and rivers and, therefore, making it possible to conduct commerce, travel for pleasure and for everyday life to take place. It is impossible to imagine that the 19th century iron industry in the region or the 20th century tourist industry could have ever developed without a well-developed network of roads and bridges throughout the valley. The tourist industry, in particular, was part of what prompted bridge designers in the 20th century to choose (stone-faced) reinforced concrete bridge designs, as they had a direct and well-established aesthetic appeal to the visitor. In this multiple property listing, the stone-faced, concrete-arch spans of the **Palmer Brook Bridge** and the **Wilmington Bridge** are the best examples of this aesthetic, which grew out of WPA-era highway bridge engineering design and construction. They evoke the highway architecture of the early automobile era and of the aesthetic design consideration that influenced the public architecture of this period.

Registration Requirements

In general, to qualify for registration concrete bridges should have been built before 1948 and the original design and features of the structure should be intact. Important elements that should be intact include the bridge's overall design and its original stonework. Additions such as sidewalks, railings, guard rails and new road surfaces, which do not compromise the bridge's overall historic integrity, are acceptable. The bridges may have had structural reinforcement since they were originally built, but where the bridge has been structurally reinforced, the original structure should be intact. The bridges should be capable of functioning, but need not be in use for carrying vehicular traffic. Under National Register Criterion A (for transportation history), a bridge should retain its integrity of location and setting and be a contributing component to the listing's theme of the *Settlement, Community Development and the Development of Land-based Transportation Systems in the AuSable River Valley, 1790-1941*.Under National Register Criterion C (for engineering significance), a concrete bridge should be a contributing component in the listing's theme of the *Evolution of 19th and Early 20th Century Rural Bridge Design and Construction, 1840-1941.*

GEOGRAPHICAL DATA

The **Historic Bridges of the AuSable River Valley** multiple property submission includes 14 bridges, which are located within the AuSable River Valley in New York's Clinton and Essex Counties. Two of the bridges included in this submission, the **Stone Arch Bridge** and the **Swing Bridge**, are already listed on the National Register of Historic Places as contributing components in the ***Keeseville Historic District*** (1983). They are included in this multiple property submission because additional information has become available which justifies their individual listing.

The AuSable River Valley watershed is 516 square miles in size and includes all or parts of five Essex County towns, two Clinton County towns and the incorporated village of Keeseville, which lies in both counties. The AuSable River has three primary branches: the Main Branch, which runs from Lake Champlain to AuSable Forks; the East Branch, which runs from AuSable Forks to its origins in the town of Keene; and the West Branch, which runs from AuSable Forks to its origins in the town of North Elba. The river is also fed by 70 other streams.

Four of the bridges included in this multiple property submission are located in Clinton County; five are in Essex County; and the remaining five bridges straddle Clinton and Essex counties. The following list summarizes the location, setting and feature crossed for each of the nominated bridges.

No	Name	Feature Crossed	Setting	MCD	County
1.	D &H Railroad Bridges (2)	AuSable River/Main Branch	wetland	T/AuSable	Clinton
2.	Carpenter's Flats Bridge	AuSable River/Main Branch	rural road	T/AuSable	Clinton
3.	AuSable Chasm Bridge	AuSable River/Main Branch	hamlet, gorge	T/AuSable	Clinton
				T/Chesterfield	Essex
4.	Old State Road Bridge	AuSable River/Main Branch	hamlet	T/AuSable	Clinton
				T/Chesterfield	Essex
5.	Stone Arch Bridge	AuSable River/Main Branch	hamlet	V/Keeseville	Clinton/Essex
6.	Swing Bridge	AuSable River/Main Branch	hamlet	V/Keeseville	Clinton/Essex
7.	Palmer Brook Bridge	Palmer Brook	hamlet	Black Brook	Clinton
8.	Walton Bridge	AuSable River/East Branch	rural road	Keene	Essex
9.	Ranney Bridge	AuSable River/East Branch	Private road (rural)	Keene	Essex
10.	Beers Bridge	AuSable River/East Branch	private road (rural)	Keene	Essex
11.	Notman Bridge	AuSable River/East Branch	private road (rural)	Keene	Essex
12.	Slaters Bridge	AuSable River/East Branch	private road (rural)	Keene	Essex
13.	Wilmington Bridge	AuSable River/West Branch	hamlet	Wilmington	Essex

