

**POOR QUALITY**  
**ORIGINAL** IMAGES  
THROUGHOUT  
DOCUMENT

## Rural Vermont

Had a railway, proposed in 1900, ever been built from Pompanoosuc to the Vershire Copper Mine and from Ely to the mine, the map of Thetford and the lives of its citizens would have changed greatly from what it is today.

Thetford town includes Post Mills, Union Village and Thetford Center — these three were involved in the railroad to "Copperfield" surveyed and estimated by Prof. Robert Fletcher and his associate J. V. Hazen, Civil Engineers at Thayer School at Dartmouth College in Hanover, New Hampshire.

The line was never built — certain barns were not torn down, pastures were not cut into, and no one suffered a railroad running down the main street of their village spreading red dust. Employment, thus, did not statistically change, no new building was done and the economic status of the villages remained virtually the same.

On October 4th, 1900, two reports were submitted by the engineers to George J. Troop, Jr., Superintendent of Mines. One was a proposed railway route from Ely Station to Copperfield; the other, was to go from Pompanoosuc station to Copperfield. The first, known as the Northern route was surveyed by Hazen. The second, known as the Southern route, was to connect with Hazen's route, traverse the meadows and flats of Post Mills, and thence proceed down the valley.

Troop's authorization of the survey stipulated the conditions that the railway line be operated by electricity and especially planned for the freight traffic of the Copperfield Mines. Also, that there be a maximum grade of 5%. A lesser gradient was sought for because a steeper gradient meant a narrow gauge line requiring special equipment.

The estimate involved breaking up the bulk at the lower terminal before transferring the cargo to the Boston and Maine Railroad. The coal cars would be carrying 60,000 pounds, hauled in trains of two or three cars. The estimate required by Troop also was for road-bed grading, ties laid, and bridges and trestles completed.

It was specified by Troop that the Company's Charter gave full right of way on public roads or on private lands secured by purchase or legal process. He therefore instructed Fletcher to locate within highway limits as

far as compatible with all other conditions of a suitable location.

Fletcher maintained that the testimony of leading citizens, well informed as to the public sentiment, showed that the desire to have a railway line down the valley was so urgent that probably the majority would willingly give the right of way and there would be little or no objection to any suitable location. In Norwich the general feeling of favorable sentiment was not so much expressed.

\$65,218 was the figure reached in the estimate. 10% added for engineering and contingencies, brought the grand total to \$71,740. Divided by a proposed 11.6 miles of railroad, gave an average cost per mile of \$6,175.

A breakdown of the figures were as follows: Yard costs (earth-work and rock-work), \$27,303; bridges and culverts, \$15,775; right of way (based on situation and quality of the land), \$4,350; grading and ditching, \$625; pipe culverts (2,000 lineal ft.), \$5,000; ties (3,000 per mile for 11.6 miles), \$10,440; and extra costs, \$3,725.

In estimating for the bridges, masonry for the abutments and piers was assumed to cost \$6 per cubic yd. Cedar ties could be brought in from the North at an estimate of 35c each. First quality hemlock and brown ash could be bought locally for 25c or less.

The total fall of the railway from the meadows at Post Mills (700 ft. above sea level) to the railroal station at Pompanoosuc was estimated to be about 300 feet, with the low-water level of the Connecticut River about 22 ft. lower. There were considerable barriers of sand-hills and gravel knolls and the road had excessive rise and fall with many steep grades, as high as 10%. This imposed conditions requiring the abandonment of the highway for stretches of a mile or more at a time.

The abrupt falls of the river varied from 15 to 20 to more than 50 feet at or near the old Chubb factory, Kennedy's mill, Thetford Center and the site of the former Roger's mill. The survey report spoke of the problem in getting around and below the sand hill north of the road fork at Mr. Sloane's. This was to be solved by putting the line around the high hill southeast of Cyrus Merrill's and Clough's.

A line was proposed to cross the river just at and below Busiel Bridge by building a

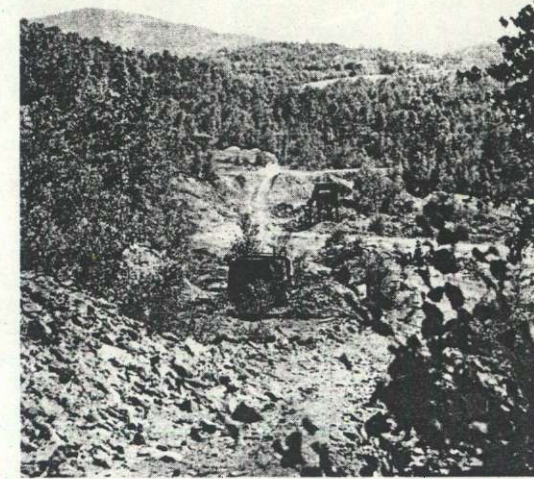
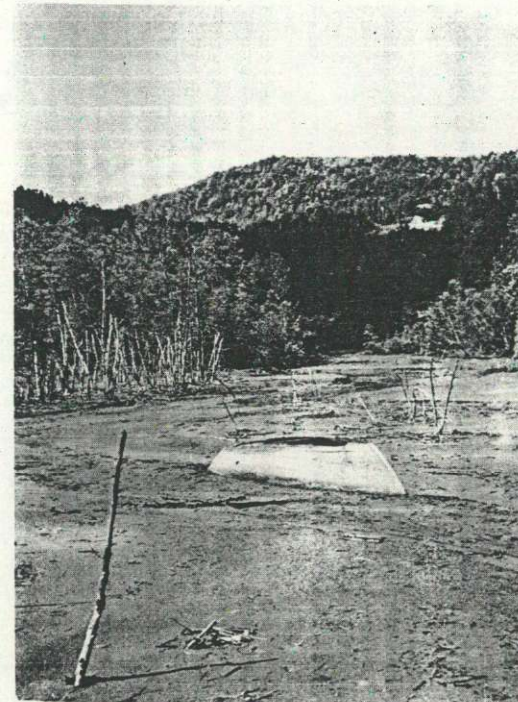
bridge over the Stratford branch be adopted.

Through Union Village Fletcher reported that the natural location was on the main street. Preferably the line would approach the Village on the east side of the road, pass in front of Mr. Barrett's house, require the removal of the barn and store-house of John Blaisdell's, pass close in front of French's store and thence in the middle of the street.

An alternate line was surveyed on the west side through to Patterson Mills, where the river crossing might be made over the mill-pond by a bridge of about a 130 ft. span, not far above the dam and highway bridge. The disadvantages were that it passed for several hundred feet along the very steep slopes of gravel banks washed at the base by the river.

Beyond Patterson Mills the line was to follow the highway which was on a low plain subject to flood by the backwater from the Connecticut River in the Spring. The approach to Pompanoosuc station necessitated a curve and shallow cut through the point of the sandridge at the schoolhouse; thence onto an embankment rising four feet to the level of the Boston and Maine Ry. tracks.

### DESOLATION AT THE MINE



Briefly, the proposed LINE A was to cross the flats at Post Mills, over a trestle of 210 ft., across the Lake Branch, through the ridge at Zenas Knight's, onto the highway just beyond Dr. Gillette's, into Thetford Center nearly parallel with the highway, crossing the river to below the old Rogers mill-site, re-crossing the river to the Busiel Bridge, 1½ miles in the highway through Union Village, thence to Patterson Mills and finally ¾ mile to Pompanoosac station.

An alternate broad gauge line (LINE B) was proposed on supposition of providing power to run only one full loaded freight car or two partially loaded cars at once. The power-house would have been located at some point on the river, as there was always water enough for boiler supply, and 200 or more horse-power might be had at times of medium flow.

They did not recommend Line B because of the distance even though it would utilize more of the highway. It would require the rebuilding of the bridge at Chubb's factory, to adopt Line A, but the cost would be reduced by lessening the earthwork and perhaps making a highway location from a point about ½ mile north of the Commodore House in Post Mills.

**POOR QUALITY**  
**ORIGINAL**

mines, with the height of the starting point at the mines 1,075 ft. above sea level. In all cases where the highway was followed it was planned to widen the road so as to give a carriage track of 16 ft. outside of the trolley rails.

The general direction of the line was to run from the mines to the western slope of the valley where the plant of George Westinghouse was located, near William Ricker's house, crossing Miner's Brook, crossing the highway and entering the meadow of George Jackson, the edge of Finn Kimball's pasture, one corner of Bidder's garden and entering the Back St. in West Fairlee.

From here the line continued onto Main St., entering the meadows of Mrs. Hutchins and H. K. Miller to the crossroad leading from West Fairlee to Fairlee Lake, onto land of Mrs. Bunker and T. Chubb, past the Creamery and Titus' land, over Abbotts land, near Gardner Melendy's house, across John Clogston's pasture to the B. & M. RR station at Ely.

In September of 1900, Supt. Troop conducted Fletcher and Hazen on a reconnaissance of these two routes. Distances were measured by carriage wheel and elevations by aneroid barometer. The surveying was done

### HISTORY OF COPPERFIELD

Vershire, a township in Orange County, is bounded north by Corinth, east by West Fairlee, south by Strafford and west by Chelsea. The township was granted in 1870 and chartered in 1781. The copper mines were located in the southeasterly part of the town in a ridge which runs through the town.

The mine was at its peak in 1864 with the Civil War demands for copper. In 1880 1,875 people lived in the town and there were 400 employees at the mine. Two other mines were operating also at this time; Copper's Hill in Strafford (known as Old Elizabeth) and a mine on Pike Hill in Corinth.

None of these mines were upon any railroad. Their products were transported by two, four and six horse teams to the stations on the Connecticut and Passumpsic Rivers Railroad, later B. & M. Ore from the Corinth mines was delivered to Bradford, a distance of 13 miles; from the Vershire mine to Ely station and from the Strafford mine to Pompanoosac.

One of the largest and most extensively wrought of all the mines was the Vershire mine on Dwight Hill, belonging for many years to the Copper Mining Co. which was chartered by the state legislature in 1853. In

Fairlee Railroad Co. not to exceed \$30,000, with stock also in the West Fairlee Savings Bank & Trust Co. not to exceed \$10,000.

No active mining was done until 1854, although digging began before 1850. In 1861 a depth was reached of 315 ft., making a perpendicular depth of about 200 ft. below the surface. At that time the company employed 100 men and boys besides those employed in transporting the ore to the railroad station.

In 1865 at a meeting held at the Eagle Hotel in West Fairlee, Mr. Smith Ely from New York City was made President of the company. The production of ore at this time with Capt. Thomas Pollard as head engineer, was approximately 104 tons a month. By 1880 this increased to 2,600 tons per month.

Finally the company erected their own smelting furnaces (see photos of furnace ruins) in 1867 under the direction of William H. Long, who later became Treasurer of the corporation. Up to this time, the ore, after being dressed down, had to be shipped away to smelting works in Massachusetts. Four furnaces were erected.

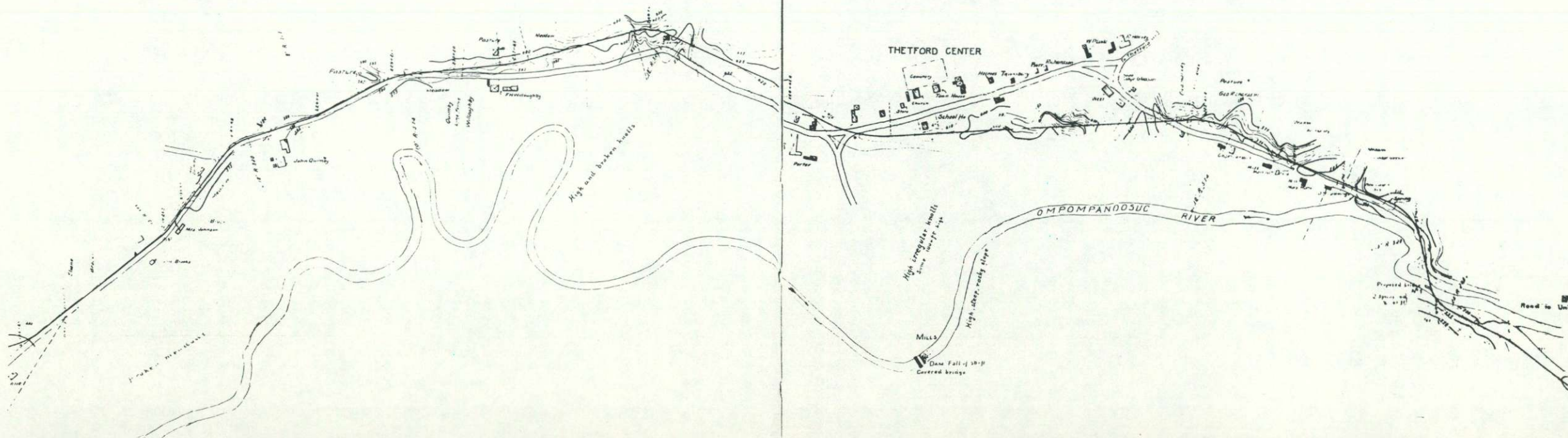
After 1870 the works were gradually enlarged and increased. However, the price of copper fell and in 1881 it averaged only 18.27c a pound. The company was then rescued from near financial collapse by Fran-

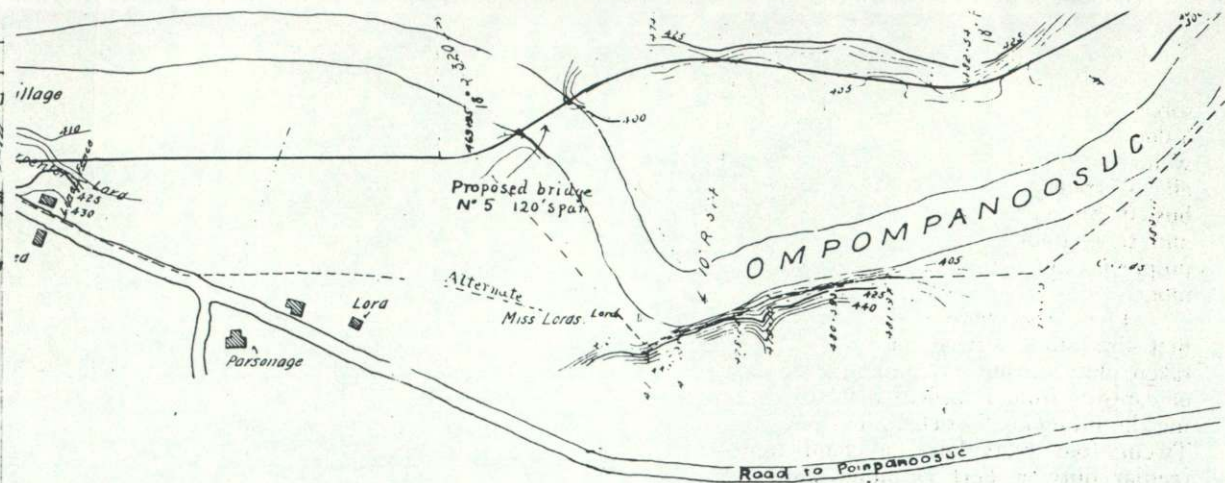
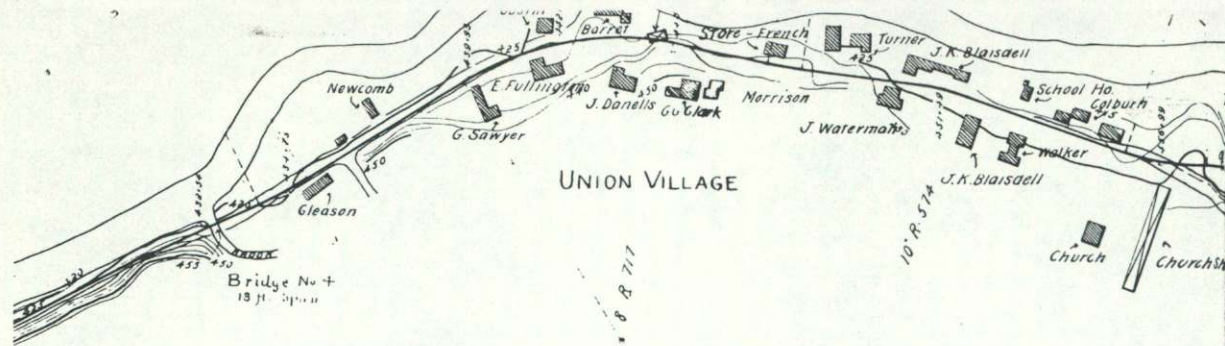
the store at Ely laying off most of the men unless they were willing to work at a reduced salary. Thus the seed was planted for the beginnings of the first labor riot in Vermont.

The notice created a ferment among the men due to misunderstandings and both Ely's life and the property was threatened as a near riot broke loose. The rioters literally jeered and threatened Ely out of town. The National Guard with 154 men from Rutland, St. Albans, Northfield and Montpelier came at a request made to Governor Barstow. Several men were arrested, but as no one appeared against them, J. K. Darling, State's Attorney, ordered their release.

On January 1888 the mine company was sold at public auction held at the Eagle Hotel for \$36,000 to Cazin, the highest bidder. Cazin paid \$2,000 down, but soon after, assigned his purchase to Otto K. Krause of New York who paid \$18,000 more. This gentleman later conveyed the property to the Copperfield Mining and Smelting Co. who worked it in 1884 with only 35 men.

By the early part of the 20th Century, the mine became inactive as did the Corinth mine. "Old Elizabeth" was practically inactive from about 1928 to 1943. Then the necessity for copper was critically needed for World War II and the Korean War. It has been active ever since.





RUINS OF SMELTING FURNACES



## — Introduction —

### HERBERT BROOKS WALKER

The pen and ink illustrations to be used in every issue of *Rural Vermonter* are drawings from the notebook of Herbert Brooks Walker of Fairlee. During the summer months Brooks owns and operates the Walker Museum on Rte. 5 in the old one-room schoolhouse which he remodeled for this purpose.

In the winter the museum items are consolidated into a few rooms, the Walkers leave their camp on Lake Fairlee and the museum-schoolhouse becomes their home. Brooks plans and buys for the next year's display and becomes an artist once again, while his wife teaches school. They have two children.

### DONALD MERCHANT

Donald Merchant is responsible for the fine lettering on both the cover and title page. The letter style of the cover is called "Big Top" or "Gay Nineties" and is often nick-named "Cracker Barrel style". The title page lettering is Don's version of a Lydian Script.

Don served in the Navy three years, taught school in Delaware, joined the Navy forces again in Korea, taught in Barre, Vt. and has been teaching in Hanover since 1956. He became interested in calligraphy in 1938 and has pursued it as a hobby ever since. He is hoping someday to be able to devote full time to engrossing.

With three children, Don and his wife are busy restoring and revamping an aged farmhouse in Norwich. As he says, "I'm regarded as a damn fool by the neighbors for attempting to keep several acres of hay field looking like a lawn!"

Thompson was, in Cooper's generation, one of the most widely read American novelists, combining romanticism and regionalism together in his novels. However, because he isolated himself on a farm in Berlin (outside Montpelier), had little or no contact with other authors, and failed to receive proper recognition from the critics, his novels have kept him in comparative obscurity.

Perhaps if his novels were not so greatly influenced by Cooper and Sir Walter Scott, there would not have been the amateurish quality found in much of his work, that often results from trying to hold others as a model rather than reaching far out, uninhibited, with one's own individualistic style.

The novel in England in the time of Scott showed a narrative technique on the part of the author to allegorize, moralize and over-ornament the characters with verbal sentimentality. In America, this sentimentality carried through even to novels that were otherwise characterized by stark realism and social protest. James Fenimore Cooper was an eye-witness to the advance of civilization upon the wilderness and conveyed through his view of pioneer life, the impression of epic grandeur.

Thompson, also, was an eye-witness to the beginnings of civilization in the wilderness of Vermont. To later and more sophisticated readers of the 20th Century, Ethan Allen and Seth Warner of Vermont history may be regarded as picturesque outlaws, highly dramatized. But to Thompson, they were real heroes ready to give their lives in the struggle for Vermont's independence.

The three most famous novels that Thompson wrote were *Green Mountain Boys* written in 1839, *Locke Amsden* written in 1847 and *May Martin* written in 1852. *Green Mountain Boys* concerned the exploits and deeds of Ethan Allen and his men who fought side by side for Vermont. It was only less than 50 years before that, as a result of the Green Mountain Boys, Vermont became the 14th state in the Union, and the tumult and violence certainly was not gone and forgotten by 1839.

*Locke Amsden* or *The Schoolmaster*, was an autobiographical novel. Thompson felt strongly about many theories current in 1847 and his dissertations on his principles and ideals were looked upon as radical by the critics.

Upon education he commented, "Education places farming science in the professions. Grades are thus established in society, in which farming is made less honorable than professional business. The farming interest, under the present order of things, will never be efficiently or adequately represented in our legislatures."