H. SUMMARY OF IDENTIFICATION AND EVALUATION METHODS

The multiple property submission, **Historic Bridges of the AuSable River Valley**, was developed in a number of steps dating back to the early 1980's. At that time, the Friends of the North Country (then known as the Friends of Keeseville) undertook its first local cultural resources inventory in the village of Keeseville. That survey identified more than 125 National Register-eligible structures, including three 19th century bridges. Based on that survey, a National Register Multiple Resource Area was created, which included the three bridges, and listed 5/20/83. Of these bridges, only the Upper Bridge was individually listed. The other two bridges, the **Stone Arch Bridge** and the **Swing Bridge** (both included in this multiple property submission) were listed as contributing components in the Keeseville Historic District. In 1991, the Friends also sponsored and undertook a Reconnaissance Level Survey of four towns in the AuSable Valley: AuSable, Black Brook, Chesterfield and Jay. This survey identified at least a dozen historic bridges and recommended that these bridges, as a group, warranted further investigation and, ultimately, National Register listing.

The Friends then sponsored and undertook a thorough survey of all the bridges in the AuSable River Valley. Entitled the "AuSable Valley Historic Bridge Survey" and completed in 1991, this survey identified and investigated about 70 existing public and private, highway, railroad and pedestrian bridges. These bridges were identified through state and county Department of Transportation records and by driving every known, passable road known or suspected to be carried by a bridge. All bridges were identified and recorded, regardless of their size, ownership or age. Each structure was located on a USGS map, was photographed, was researched through secondary sources, and a Building-Structure Inventory Form was prepared for each. In addition, a lengthy historic overview, existing conditions overview, index of known manufacturers, fabricators and contractors and a bibliography were prepared. The format and structure of the survey closely paralleled the format and structure of other known thematic, National Register, multiple resource nominations. The survey also recommended that 21 bridges in the survey be more closely considered for National Register listing.

The survey and its recommendations were forwarded to the New York State Office of Parks, Recreation and Historic Preservation for their review. They eliminated two bridges from consideration because they had been too compromised by rehabilitation, alterations or deterioration and they raised questions about three other bridges, which have been addressed as this nomination was prepared. This nomination is primarily the result of these surveys and previous and ongoing consultation with the New York State Office of Parks, Recreation and Historic Preservation.

Also as a result of the historic bridge survey, the Friends of the North Country wrote and published *Crossing the River: Historic Bridges of the AuSable River*, a small booklet designed to educate the public about the history and significance of these bridges.

In addition to the survey work and research mentioned above, listed below are several other identification, evaluation and recognition efforts that have shed light on the significance of these bridges which need to be mentioned.

1. In 1984, the New York State Department of Transportation, in cooperation with the New York State Office of Parks, Recreation and Historic Preservation, undertook a statewide survey of the bridges in its jurisdiction to identify those both eligible for the National Register and those which merited preservation. That survey identified three bridges included in this multiple property submission, as National Register eligible. It should also be noted that at least one, the Walton Bridge, was deemed not eligible at that time and several others were overlooked.

2. In 1987, the Mohawk-Hudson Chapter of the American Society of Civil Engineers (ASCE) nominated and had designated the three National Register-listed bridges in Keeseville as National Historic Civil Engineering Landmarks. This is a distinction they share with fewer than 50 other bridges nationwide. To commemorate this designation, the ASCE chapter and the Friends of Keeseville published a small booklet entitled *Historic Bridges of Keeseville*. In its introduction, William Chamberlain, writes:

> The significance of the Keeseville Bridges is due largely to the coincidence of their proximity to one another, a circumstance that provides a unique opportunity to experience within a single one-half mile segment of the AuSable River three distinctly different engineered solutions to the stream crossing problem: the use of stone masonry in compression, wrought iron in tension and compression and steel in tension. Each bridge was tailored to its anticipated loads and the constraints of the site and each reflects the materials and design technology of its period.