*May Martin*, or *The Money Diggers*, deserves special comment primarily because of the legend upon which the story is based. The story was originally composed in 1835 — the result of an offer of a \$50 prize offered for the most original tale by a periodical, "The New England Galaxy." The legend of the story, which follows, is from Thompson's introduction to the novel written in 1850.

Following the Revolutionary War a foot traveler came from Lower Canada into one of the western towns of Vermont, and hired himself out to a farmer for a month to earn some ready cash. As soon as his time was up, he took his wages and sought to hire a local surveyor and experienced woodsman as a guide to help him in a search for buried treasure in that region, promising to share a portion of this with his guide and assistant. However he failed to convince the surveyor of the practicability of so hopeless a project as searching for treasure in the interior of Vermont.

The treasure came about as a result of the French and Indian Wars when a small party of adventurers undertook to go over land from New York to Montreal with a large treasure previously secured while on an expedition to Mexico. They followed the usual route through Lake Champlain and along its borders, but were forced further inland when accosted by a party they believed were about to rob them of their treasure.

They buried the treasure in a secluded spot in the vicinity of Camel's Hump in the Green Mountain range, swore each other to secrecy and loyalty, and fled hence to Canada by a different route. Part of the compact between the men was that none was to approach or touch the common treasure except in the presence of the others.

For many reasons they were prevented from getting together and regaining their treasure. After a period of years, all but one individual

party who finally abandoned the search for lack of result, and departed for Canada from which he never returned.

The search and story was nearly forgotten, when by accident, a scientist and his son on a mineralogical expedition over Camel's Hump, came across a rude furnace and found several crucibles used in smelting precious metals.

No sooner was the coincidence of this story known than dreamers of buried treasures were on the alert. One company was organized with a systematic attempt and which became invested in its progress of romantic interest. It was the doings of this company which furnished the basis for the story of *May Martin*, or *The Money Diggers*.

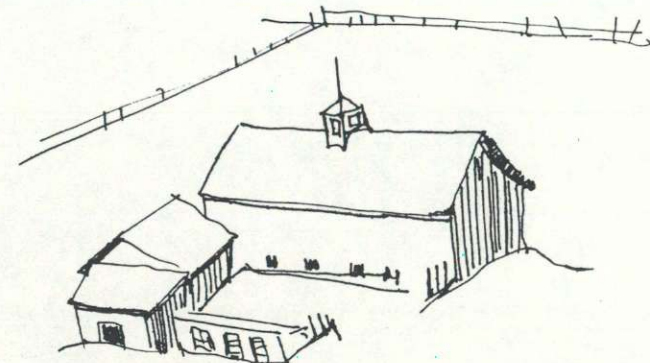
There are other references in the story worthy of note, especially as they are proof of the author's vast acquaintance with the general world, and not merely Vermont. The company who made the search was headed by a young man who was believed to be one of a band of counterfeiters who had learned their art from the noted Stephen Burroughs. History also has it that Burroughs did send an agent from his "Snag Factory" in Canada to establish a branch in this unexplored region of the Green Mountains.

material things or in solving mysteries, was considered as so much humbug by the intellectual, but nevertheless was an important part of Clairvoyance which continues to puzzle psychiatrists and scientists of today.

#### FACTS ABOUT THE AUTHOR

Thompson was born at the foot of Bunker Hill in October, 1795. He later moved to Vermont and owned and operated an early Vermont newspaper, "The Green Mountain Freeman." He was a teacher, a lawyer and Judge of Probate for Washington County from 1837-1840. In 1838 he was appointed by the General Assembly to be one of the four incorporators of the Vermont Historical Society.

His wife was an active society woman continually doing acts of charity. Thompson was opposed to all secret societies and was a member of the Anti-Masonic political group in 1827. Thompson's comment about his wife applies to his views on mankind in general: "She never learned that silence and seclusion may be the best comforts in life."



Vermont's first labor significant labor strike required the use of the state militia and is known as

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## THE BOLTON WAR

By Peter Konkle, President  
Vermont Labor History Society

The construction of the railroad from Boston through central Vermont to Burlington was a race against a competing railroad being built through Rutland. The grand prize was the financial reward of connecting by rail the rich harvest of Canadian natural resources with markets in Boston and the eastern seaboard of a young America. But construction on the central Vermont line was delayed for three years due to Vermont's first significant labor strike.

Early railroad construction in Vermont was a bootstrap operation, mostly through undeveloped wilderness. Bolton, Vermont, was originally chartered in June of 1763 by Benning Wenworth, then Governor of New Hampshire, and named for the Duke of Bolton, England. Bolton's first town meeting took place in May 1770 at the house of Samuel Canfield in New Milford, Connecticut, where the hiring of surveyors was authorized. Essentially unsettled when the railroad began construction in 1846, workers and their families were "housed" in makeshift camps and dependent on their employer for food and supplies.

Three hundred laborers were hired to construct the five miles of track which were to run through Bolton. The 1845 potato famine in Ireland created a convenient source of eager workers for northern New England. In fact, the railroad camps at Bolton were called Dublin and Cork by the workers. Arriving penniless in New Brunswick and Quebec ports, the Irish immigrants endured many hardships for the opportunity to work in America. Desperate to survive, these workers would later find jobs in the quarries and factories which followed the railroads.

CAMPS WERE  
NEXT TO  
PINEO BRD.  
(See Map)

America's first entrepreneurs generally did their business without government regulation or oversight. This increased investor risks and provided opportunity for abuse and corruption. Ralph Nading Hill suggests that Elijah Paine, President of the fledgling Vermont Central Railroad Company, was "not exactly honest." "Corruption spread to the contractors and subcontractors, each lining his own pockets until so much money had been siphoned off that there was no cash left to pay the workers."(1)

Vermont Central Railroad (later reorganized under the name of Central Vermont Railroad) hired a Mr. Belknap as construction contractor for the Bolton section. Mr. Belknap subcontracted the work to Eggleston, Barker & Co. who in turn subcontracted with H. S. Barnum to hire the workers and secure provisions. Barnum subcontracted with four others to recruit the workers. Barnum and Barker essentially served as the on-site managers of the project.

Work began on the Bolton section of the rail bed in March 1846 and proceeded at a good pace for several months. After their employer deducted charges for food and "shanty rent" the laborers earned less than four cents (\$.04) per hour for their dangerous work. Unskilled, and under the direction of inexperienced bosses, workers were blown up in blasting operations and crushed under stone and timber hoisted by makeshift derricks. Seventeen workers were killed between March and July 1846, when the workers rebelled. (2)

*While  
constructing  
the bridge  
over the  
Winooski  
(See Map)*

Payrolls for the Bolton crew had been held up on various pretexts. The workers had not received any pay when in the last week of June Barker sent the first payroll to Barnum who used it to pay his debts for food and supplies. When Barnum again appeared without their pay, the increasingly threatening workers caused him to flee to Burlington to seek additional funds "(rather unceremoniously, I admit) and by circuitous route," as he later described. Barnum brought back Barker with some cash which ran out with many of the workers still unpaid. Barker told the workers that he would go to Montpelier to get the balance of the payroll.

According to Barker, the contractor above him, Mr. Belknap, had been slow in paying, and Mr. Belknap reported that he had difficulties collecting the \$200,000 owed him by Vermont Central Railroad. Railroad companies raised cash for construction by selling stock, but often they would need to raise additional cash and would do so by assessing their stockholders. Vermont Central Railroad had assessed their shareholders ten dollars (\$10) per share on January 1, 1846, but some stockholders preferred to forfeit their shares rather than pay an assessment. With cash running short and with so many contractors taking their profits before payrolls were met, the workers, without any other means to secure the money due them, took matters into their own hands.

Rather than allow Mr. Barker out of their sight, the workers and their families held him hostage by surrounding his Jonesville hotel while his partner, Stephen Haight, made the trip to Montpelier. The hotel was surrounded for three days and nights by men and women who made angry speeches and recited their



grievances. When no railroad official appeared the Burlington newspaper reported that the workmen

threw impediments in the way of the mail stages...and with violent language and demeanor had attempted completely to prevent the free use and occupation of the road by the public.

A Mr. Gleason of Richmond reported to the local sheriff that there was a strike of workers three miles east of Huntington's Tavern and "having collected together, were disturbing the peace in various ways." Sheriff Ferris, two deputies, and the Constable of Burlington, Mr. Church, went to the hotel and ordered the workers to disperse, but "his proclamation...was utterly disregarded." The Sheriff attempted to arrest several of the leaders for disturbing the peace, but they were "rescued by force from his custody."

The Sheriff then requested an "armed force" be called out, and on Friday, July 3, 1846, the Light Infantry Co. in Burlington mustered under Captain Joseph Hatch. The Sheriff returned to Richmond with the Infantry, along with the Company of Firemen from Burlington who were furnished arms and ammunition by the Sheriff.

The editor of the Burlington Free Press, DeWitt Clinton Clarke, described the confrontation (3):

With this force, amounting to seventy-five or eighty men, the Sheriff again reached Richmond, on Friday evening, accompanied also by a number of our most respectable citizens. On Saturday morning, (July 4th) either intimidated by the presence of an armed body of men, or otherwise awakened to a conviction of the fruitlessness, as well as the criminality, of further resistance, the Disturbers had mostly dispersed. Mr. Barker was released, some ten or twelve were arrested and lodged in jail in Burlington, and thus the affair terminated- fortunately without bloodshed or further outrage.

Editor Clarke continues by adding:

It appears that the the ground of complaint on the part of the laborers was that they were not paid for their labor, & that they had received no pay for several weeks. Their language to the Sheriff was, "give us our pay and we will disperse- this is all we ask, and this we will have." Now these were poor men, earning their daily bread by the sweat of the faces, and they ought to have been promptly paid. Holding all resistance to the

Laws, and all illegal combinations for the purpose of redressing even real wrongs, in utter abhorrence, and believing that they should be suppressed, promptly and, if necessary, by armed force, we yet unhesitatingly affirm that these laborers, indefensible as their conduct became, were not the first wrongdoers. That sin must lie at the doors of those who, knowing their necessities, continued to receive the benefit of their unrewarded labor. ...Those who, by injustice, incite others to a violation of the laws of the land, should and will, in the estimation of good men and merciful judges, share the responsibility of the crime, however unjust may be the legal allotment of punishment.

The Bolton workers never did receive the pay owed them, and construction of the Vermont Central Railroad was essentially halted until March of 1849.

(1) "Put Vermonters Ahead: A history of the Vermont National Guard 1764-1978" by Peter H. Haraty; Queen City Printers, Inc. Burlington, VT., 1982.

(2) David Reed, "Vermont Historical Gazeteer of 1867".

(3) Burlington Free Press, July 10, 1846.

(Enclosed)

NOTE: According to an article by Gene Sessions appearing in the Spring 1987 edition of "Vermont History" (footnote 16, page, 91) several personal letters exist which may give first hand accounts of the incident, but which are not available until the Fall 1989 because of the reconstruction of Vermont History Society facilities in Montpelier.

RELATED ITEM: While the Vermont Central Railroad was being constructed Catherine Driscoll Dillon followed the construction gangs, keeping a boarding house and grog shop which moved northward with the crews. It was reported that she always had plenty of whiskey available on payday. Her obituary appeared in the January 11, 1872, edition of The Daily Free Press and Times, Burlington, Vermont, and reads in part:

(Enclosed)

She was a very remarkable woman, and no one had

obtained a greater local notoriety. She came from Ireland a poor and young woman, with her husband, about the time of the building of the Vermont Central and Vermont & Canada Railroads, and kept a boarding-house for the laborers along the line of the road as they progressed, to Rouses Point. At her boarding-house, whiskey was always to be obtained by her boarders and others, in spite of the contractors. From Rouses Point she came to St. Albans, and continued in the same occupation. About the time the "Maine Law" was first enacted, and for years afterwards, she continued to make business lively for the police forces. Though difficult to capture, she was arrested scores of times, and as often escaped either from the county jail or from the courts of justice. At length she was indicted by the United States District Court, about five years ago, for being connected with smuggling and for trafficking in smuggled liquors. In this court she was obliged to submit to a fine of \$2000 which she paid. ...Becoming tired of her husband she obtained a divorce from him, it is claimed in the following manner: Returning from a trip on the cars, Mr. Dillon failed to find his valise, when, through her advice he selected another from those remaining in the pile of baggage; but no sooner had he reached home than she procured his arrest for larceny. The unfortunate man was sentenced to Windsor prison, and upon his release went out in the Vermont Cavalry Regiment as a bugler. In one way or another she amassed a considerable fortune, variously estimated at from fifty to seventy-five thousand dollars. At her death she was about forty-five years of age. In her younger years she was considered handsome, but later her personal beauty had become somewhat failed, owing to the excessive use of stimulants.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
GEOLOGICAL SURVEY

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
CORPS OF ENGINEERS  
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(BOLTON)

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(RICHMOND)

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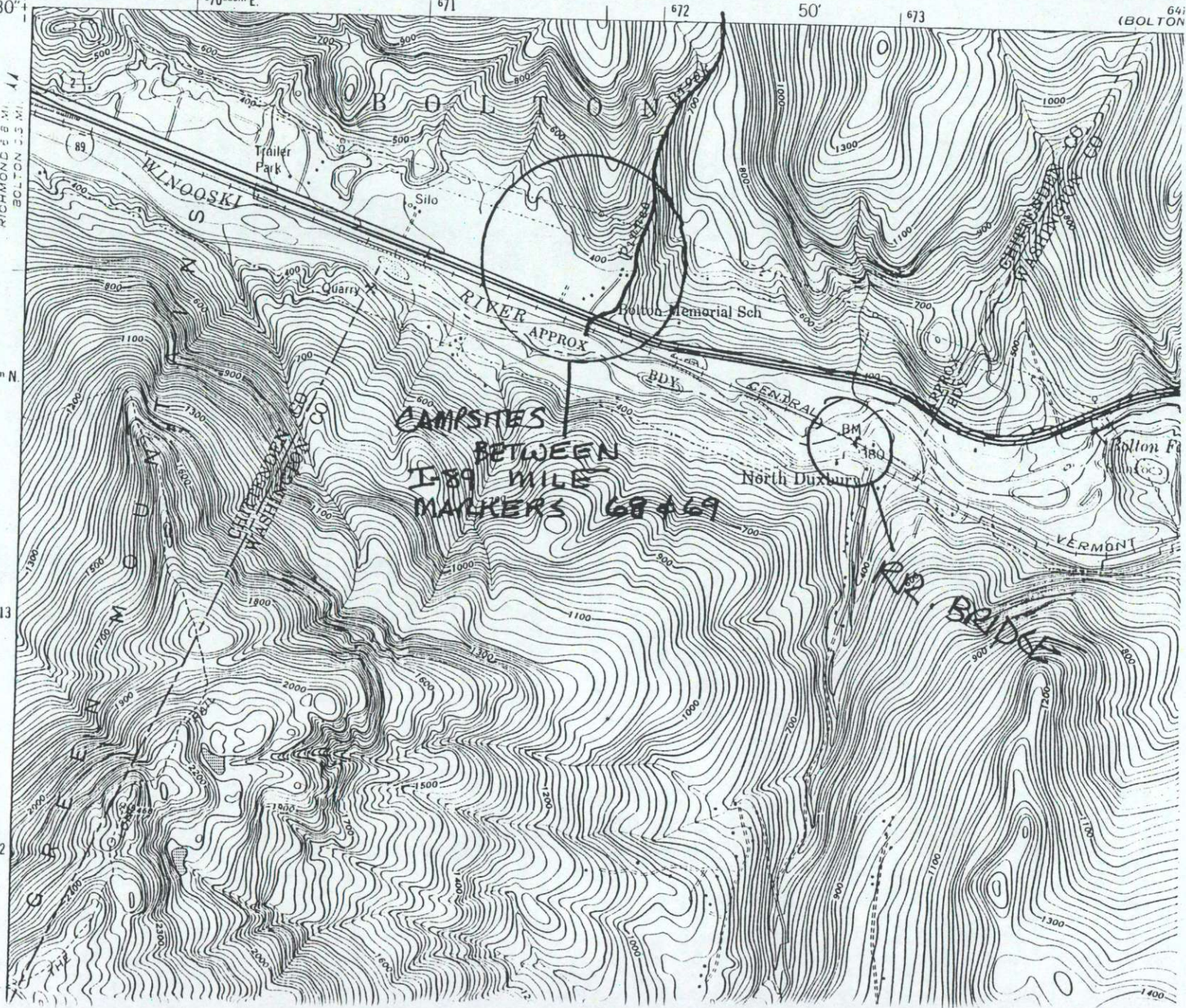
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BOLTON 3.5 MI.

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**POOR QUALITY  
ORIGINAL**

*3pgs -*

7-11-1846

# BURLINGTON FREE PRESS

## Disturbances on the Railroad.

Considerable excitement was aroused in our town, on Friday last, by the sudden requisition of the Sheriff, Mr. Ferris, for an armed force, to aid him in the execution of legal process, which had been forcibly resisted by the laborers on the Central Railroad, near Richmond in this County. The principal facts in the case, as we learn them from the SHERIFF, are these:

On Friday morning last, information was communicated to the Sheriff, by Mr. Deputy GLEASON of Richmond, that the laborers on the Railroad, (some 200 in number,) about three miles east of Huntington's tavern, had suspended work, and having collected together, were engaged in disturbing the peace in various ways—that they had thrown impediments in the way of the mail stages running between Burlington and Montpelier—and with violent language and demeanor had attempted completely to prevent the free use and occupation of the road by the public—and finally that they were holding in duress Mr. BARKER, one of the principal Contractors, peremptorily refusing to liberate him.

The Sheriff promptly repaired to the scene of the outrage, accompanied by two of his deputies and Mr. Church, Constable of Burlington, and by peaceful means endeavored to cause the rioters to disperse. His Proclamation to this effect was disregarded, and his attempt to release Mr. BARKER forcibly and successfully resisted. Obtaining the necessary warrant for the arrest of the supposed ring-leaders, he again met with resistance, and the individuals arrested were rescued by force from his custody.

Under these circumstances the requisition for an armed force, above alluded to, was promptly resorted to by the Sheriff. The Light Infantry Co. in Burlington were called out, and the Company of Firemen immediately and unanimously tendered their services to maintain the supremacy of the law, and were furnished by the Sheriff with arms and ammunition.

With this force, amounting to seventy-five or eighty men, the Sheriff again reached Richmond, on Friday evening, accompanied also by a number of our most respectable citizens. On Saturday morning, either intimidated by the presence of an armed body of men, or otherwise awakened to a conviction of the fruitlessness, as well as the criminality, of further resistance, the Disturbers had mostly dispersed. Mr. BARKER was released, some twelve or twelve were arrested and held in custody.

## COUNTY ITEMS.

**REVENUE**—The Whigs of the Battle County met at Manchester on the 2d instant, and doubtless nominated a good ticket for County Senators. But the *Banner of last Monday*, for some unaccountable reason, has not yet reached us.

We learn however, from the *Voice of Freedom*, that WILLIAM HENRY of Hallow Falls, has been selected as the successor, to Hon. S. FARR, the present able and valuable Representative in Congress, of the First District, embracing Bennington, Windham and Rutland Counties. His election is an excellent one—Mr. HENRY is a gentleman of the highest, and of most capital judgment, and though not a speaking man, will be invaluable as a Committee-man. He will do credit to his large District and to the State.

**WISCONSIN**—Messrs. ERLING HOWE JR., JOHN KIMBALL, and AUSTIN BROWN are the Whig candidates for the State Senate in the coming Wing County. Good men, and true. Mr. Howe has heretofore represented his County in the Senate. The *Hallow Falls Gazette* says: "The nominations will give entire satisfaction, and we believe the ticket will receive every vote of the party."

The Lenoire District Convention for District, says the *Winham Co. Democrat*, will meet at Jamaica, on the 15th inst. for the purpose of keeping up an organization we conclude. By the way we perceive that the heading of the first outside column of the Democrat is "The First side." Is it disagreeable to the Democracy?

The Democrat, speaking of the State Ticket of necessity, says: "our own party have been compelled by circumstances to select another *second* able man, as a candidate for the first office in the State. A most embarrassing position truly."

The *Phoenix* has a capital article on the "Light Nominations," besides the following complimentary paragraphs:

Gov. Stark and Prof. Adams—State Council—were in town during Sunday and Monday last. The four did himself the honor of calling upon us.

The Convention for this County, assembled at Castleton yesterday. We will underwrite before hand, for the non-success of the Wings of Old Rutland.

The Rutland and Addison Insurance Co. have declared a Dividend—see us. *Altered an assessment*, &c. &c. at the same place. The loss by the burning out of the Hallow Falls in Vergennes, is doubtless the principal cause of this large call.

The Herald contains a communication from our respective Auditor, S. H. Hodges, Esq., regarding the conclusions of his predecessor, Mr. Ferris. We will publish next week.

**WINDHAM**—The *Journal of Commerce*, Old-Fashioned.

The annual Commencement exercises of New York University, was held on Wednesday and Thursday of this week. Address was delivered by Dr. A. B. W. S. Editor of "Brown's Review" and President of the University of New York, at Bologna, Italy. By the very able management of Gen. Russell, our military and scientific University at Norwich, we were able to receive the Cadets of the Army, a general course of acknowledged merits for the exercises they received in their respective arms, under the command of the efficient General, to Boston and County.

The Wing County Convention will be held at Weststock, August 1st.

Mr. HERRICK, Editor of the *Mercury*, was arrested, a few days since, on suspicion of having written the following article:

The Convention of the County of Vermont, held at Weststock, August 1st, 1846.

so far as talent is concerned, will compare favorably with the democratic nominees. Thank you!

The semi-centennial celebration of the Calendon Co. Grammar School, took place at Peacham on the 1st instant. The exercises were highly interesting and instructive. Judge KILFIELD delivered the address—This institution is in a deservedly flourishing condition.

A son of Mr. J. Gordon, of Sheffield, 4 year old, was accidentally killed by the falling of a cart body upon him.

**FRANKLIN**—Miss Franklin is the granary of Governors this year. She would be twice herself if they should all, EATON, SMITH and BRAINERD—happen to be elected.

The Wing Co. Convention will be held at Sheldon Creek on the 10th, to-day. The Wings of Franklin must give a good account of themselves in September. They sowed it to the good cause, and to HORACE EATON.

The *St. Albans Republican*, in speaking of John Smith, rather inaccurately remarks: "His opinions have been formed after a careful investigation of the principles of the *two parties*." It should be "the three parties," as Mr. Smith was first an American Republican, or whig, then an anti-slavery, and then a Liberator. The descending series of changes is very regular, and we wonder if we could recollect the *Republican*. We ask nothing for making the correction.

**ORLEANS**—The *Farmer* had a great celebration at Iraburgh on the 10th.

The Whig Convention meets at Iraburgh to-morrow (11th), the Lenoire Convention, also, meets at the same time and place. Perhaps they can agree on a nomination.

Miss Stewart, a daughter of the late war, died at D on the 1st Monday.

## Congress—Tariff Repealed?

Our Congress—immure will be later.

The House of Representatives have engaged, during the week ending last Friday, in debates upon the TARIFF. This cherished measure of the Whig Party, the Tariff of 1812, elicited many able speeches in its defence. Messrs. MAJORS and COLLIER, each made a strong effort to arrest the progress of repeal.

But on Friday last, a day appropriate for the enactment of a measure so important to the enterprise and industry of the Country, McKay's bill was passed, by a vote of 119 yeas and 119 nays. The Tariff of 1812 is REPEALED. The House of Representatives, and that it will be so, with the Senate, we trust, a day hence.

The House, therefore, as the *farmer* says, when the work of *Death* was accomplished.

The *Union*, with a very little triumph, exclaims: "The revenue Tariff pass'd! Glory enough for today."

Mr. BRINKLEY, of a very different hue, *exclaimed* in the course of his speech, "Oh, Faraday, he made a mistake in saying that McKay's bill, and on Friday *repealed* it." The power of party feeling can do that.

"We will publish the New Tariff bill next week. Its great and pernicious effects, by the substitution of *ad valorem*, for specific duties, thus opening the door to fraud, is imperious."

The SENATE have done little of interest except to pass a bill, passed here in Virginia, the City of Alexandria, in the District of Columbia. This bill was passed last Thursday, and the Senate adjourned on the 1st Monday.

## The Conventions on Tuesday

The Democratic Convention of the County of Vermont, held at Weststock, August 1st, 1846.

**FRANKLIN**  
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met and the city a sect. A "tin" presentation  
which occurred at the meeting rather surprised  
one of the officers, who is given to "foreign  
travel," and made much merriment.

### The Officers' Re-Union.

The exercises of the meeting of the Re-Union  
Society of Vermont Officers, in this city to-day,  
will be as follows:

Preliminary meeting, for the election of offi-  
cers and other business, at the Grand Army  
Hall, at 11 o'clock a. m.

Oration by Hon. George F. Edmunds, United  
States Senator, at the City Hall, at 7 o'clock  
p. m.

Society Dinner, at the Van Ness House, at 8  
o'clock p. m.

Social Hop, at the same place, at 9.30 p. m.

The thing of most public interest, in the pro-  
gram, is of course and rightly, the address of  
Senator Edmunds, in the City Hall, this even-  
ing. Our citizens, who know what a fresh, in-  
teresting and able speaker their distinguished  
townsman is, and who would be glad to hear  
him oftener, will of course improve this oppor-  
tunity, and give him, with the Officers, a full  
audience. All, of both sexes, will be welcome;  
seats will be free to all, and there will be ample  
provision to seat all comfortably. The address  
commences at seven, and it will be well to be on  
hand in good season.

The Officers will, we trust, be present in good  
numbers at this meeting, and they will have a  
good time—they always do.

The present board of officers are:

- President—Gen Geo. F. Easter, Burlington.
- Vice-Presidents—Col James H. Walbridge, Bennington; Major Joseph Grant, Newport.
- Treasurer—Gen F. T. Pitkin, Montpelier.
- Recording Secretary—Major James S. Peck, Montpelier.
- Corresponding Secretary—Lieut J. C. Stearns, Bradford.
- Executive Committee—Gen W. W. Henry, Burlington; Major R. B. Valentine, Bennington; Capt. L. H. Bishop, Chicago, Ill.

### VERMONT PHARMACEUTICAL ASSOCIATION.

We have read the proceedings of this Associ-  
ation at its annual meeting, held at Rut-  
land, October 11th. It is a handsome pamphlet  
of thirty pages from the Herald press, and  
contains the minutes of the meeting, the  
address of the President, Dr. Case, of Brandon,  
various papers presented by different members,  
conspicuous, by laws, etc. We are glad to  
note the interest in improvement in pharmacy  
which seems to exist among druggists in this  
State. Public attention has been roused more  
than ever in the last few years by mistakes oc-  
curring in ill-managed drug stores, which have  
resulted fatally. In a number of States the  
feeling has been so strong that laws have been  
passed, requiring a certain amount of efficiency  
in a person dispensing drugs. It is fair to say  
that no class have quicker seen the necessity, or  
more actively favored such laws, than the ma-  
jority of druggists. In anticipation of the time

possible as a lawyer." Attorney General—  
"Dexter's men/like are buried six feet under  
ground, a lawyer's are not." Dexter—"But  
they are now/lines hung on a tree."

DEATH OF MRS. DILLON.—Mrs Catherine  
Dillon, (whose maiden name was Driscoll,) was  
found dead in her residence, at St. Albans,  
Tuesday forenoon last. She lived alone, and  
appearances indicated, when found, that she had  
been dead some twenty-four hours. She was a  
very remarkable woman, and no one had ob-  
tained a greater local notoriety. She came from  
Ireland a poor young woman, with her husband,  
about the time of the building of the Vermont  
Central and Vermont & Canada Railroads, and  
kept a boarding-house for the laborers along the  
line of the roads as they progressed, to Rouses  
Point. At her boarding-house, whiskey was  
always to be obtained by her boarders and  
others, in spite of the contractors. From Rouses  
Point she came to reside at St. Albans, and con-  
tinued in the same occupation. About the time  
the "Maine Law" was first enacted, and for  
years afterwards, she continued to make busi-  
ness lively for the police forces. Though diffi-  
cult to capture, she was arrested scores of times,  
and as often escaped either from the county jail  
or from the courts of justice. At length she was  
indicted by the United States District Court,  
about five years ago, for being connected with  
smuggling and for trafficking in smuggled  
liquors. In this court she was obliged to submit  
to a fine of about \$2,000, which she paid. She,  
however, took her personal appeal to President  
Johnson, at Washington, but could obtain no  
satisfaction. After this, she abandoned the traffic,  
and turned her attention to other pursuits.  
Becoming tired of her husband she obtained a  
divorce from him, it is claimed in the following  
manner: Returning from a trip on the cars,  
Mr. Dillon failed to find his valise, when,  
through her advice he selected another from  
those remaining in a pile of baggage; but  
no sooner had he reached home than she procur-  
ed his arrest for larceny. The unfortunate man  
was sentenced to Windsor prison, and upon his  
release went out in the Vermont Cavalry Regi-  
ment as a bugler. In one way or another she  
amassed a considerable fortune, variously esti-  
mated at from fifty to seventy-five thousand  
dollars. At her death she was about forty-five  
years of age. In her younger years she was con-  
sidered handsome, but later her personal beauty  
had become somewhat faded, owing to the ex-  
cessive use of stimulants. She died without is-  
sue, but leaves two brothers living in Franklin  
County, one of them a prominent business man.  
One brother, to whom she was very strongly at-  
tached, was killed in a mole at Charles Potter's  
hotel at "Slab City" Canada, about ten years  
ago.

ACCOUNT OF THE BULLOCK SKIN.—Some  
specimens on Monday reported two months of

CONFERENCE OF THE EAST  
TROUBLE.

SHALL LOUISIANA BE PLACED  
MARTIAL LAW.

THE SPANISH WAR CLO  
VANISHING.

AGITATION OF VICTORIA WOULD  
SHE WILL RISE TO EXPL

DEFEAT OF MEXICAN REVOLUTI

TWEED WILL NOT CLAIM  
SEAT.

NEW YORK YACHT CLUB TO  
TRIP TO RUSSIA.

NEW YORK NEWS.

DEFEAT OF MEXICAN REVOLUTIONS  
MARR.

New York, Jan. 11.—A city of M  
speech of the 31st, states that the vessel  
under Diaz, in Galicia, was completely  
with a loss of artillery. Many were  
wounded.

TWEED HAS DECIDED NOT TO CLAIM  
SEAT IN THE SENATE.

An Albany letter states that Tweed  
told his friends there that he is not  
claim his seat in the Senate.

DANIEL YUS ILLIKES OF  
Erasto: Carning is dangerously ill.

ACTION OF TARRANTY SOCIETY.  
The Tarrants of Tarrant County have  
petition closing Tarrant Hall to all  
committees or organizations.

END OF THE WHELANFIELD CA  
Judge Sixty, before whom the Fish  
case had been proceeding, states that the  
course is now practically ended. It is  
brought up again.

MRS. JEFFERSON AT LIBERTY AGAIN  
Mrs. Jefferson is no longer under  
and her servants are discharged from

NEW YORK YACHT CLUB GOING TO RUSSIA  
TATION OF THE GRAND YORK AN  
The New York Yacht Club is making  
plans for a cruise to Russia next summer  
in the "Grand Duke".

WASHINGTON NEWS.

THE LOUISIANA TROUBLE—SOME NEW  
HE DECLARED UNDER MARTIAL LAW  
SOLUTION OF THE TROUBLE AND A  
GENERAL.

WASHINGTON, D. C., Jan. 11.—The  
and the Attorney General will have  
then upon the Louisiana trouble, the  
decision will probably be made in the  
viability of enforcing the commercial  
law. There is great anxiety in the  
country.



CITY OF BURLINGTON  
Labor-Management  
Program



ROOM 21 · CITY HALL  
BURLINGTON  
VERMONT 05401  
~~(802) 658-9300~~

James F. Konkle  
Five Lincoln Avenue  
Montpelier, VT 05602

Giovanna -  
Here's the Bolton War  
info we talked about.  
Enjoy,

P.K.

work : 865-7231  
Home : 229-5948

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## **Part 1: The American and Pennsylvania Lumber Industries: Historic Context**

Introduction: Three Eras of Logging on the Allegheny National Forest

The Early American Lumber Industry, 1700-1850

The Colonial period, 1700-1790

Early Commercial Logging: Maine and New England

Westward Migration: Connecticut, New York, Pennsylvania

From the North Woods to the Northwest

The Era of Industrial Logging, 1850-1930

Technology-driven change

Demand-driven change

Rise of Conservation Forestry, 1910-1945

Evolution of Scientific Forestry

Depletion of Forest Reserves

New Harvest Methods

Technology: Truck Logging Eclipses Railroad Logging

Part 2: Railroad Logging on the Allegheny National Forest, 1880-1945: Historic Context

Background and Land Use Patterns

Geology/Topography/Dendrology--Wood Utilization

Contact and Early Settlement Period: 1750-1850

Native American Use of the Forest

European Settlement Patterns: The Holland Land Company

Other Large Warrants

The Rafting Era: 1805-1885

Early Lumbering Operations

Early Commercial Mills

Harvesting Methods

Early Markets: Pittsburgh, New Orleans

White Pine Harvest on the Allegheny and Tributaries

The Susquehanna Boom and Consequences

Local Adoption of New Technology: Steam Power, Tramroads

The Railroad Logging Era: 1885-1930

Factors Promoting Local Growth of Market

The Logging Railroad as Part of the Lumbering System

New Forest Products Industries

Truck Logging/National Forest Era: 1930-1950

Acquisition by Federal Government

Vestigial RR operations and new truck operations  
Last large mills

#### Company Narratives

Wheeler and Dusenbury  
T.D. Collins  
S.S. Bullis  
Elisha Kane  
Horton, Crary & Co.: Tionesta Valley Railway  
Central Pennsylvania Lumber Co.  
McKean Chemical Co.

### Part 3: Evaluation of Railroad Resources and Associated Property Types

#### Historic Property Types

##### Railroad Grades and Associated Structures

- i. Trestles
- ii. Culverts
- iii. Support structures
- iv. Logging camp sites
- v. Station sites

##### Mill Sites

Dams and Water Control

Lumber Towns

Historic Landscapes

#### Criteria for significance

### Part 4: Industry Data

Database of Companies using Railroads on the Allegheny National Forest

# Part 1

## The American and Pennsylvania Lumber Industries: Historic Context

### I. Introduction

Anyone who spends time in the woods on the Allegheny National Forest in Warren, Forest, Elk, and McKean counties of northwestern Pennsylvania will eventually encounter the material remains of the turn-of-the-century forest products industry. Hundreds of miles of old logging railroad grades crisscross the forest, built by turn-of-the-century lumbermen to bring timber to their mills. Hikers of the Forest's established recreational trails often find themselves walking on an elevated fill, every other step falling in a shallow depression that once held a crosstie. Many anglers and hunters find the old roadbeds useful for accessing their favorite spots. Though many miles of the more remote logging lines have been irrevocably abandoned, some of the more accessible ones have been converted to township roads, forest roads, improved trails, and oil and gas pipeline rights-of-way. Others have seemingly vanished without a trace. Whatever their status, they are the most tangible evidence of the timber industry that shaped the present forest and the economy of the region.

These railroad grades are also the most prevalent cultural resource sites relating to the historic logging industry on what is now the Allegheny National Forest. This area has supported a vigorous timber industry since it was settled by European Americans in the late 1700s. In many ways the Allegheny region's lumber industry has mirrored those of other logging regions, but in other respects is quite unique. A peculiar arrangement of factors, including its relative inaccessibility, its proximity to markets, and the presence of other resources, combined to create what one forest scientist has called "the highest degree of forest utilization that the world has ever seen in any commercial lumbering area."<sup>i</sup> Given the dense web of historic railroads, sawmills, tanneries, wood chemical plants, and other forest byproduct industries in the four-county region, this assertion is quite plausible. The logging railroad is emblematic of this period of rapid industrial expansion in the forest products industries.

Yet this era of industrial logging was often wasteful and destructive. Little thought was given to sustaining the harvest of timber or regenerating a new forest, and essentially the entire forest was clearcut between 1880 and 1930, leaving little besides stumps, slash, and briars behind. Worse, the slashings fueled annual forest fires that have left large areas in a savanna-like condition, with depleted soil still unable to support a forest cover more than seventy years later. Communities solely dependent on forest industries were abandoned as the companies dissolved or moved on to southern Appalachian forests or to the lumber regions of the Pacific Northwest.<sup>ii</sup>

Commercial logging was an industry carried on in a more sustainable fashion both before and after the railroad logging era. For the first half of the nineteenth century, both land and timber were abundant and available in seemingly inexhaustible quantities. Local supplies met local needs. As

urbanizing areas depleted nearby timber supplies, transporting lumber from increasingly distant sources required a simple and inexpensive mode of transportation. For most areas, rafting timber and lumber by water proved to be a convenient and wholly satisfactory method. During an era technologically symbolized by wood and water-wood for construction and water for power and transportation-rafting represented the earliest stage of industrial logging. As the American phase of the industrial revolution began with the advent of steam for power and steel and iron for engineering, the industry passed into its adolescent, rapid-growth stage, exemplified by networks of logging railroads and huge steam-powered band sawmills capable of processing hundreds of acres of forests daily. Industrial forestry matured into a form recognizable today only after this paradigm had run its course; the limitations of the technology became apparent in due time, and the sacred myth of the inexhaustibility of natural resources passed in favor of a more sober, responsible land ethic. The new period, its beginning marked by the rise of scientific forestry and the philosophy of sustainable harvests, is now characterized by truck-and-tractor logging and a decentralized processing industry with smaller dispersed units.

In his landmark 1934 work *Technics and Civilization*, the late historian of technology Lewis Mumford provides an excellent analogy for these three eras (rafting, railroading, and truck logging) of the forest products industry. Mumford notes three distinct and successive but overlapping eras of technological sophistication over the last thousand years of Western civilization. Each of these "technological complexes" represents a definitive period of human history, characterized by its unique resources and raw materials.<sup>iii</sup> The "eotechnic" era was a wood-and-water complex, with a strong relationship to craftsmanship and agriculture. Invention and adaptation paced the development of scientific inquiry. The succeeding "paleotechnic" era was a coal and iron complex, marked by the invention and adoption of the steam engine and characterized by rapid, profligate utilization-exploitation is more descriptive-of natural resources. Steam railroads best exemplify the period. The "neotechnic" complex, Mumford noted, was (and still is) an electricity and alloy complex. By projecting his criteria forward over the sixty years that have passed since he advanced this model, the modern Neotechnic complex can be said to be marked by the electric dynamo, the internal-combustion engine, the radio, and the computer.<sup>iv</sup>

Each of these eras-eotechnic, paleotechnic, and neotechnic-have overlapped and interwoven with each other, so elements of each period are still discernible in succeeding eras. So it is with the three eras of the lumber industry. The first decades of the twentieth century saw the last timber rafts, the zenith of railroad logging, and the first gasoline-powered tractor-skidders and log trucks that were not dependent on steam technology.

However, it is the railroad logging era which has left the most lasting imprint on the landscape, the composition of the forest itself, and the regional economy. Though its physical evidence and associated artifacts can often lend understanding to the social, economic, and environmental values of the day, much more can be learned by studying the phenomenon in its historic contexts. How did lumbering, one of the most pervasive of American industries, develop in northwestern Pennsylvania? How did this development pattern reflect--or contrast, or even influence--other patterns in other regions? Or was it unique? As a technological response to an engineering problem, how did the logging railroads on the forest reflect the values and concerns of those who built and used them?

## **II. The Early American Lumber Industry, 1700-1850**

## *The Colonial period, 1700-1790*

The lumber industry in North America makes a valid claim as the oldest industry of the continent's post-contact civilization. While American Indians used the forests for their local needs, it was the European colonists who initiated commercial trade in timber, and they did so almost immediately after their arrival on the Atlantic Coast. There they found awe-inspiring forests of giant pines which answered a critical need for the British shipbuilding industry. As early as 1605 Captain George Weymouth had brought samples of white pine back to England from Maine. In 1609 one of the first commercial cargoes bound for England from Jamestown, Virginia, was a shipment of eighty enormous pine timbers destined to become masts for His Majesty's Navy. Dutch vessels from New Amsterdam also sent cargoes of timber to the Netherlands.<sup>v</sup>

So the American export timber trade was born early, and until the Revolution--and then afterwards--the European shipbuilding industry depended upon American forests. Timber scouts marked the choicest trees for the Crown, irritating the settlers who were proscribed from cutting trees blazed with the "King's broad arrow." For the colonists, however, the huge forests were an impediment to settlement and agriculture. What they did not use to build their homes, barns and fences, they simply felled and burned.<sup>vi</sup> As the nation left its colonial period behind, these practices characterized the settlement of arable land throughout the Northeast. On the frontier, lumber was no more than a byproduct of creating farmland. But it was an extremely important byproduct. Wood served almost every possible purpose, from fuel to furniture to the most basic household implements.

### *Early Commercial Logging: Maine and New England*

As the most densely populated area of the Early Republic, New England at the turn of the nineteenth century demanded ever-increasing quantities of lumber. The forests of Maine provided the raw material for the nation's early industrial and municipal expansion.

Industrial logging, as it came to be practiced in the United States during the latter half of the nineteenth century, originated in Maine. The heavy forest cover of white pine and spruce, an abundance of streams favorable for floating and rafting timber, and the lengthy periods of snow cover that materially aided skidding timber to water were the primary factors in the emergence of the industry there.<sup>vii</sup>

Most importantly, the techniques and technology of large-scale timber production were invented and improved on the waters of the Kennebec, the Penobscot, and Androscoggin watersheds. Maine loggers introduced the "chip-chopping" method of felling trees and bucking logs; they learned to efficiently sled heavy loads of logs on snow and ice; and they developed the art of driving logs to containment booms where they were sorted, graded, and sent to the mill. The most indispensable tools of the mid to late-nineteenth century logger--the crosscut saw and the peavey--originated in the Maine woods.