The Keeseville bridges symbolize a different, though equally important, facet of 19th century bridge building practice than the so-called "monumental" structures, such as the Brooklyn Bridge. Monumental structures represent the benchmarks of the technology and are typically the work of more famous practitioners. Hence, they are more frequently the object of recognition. In contrast, the hundreds of thousands of smaller highway and pedestrian bridges reflect a more vernacular tradition and were built by engineers and entrepreneurs unknown to most of us. Yet, it was these little bridges that replaced the ford and ferry and made highway transportation feasible for the vast majority of the population.

3. In 1987, the Historic Engineering American Record (HAER), under contract from the New York State Department of Transportation, began several years of recording and documentation work in the state. Among the bridges documented by HAER during this period were the 1878 Upper Bridge in Keeseville, (already individually listed on the National Register), the 1879 Rolling Mill Hill Bridge in AuSable Forks (since demolished), and the 1857 Jay Covered Bridge, which although identified and discussed in the cover document for this multiple property submission, is not included for nomination at this time because it has been temporarily removed from its site. These three AuSable River Valley bridges were selected for documentation because of their historic and engineering significance, because of their poor condition and because there were plans afoot to replace or bypass them. The documentation and recognition of these bridges by HAER has added immeasurably to our understanding and appreciation of them.

4. In 1991, the Preservation League of New York State, through its Technical Assistance Center, prepared a report for the Essex County Planning Office and the Town of Jay to evaluate the significance and condition of the 1857 Jay Covered Bridge.

5. In addition to the National Register eligibility determinations already mentioned, the New York State Historic Preservation Office has previously evaluated the AuSable Chasm Bridge for eligibility (5/10/90).

This multiple property submission covers all of the known pre-1948 bridges in the AuSable River Valley, which meet the criteria for National Register listing. The document may be expanded in the future as post -1948 bridges of historic and/or engineering significance are found which meet the criteria for listing or, in the case of the Jay Covered Bridge, when it is restored intact to its original location.

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Historic Bridges of
the AuSable River Valley
Multiple Property Submission
(MAP 1 of 4)

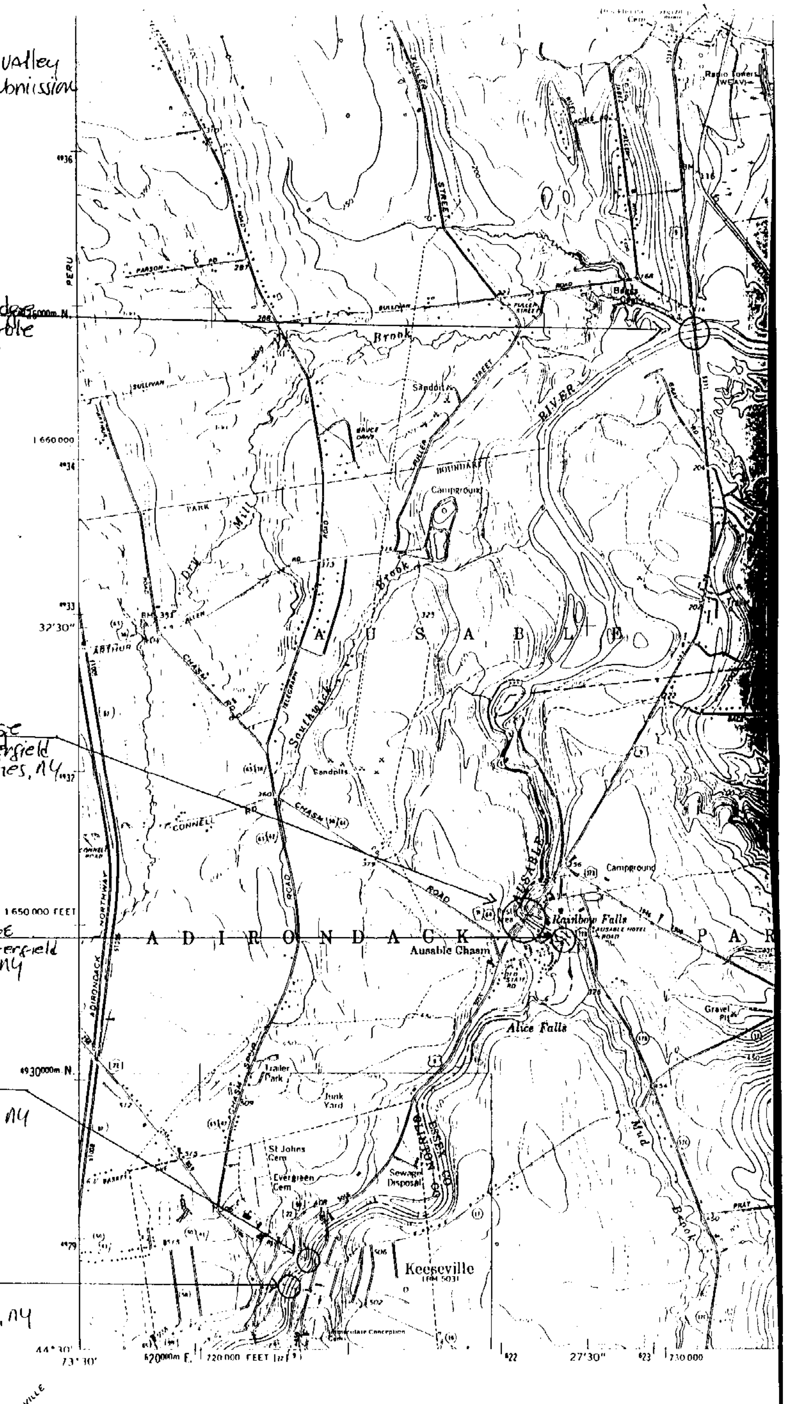
Carpenter's Flats Bridge
Towns of Peru + AuSable
Clinton County, NY
Zone: 18
Easting: 623178
Northing: 4934893