The demanding work engendered a lifestyle among New England loggers that is legendary if not indeed mythical. Hard physical labor, lack of diverse social contact, and spartan living deep in the

woods for extended periods often prompted lusty recreational activities during the loggers' time off. The Maine logger's proclivity to "blow 'er in" at the nearest town's entertainment district on payday became a bountiful source of song and verse.<sup>viii</sup>

Besides setting these enduring patterns, these early loggers began a less fortunate tradition as well: By the time of the Civil War, New England's forests had been essentially reduced to lumber, stumps and slash. An army of experienced loggers fanned out across the Northeast to in search of new expanses of pine timber.

#### *Westward Migration: Connecticut, New York, Pennsylvania*

Commercial lumbering's westward expansion first moved south, to the valleys of the Connecticut, the Hudson, and the Susquehanna rivers. The technique of rafting timber--especially useful to transport non-floating hardwood species such as oak--found favor on the slower-flowing rivers. Where white pine stands predominated, log-driving was the method used to move timber to the mills.

Here too, white pine was the preferred species of timber. Dozens of mills along the drainage of these streams delivered quality, blemish-free dimension lumber that built the northeast in the pre-Civil War era.

#### *From the North Woods to the Northwest*

America's mid-19th century industrial expansion led to rapid exploitation of natural resources in all settled areas of the nation. After the Civil War, this was characterized by a rush to the West, where the . The public ownership of these lands began with the cession of the original thirteen colonies' western claims to the federal government; by treaty and conquest it was eventually expanded to over three-quarters of the continental United States. Of that total, more than 37 million acres was deed to the western states and 91 million acres went to the railroads. The Ordinance of 1785 and the Cash Sales Act of 1820 initiated the early public land auctions and speculation, and the Homestead Law of 1862 codified the distribution of the public land resource to individuals and families. Beyond the prairies in the upper Midwest and especially beyond the Rocky Mountains, the uniquely American paradigm of free land and timber yielded what proved to be the largest reserves of timber in the continental United States. Timber operations were carried out there on a scale unprecedented in the East, as both the acreage and size of the trees were unsurpassed anywhere previously logged. As these regions developed, they drew workers and their experience from the established and declining lumber regions to the east.<sup>ix</sup>

### **III. The Era of Industrial Logging, 1850-1930**

#### *Technology-driven change*

As the nation approached the midpoint of the 19th century, the state of technological development was about to make a great leap forward. Railroads were decisively replacing canals as the preferred method of transporting commodities. The richness of natural resource deposits such as coal, iron, timber, and later, oil became apparent as the United States' boundaries pushed westward.

### *Steam Power*

The steam engine has become synonymous with the arrival of the industrial revolution at whichever point it was introduced. Great Britain's industrial revolution preceded that in North America by at least fifty years. In Britain, Boulton and Watt's steam engine, the first truly practical and reliable prime mover, was built in the 1770s, and early American steam engines were often British imports. Between 1800 and 1820 the steam engine found slow but steady adaptation in urban areas, often in water pumping systems such as that at the Fairmount Works in Philadelphia in 1800.<sup>x</sup>

Before the steam engine could fulfill its promise of versatile, efficient power, it had to wait for manufacturing technology to catch up. Thus the steam engine did not achieve its greatest impact until it became lightweight (relatively, that is), portable, reliable, and cheap. With its development stimulated by the new railroad and inland navigation industries, these requirements were largely met by 1850.<sup>xi</sup>

### *Mill Machinery*

The transition from the water-powered sash and "muley" saws were not immediate, as might be expected from the widespread availability of steam power. Moreover, the circular saw, generally recognized as the technological successor to the reciprocating saw, was superior to the sash saw only in speed and productivity. Introduced in America in 1814, the circular saw made slow headway during the first half of the nineteenth century. The primary reason for this was the limitations of metallurgy during the antebellum era. Steel was scarce, difficult to manufacture and therefore expensive, and thus not often used for sawblades. Shaping a large sheet of iron into a flat, thin, and durable saw blade was, at best, difficult. This situation greatly limited the diameter of circular saws--which were then useless with large-diameter logs, which white pine tended to be. Moreover, the kerf of an early circular saw blade--usually 5/16 of an inch--was no improvement over a sash saw, and a typical circular saw made 312 feet of sawdust for every thousand feet of lumber.<sup>xii</sup>

Thus the productivity gains of the circular saw were not generally enjoyed by lumbermen until steel became cheap as well as strong, and this did not happen before the adoption of the Bessemer converter in the steelmaking industry after 1872. A steel circular saw was thinner and of greater diameter than its iron forebears, and coupled with the steam engine, finally fulfilled its promise of greater productivity.

### *Railroads*



The best-known product of the steam age was the steam locomotive. Developed at the beginning of the nineteenth century in Great Britain and introduced into commercial service in the United States in the late 1820s, the steam railroad quickly grew into the first "big business," as exemplified by the Pennsylvania Railroad, and more than anything else symbolized the rapid progress of American civilization. The railroading industry--dominated by such giants as the Pennsylvania, the Baltimore and Ohio, the New York Central, and the Erie--emerged from the Civil War as the driving force in the economic life of the United States, making possible a truly national market economy. Across the nation, new industries and enterprises sprang up in the wake of the railroad's arrival. With few exceptions, a town newly connected to a railroad was all but assured of a prosperous future.

### *Demand-driven change*

As the American economy boomed following the Civil War, the growing industrial base of the Northeast created an unprecedented demand for forest products. As the physical plants of the diverse industries expanded, demand for building materials did too, especially dimension lumber for homebuilding. Between 1860 and 1900, more than ten million permanent dwellings were built in the United States, according to United States census reports.<sup>xiii</sup>12 Though rural areas could obtain needed lumber locally, large cities were required to import their lumber supplies. Thus a rail-shipped market for lumber expanded steadily through the last half of the nineteenth century.

Not a small consumer of lumber was the railroad itself. Though it was the exemplar of the iron age, railroads ran on a foundation of wooden ties--millions of them. Railroad construction prompted unprecedented demand for timber for ties, trestles, and other structures.

*other uses: fuel, export, mining*

Rise of Conservation Forestry, 1910-1945

Depletion of forest reserves

"cut out and get out"

Evolution of Scientific Forestry

New harvest methods

Technology: Truck logging eclipses railroad logging

## Part 2

# Railroad Logging Era on the Allegheny National Forest, 1880-1945: Historic Context

### **Background and Land Use Patterns**

#### *Geology/Topography/Dendrology--wood utilization*

The present Allegheny National Forest lies in the northernmost extent of the unglaciated Allegheny Plateau physiographic province. Terminal moraines of both the Illinoian and Wisconsinan glacial periods are within a few miles of forest boundaries, and ample evidence of glacial action exists in the local drift-filled bottomlands. Several watercourses in the forest owe their present courses to glacial action during both the Illinoian and Wisconsinan glacial periods, when these streams reversed their direction of flow as ice blocked their channels, forming lakes which drained as their waters found new spillways. Tionesta Creek below Barnes and the Allegheny River between Warren and the Kinzua Dam are examples of major streams which have reversed their preglacial direction of flow.<sup>xiv</sup>

The Allegheny River drains the entire ANF region. Three primary watersheds drain the interior of the forest, all of which rise in the McKean county highlands. Kinzua Creek enters the forest at Guffey and flows northwest to meet the Allegheny at the site of the town of Kinzua, now inundated by the Allegheny Reservoir. Tionesta Creek rises almost wholly within the forest and flows generally southeast to the Allegheny. Its West and South branches meet near the geographic center of the forest; other important tributaries include Coon Creek, Salmon Creek and The Branch. The Clarion River and its tributaries form much of the southern and eastern forest boundary. Wilson Run rises at Kane, flows into the West Branch at Wilcox, and flows south to Ridgway; there the main Clarion forms and flows southeast, leaving the forest near Clarrington. Mill Creek, Bear Creek, Spring Creek, and Millstone Creek are important tributaries to the Clarion River.

The topography is best described as a dissected plateau with dendritic stream patterns. Surface rocks are mostly of Mississippian and Pennsylvanian age. Some of these, especially the Olean Conglomerate, form huge boulder fields where surrounding rock has eroded. Though from the air the forest seems quite level (though with pronounced valleys), since the major roads follow the valleys visitors have the impression of traveling through mountainous country. Since surrounding areas--especially to the north, west, and south--are much more rolling and agricultural, this impression is accurate to a degree. The rough topography discouraged Euro-American settlement following the Revolutionary War, and the geology was responsible for early intensive development by the petroleum industry following the Civil War era.

It was the forest cover, though, that attracted the most pervasive and continuous industrial development. Foresters have often differed on the exact original composition of the "presettlement" forest, which quite probably differed from the composition of the forest before any significant human influence.

Marquis identifies three distinct eras of logging in northwestern Pennsylvania: The Rafting Era, the Railroad Logging Era, and the Truck Logging Era. A little bit of context will introduce these periods.

### **Contact and Early Settlement Period: 1750-1850**

#### *Native American use of the forest*

The Allegheny region has been inhabited more or less continuously for at least ten thousand years. Evidence of most of the primary culture groups of the Northeast and Mid-Atlantic is present across the forest, from Paleo-Indian through the Archaic and Woodland periods.

It has been known generally for years among anthropologists that the aboriginal inhabitants of northwestern Pennsylvania often modified their environment to keep pests and vermin at bay and to encourage forage crops such as roots and berries. Researcher Charles Ruffner has recently developed some associations between the Oak forest type and native american use of fire on the Allegheny National Forest. His research suggests that "prehistoric silviculture" may be an apt term for the way that indigenous cultures manipulated the forest cover.<sup>xv</sup>

#### *European settlement patterns: The Holland Land Company*

Following the establishment of the first state land office in 1784, northwestern Pennsylvania was legally opened for settlement. In actuality, it was still closed. Though the Iroquois had relinquished claims to the region following the treaties of Fort Stanwix (1784) and Fort Harmar (1789), the Seneca still inhabited the Allegheny valley, the only truly suitable agricultural land in the region. The wars in the Northwest Territory, which did not end until 1794, also helped to postpone white immigration. Only after 1795, when the Seneca relinquished all claims to their ancestral homeland, did northwestern Pennsylvania open to Euro-American settlement.<sup>xvi</sup>

The lands east of the Allegheny were divided into eighteen districts and a surveyor appointed for each. Prices were fixed at \$30 per hundred acres, or about eighty cents an acre. Takers were not numerous at that rate, so the tariff was reduced to \$20 in 1788, and again in 1792 to only \$5, or only 13 cents per acre. After this price sales were quite rapid.<sup>xvii</sup>

Wilhelmina Pieterse, a student of early European settlement, describes the process by which the Pennsylvania Land Office issued a warrant for each 1,000 acres:

The owner would then have to send this [warrant] to the deputy surveyor who was instructed to take possession of the land for him. The latter then assigned him a lot. In order to obtain good lands in this way one had to be well informed as to the quality of the entire complex of lands of which one had bought a part. One also had to know which lands were still unsold, how many warrants had to be issued

and if there were any preferential claims about. In practice it came down to the fact that only those who were on good terms with the deputy surveyor had any chance to get good land allotted to them.<sup>xviii</sup>

The earliest of these settlers located their claims on the larger watercourses, where the most fertile agricultural lands could be found. Few settled before 1850 on the drier, less fertile uplands east of the Allegheny River.<sup>xix</sup>

In the majority of cases the lands were purchased for investment or speculation. At such a low rate wealthy investors could purchase huge tracts, and from 1792 through 1794 more than five thousand warrants were sold.<sup>xx</sup>

In the late decades of the 1700s the Netherlands was an active investor nation, and Amsterdam bankers loaned the new United States several million guilders shortly after the end of the Revolution. Future President John Adams, then ambassador to the Netherlands, facilitated the loans with several prominent bankers, among them Wilhem Willenk, who as part of an informal "Club of Six" had begun to invest in American lands and improvements.

By 1792 the Club of Six had obtained shares in such prominent ventures of the day as the Potomac Canal Company, the James River Company, and the Connecticut Canal Company. When their agent advised the Club to begin obtaining land, the group accordingly purchased 3.3 million acres of the Genessee Lands in New York from Philadelphia financier Robert Morris in December 1792.<sup>xxi</sup> The same month the Club reserved 700,000 acres east of the Allegheny River in Pennsylvania. Willenk became the landowner of record of large portions of northwestern Pennsylvania. More land acquisitions followed on both sides of the Allegheny River, and in November 1795 the Club chartered the Holland Land Company.<sup>xxii</sup>

East of the Allegheny, Holland acquired 1,047,000 acres for \$400,000 from James Wilson of the Pennsylvania Supreme Court. These tracts were not rich alluvial lands, which went to more influential investor/settlers such as George Mead, who bought a large number of warrants at the same time. Instead Holland settled for less desirable tracts in the uplands, often sight unseen.

The Holland Land Company's policies were detrimental to the interests of settling the country. The company would on occasion resell delinquent improved tracts without the warrantee's knowledge, which tended to cloud the chain of ownership. Squatters also complicated the process of obtaining clear title to land, and the Holland company's surveys conflicted with Mead's on nearly 30,000 acres.<sup>xxiii</sup> Though the company eventually disposed of most of its agriculturally suitable land, its Pennsylvania purchases were hardly good investments.

In 1813, Henry Shippen of the Lancaster Land Company purchased a number of the Holland warrants east of the river, an area encompassing 174,000 acres. Most of Warren County east of the Allegheny, and the southwestern portion of McKean County, were included in this purchase. The following year the company employed Colonel Samuel Dale of Franklin, Pennsylvania, to survey the large tract, which he divided into 160-acre lots which are still used to describe their location. However,

the land remained unimproved, and the War of 1812 curtailed any new settlement.<sup>xxiv</sup> By 1816 Lancaster had defaulted on its payments, but not before reselling several of its choicer lots. In 1832 most of the lots reverted to the state and the counties, where they remained on the unseated lands list for decades. Much of Mead's land also ended up on the tax list. The confusion of ownership, complicated by conflicting surveys, further retarded their sale until a new land ethic took root in the Pennsylvania north woods.

### *Other large tracts*

Much of what is now McKean County was granted to another Philadelphia investor, William Bingham, whose lands were subdivided in 1797. Three hundred thousand acres were acquired for the Ceres Company by trustee John Keating.<sup>xxv</sup> The area around present-day Bradford was acquired by the United States Land Company in 1836, which began selling tracts to lumbermen beginning in 1838 through its agent Levitt Little. In 1850, the U.S. Land Company sold its remaining tracts, amounting to about 50,000 acres, to Daniel Kingsbury. The Bingham Estate, heirs to Philadelphia investor Phillip Bingham, continued to subdivide large tracts of his Elk and McKean county accumulations until late in the nineteenth century.<sup>xxvi</sup>

In southwestern McKean County and northern Elk County, lands originally patented to the Holland Land Company were purchased for taxes in 1854 by Dr. William A. Irvine, who with Warren industrialist Thomas Struthers formed the McKean and Elk Land and Improvement Company in 1856.<sup>xxvii</sup> This huge tract, encompassing 127 warrants and nearly 130,000 acres, was acquired to benefit from its location on the proposed route of the Sunbury & Erie railroad, which had been chartered in 1837.<sup>xxviii</sup> The company failed before the railroad reached the tract, and the lands were apportioned to farmers, lumbermen and developers over the ensuing thirty years.<sup>xxix</sup>

Forest County was assembled from parts of Jefferson County in 1848 and Venango County in 1866. The Venango portion was settled first, as it was located in the Allegheny valley. Much of the uplands that were formerly Jefferson County were unseated as late as the late 1860s; the rest were taken up by investors interested in the coal, oil, and timber resources.<sup>xxx</sup>

By the Civil War era, then, much of the land now in the Allegheny National Forest had reverted to county ownership for taxes or accrued to speculators and large landowners, rather than being subdivided into small agricultural tracts as was the case in surrounding areas--Clarion, Jefferson, Venango, Erie, and the Northern Tier counties of New York. This ownership pattern had far-reaching implications, especially regarding the eventual disposition of these counties' forest resources.

## **The Rafting Era: 1805-1885**

### *Early lumbering operations*

From 1800 to 1870, timbering and lumbering in Pennsylvania referred to a single species: *Pinus strobus*, the white pine. Given the variety of valuable species available to the modern logger on the Allegheny Plateau, this focus on pine seems shortsighted. But the value of pine to the early settler and builder simply cannot be overstated. The wood was long-lasting, resisted warping, and was easily worked, no small consideration if one takes into account the productivity of the average early-nineteenth century sawmill with a waterwheel and a sash saw. Pine also floated easily, important in an era lacking railroads or even roads. Furthermore, the amount of finished, blemish-free lumber which could be derived from a single tree is difficult to comprehend today with modern perceptions of what constitutes a large tree. Though a visit to the remnant groves at Hearts Content or Cook Forest is useful for picturing such a resource; the champion examples of the species are long gone, as these vestigial tracts would have been had they contained exemplary specimens. In the early lumbering era, pines with trunks five to six feet in diameter and heights of over two hundred feet were representative large trees. An early chronicler noted a large pine timber, as prepared for export to Europe, measured 42 feet long and four feet square.<sup>xxxii</sup> With such a productive forest resource available, the hemlock and hardwood forests remained unharvested, awaiting a different fate well into the future.

### *Early Commercial Mills*

The Seneca nation was among the earliest traders in the exceptional lumber of the Allegheny region. The first recorded commercial lumber sale in the area took place in 1795, when a Major Craig, stationed at Pittsburgh, sent Marcus Hulings with "three bags of money and some other articles" to obtain boards at Chief Cornplanter's sawmill on his grant on the upper Allegheny.<sup>xxxiii</sup>

The earliest lumbering stream in the upper Allegheny section was Brokenstraw Creek, along whose course grew some of the finest white pine timber of the early rafting era. Darius and Joseph Mead began rafting lumber from their Brokenstraw mill to Pittsburgh in 1801. In 1805 commercial rafting of finished lumber to New Orleans--newly acquired in the Louisiana Purchase--began under the impetus of Pittsburgh and Meadville merchants. Dr. William A. Irvine, grandson of the Revolutionary War general and proprietor of one of the region's largest estates, established mills at both Irvine and Tidioute. Soon mills lined both Conewango and Brokenstraw creeks, and rafts of both finished lumber and square timbers--the pine hewn just enough for lashing together snugly--descended the river on each rise of water. During the peak of the rafting era over five million feet of finished lumber alone descended the Brokenstraw.<sup>xxxiiii</sup>

In 1800 eastern Venango County, now Forest County, was beginning to open to settlement along the Allegheny. The earliest farms were often located on recently vacated Indian villages and fields. By the 1820s the lower Tionesta drainage was being settled.<sup>xxxv</sup> There, like in Warren County, the plentiful white pine prompted early commercial milling operations. Oldtown, three miles up the creek from Tionesta, was settled by the Reverend Hezekiah May. A mill was built there soon after, and his sons became prominent lumbermen. John Ford's mill at the mouth of Coon Creek was the nucleus of the hamlet of Ford's Mills, later Nebraska.<sup>xxxvi</sup> The Balltown mill, another ten miles upriver, was established by Isaac Ball in 1823. These mills were all commercial propositions and cut lumber primarily for the Pittsburgh market.<sup>xxxvii</sup>

In 1821 Quaker John J. Ridgway secured a 100,000 acre grant in present McKean and Elk counties to found an agricultural colony. The seat of this experimental community was at Montmorenci, six miles north of present Ridgway. A sash saw, carding and grist mill was built on Big Mill Creek by 1825. It furnished wool for clothing, ground meal, and lumber for building. The colony was not a success, and the nascent industrial operations moved to the Clarion River proper at Ridgway in the late 1820s. From here logs were squared, lashed into rafts, and added to the Pittsburgh lumber trade.<sup>xxxvii</sup>

### *Harvesting Methods*

The rafting era logging industry was highly seasonal. Logs were difficult to transport long distances over land, and such work was most easily done with a good snowpack for skidding the logs to the mill.

Winter was the important logging season primarily because of the ease of transporting logs over packed snow. A team of horses could pull a sleigh loaded with many times the number of logs than the same team could skid over bare ground. In this way, the teamsters brought logs down to the stream banks and waited for the spring rise.

Early mills were operated by water power and usually contained only a vertical up-and-down or sash saw. An exceptionally productive mill cut only 100,000 board feet of lumber yearly. Productivity was further limited by fluctuations in water level, and too much water could be as much of a problem as too little.

During the warm months there was seldom enough water for powering the mills. Seasonally low water limited rafting logs and lumber on the Allegheny, although lumbermen could drive rafts on the smaller streams by means of artificial floods, called "pond freshets," created by a series of splash dams which were sequentially breached to provide a brief flood. Coordinating the separate phases necessitated a highly seasonal industry, but one which was complementary to farming. In this early era, the summer farmer was also the winter lumberman.