AuSable Chasm Bridge
towns of AuSable + Chesterfield
Clinton + Essex Counties, NY
Zone: 18
Easting: 622109
Northing: 4931090

OLD STATE ROAD BRIDGE
towns of AuSable + Chesterfield
Clinton + Essex Counties, NY
Zone: 18
Easting: 622367
Northing: 4930960

STONE ARCH BRIDGE
VILLAGE OF Keeseville
Clinton + Essex Counties, NY
Zone: 18
Easting: 620742
Northing: 4928893

Swing Bridge
VILLAGE OF Keeseville
Clinton + Essex Counties, NY
Zone: 18
Easting: 620606
Northing: 4928716



Prepared and published in 1979 by the New York State Department of Transportation, in cooperation with the U.S. Department of Transportation, Federal Highway Administration.

Map base from 1966 U.S. Geological Survey 7.5-minute quadrangle.

Map revisions made using 1978 aerial photography, construction plans, official records and other sources. Features revised include: highways and other transportation facilities; civil boundaries; recreation sites; hydrography; and buildings. Grey tint indicates intensely developed areas in which only landmark buildings are shown.

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NEW YORK - ESSEX CO.
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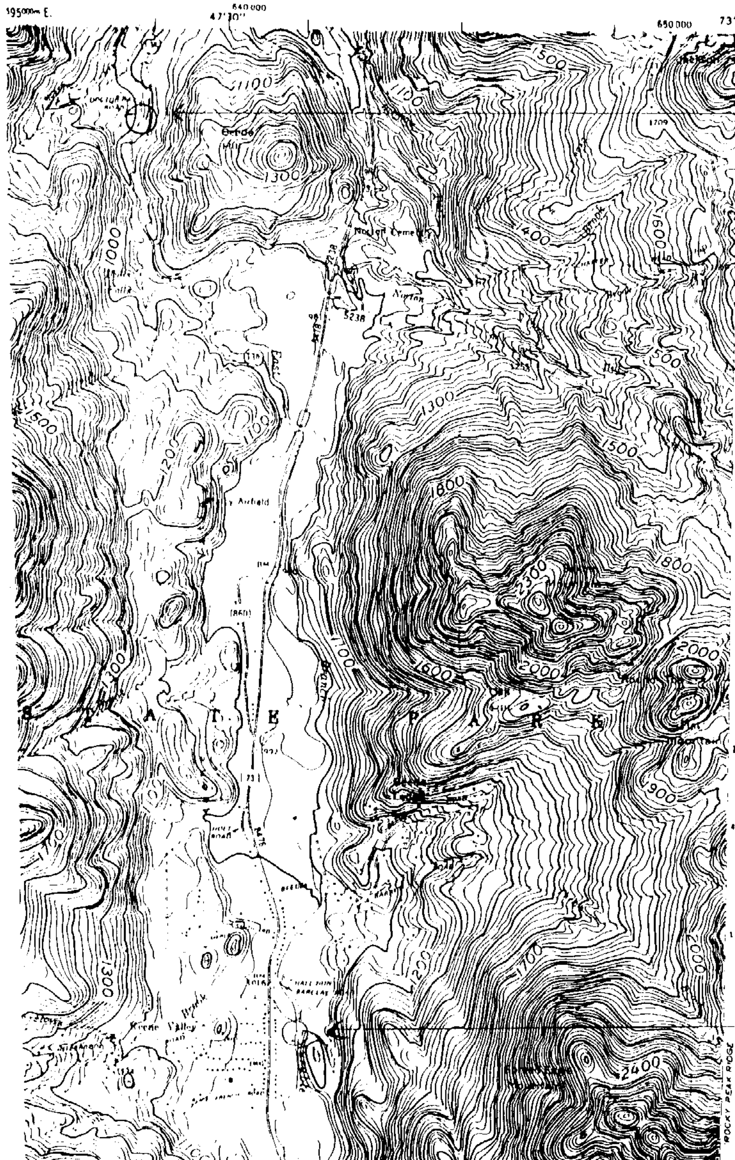
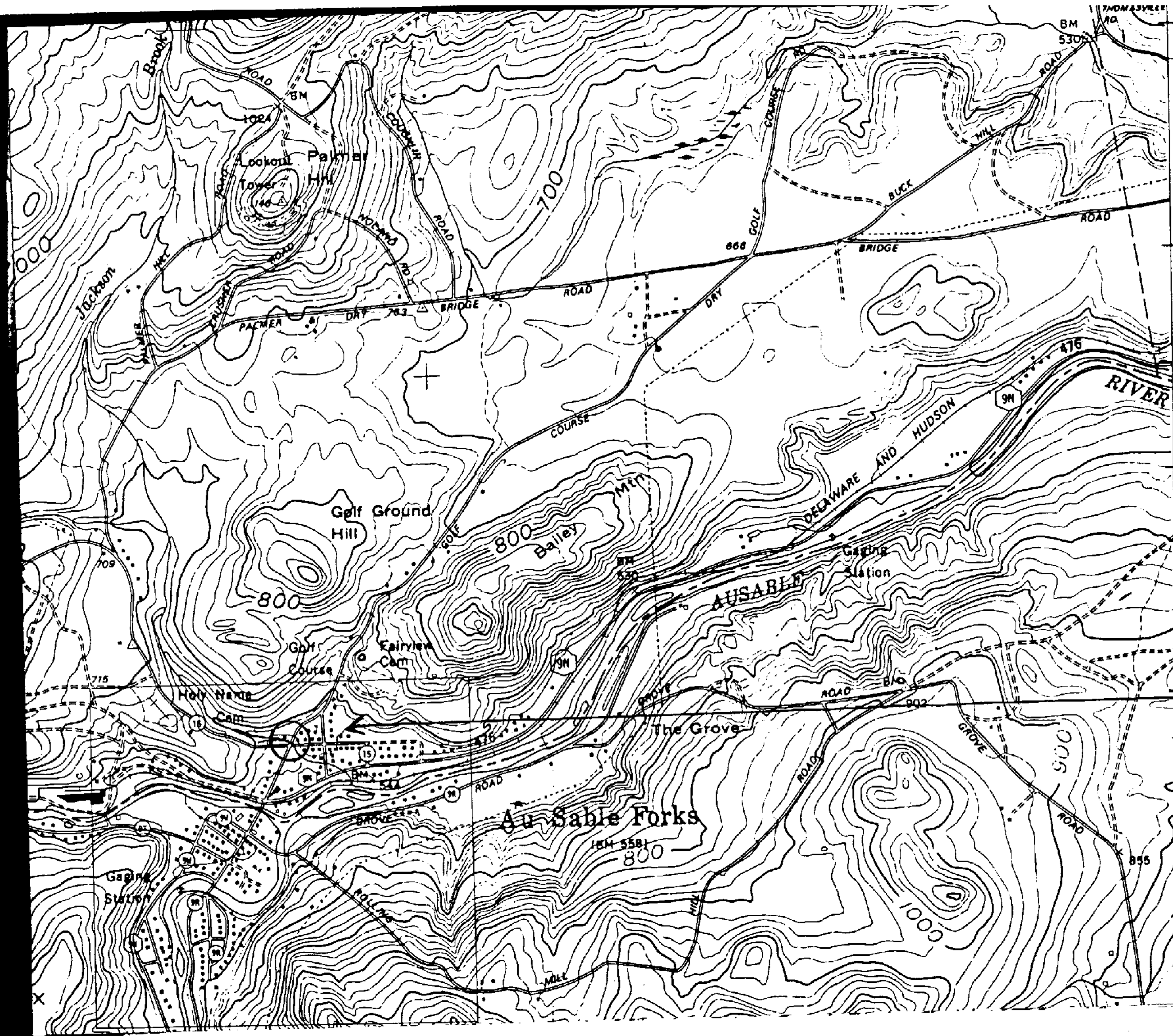