### *Early Markets: Pittsburgh, New Orleans*

In a very real sense, the growth of Pittsburgh as a commercial center made possible the development of commerce elsewhere in western Pennsylvania. By 1800 the frontier had been pushed beyond western Pennsylvania, and Pittsburgh's commercial links with the seaboard were now limited by the lack of internal improvements in Pennsylvania. Accordingly, the burgeoning city formed links with those markets most easily reached by available transportation--that is, river transportation--and so New Orleans became a more important market than Philadelphia for western Pennsylvania's agricultural surplus. As the nation's westward movement commenced following the Louisiana Purchase, Pittsburgh's commerce was considerably enhanced by outfitting the growing tide of transient emigrants.<sup>xxxviii</sup> By 1802 chronicler Zadock Cramer noted that the city boasted ". . . one extensive paper mill, several oil

mills, fulling mills, powder works, iron works, salt works, saw and grist mills, [and] boat yards" among its most important industries.

Boatbuilding and wood manufactures, taken together, contributed the most to the value of Pittsburgh's commercial enterprise.<sup>xxxix</sup> Thus Pittsburgh early became an important market for Allegheny river timber, as well as a waypoint for downriver trade.

By the late 1830s more than a million board feet of lumber--not even counting logs, shingles, lath, staves, and other finished wood products--annually passed through the mouth of the Allegheny at Pittsburgh bound for downstream markets.<sup>xl</sup>

By 1801 Venango County loggers began floating rafts of lumber to market, and beginning in 1805 Warren County lumbermen floated rafts of seasoned lumber to New Orleans. There, clear white pine lumber brought \$.40 per foot. The entrepreneurs realized a good profit on these ventures, justifying the considerable risk involved in the journey. From New Orleans, the raftsmen then boarded sailing vessels for Baltimore and then walked home; some walked all the way back from New Orleans.<sup>xli</sup> Soon Pittsburgh, Wheeling, Cincinnati, Louisville, St. Louis, and other river towns became lucrative markets for lumber. The annual spring freshets found the Allegheny literally covered with downbound lumber rafts. By 1830, the cream of the white pine timber downriver in Venango and Butler counties had been skimmed, and the industry in that region began a steady decline.<sup>xlii</sup>

Up the river, however, the boom was just beginning. The rougher topography, much less suited to agriculture except in the bottomlands, discouraged settlement and the steep hillsides still retained their cover of timber. Since ownership of large portions of Warren and Forest counties remained clouded, very little activity of any sort took place on the wild uplands.

### *White Pine Harvest on the Allegheny and Tributaries*

As the arable land was cleared in the Allegheny valley following settlement, much of its timber found its way downriver to Pittsburgh, which absorbed about a quarter of the volume. The other three-quarters went to other growing markets down the Ohio and Mississippi River, including Wheeling, Cincinnati, Louisville, St. Louis, and New Orleans. Though all of these cities enjoyed abundant local timber resources of their own, the quality of Allegheny white pine gave it preference and Allegheny lumber rafts were famed throughout the entire Mississippi Valley.<sup>xliii</sup>

Such demand stimulated a steadily increasing harvest. In 1825 the *Conewango Emigrant* estimated Warren County's output at twenty million feet of boards and planks, ten thousand shingles, and other finished and semi-finished products valued at over \$30,000. The downside of the timber "boom," the editor lamented, was the depression of timber prices due to overproduction and an alarming neglect of agriculture in the area.<sup>xliv</sup>



The white pine harvest peaked between 1832 and 1840, after which it declined slowly as the pine stands were depleted. By 1870 little pine remained in Warren County.<sup>xlv</sup> Much still remained on the uplands drained by Tionesta Creek in Forest County, and some vestigial groves which were purchased and put in reserve. The Grunderville mill of the Warren Lumber Company is a good example of a late (1900-1906) limited operation that specialized in white pine timber.<sup>xlvi</sup>

### *The Susquehanna Boom and its Consequences*

Pennsylvania's growing exploitation of its timber resources was not limited to the Allegheny valley. The Susquehanna River watershed drains by far the largest part of Pennsylvania, and by the 1840s the West Branch of the Susquehanna was being intensively developed for its white pine resources. With the development of the Pennsylvania canal system in the 1830s, the lucrative Philadelphia market was opened to sawmill operators on the Susquehanna.

Rather than rafting logs to the mills, loggers floated the timber during periods of high water during the spring melts. Williamsport in Lycoming County developed as a lumber center between 1850 and 1860; in fact, it became for a while the lumber center of the nation after 1860 as Pennsylvania ranked first in the nation in lumber production.<sup>xlvii</sup> This productivity was the result of two factors: the increased efficiency of steam-powered circular sawmills and, primarily, the Susquehanna Boom Company.

Major James E. Perkins, the founder of the company, arrived in Pennsylvania from the cutover forests of New Hampshire in 1846 and surveyed the entire length of the river for a suitable place to trap the logs coming down the upper West Branch and its tributaries. He selected a spot just west of Williamsport with a seven-mile reach of deep water. The Susquehanna Boom Company incorporated in 1849 and immediately began constructing a line of timber-cribbed piers that, when strung with cable, prevented logs from passing downstream. The company charged mill owners one dollar per thousand feet for handling their logs. The assurance of a steady supply of raw materials caused an immediate concentration of sawmill industry at Williamsport, and during driving season there was likely to be hundreds of millions of board feet of logs in the boom awaiting sawing. The resulting volume of finished lumber, arriving on the market at a time of rapid industrialization, was on an unprecedented scale. The Civil War increased demand even more.<sup>xlviii</sup>

This efficient system, possible only on non-navigable streams, lasted into the early decades of the twentieth century.<sup>xlix</sup>

Though events east of the Allegheny Divide would seem to have little bearing on the Allegheny River lumber trade, the implications of the Susquehanna boom were far-reaching. Technologically it provided cost-effective log transportation, albeit still on a seasonally-limited basis. But its most

profound effect, in relation to northwestern Pennsylvania, was an accumulation and concentration of capital and industrial prowess that was to later make its power felt west of the Allegheny Front.

*Local adoption of new technology: steam power, tramroads*

The most profound effect of the arrival of steam technology was to make log harvesting and transportation methods obsolete. Portable steam power arrived in the region in a big way with the advent of the petroleum industry in the years during and following the Civil War. No longer seasonally limited by water levels, mills could cut year-round. Additionally, a steam-powered mill was not limited to a stream bank, allowing the lumber operator to site it closer to his timber. In this way, steam mills began locating on the plateau tops in the 1870s.

Many of these new mills appear on northwestern Pennsylvania counties' tax assessment lists in the 1870s and early 1880s. More often than not these were very small mills, producing lumber for local use. Commercial mills still needed to be located near transportation for a market outlet.

Increasingly, this method of transport was the railroad.

### **The Railroad Logging Era: 1885-1930**

Even given the rapid expansion of the American industrial complex following the Civil War, northwestern Pennsylvania experienced a boom that outstripped much of the rest of the industrialized portion of the northeast. The discovery of plentiful supplies of crude oil in Venango County throughout the 1860s, Warren and McKean counties in the 1870s, and Forest County in the early 1880s created a significant local demand for timber. Coopers required oak staves in huge quantities, and rigbuilders used large quantities of pine, and later hemlock for building drilling rigs and derricks. The boom towns that mushroomed at the fringe of each new strike also created a market for dimension stock. Several area mills, notably E.M. Clapp's mill at Tiona in Warren County, specialized in "rig stuff," dimension lumber sawn especially for rigbuilding.<sup>1</sup> Since the design of drilling rigs had standardized by the late 1870s--and, with the exception of a set of "rig irons," they were constructed almost entirely of wood--lumbermen could supply what was essentially a rigbuilding kit for drillers, complete with all necessary dimension stock.

With the oil boom also came the advent of small, portable steam engines, which meant that a portable sawmill was easily set up in an area of drilling activity. Indeed, the discovery of oil in any locality led to an immediate stripping of the nearby forest cover, whether used as lumber or fuel for the rigs' steam boilers.<sup>li</sup>

Given the speculative nature of the oil boom era, it is hardly surprising that would-be railroad magnates thought it a good idea to capitalize on transportation needs to and from the new boomtowns. A number of new oil boom railroads were extended to the Oil Creek valley in Venango County in the early 1860s, and the extensive Bradford field was laced with new short-line railroads. The Olean, Bradford, and Warren Railroad (OB&W) extended from Bradford through the heart of the Bradford oilfield, crossed the crest of the plateau at Marshburg, and descended Chappel Fork to Kinzua Creek, joining the Buffalo, Pittsburgh and Western (BP&W) at Kinzua. This route, billed as the "Bradford Short Line" and completed in the spring of 1882, provided Bradford oil refiners the nearest western rail link with Erie, Cleveland and points west, and also provided oil businessmen and speculators with fast connections between the principal cities in the Oil Region.<sup>lii</sup>

Other lines were built to serve (or, more likely, exploit and profit from) single pools, and records show three such railroads on the Allegheny National Forest. The Cherry Grove field, high on a remote plateau in southern Warren County, caused an unprecedented stir in the oil industry. The most productive wells ever discovered up to that time created an instant boomtown of nearly 15,000 inhabitants, dubbed Garfield for the recently slain president, miles from any service center.<sup>liii</sup>

The Warren and Farnsworth Valley Railroad had been projected almost from the first rumors of rich oil territory in southern Warren County, and was quickly surveyed and graded with all possible haste. A ten-mile segment, from a junction with the Philadelphia and Erie at Clarendon to its terminus at Garfield in the midst of the boom territory, was completed in August 1882, providing a welcome alternative to the congested and expensive toll plank roads. Eight trains a day barely served the initial demand.<sup>liv</sup> The boom collapsed a month later, and the railroad was soon reduced to a single train each way per day.

A second venture aimed to connect the oil centers of Titusville and Bradford. The "Bradford Air Line" was proposed in four sections to cross the difficult intervening terrain, with Garfield as its midpoint. Conceived a bit too late to cash in on the Cherry Grove boom, the segment between Tiona and Garfield was nevertheless capitalized, surveyed, and graded along Arnot and Little Arnot runs. The Garfield and Cherry Grove Railroad was completed in early 1883 after being briefly abandoned.<sup>lv</sup>

Both the Warren and Farnsworth Valley and the Garfield and Cherry Grove railroads were acquired by Horton and Crary for use in their tanbark and timber operations, which were progressing concurrently with the oil boom. The lines were assimilated into their Tionesta Valley Railroad system, and at least one of the locomotives was sold to the James Brothers at Kane for their Kane Oil Fields Railroad, which was built in southeastern McKean County to serve the oil boomtown of JoJo.<sup>lvi</sup>

Though several railroads in the region were projected to benefit from the oil industry, the aforementioned three were the only ones in the area that served individual pools. Given both the short life of the area's oil booms and the rarely-recovered expense of building and equipping a railroad, the power of the boom mentality and unbridled optimism to subvert prudent business sense is seldom better portrayed.

## **Advance of technology**

*i. local advent of the band saw*

*ii. description of a typical band mill*

*Improvements in four-season transportation*

## **Trunk-line Railroads**

Pennsylvania never recouped its investments in its canal-related internal improvements, largely because of competition with railroads. The Pennsylvania Railroad, an engineering achievement of profound significance, paralleled the route of the Pennsylvania Main Line canal system from the Susquehanna to Pittsburgh and beyond and quickly overtook the canal in freight and passenger haulage. By the Civil War era, the steam railroad had permanently rendered canals obsolete, as well as halting the growth of regional roads and turnpikes until the advent of the automobile a half-century later.

The primary railroad of influence in the Allegheny region was the Sunbury and Erie Railroad, which was chartered in 1837 to connect those communities. The name changed in 1860 to the Philadelphia & Erie Railroad to reflect consolidation and its goal of connecting those cities. Capitalized at ten million dollars, the road was completed from Erie to Warren in 1860 and to Kane in 1864. The railroad followed a general northwest-to-southeast route that entered the region from the Brokenstraw valley, followed the Allegheny river to Warren, and then climbed nearly seven hundred feet to Kane by ascending Dutchmans Run, descending the North Branch of Tionesta Creek, and climbing Two Mile Run on a gentle gradient. By 1865 it was completed from Erie to Sunbury, 287 miles, and had been leased by the Pennsylvania Railroad.<sup>lvii</sup>

The final link in completing this northern transmontaine route was the segment between Ridgway and Warren. As late as 1859 no decision had been made on its routing, though several rights-of-way had been surveyed. The two finalists were a southern route that ran along the Clarion River, up Big Mill Creek and into the Tionesta Creek drainage, and a northern route that ran up the West Branch of the Clarion River, its Wilson Run tributary, and down Two Mile Run. Though both routes were nearly equally advantageous, the Road Committee justified its recommendation to the Board of Directors based upon the following logic:

. . . the Mill Creek [route], though shorter than the Clarion by some 3 1/2 miles, the latter is believed to present better commercial advantages in local trade; and whereas while the Northern or Clarion route will materially advance the value of the land owned by the McKean-Elk Land Improvement Company, it seems but just that the turning point of the location should rest upon the liberality of the subscription made by that company in aid of the construction of our railroad.<sup>lviii</sup>

Thomas Struthers, it will be recalled, had invested heavily in land along the northern route, and thus found it equally advantageous to invest in the railway corporation.

This railroad was unquestionably the greatest single factor in opening the Allegheny region's forest resources to exploitation. Tonnage figures compiled in 1865, a year after the line's opening, show that lumber was the most prevalent commodity handled by the new railroad with over 27 percent of the total tonnage represented by wood products.<sup>lix</sup> This figure grew rapidly. Contemporary writers noted that the route ran through an "unbroken" forest of hemlock, a species especially valuable to the growing leather tanning industry. Within months several tanning concerns opened along the railroad; the center of this industry located at Sheffield, which had moved two miles up the North Branch of the Tionesta to join the railroad. With the railroad's completion, the economy of the region was for the first time tied with eastern markets, rather than only Midwestern ones necessitated by river transportation.<sup>lx</sup>

As the oil boom got underway to the southwest in Venango County, several railroads were projected to follow the natural corridor provided by the Allegheny River and connect with markets in northeastern Pennsylvania and western New York. The Warren & Franklin Railroad, completed in 1866, ran 51 miles along the river from Irvineton (present Irvine) to Oil City, giving that booming oil town its first rail outlet. It was absorbed into the Oil Creek and Allegheny River Railroad the following year. Despite the booming refining and machinery business, fierce rail competition in the Oil Region weakened it; this consolidation defaulted in 1875 and was absorbed into the Pittsburgh, Titusville, and Buffalo Railway. In quick succession, the route became the Buffalo, Pittsburg [sic] & Western Railroad in 1881 and the Western New York and Pennsylvania Railroad (WNY&P) in 1895. In 1900 the Pennsylvania added the WNY&P to its huge system.<sup>lxi</sup>

#### *The Narrow-Gauge Movement on the Allegheny Plateau*

Narrow-gauge railroading was practiced to an unusual degree on the Allegheny Plateau in the latter part of the 19th century, surpassed only in the mineral region of Colorado. Over 305 miles of regular lines connected various points, primarily in the McKean County oil fields.<sup>lxii</sup> For insight into this phenomenon, a look at the rationale for non-standard gauging is helpful.

The engineering justification for a 3'0" gauge (as opposed to the standard 4'8 1/2") lies in a perceived economy of construction and operation. With a standard gauge, argued proponents, the ratio of tare (dead) weight to cargo weight ranged from 29 to 1 for passengers to 7 to 1 for freight.

The Baltimore and Ohio Railroad began competing with the huge Pennsylvania Railroad system in the region when it acquired the narrow-gauge Pittsburgh and Western Railroad in 1890. This meandering, circuitous route--its surveyors apparently preferred following the land's contours rather than engineering a series of cuts and fills-- was completed in late 1882 and followed the crest of the Big

Level from Foxburg in Clarion County through Marienville to Kane, where it met the Philadelphia and Erie. It was made a standard gauge line in 1911 and served a number of lumber and glassmaking concerns along its route.<sup>lxiii</sup>

Thus by the late 1880s the major railroad concerns in the region provided well-established outlets to all major national and regional markets. Fanning out in all directions, these main-line railways provided an enviable array of potential markets to the forest products industries.

### *Short-line Railroads*

As noted, the main-line railroads had a profound influence on the development and exploitation of the Allegheny region. Not only did they serve as a stimulant for economic and industrial growth as an outlet to markets; they also brought tourists and vacationers to a region even then becoming known as a healthful, pleasant mountain resort.<sup>lxiv</sup> As the industries grew in the larger towns of Bradford, Kane, Ridgway, Warren, and Sheffield, each municipality became a junction point for smaller railroads that branched out into the hinterlands. These short lines served as feeder lines, bringing goods and passengers to the larger transfer points.

The Tionesta Valley Railroad was the most important of these short lines. It strategically connected the narrow gauge (until 1911) Pittsburgh & Western on the Big Level and the Philadelphia & Erie main line at Sheffield. Its center of operations, at Sheffield, was adjacent to huge tracts of uncut tanbark and timber, and the railroad extended branches deep into the tall timber. To the west in McKean County, General Elisha Kent Kane opened the Kinzua valley, connecting the Erie Railroad at Mt. Jewett and the WNY&P at Kinzua. And Teddy Collins connected the towns of Sheffield and Tionesta with a railroad of the same name, which ran along the steep-banked Tionesta Creek for some forty-five miles.

Thus, by the mid-1880s the Allegheny National Forest region had been thoroughly crisscrossed by a variety of competing but connecting railroads, both standard and narrow-gauge, that were suitable for both accessing raw materials and exporting finished products. Some of the major markets of the nation--Pittsburgh, Buffalo, and Cleveland--were now no more distant than a day's journey "on the cars." The economic growth of the region seemed assured as land prices rose and the oil industry boomed, and was limited only by the resources themselves. During this era, both resources and optimism seemed equally unbounded.

### **iii. Logging Railroads**

With one of the largest concentrated areas of virgin forest,

## **The Logging Railroad as part of the lumbering system**

### **1. Early Logging Railroads, 1880-1890**

TD Collins' Fox Creek Tram, 1887. 13-ton Shay

E.M. Clapp & Co., 1882, 7-ton Dunkirk

I.L. Shank & Co., Cornplanter, 1882

Wheeler & Dusenbury, 1883, 0-4-0; 1885, 13-ton Shay

James Brothers, 1884, 10-15 ton Shay

### **2. Zenith of Railroad Logging, 1890-1903**

### **3. Emergence of Corporate Railroad Logging, 1900-1935**

*consolidation! (Davis, ed. 1983)*

### **4. Marginal Operations, 1900-1945**

*a. evolution and development of equipment*

i. Locomotives

- ii. Loaders
- iii. Track and engineering
- iv. Unique features

There were several factors which made railroad logging unique in the Allegheny region. One salient feature was its persistence. Not only were some of the earliest rail logging operations conducted here; railroad logging's final stand in Pennsylvania was also within the boundaries of the ANF, with Wheeler and Dusenbury, Central Pennsylvania Lumber Company, and Clawson Chemical Company still using their rail systems into the 1930s and 1940s. In the eastern states, only West Virginia and remote parts of the southern Appalachians in North Carolina and Tennessee hosted rail logging operations in the postwar era.<sup>lxv</sup> Thus in the general region, the Allegheny plateau gave up its virgin forests last. The last notable stands of virgin timber are in or adjacent to the ANF.

The other unique feature was the virtual technological stasis in railroad logging development in northwestern Pennsylvania after the turn of the century. In terms of railroad construction, sawmill technology, skidding and loading techniques, and the organization of work, the final rail logging operations in the mid-1930s did not differ markedly from those of the late 1890s. Indeed, the latest technological advances noted in this study were the introduction of steam log loaders at the turn of the century and the adaptation of electricity at the Sheffield mill in 1908.

Particularly puzzling is the non-adaptation of several technologies in general use in western logging from the mid-1880s, namely the steam "donkey," a portable steam winch used to skid large logs with wire rope to the railhead; and its successor, the steam skidder. This type of skidder, many of which were built by the Lidgerwood company, found wide application in adjacent logging areas of the East, and were indispensable to western operations. Logs were yarded to a central location by high lead lines attached to a "gin pole" fifty feet or more high at the skidder. One of the Collins operations used a Lidgerwood skidder briefly during the World War I era, a time of general labor shortage and high demand. Therein lies a clue as to the organization of skidding work.

Log skidding by horse team in the Allegheny region lasted until the very end of the railroad logging era. The explanation for the persistence of this practice seems to be the availability of a large labor force of skilled teamsters in the area. Even given the relatively rough topography, the dendritic watercourse pattern gave logging railroads access to nearly every valley and hollow. Thus skidding the logs to the landing was almost always a downhill job to a nearby railhead. Additionally, steam donkeys and skidders were quite possibly overengineered for the kind of lumbering done on the Allegheny Plateau. Designed to skid the large redwoods and Douglas firs that composed the western logging areas, these machines were engineering overkill for the hemlock-beech forests of Pennsylvania, where even the largest trees were much smaller. Additionally, the regional petroleum industry created work for hundreds of teamsters, and during the lull in exploratory operations between 1900 and 1925, many otherwise unemployed teamsters probably found logging work preferable to following the oil boom to the Southwest. This non-adaptation of available technology also explains the density of the logging railroad network on the forest.<sup>lxvi</sup>



## **New Forest Products Industries**

The beginning of the industrial era on the Allegheny Plateau saw the emergence of new wood products technologies, and the linking of raw materials and markets by railroad prompted several new classes of industry to locate at the nearest intersection of rails and resource. Chief among these, and the earliest, was the leather tanning industry, attracted to the vast expanses of hemlock. The first regional tannery was built at Warren in 1860 by G.A. Newkirk at the mouth of Glade Run.<sup>lxvii</sup>

### *Leather Tanning*

The rise of the tanning industry in northwestern Pennsylvania coincides quite precisely with the completion of the Philadelphia and Erie Railroad across the Allegheny Plateau in 1864. More than any other, this industry shaped the exploitation of the region's forest resources, to the point that all other forest products industries, including lumber, were de facto subsidiary operations.

The chief proprietors of the tanning industry in the Allegheny region were the Horton and Crary families, who had operated tanneries in the northeast since the colonial era.<sup>lxviii</sup> Walter and Webb Horton located the site of their future tannery operations at Sheffield Station (now Sheffield) in 1864, just as the Philadelphia and Erie Railroad arrived. The site stood at the center of a vast expanse of hemlock forest, which proved adequate to supply the tannery for more than fifty years. Forming a partnership with Horace and Jerry Crary in 1867 as Horton, Crary and Company, the firm systematically built an entire town and service center that served for nearly eighty years as the center of a forest products empire.

This first tannery, called the Sheffield Tannery, was followed in late 1867 by the Horton Tannery under the control of Schoellkopf, Horton and Company. In 1879 McNair & Company built the Tionesta Tannery about a mile east of Sheffield on Two Mile Creek on the P&E line.<sup>lxix</sup>

North of Sheffield, General Roy Stone established the Stoneham tannery in 1867, and Franklin H. Rockwell built the Rockwell tannery about a mile west of present Clarendon at the mouth of Farnsworth Creek in 1871. That same year, H.J. Brooks established a tannery site eight miles up the South Branch of Tionesta Creek from Sheffield, which was then still without rail service. The site became the village of Brookston.<sup>lxx</sup>

This concentration of outside capital investment in the southern Warren County wilderness marked a decisive shift in the economic life of the region. Stoneham, Clarendon, Sheffield, and Brookston grew rapidly with the influx of labor and the new wage economy. The old Holland, Mead, and Lancaster lands, which had languished on the tax rolls for decades, were quickly parceled out

among the tannery interests, with Horton, Crary taking the lion's share of over 30,000 acres. Cherry Grove, Mead, and Sheffield Townships passed almost entirely into the hands of the leather industry.

The decade between 1870 and 1880 saw a steady expansion of operations. The strength of the industry may be gauged by its growth during the middle 1870s, which were largely depression years following the Panic of 1873. By 1880, another growth industry, petroleum, commenced adding to the tannery capitalists' coffers. They leased mineral rights to drillers, took little of the risk, and accrued royalties from rich strikes in the Clarendon, Cherry Grove, and Sheffield oil pools.<sup>lxxi</sup> The company branched out into associated businesses, including blacksmithing, wholesale groceries, and, seemingly as an afterthought, transportation.

In 1879, with most of the land acquisition program complete, Horton, Crary's officers organized the Tionesta Valley Railroad to run down Tionesta Creek from Sheffield. One historian speculates that the combine waited to build a railroad until after all available land had been taken up so as not to inflate its value before purchase.<sup>lxxii</sup>

In 1893 nearly all of the tannery interests in northwestern Pennsylvania merged to form the United States Leather Company. This combine, one of the largest corporations in America, divided its tannery operations into three operating divisions. Two of these subsidiaries had extensive interests in the ANF region. The Penn Tanning Company was the operator of twelve tanneries, including all of the Warren, Stoneham, Clarendon, Sheffield, Brookston, and Kellettsville tanneries. The Elk Tanning Company controlled the tanneries at Arroyo, Portland Mills, Ridgway, and Wilcox.<sup>lxxiii</sup>

Before entering the merger, Horton, Crary completed their land acquisitions, bringing their total holdings to more than 125,000 acres across the four-county region.<sup>lxxiv</sup> Such an immense tract held in reserve helped to pace the development of the property. The shape of that development became clear with the formation of the subsidiary Central Pennsylvania Lumber Company (CPL) in 1903. The establishment of this massive firm, with huge mills scattered across northern Pennsylvania, marked the apex of the industrial logging era. Its size was matched only by the thoroughness of its exploitation of its timberlands.

### *Wood Chemical Plants*

In the middle 1880s, the intensive drilling in the McKean and Elk county oil and gas region resulted in discoveries of large reserves of natural gas. Quickly made available as an industrial fuel, this valuable resource stimulated the local development of several new fuel-intensive industries. Chief among these were a carbon-black factory at Kane, glass plants at Kane and James City, and wood chemical plants at a variety of locations.<sup>lxxv</sup> Specifically, these manufactories were known as hardwood distillation plants, whose primary products were charcoal, methanol, and various acetates. From the turn of the century through the World War I era, the center of this specialty industry gravitated to the Allegheny plateau. There, plentiful raw materials available in the ideal mixture of species--beech, birch,

maple, and oak--coincided with cheap fuel (free fuel when a gas well was drilled on the company's property) and a choice of rail connections to markets.<sup>lxxvi</sup> In 1889, there were 18 such plants in Pennsylvania, four of which were in McKean County. In 1907, there were 53 plants in Pennsylvania, most within a 50-mile radius of Bradford. By 1932 this number had been reduced to 21, with McKean County still the center of the industry. In total, more than 70 hardwood distillation plants were operated in the state over the course of the industry's history.<sup>lxxvii</sup>

The process was fairly simple. Dry hardwood was heated in retorts to recover the constituent tars, gases and distillates. The residual material was charcoal. Of these components, the charcoal and distillate, called pyroligneous acid, were the valuable components. The tars and gases were usually burned as fuel.<sup>lxxviii</sup> Further distillation of the pyroligneous acid concentrate yielded vapors of wood alcohol, acetone, acetic acid, and water. These vapors were then passed through a solution of calcium oxide (CaO), yielding a weak solution of calcium acetate. The unabsorbed alcohol was concentrated to an 80 percent crude methanol, and another concentrating, evaporating, and pressing process yielded 80 to 82 percent "gray" acetate of lime. Now marketable products, the charcoal, methanol, and acetate of lime were sold, often through a sales agency. Each cord of wood, depending on the efficiency of the particular plant, was capable of yielding two hundred pounds of gray acetate of lime, ten gallons of crude methanol, and fifty bushels of charcoal.<sup>lxxix</sup>

The products went to various consumers. Much of the charcoal went to iron and steel manufacturers, where it was used to make charcoal iron or specialty steel alloys. It was also a chief constituent of black powder. Acetic acid, one of the most widely used industrial chemicals, was known as "the most important organic acid."<sup>lxxx</sup> It was used widely in the organic chemical industry to make lead, copper, and sodium acetates, pigments, and cellulose acetate film stock. Acetone, an important industrial solvent, was used in large quantities in the manufacture of Cordite, a smokeless explosive, and in manufacturing lacquers and other solvents. Methanol, besides its use as a denaturant, was also used to manufacture cellulose acetate, and for many years was the only raw material from which formaldehyde could be manufactured. Formaldehyde was an extremely important chemical in the early decades of the century and was an early standard for disinfectant, preservative, and antifungal applications, as well as the base for a number of early plastics such as Bakelite.<sup>lxxxi</sup>

The manufacturer of these wondrously useful modern chemicals, the wood chemical plant operator, seldom inhabited the same philosophical universe as the chemist, and was much more a lumberman than a scientist. Hardwood distillation companies relied on a steady source of cord hardwood, and either made long-term contracts with industrial loggers or purchased their own woodlots. Either way, they relied on logging railroads for their wood supply. Several companies, including the McKean Chemical Company at Dahoga, Elk County, and the Lewis Run Manufacturing Company in McKean County, bought extensive woodlands to ensure long-term supplies and built their own railroad systems. Others relied on second parties, like the Clawson Chemical Company with plants at Barnes in Warren County and Hallton in Elk County. Clawson purchased cordwood from the Central Pennsylvania Lumber Company, which was delivered to the two plants by the Tionesta Valley Railway.<sup>lxxxii</sup>

Wood chemical markets were as volatile as the products. In 1906 Congress passed denatured-alcohol legislation that removed an excise tax on ethanol used for industrial purposes. Ethanol was much

more cheaply made, and overnight both the price and market for methanol fell by two-thirds. On the other hand, demand for acetone used in manufacturing smokeless powder exploded during the World War I era, and prices nearly tripled before the federal government established price ceilings. At that time, ethanol's war use was limited and prices were little affected.<sup>lxxxiii</sup> In 1921 the postwar industrial depression profoundly impacted the markets for both wood chemicals and charcoal, and many plants went out of business. The industry went into its own depression at this point, as less-expensive synthetic processes for methanol and acetic acid manufacture reduced absolute demand for the same organically derived chemicals. Additionally, both charcoal iron and black powder manufacture were moribund industries, and demand for charcoal dropped also. Charcoal was both the bulkiest product and the most expensive to store, since it had to be kept dry. When storage reached capacity due to a soft market, the entire works had to shut down. For this purpose, several hardwood distillers shipped their charcoal to a central sales agency.<sup>lxxxiv</sup>

After 1921, the wood chemical industry was strictly marginal. Outside the region only those plants which were extremely efficient or had captive markets survived. In northwestern Pennsylvania, low operating costs were an advantage, but surviving manufacturers were eventually forced to modernize. A survey of the entire industry in 1932 showed northwestern Pennsylvania manufacturers to have the lowest capacity, the least refined products, and the most casual accounting. Yet 21 of the 49 plants in the country were located there.<sup>lxxxv</sup> This phenomenon underscores the advantage of the ready supply and low operating costs that the region's chemical manufacturers enjoyed.

Towards the end, at least one manufacturer--a lumberman--decided that the second-growth timber was better destined for future sawtimber than conversion to chemicals and charcoal at margin. In 1928, N.P. Wheeler Jr. offered the U.S. Government 14,000 acres of woodland cut mainly for sawtimber but which had been under agreement to be cut for cordwood for the Tionesta Valley Chemical Company. Wheeler wrote:

... I think it will be recognized by all of us that on the tail end of our operation it will be impossible for the Chemical Company to pay us enough for the wood to enable us to maintain our long railroad and put wood over the hill into Mayburg on a Chemical wood proposition alone. ... From all the correspondence and conversations I have had with Mr. Collins he is heartily in favor of seeing second growth purchased by the government and allowed to grow, rather than see it cut into Chemical wood and see it put through the plant at an even break or a loss.<sup>lxxxvi</sup>

### *Specialty products*

Paradoxically, during the peak of the exploitative era from 1880 to 1930, few parts of a tree were wasted. Adjacent to the larger mills was often found a dependent operation that processed materials culled from the main milling process. Lath and shingle mills are good examples. For instance, Teddy Collins built a box mill onto his Nebraska operation shortly after its establishment to process the usable waste from his planing mill.<sup>lxxxvii</sup> Shingle mills were often found near larger operations and used logs

not suitable for dimension lumber. In many cases the proprietor was a former associate of the primary logger or jobber.

One of the most widespread byproduct industries was the Standard Wood company, manufacturers of kindling wood, which built plants at Kellettsville, Sheffield, and Kushequa. These distinctive structures were characterized by their tall, narrow wood-clad steam kiln buildings, which inevitably burned down. Kindling wood manufacturers dried small chunks of waste wood in the kiln building, trimmed them, and then bound them into bundles using an ingenious patent press. The kindling bundles were sold in urban areas chiefly to ignite coal fires in domestic and industrial applications.<sup>lxxxviii</sup>

The forest composition in the area being cut often suggested the subsidiary processing operation. Tracts with good beech or ash timber often prompted the establishment of a turning operation. Levi S. Clough, operating north of Marienville at the turn of the century, also had considerable investments in the furniture industry in Union City, Erie County; a secondary mill at the Clough's Mills site manufactured table and chair legs from bolt-length logs to send to his finishing operations.<sup>lxxxix</sup>

#### *High degree of forest utilization*

As early as the 1870s, the new industrial focus on the local forest resources was having an aesthetic impact. One of Warren's leading citizens, noting the emergence of new industry along the route of the P&E Railroad, commented, "Six large tanneries and several smaller ones have recently commenced the consumption of hemlock bark, and are making sad havoc of the native deer parks."<sup>xc</sup>

This observer correctly noted that the wholesale exploitation of the forest coincided with the capital-intensive operations of the tannery interests. When these same interests formed the Central Pennsylvania Lumber Company, the prevailing ethic, now established, was maximum utilization of the forest resources. A generalized harvesting pattern follows:

In the spring, bark peelers began systematically dropping the hemlocks on a tract to which the railroad had established a spur track. From May to July, the peelers removed the hemlock bark and stacked it in cord lengths. Teamsters hauled the bark to the railhead, where it was hauled to the bark yard at the tannery and stacked to dry for up to a year before it was ground and the tannin extracted.

The teamsters returned to the tract, where the fallers and buckers cut the peeled hemlocks into logs. These logs, as well as the best specimens of the hardwoods--beech, oak, cherry, maple, and ash--were also cut and dragged to the landing at the railhead, where a steam loader hoisted the logs and placed them on the cars. The cars were shunted out to the main stem of the logging spur, where they were hauled to the mill. The log train divided the load between the hemlock mill and the hardwood mill, rolling the logs into the ponds at each mill.

After the sawtimber was removed from the tract, teams of woodcutters took down virtually all of the remaining "cull" hardwoods, down to a diameter of about four inches or less. Only snags, saplings

and small hemlocks remained standing. The woodcutters worked efficiently, cutting a straight swath about sixty feet wide across the tract, and piled the slash in long windrows on either side of their row. After one swath was completed, the cutters began another row, repeating until the entire tract was stripped. They also gleaned the slash for the larger limbs of the hardwood sawtimber. The cordwood was piled and then teamed out to the railhead, where it was loaded lengthwise on flatcars and hauled to one of the several hardwood distillation plants that purchased the scraps from the timbering operations. After drying for up to a year in the woodyard, the wood was loaded into small cagelike rail buggies and wheeled into a retort, where the volatile constituents were distilled out and separated from the residual charcoal. The separate components--charcoal, methanol, and acetic acid--were then shipped by rail to the regional industrial centers: Cleveland, Buffalo, Rochester, and Pittsburgh.

Such an intensive utilization program was related much more closely to mining than to forestry. Indeed, surviving maps of cutting operations noted cutover land as "stripped."<sup>xc</sup> Of the corporate forest products companies, few had further plans for their cutover lands. If the opportunity arose, the land was sold for a fraction of its former value, as there seemed to be no economic rationale for waiting for the next timber crop to mature. Indeed, even visualizing a new crop of trees, where only expanses of blackberry and sun-tolerant seedlings carpeted the landscape, must have been difficult.

The worst threat to the ravaged woodlands was fire. Though forest fires in cutover areas had plagued the lumber industry (and in the oil region, also the petroleum industry) for years.

## **ii. The Call for Conservation**

### **V. Truck Logging/National Forest Era: 1930-1950**

1. Acquisition by Federal Government
2. Institution of conservation practices
3. Vestigial RR operations and new truck operations
4. Last large mills

## Company Narratives

- I. Wheeler and Dusenbury
- II. T.D. Collins
- III. S.S. Bullis
- IV. Elisha Kane
- V. Horton, Crary & Co.: Tionesta Valley Railway
- VI. Central Pennsylvania Lumber Co.
- VII. McKean Chemical Co.

## Part 3: Evaluation of Railroad Resources and Associated Property Types

The logging railroad was only one part of an extensive industrial system, and therefore grades should be considered in the context of their associated property types, including logging camps, skidroads, mill sites, lumber towns, and other built and engineered structures.

Railgrades are a scarce resource on the ANF only in that there are a finite number of them still extant. There are literally dozens of them, and hundreds of miles of grade, making them the most prolific historic property type on the forest. From an engineering standpoint, very little differentiates one from another, and from ones outside the region, other than the style of grading and level of capitalization. This fact militates against their nomination simply on the basis of cultural evidence of the logging industry in a certain area.

Additionally, with the exception of still-operational rail routes such as the Allegheny Railroad (the former Philadelphia and Erie) and the Knox, Kane, and Kinzua Railroad (the former Pittsburgh and Western), there are *no* examples of historic rail corridors exhibiting the highest levels of integrity still extant. Additionally, there are no such examples of logging railroads. Rails have been removed, ties and trestles have been torn out or have decayed, and the grades themselves have deteriorated either from natural or anthropogenic processes. Nomination on the basis of integrity will require a resource that strongly imparts a sense of identity and purpose.

The likely purpose of a railgrade National Register nomination will be as support for some proactive measure, such as adaptive reuse as a rail-trail or non-motorized travel corridor. Nomination as a protective measure may not be an appropriate management activity, given that many miles of railroad grade lie in wilderness areas and have little need for protection from anthropogenic influences.

Recent discussions among Forest Service cultural resource managers have indicated questionable value to the research potential (Criteria D issues) of railgrades in and of themselves. Their chief value in this context is as definition of a high-probability area for locating sites of associated property types, such as logging camps and log landings.



For National Register nomination, a railroad grade system may be eligible:

Under Criteria A

Under Criteria B

Under Criteria C

If a distinct grade exhibiting good integrity cannot be documented historically, it will be considered eligible only if it can be shown by method or type of construction to be unique, significant, and distinct from adjacent or similar grades. Supporting documentation must be gathered showing the tract was once owned by a logger known to have used a logging railroad.

Under Criteria D

Associated Property Types:

Rolling Stock

Railroad Grades

Skidroads and slides

trestles, culverts, and bridges

Structures, appliances, tanks, and associated features

Logging Camps

Railroad Stations and Camps

Historic Rural Landscapes

### *Documentation*

Minimal levels of recordation: All railroad grades identified in the literature and exhibiting features on the ground will, at a minimum, be assigned a site number and surveyed along the historically documented route within the project area. Railroad grades will be recorded as a single site if all portions of it were built in the same era, or operated as a integrated system at the same point of time. Exceptions will be made if the grade is part of a large system that was geographically and/or temporally dispersed, but these will still be linked.

Higher levels of recordation include:

- 35mm photography
- Mapping
- GPS Recording
- GIS Mapping
- PASS form with above data
- National Register nomination

HABS/HAER documentation, at this time, does not appear to constitute an appropriate or necessary form of recordation for any grades on the ANF. Such higher levels of documentation should be undertaken when eligibility has been established, avoidance is not feasible, and a memorandum of agreement with the SHPO stipulates the appropriate recordation level for mitigation.

Factors weighing against eligibility:

- Grade is indistinct and discontinuous. The type of construction of many early logging railroads left little of an imprint on the forest floor, especially if it was constructed on stringers. This method of construction was not limited to just early examples, as photographs of the Bear Creek Tram in Elk County show stringer construction (Casler, 1159).
- Grade is a spur used for an ephemeral operation.

*Mitigation of Adverse Effects*

Upon concurrence with a determination of eligibility, the Forest Archeologist will be responsible for recommending mitigation of adverse effects if management activities are likely to impact the site.

Eligibility of a grade does not necessarily imply that it requires avoidance or protection. Other management activities and undertakings may be appropriate, such as crossing the site with a skidding trail or rebuilding the grade as a motor road. Such undertakings will be examined on a case by case basis.

If a grade is ineligible for inclusion to the National Register, there will be no responsibility on the part of the agency to protect it.

1. Railroad Grades and Associated Structures

- i. trestles
- ii. culverts
- iii. support structures
- iv. logging camp sites
- v. station sites

2. Mill Sites
3. Dams and Water Control
4. Lumber Towns
5. Historic Landscapes

### Relative significance

### Part 3

### Industry Data

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<sup>i</sup>David A. Marquis, *The Allegheny Hardwood Forests of Pennsylvania*, USDA Forest Service General Technical Report NE-15 (Upper Darby, Pa: Northeastern Forest Experiment Station, 1975), 11.

<sup>ii</sup>Samuel T. Dana, "Forestry and Community Development," USDA Bulletin No. 638 (Washington: GPO, 1918), 4.

<sup>iii</sup>Lewis Mumford, *Technics and Civilization* (New York: Harcourt, Brace and World, 1934), 109-212 passim. Mumford credits Patrick Geddes (*Cities in Evolution*, 1915) for first enunciating the Paleotechnic and Neotechnic paradigms, but notes he neglected the preparatory Eotechnic phase.