WALTON BRIDGE
Town of Keene
Essex County, NY
Zone: 18
Easting: 595965
Northing: 4899541

Historic Bridges of the
AuSable River Valley
Multiple Property Submission
(MAP 2 of 4)

NOTMAN Bridge
Town of Keene
Essex County, NY
Zone: 18
Easting: 597116
Northing: 4893634

[redacted]



Historic Bridges of the AuSable River Valley Multiple Property Submission

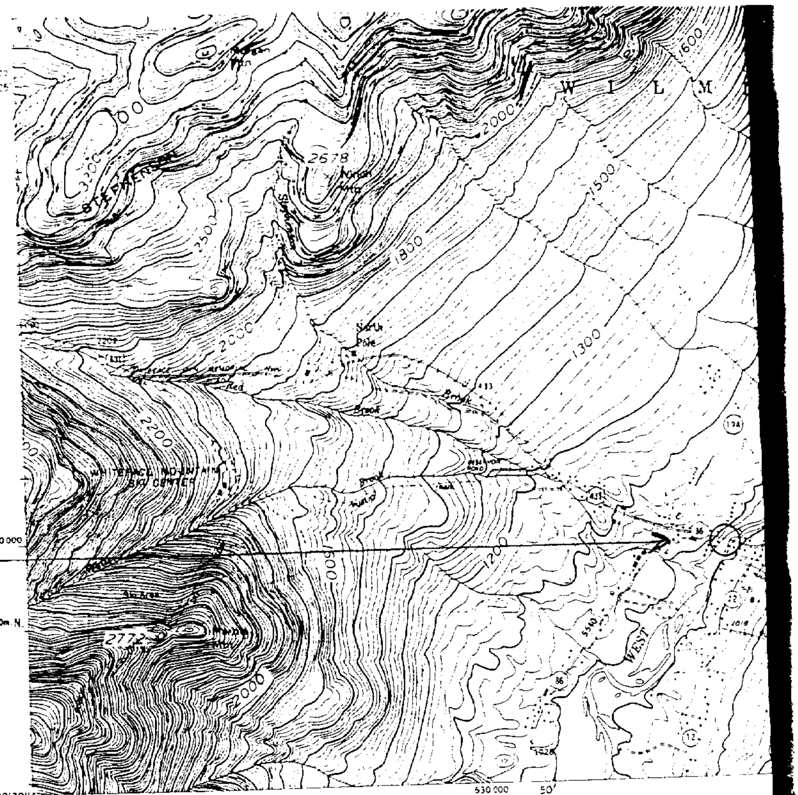
(Map 3 of 4)

Palmer Brook Bridge
Town of Black Brook
Clinton County, NY
Zone: 18
Easting: 605460
Northing: 4921788

Historic Bridges of the
AuSable River Valley
Multiple Property Submission
(Map 4 of 4)

Wilmington Bridge
Wilmington, Essex County, NY

Zone: 18
Easting: 594171
Northing: 4915537



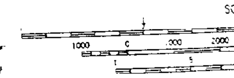
Prepared and published by the New York State Department of Transportation in cooperation with the U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads.