<sup>iv</sup>Mumford, 109-110.

<sup>v</sup>Stanley F. Horn, *This Fascinating Lumber Business* (New York: Bobbs-Merrill, 1943), 17-20.

<sup>vi</sup>Horn, 19.

<sup>vii</sup>Fred C. Simmons, "Yesterday and Today: Since the Days of Leif Ericson," in *Trees: Yearbook of Agriculture*, 1949 (Washington: USDA, 1949), 688-689.

<sup>viii</sup>*Ibid.*; Stewart Holbrook, *Holy Old Mackinaw: A Natural History of the American Lumberjack* (New York: Macmillan, 1951) is a rich source of anecdote and legend of the social history created by these colorful workers.

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ix William B. Greeley, *Forests and Men* (Garden City, NJ: Doubleday, 1951), 32-33.

X Carroll Pursell, *The Machine in America: A Social History of Technology* (Baltimore: Johns Hopkins Press, 1995), 58-61.

xi Some of this development imperative came from government regulation. With boiler explosions on western river steamboats becoming a frequently recurring tragedy, Congress passed the Steamboat Act in 1852 which set standards for boiler construction and operation. George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York: Holt, Rinehart and Winston, 1951), 68-69.

xii Pursell, 22.

xiii Wilhelm, 4.

xiv W.D. Sevon, ed., *Geology of the Upper Allegheny River Valley in Warren County, Pennsylvania* (Harrisburg: Field Conference of Pennsylvania Geologists, 1992), 67 and passim; also Shailer S. Philbrick, "Kinzua Dam and the Glacial Foreland," in Donald R. Coates, *Geomorphology and Engineering* (Stroudsburg, Pa.: Dowden, Hutchinson & Ross, 1976), 179-188.

xv Ruffner, Charles, 1998.

xvi McKnight, *Pioneer Outline History of Northwestern Pennsylvania, 1780-1850* (Philadelphia: J.B. Lippincott, 1905), 56-57. In 1783, the General Assembly had set aside lands west and north of the Allegheny River and Conewango Creek for donation to Revolution veterans, or to redeem for their depreciation certificates. This was done regardless of the fact that those lands were still legally held by the Seneca. Chief Cornplanter, in particular, remained belligerent to any Euro-American settlement until after 1795. See also Anthony F.C. Wallace, *Death and Rebirth of the Seneca* (New York: Random House, 1969), 168-177.

xvii 15 McKnight, 65-66.

xviii Wilhelmina C. Pieterse, *Inventory of the Archives of the Holland Land Company, 1789-1869* (Amsterdam, Netherlands: Municipal Printing Office of Amsterdam, 1976), 18.

xix One notable exception is Montmorenci in Elk County, settled before 1820; the upland farmland is one of the few fertile spots on the high plateau where agriculture was practiced. Debeers, x.

xx McKnight, 66. Some examples of large transactions: involving land on and adjacent to the ANF: Holland Land Co. (Willenk et al.), 1,105 warrants, 995,400 acres; James Wilson, 510 warrants, 451,000 acres; Herman Le Roy and Jan Lincklean (also of Amsterdam, Holland), 303 warrants, 272,700 acres; Thomas M. Willing, 311 warrants, 311,000 acres; William Bingham, 125 warrants, 125,000 acres; Robert Morris, 185 warrants, 163,000 acres.

xxi Robert Morris Sr. was a prominent financier of the American Revolution, and had been granted the legal right to purchase the lands from the Indians. Wallace, 179-183.

xxii Pieterse, 9-11.

xxiii W.M. Cashman, "Notes on the Holland Land Company, 1792-1836," paper given at the annual meeting of the Warren County Historical Society, 1968 (n.p.); S.P. Johnson, "Historical Sketch of Warren County," in *Historical Atlas of Warren County, Pennsylvania* (J.C. Howden and Co., 1878), 9.

xxiv Ibid.

xxv Defebaugh, 608.

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XXvi Vernelle A. Hatch, ed, *Illustrated History of Bradford, McKean County, Pennsylvania* (Bradford: Burk Bros., 1901), 15; Henretta, 120-121. Bingham died in 1814, but his estate continued to distribute his holdings for many years. One 5,000-acre tract was sold to petroleum prospectors as late as 1875. Most of the former Bingham lands lie to the east of the National Forest in McKean County.

XXvii Struthers, a successful speculator, was also Irvine's lawyer and probably a bad influence. This purchase brought Irvine to the brink of financial ruin, and he was obligated to deed his share in trust to Struthers in order to protect his investment in face of his debts, which were considerable. His father-in-law, Dr. Stephen Duncan, once wrote him, "I consider your rage for improvement nothing short of mental derangement." Wainwright, 60-61.

XXviii Smith, 158.; Henretta, ?

XXix Deeds Elk Co., Pa.: Benjamin Jones to William A. Irvine (August 1, 1853), Book D, p. 338; William A. Irvine to McKean & Elk Land and Improvement Co. (June 10, 1856), Book E, p. 583. Recorder's Office, Elk County Courthouse, Ridgway, Pa. Also Deed Index.

XXX Samuel D. Irwin, "History of Forest," originally published in the *Forest Press* in 1868; reprinted in *The Forest Press* Centennial Issue, February 9, 1967, C6. Irwin noted "this portion of the county is not by any means thickly settled yet, the lands being for the most part in the hands of new residents."

XXXi Wilhelm, 22.

XXXii Neville B. Craig, *The History of Pittsburgh with a Brief Notice of its Qualities of Communication and other Advantages for Commercial and Manufacturing Purposes* (Pittsburgh, 1851), quoted in Reiser, 57.

XXXiii Nicholas B. Wainwright, *The Irvine Story* (Philadelphia: Historical Society of Pennsylvania, 1964), 48.

XXXiv Childs, 10. Forest County was formed by the division of Jefferson County in 1848 and Venango County in 1866.

XXXv Casler, 901.

XXXvi Childs, 97.

xxxvii Defebaugh, 615.

XXXviii Catherine Elizabeth Reiser, *Pittsburgh's Commercial Development, 1800-1850* (Harrisburg: Pennsylvania Historical and Museum Commission, 1951), 11.

XXXix Iron contributed \$56,548 to Pittsburgh's economy; boat building \$40,000, and wood \$33,900. Zadock Cramer, *Almanack for the Year 1803*, in Reiser, 14.

Xl Leland D. Baldwin, *Pittsburgh: Story of a City, 1750-1865* (Pittsburgh: University of Pittsburgh Press, 1937), 192.

xli Johnson, 9.

xlii J.H. Newton, ed., *History of Venango County* (Columbus, O.: J.A. Caldwell, 1879), 180.

xliii Reiser, 57.

xliv Ibid., quoted from the *Meadville Messenger*.

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- xlviJohnson, 9.
- xlviCasler, 1139-40.
- xlviDefebaugh, 595.
- xlvi*Ibid.*, 597; Lewis Edwin Theiss, "Lumbering in Penn's Woods," *Pennsylvania History* 19 (October 1952), 399-404.
- xlviNavigating a log-filled river was extremely hazardous, so log driving and log rafting only rarely coincided.
- lCasler, 863.
- li<sup>47</sup>For instance, Warren County tax assessment records for Cherry Grove township from 1880 to 1883 show a boom of sawmills concurrent with the oil excitement.
- lii*Petroleum Age* 1 (May 1882), 218.
- liiiPhilip W. Ross and Michael Caplinger, *The Historic Petroleum Industry in the Allegheny National Forest* (Morgantown, W.Va.: Institute for the History of Technology and Industrial Archeology, 1994), 29-34.
- livCasler, 824-826.
- lv*Ibid.*, 828.
- lvi*Ibid.*, 827. The route of the Warren and Farnsworth Valley Railroad is preserved in the alignment of Forest Road 154, which adapted its grade for most of its length.
- lviiSchenck and Rann,
- lviiiReport, Road Committee to Board of Directors, Sunbury and Erie Railroad, May 19, 1859; quoted in Henretta, 176.
- lixCommonwealth of Pennsylvania, *Reports of the Several Railroad and Canal companies of Pennsylvania for 1865* (Harrisburg, 1866), 425.
- lxBruce Smith, *Historical Collections of Sheffield Township, Warren County, Pennsylvania* (Warren, Pa.: The Mohr Printery, 1943), 424.
- lxiThe route apparently never paid its own way. The Pennsylvania operated the division as a consistent loss, with its best year in 1923 when it lost only \$78,000. Norman J. Perrin, *The Western New York and Pennsylvania Railway* (Boston, Mass.: Railway and Locomotive Historical Society, 1943), 1-5.
- lxiiGeorge W. Hilton, *American Narrow Gauge Railroads* (Stanford, Cal.: Stanford University Press, 1990),
- lxiiiRonald Childs, *History of Forest County, 1867-1967: from the Files of the Forest Press* (Tionesta, Pa.: Forest Press, 1989), 349-350.
- lxivAlong the P&E, Kane was especially known for its healthful climate and mineral springs. See J.E. Henretta, *Kane and the Upper Allegheny* (Philadelphia: privately published, 1929) 24, 35 and passim.
- lxvSee Roy Clarkson, *Tumult on the Mountains: Lumbering in West Virginia, 1770-1930* (Parsons, W.Va.: McClain Printing Co., 1965). Several films document the last days of railroad logging in the central and southern Appalachians in the 1950s and 1960s.

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lxvi Walter Casler, interview by author, 24 August 1994. Mr. Casler died in 1997. It should be noted that while Mr. Casler was one of the leading historians concerning railroad logging technology in northwestern Pennsylvania, this rationale is speculative and was not documented by specific cases.

lxvii Casler, 804.

lxviii Casler, 804-8.

lxix 806.

65807-9.

lxxi Another lucrative source of income for both Rockwell and Horton, Crary were their plank roads to Cherry Grove, which were converted to toll roads as the boom struck. Horton, Crary operated some of their own oil leases, and a subsidiary opened the pool that pointed the way to the gusher pool at Cooper Tract. The natural gas found east of Sheffield provided cheap fuel and light for Sheffield's homes and industry. See Bruce Smith, *Historical Collections of Sheffield Township* (1943); Casler, 808, 823.

lxxii

lxxiii Taber, 1083: map.

lxxiv Casler, 811.

lxxv Anon., *History of the Counties of McKean, Elk, and Cameron in Pennsylvania* (Chicago: DeBeers, 1890), 620x.

lxxvi

lxxvii Charles L. Campbell, "The Wood-Distilling Industry," *Metallurgical and Chemical Engineering* 8 (March 1910), 155-159; R.S. McBride, "Hardwood Distillation Faces New Economic and Raw Material Problems," *Chemical & Metallurgical Engineering* 39 (October 1932), 534-538; Taber, 753.

lxxviii In some other regions, the tar was distilled into other valuable components, but this was never done in Pennsylvania (McBride, 536 chart). In some cases the tar was simply discarded, and several accumulations of this tar in the ANF have created hazardous waste disposal problems.

lxxix Campbell, 155-156. A cruder product, manufactured by the earliest "acid factories," was "brown" acetate of lime--simply evaporated neutralized pyroligneous acid.

lxxx D.F. Othmer, "Acetic Acid and a Profit from Wood Distillation," *Chemical and Metallurgical Engineering* 42 (July 1935), 361.

lxxxix L.F. Hawley, "Wood Distillation Industry," *Chemical and Metallurgical Engineering* 25 (July 27, 1921), 138.

lxxxii Taber, 1055-1059, 1099[1]-1099[14].

lxxxiii Hawley, 138-139.

lxxxiv Taber, 760.



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lxxxv McBride, 535-538.

lxxxvi Correspondence, N.P. Wheeler to Fred R. Klinestiver, October 26, 1928. Judson Wilson collection, Kellettsville, Pa.

lxxxvii Casler, "Collins Empire,"

lxxxviii Casler x. the Keystone Wood Company was a competing kindling manufacturer.

lxxxix Casler, "Collins Empire," x

<sup>xc</sup>Johnson, 10.

<sup>xc</sup>i Central Pennsylvania Lumber Company, Map of Sheffield Operations, 1931; in map collection of the Warren County Historical Society, Warren, Pennsylvania.

*Log Drives  
on the  
Connecticut River*

Bill Gove

2003

Bondcliff Books

LITTLETON, NEW HAMPSHIRE

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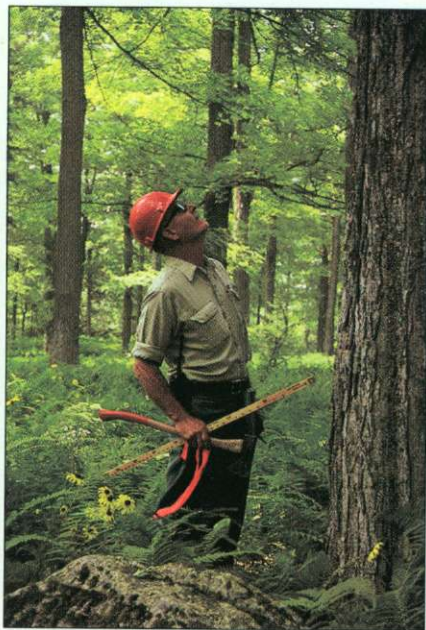
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# From Field to Forest

*Over the Past 200 Years,  
The Great Forests of Vermont Have Been Reborn;  
Now What?*

**I**F DAIRY FARMS are the heart of the Vermont landscape, then forests are its soul. No other natural resource in the state has such presence and diversity. Take your pick: Apples. Firewood. Scrabble pieces. Wildlife habitat. Furniture. Maple syrup. Toys. Clothespins. Simple beauty. Vermont trees provide them all. The oldest living thing in Vermont is probably a tree. And each fall it is the trees that transform the hills into a blaze of red, orange, and yellow.

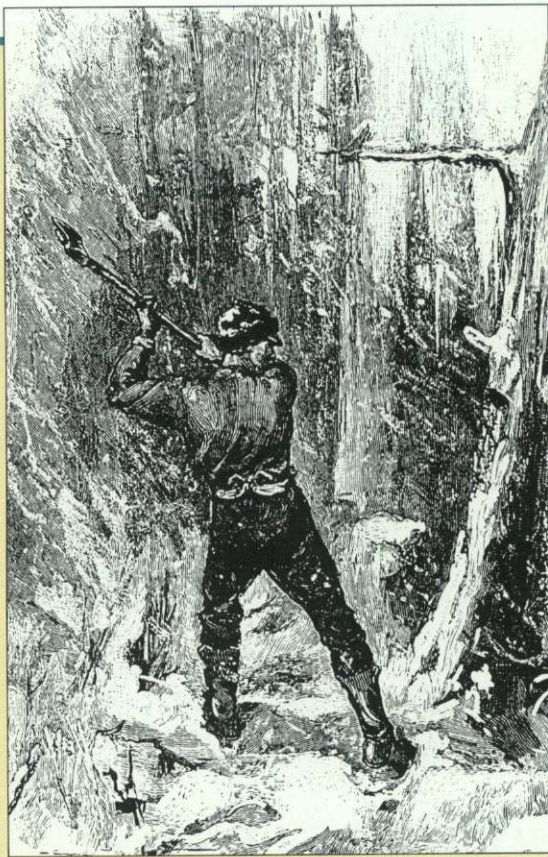
But Vermont's mountains weren't always rich in forest. More than two centuries ago the trees stood in the way of settlers eager to clear them for farming. And clear they did. In what was nothing short of an ecological catastrophe, between 1760 and 1850 three quarters of the forest that had dominated Vermont's landscape for thousands of years fell to the ax, the torch and the plow.



By BRYAN PFEIFFER

Through the remarkable force of nature and the resiliency of trees and soil, however, the woods have reclaimed the state. Rising from Vermont's abandoned hill farms is a forest that today covers 4.5 million acres, or about 75 percent of the state. It grows along old stone walls and the remnants of farm roads in what were once fields. It sprouts in old pastures manured by generations of farm animals. It rises through the cellar holes of vanished houses, wraps itself around old, cast-off farm equipment, and engulfs the abandoned orchards of long-gone subsistence farms. Ask anyone who has ever tried to keep a patch of Vermont ground clear of brush and saplings about its speed and relentlessness.

These new woods have become a powerful natural resource, shaping a heritage, creating an economy and asking little in return. And as the state be-



"The surface of the town [Pawlet] in its virgin state was clothed luxuriantly. On the alluvials grew the sycamore and elms, on the swamps and marshes the hemlock, tamarac, and black ash, while on hillsides and mountain slopes flourished the pine, sugar maple, beech, birch, and several species of oak ... Its mountain heights were crowned with spruce and cedar. The early settlers consigned to the log-heap many a towering pine and stately oak, which if left to the present time would have been of great value."

Abby Hemenway,  
describing early Vermont in  
*The Vermont Historical Gazetteer*, 1877



"Most of the country is still unsubdued by the plow. Innumerable stumps, the remains of the pristine forests, deform the fields. Pines, scorched and blackened by fire, or piled in confusion in fields cleared half by axe, half by burning, indicate a country in some parts, at least, imperfectly subdued by man."

Benjamin Silliman, 1819

gins its third century, Vermonters are taking a closer look at their trees, their protection and their sustainable use.

"For a lot of our history we've asked 'what can our forest provide for us?' " said state naturalist Charles W. Johnson. "Now, and in the future, we should be asking 'what can we do for the forest?' "

The forests the first Vermonters encountered were distinct from the forests of today. The settlers saw to that.

Arriving in increasing numbers after 1763 — when the Treaty of Paris ended the French and Indian War, they entered an unbroken, dark, deciduous forest rich in maple, beech, birch, basswood, and oak, interspersed with hemlocks and giant white pines. Spruce and fir prevailed at higher elevations and in the northeast corner of the state. Mountain lion, black bear and timber wolf roamed the woods. White-tailed deer, moose and turkey were common, as were smaller mammals such as beaver, marten, fox, fisher and lynx.

To carve out an existence in this wild world, the settlers immediately assailed the trees. Hardwoods served as fuel and, along with softwoods, became building materials. Potash made from wood ash became fertilizer as well as a raw material for production of soap. So relentless was the deforestation (despite the lack of chainsaws and logging trucks) that settlers often simply girdled trees and burned them to make room for sheep, cattle and crops.

By the 1850s nearly 70 percent of the state was treeless. Only the remote spruce-fir forests remained relatively untouched. The painters of the Hudson River School, which celebrated the beauty of the natural landscape between 1825 and 1870, rarely painted in Vermont, notes Carl Reidel, director of the Environmental Program at the University of Vermont: "There was nothing to paint," he said, "but sheep and bare hillsides."

Stripped of their protective trees, the hills eroded and darkened the rivers and streams with mud and debris, no doubt killing fish populations. Their habitat destroyed, other wildlife was soon wiped out. And by the late 1800s, the last great predators of the Northeast, the timber wolf and the mountain lion, were hunted or pushed out of existence (although some people insist

a few catamounts remain).

Vermont George Perkins Marsh, a lawyer, diplomat, politician and historian, saw the harsh effects of deforestation at home and in his world travels during the nineteenth century. His experience shaped him into one of America's first conservationists, and he warned in his 1864 book *Man and Nature* that man's domination of nature would destroy it.

But as Marsh sounded his warnings, Vermonters began to leave the land. The advent of the railroad, the Civil War, the dawn of the industrial age and its higher-paying jobs, and the fertile, flat tracts of the Midwest all combined to beckon farmers from the rocky hills of Vermont.

The exodus gave the forest an opportunity for renewal. Abandoned pastures grew first into shrub and later were reclaimed primarily by white pine, a pioneer species. Although reforestation had begun to take hold, logging continued for the softwoods in higher elevations and the Northeast Kingdom. Commercial logging operations surged into the late 1880s as the country grew. Timber was moved from Vermont over new railroads and by the great log drives on the Connecticut River to pulp, paper and saw mills supplying the growing markets of southern New England. Around the turn of the century the white pine that had reclaimed the pastures was mature enough to harvest. In the understory of those pines grew young, shade-tolerant hardwoods. When the pine was logged, the hardwoods flourished and became the predominant forest of today.