Map base physical and cultural details compiled from U.S. Geological Survey 15-minute quadrangle, edition of 1953; highways and drainage related to highway construction compiled in 1969 from construction plans, aerial photography dated 1969, and various other sources; road and street names and boundaries compiled from D.O.T. surveys and public records.

Map does not necessarily comply with National Map Accuracy Standards.

Official changes in boundaries, names and planimetric features should be reported to: Map Information, New York State Department of Transportation, State Campus, Albany, N.Y. 12226

QUADRANGLE LOCATION



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5,000-meter grid

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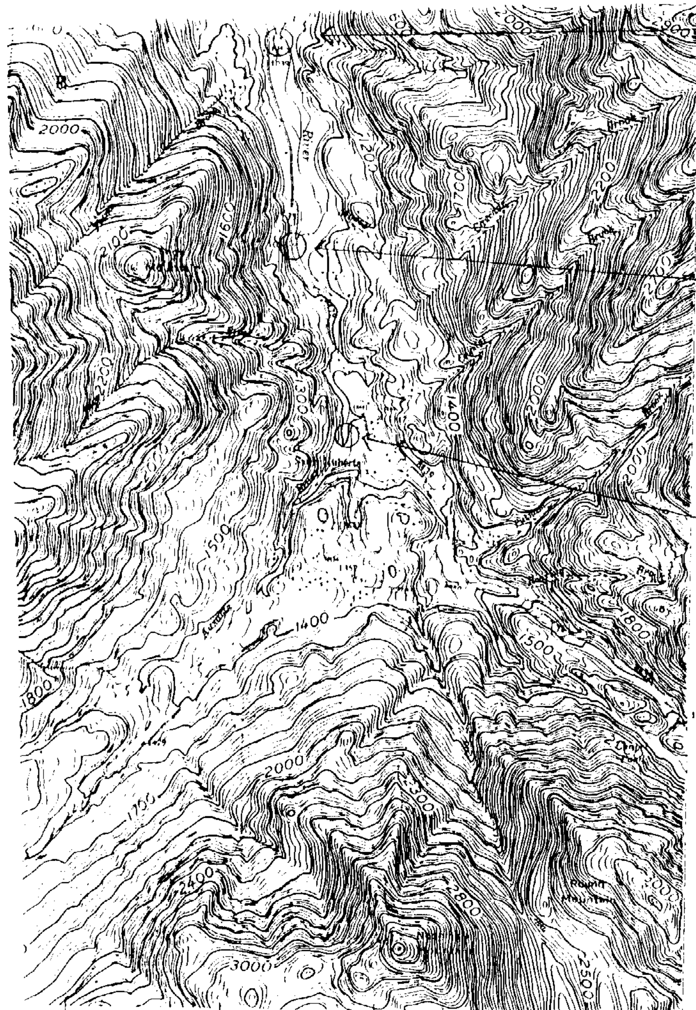


RANNEY BRIDGE
Town of Keene
Essex County, NY
Zone: 18
Easting: 597192
Northing: 4892590

Beer's Bridge
Town of Keene
Essex County, NY
Zone: 18
Easting: 597342
Northing: 4891224

Slater Bridge
Town of Keene
Essex County, NY
Zone: 18
Easting: 597722
Northing: 4890007

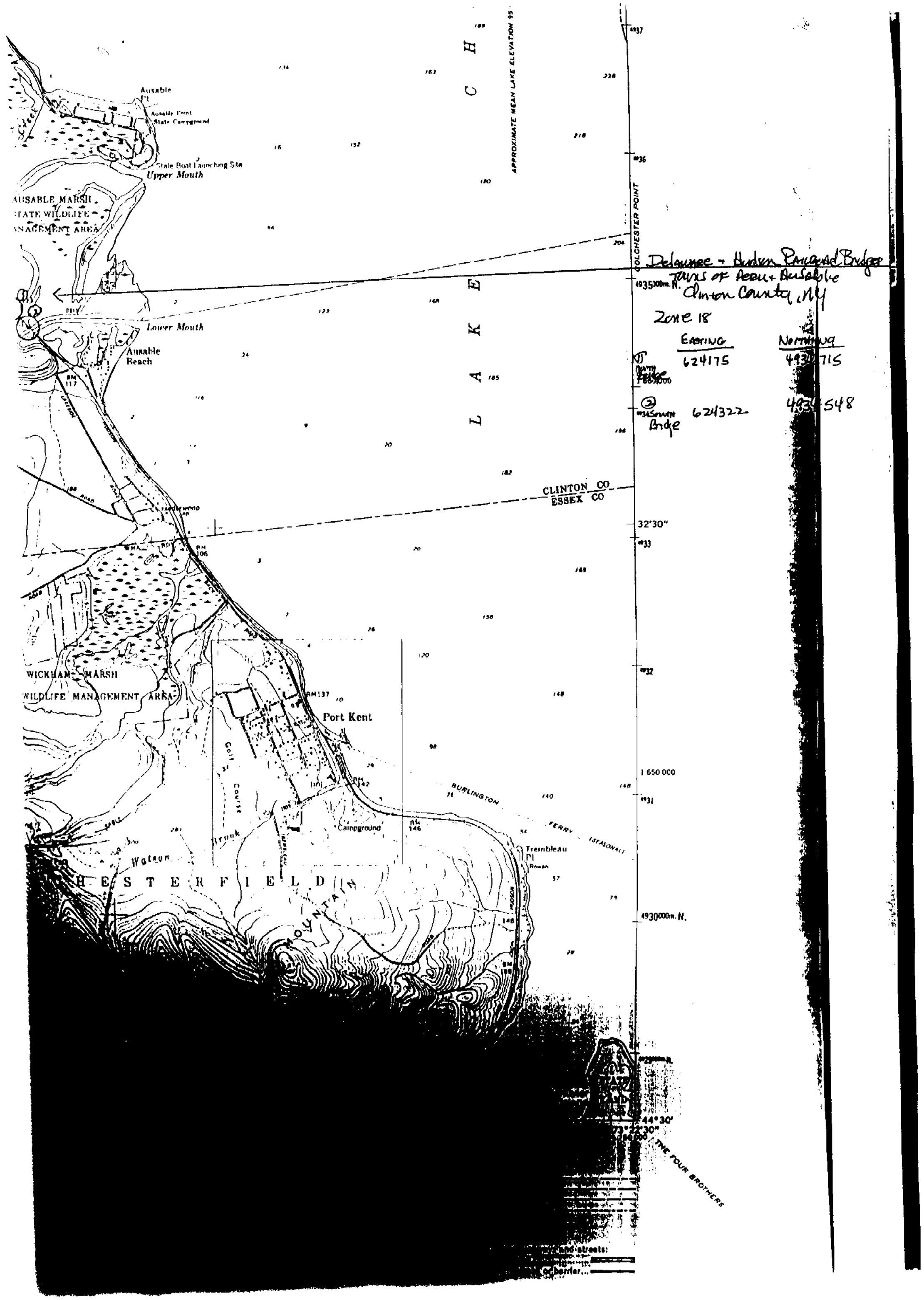
44°07'30"
73°45'
600000m E.
4890000m N.

BOUNDARIES
State
County
Town
City or Incorporated Village
Federal aid approved Urban Area
Supplemental map enlargement limit

ROADS
Interstate route
U. S. route
State route
County Road
Divided highways:
Mall more than 25 feet
Mall 25 feet or less
Undivided highways:
4 or more lanes
2 or 3 lanes
Private roads
State Highway number and limit 8380

System

441736 DP


Delaware + Hudson Railroad Bridge
Towns of Peru + AuSable
Clinton County, NY
Zone 18
Easting
Northing
(1) North Bridge 624175
(2) South Bridge 624322
Ausable Pt
Ausable Point State Campground
State Boat Launching Site
Upper Mouth
AUSABLE MARSH STATE WILDLIFE MANAGEMENT AREA
Lower Mouth
Ausable Beach
L A K E C H
APPROXIMATE MEAN LAKE ELEVATION 95
COLCHESTER POINT
4935000m. N.
CLINTON CO
ESSEX CO
32'30"
WICKHAM MARSH WILDLIFE MANAGEMENT AREA
Port Kent
Golf Course
Campground
1 650 000
BURLINGTON FERRY (SEASONAL)
Trembleau Pt
Watson
HESTERFIELD
MOUNTAIN
4930000m. N.
44°30'
THE FOUR BROTHERS