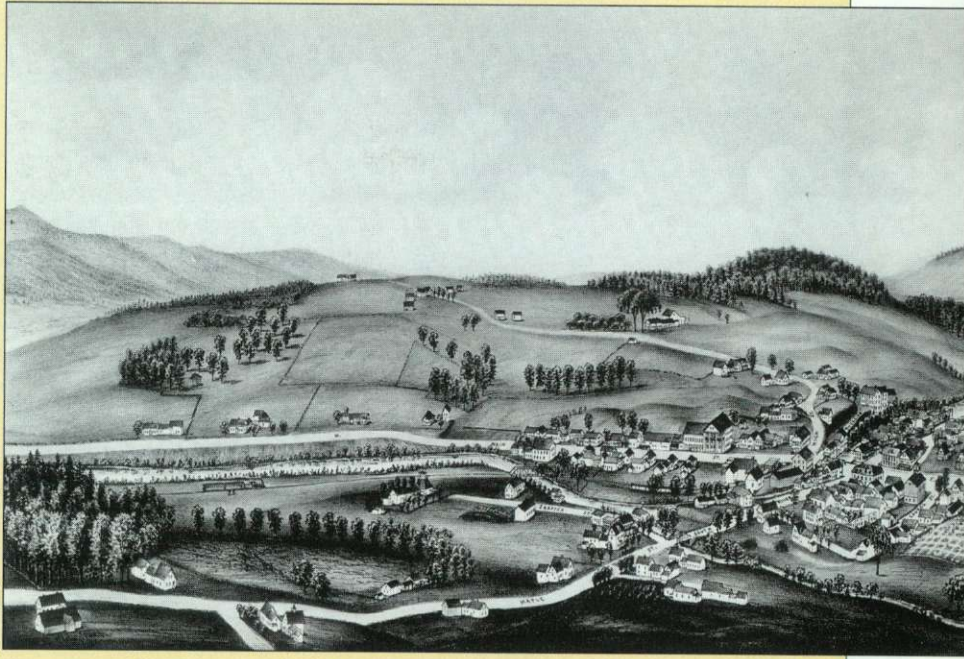
Foresters and naturalists like to say that this new forest is not just any woods. The northern hardwood species that now dominate so much of Vermont — sugar maple, American beech, yellow birch, and red maple, among others such as ash and cherry — create a forest ecosystem found in few places other than the northeastern quarter of the United States. Almost nowhere else on Earth can offer so much maple syrup, such bright fall foliage, such high-quality wood products and such great ecological diversity.

"You forget that this is a very exceptional and fascinating ecosystem," said Mollie Beattie, a forester and for-

By 1870, 68% of Vermont land was open for farming; since then, more than two million acres of farmland have reverted to forest, and today only about 25% of the state is cleared land.



Lithograph of Wilmington, 1891



"The wild forest had receded and given place to broad fields of tilth, meadow land, and pastures, not now in the uncouth desolation of stumps and log-heaps, but dotted with herds and flocks. The jangle of the sheep-bell was as frequent as the note of the thrush in the half-wild upland pastures...."

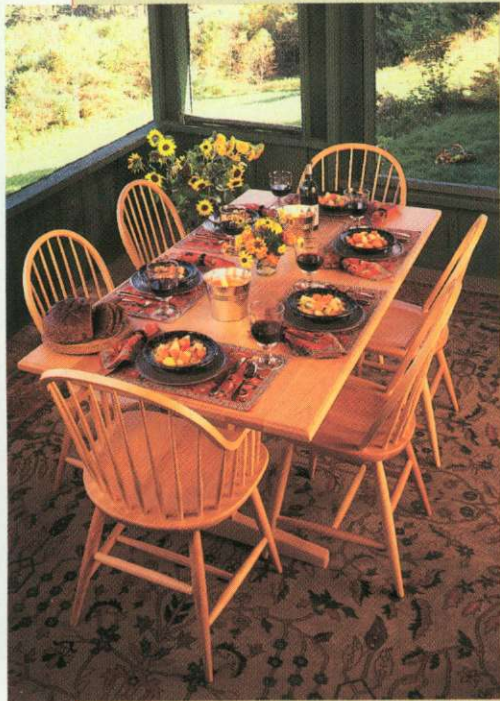
Rowland Robinson, writing in 1892 about the heyday of Vermont's sheep industry, 1840-50

Log drive on the White River at Sharon, 1895. Vermont Historical Society



"With the disappearance of the forest, all is changed. The face of the earth is no longer a sponge, but a dust heap, and the floods which the waters of the sky pour over it hurry swiftly along its slopes, carrying in suspension vast quantities of earthly particles ... The earth, stripped of its vegetable glebe, grows less and less productive, and, consequently, less able to protect itself ... Gradually it becomes altogether barren."

George Perkins Marsh,  
*Man and Nature*, 1864



Vermont hardwood furniture (above, by Pompanoosuc Mills) is nationally known.

## The Growing Future of Wood

these hardwood forests is enormous, and they see expanding markets for specialty wood products.

"I think the niche markets are going to be our answer," said Conrad Motyka, state commissioner of forests, parks and recreation. "And there are several reasons for that. One is that we have a raw material that will provide that for us — at home. And we have an image, that made-

in-Vermont image, that is very saleable in the upscale marketplace."

"We now have quite an incredible variety of manufacturing firms out there," said Bob De Geus, a utilization specialist with the forests and parks department. "There are people making furniture, tool handles, prefab buildings, paper, log homes, plywood, sporting goods, clothespins, bowling alleys, musical instruments — there are some highly respected violin makers in this state now ..."

In fact, the state estimates that there are more than 10,000 Vermonters employed in wood products and forest-related jobs, about 60 percent of them in secondary wood manufacturing. Many of those businesses are small, but have considerable potential for expansion. "It bodes very well for the future," De Geus said.

"In the Northeast we have pretty much a corner on the fine temperate hardwoods," notes David Stevens, a state forest products marketing expert. "As tropical woods fall more into disfavor

you'll see more people turning to northern hardwoods."

The beauty of the wood products industries developing in Vermont, De Geus said, is that they have a strong economic reason to be here: their raw materials grow and are harvested nearby. "It isn't really sensible to have your main plant in New York City while your raw materials are growing in Washington County, Vermont," he said. "It pays to keep your plant close to home."

The result? Many young, idealistic entrepreneurs devoted to quality woodworking are founding businesses in Vermont. They have quickly established themselves as flexible, economically viable expressions of the Vermont ethic. And they make money.

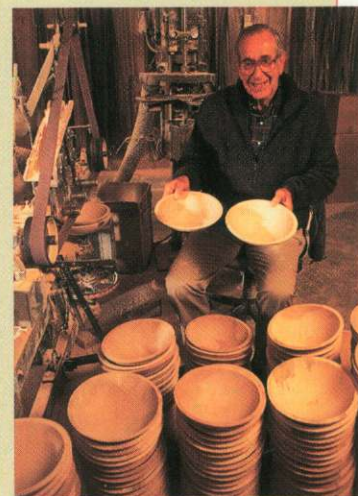
A "Vermont style" is beginning to be recognized in furniture produced in the Green Mountains. It combines traditional and modern design elements with bold use of the lighter hardwoods, such as sugar maple, birch and ash, and the high quality for which Vermont is known.

"The quality is consistently high from shop to shop," said De Geus. "And what's happening here is consistent with what people think about Vermont ... They're concerned about the quality of the environment, about making their shop not only a safe place

to work, but a good place — a place where people want to come to work."

Overall, forest-related industries are growing slowly, about one or two per cent per year, De Geus said, but he believes that's probably good.

"This is not going to bring a boom — there isn't going to be a Massachusetts Miracle based on furniture manufacturing," he said.



Bob Fuller's Granville Manufacturing Co. makes 125,000 hardwood bowls a year.

"But when you have businesses growing at a modest pace, like as not they're going to be around for a while. Now we have a substantial group of small industries from which growth is going to come in the future, and that's very healthy."

Finishing furniture at Ethan Allen Inc. in Beecher Falls.



**W**HAT DOES the fact that Vermont is now a forested state mean for the state's future? Most of the experts interviewed for this article agreed that the resurgence of the forest offers important economic opportunities — if Vermonters can only realize them.

University of Vermont Professor Emeritus Hubert Vogelmann, one of the scientists who studied the effects of acid rain on Vermont's high-altitude forests, said that the German foresters and botanists who came to Camel's Hump to review his work were astounded by the richness of the lower-altitude deciduous forests they saw in the Green Mountains.

"They kept saying things like 'do you realize what you have here?'" Vogelmann recalled. "The rest of the world can grow conifers, but there are very few corners of this earth where you can grow hardwoods like maple and yellow birch — and they grow better here than almost anywhere else!"

State officials believe that the potential for industries based on

mer state commissioner of forests, parks and recreation, "much more so than a lot of places that are known for their woods. And we tend to take it for granted."

Other major forest types in the state include the spruce-fir forests of high elevations and the Northeast Kingdom and the white pine-red pine forests largely inhabiting the valleys near the Connecticut River and Lake Champlain.

The return of the forest brought back wildlife as well (see page 47). The wolf has not returned, but the coyotes' oft-heard nighttime howl hearkens back to the forests of pre-settlement times.

How healthy are Vermont's forests? The good news is that most experts say they are hardy, and lack any imminent environmental threat. A recent state evaluation of major tree species revealed that most had grown healthier between 1986 and 1991.

"Overall our forests are healthy," said Sandra Wilmot, forest health specialist at the Vermont Department of Forests, Parks and Recreation. "We're finding that over 90 percent are in our 'healthy' category, which is great."

But Wilmot and other experts warn that trees nonetheless face an assortment of hazards ranging from high winds to global warming. Vermont's forests are robust, but insects, acid rain, ozone, drought and diseases pose environmental threats individually or collectively. It appeared that circumstances were just right for the pear thrips invasion of 1988 that damaged nearly a half-million acres of maples in southern Vermont. But experts wondered whether some combination of adverse environmental factors put a general stress on the maples, making them less able to withstand the tiny insects. The industrial age and its pollutants, after all, are new forces in the long, slow life of a forest.

"Yes, it's resilient," said Beattie, "but when you consider all the insults that have been heaped on it in the last 200 years, the question is how much longer can we rely on that resiliency?"

"Our intervention has made a big difference and I'm not sure we know the ecological impacts of that."

Perhaps more important than environmental factors, economics is also a force in the Vermont forest. Eighty-seven percent of it is privately owned, and depends on the stewardship of

66,000 landowners — ranging from homeowners to utilities, from farmers to timber companies. During the last century these landowners and others, such as the federal government's 345,000-acre Green Mountain National Forest, have created what is often called a "working landscape." These privately owned forests serve multiple purposes: They are managed not only for timber but maintained for hunting, wildlife habitat, scenery, cross-country skiing, hiking, snowmobiling and other recreation.

One tool for preserving Vermont's working landscape is tax policy. Landowners who agree to protect their forests under a state-approved forest management plan pay taxes on the property's forestry value rather than its higher fair market value — and the state reimburses towns for the difference. Informally called the "current use" program, the approach recognizes that sound long term management of the forest often brings a lower financial return than wholesale cutting or housing development. The land is therefore taxed accordingly — at its "current use" value rather than its development value.

"If you're going to tax people on their land for its value to grow second homes or condos," said Beattie, "they don't have much incentive to grow trees."

Current use taxation has grown quite popular, covering approximately 8,900 parcels comprising 1.4 million acres of forest and farmland. But Vermont has been forced, like many other states, to pinch pennies in its state budget and the current use program has been eyed for cuts — to the dismay of both environmental groups and land owners.



Examining birch logs for Ethan Allen Inc.; Alden Pellett

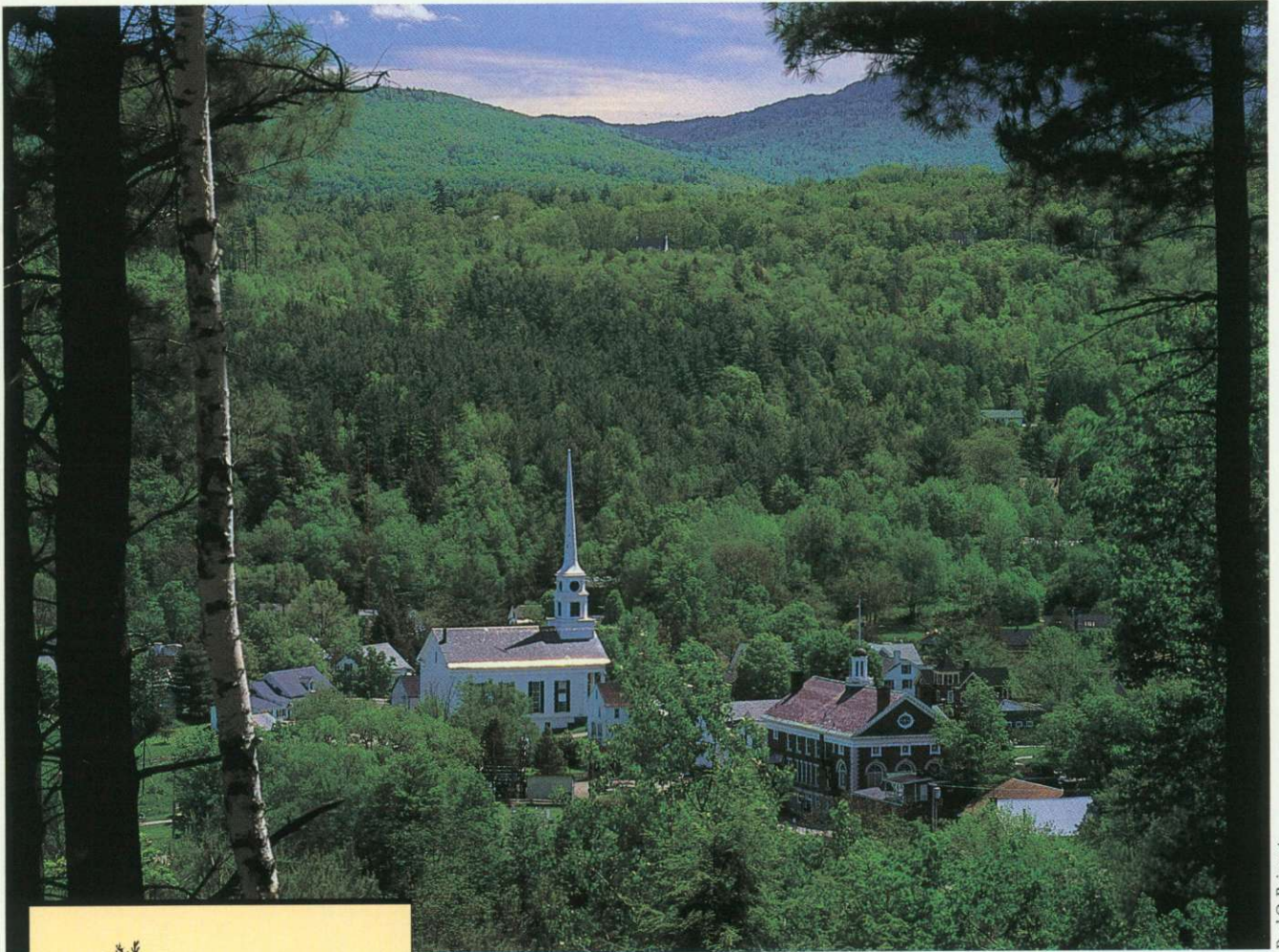
"To the distant eye, our forests do not reveal their checkered history. To most, they seem to have been here always, and promise to be here forever, making the mountains and valleys beautiful, providing us work and play and inspiration. But appearances are deceiving. With regained prominence, they are at risk of being taken for granted.

Over centuries of use, these forests have served us well. And now it is our turn to reciprocate. It is we, not they, who need to be of service, for the sake of both our futures."

Charles W. Johnson,  
Vermont State Naturalist,  
1993

**B**ecause of its diversity, its growth rate, and the fact that precipitation falls here in similar amounts almost every month of the year, Vermont's woods have been compared to the rain forests of the tropics. "I think the analogy's pretty good," says UVM's Carl Reidel. "The only place on earth that probably has more diversity is the tropical rain forest."





Paul O. Boisvert



In the 18th century the white pines that towered above the surrounding trees captured the imaginations of Vermont's new inhabitants. Even as the settlers brought down the forests, they incorporated pines into the young state's coat of arms and the Great Seal of Vermont.



Of Vermont's 6 million acres, 4.5 million, or about 75%, are wooded.

*Once bordered by cleared fields, the resort village of Stowe is now surrounded, like most of Vermont's towns and small cities, by tree-covered hills.*

Although New England's economy and its real estate market have slowed considerably since the late 1980s, Beattie said recreational and development pressures remain: Residential and second homes still push deeper into the forest, helped along in part by four-wheel-drive vehicles that make routine access more reliable. And Vermont is within a day's drive for tens of millions of people in the East. "We are Central Park to New England," said Beattie.

That notion became clearer in 1988, when a French company, Diamond Occidental Forest Inc., put up for sale nearly 500,000 acres of forest land in New York, Vermont, New Hampshire and Maine. Because the land was not only offered to timber companies but also to real estate developers, the sale shook the earth beneath the working landscape [VL, Autumn 1989]. Although some key parcels were ultimately protected as natural areas, the timber sale drew attention to 26 mil-

lion acres of forest land stretching from New York to Maine. Dubbed the Northern Forest Lands, the territory includes privately owned forests covering much of northeastern Vermont.

Today, a federally created Northern Forest Lands Council, a non-regulatory task force with members from the four states, is working to protect the working landscape of the Northern Forests. The council's mission is to reinforce the patterns of land use and private ownership that have characterized the region for decades and have fostered forest-based economies.

In 50 years, Vermont's landscape will look much as it does now, forestry professionals believe, because the forest has reclaimed about as much land as can be expected. It is likely, they say, that new development will move into the newly forested areas, making forest management tricky.

But the underlying tone of many of the comments these days about Ver-

mont's changing ecology is positive, not fearful. More and more, Vermonters are beginning to see the resilient and many-faceted forests that surround them as a resource — an opportunity waiting to be used properly.

"I see more common sense — more ecological sense, even more economic sense — evolving in the next several decades," said Larry Forcier, dean of the University of Vermont's Division of Agriculture, Natural Resources, and Extension. "I think we're going to continually get smarter in finding ways of creatively managing and using the forest resource we now have."

A resurgent, well-managed forest can help create a 21st century Vermont that is clean, economically vibrant, and a pleasant place to live, said Forcier:

"People will come to appreciate, more and more, the peace and stability that come from working on a long-term renewal activity such as managing a woodlot.

"People will want to be in Vermont because of the quality of life they will find here. The forest will be part of that, as will the self-confidence and competence [of Vermont's people], all those characteristics we've valued in Vermonters for two centuries."

#### For More Information

Landowners interested in help managing Vermont woodland can contact their county forester or independent private foresters; the state Department of Forests, Parks and Recreation, 244-8716; or the University of Vermont Extension Service office in their area.

A recent book on managing forest land is *Working with Your Woodland, A Landowner's Guide*, by Mollie Beattie, Charles Thompson, and Lynn Levine, published by the University Press of New England.

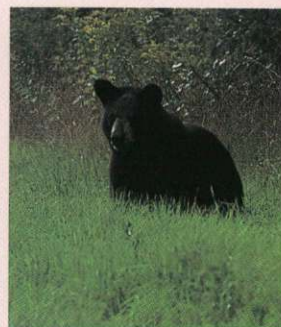
*Bryan Pfeiffer, a reporter for the Rutland Herald and the Barre-Montpelier Times Argus, wrote about Bald Mountain Natural Area in our Summer 1992 issue. He cites the books The Nature of Vermont, by Charles Johnson, and Visions, Toil and Promise: Man in Vermont's Forests, edited by Charles Browne and Howard B. Read Jr. and published by the Fairbanks Museum, St. Johnsbury, as references for this article. Vermont Life thanks the Vermont Historical Society and Paul Eschholz of the University of Vermont for assistance in locating the quotations on pages 42 and 43.*

Charles H. Willey



There were fewer than 5,000 deer in Vermont by the 1850s, when the state was nearly 70% treeless. Deer hunting was banned in 1865, and by 1878 deer were so scarce that 17 were brought into southern Vermont from New York to expand the herd. Today there are more than 120,000 deer.

Charles H. Willey



By the middle of the 19th century, there were fewer than 200 black bears in Vermont; today there are more than 2,000, although there are concerns about the effects of development on bear habitat.

Jim Blakeslee



Wild turkeys had vanished from Vermont by the time land clearing reached its height. A reintroduction program begun in 1969 has put the number today at roughly 15,000, with the highest concentrations in the southeastern and southwestern parts of the state and in the Champlain Valley, areas with the oak trees turkeys depend upon for acorns.

There were no coyotes in Vermont when the first settlers arrived, but in this century they began to filter into the state from the north and west. The first recorded Vermont coyote kill was in 1948. Today the population is estimated at between 3,500 and 5,000.

John Hall/Vt. Fish & Wildlife



Charles H. Willey



By the mid-1800s, there were probably no more than 20 moose in the state. Today there are between 1,000 and 1,500, and a limited moose season is being considered to reduce moose-car collisions in northeastern Vermont.

Lovell, Mrs. Frances and Mr. Leverett C. History of Rockingham.  
Bellows Falls, VT (1958)

Chapter III: Industries and Finance

LOG DRIVES:

Came down the Connecticut River each spring from the forests far up the river. While today paper can be made from hardwood, in 1900 log drives consisted mainly of pine and spruce. (57)

In 1915 the last big drives went over the dam. Logs had been going over the dam for 60 years when the first drive went through in 1869.

Previous to 1870, log rafts 12x60 were poled down the river as men learned the Connecticut was an easy and accessible route.

Remains of old piers in middle of river- crypts of logs filled with rock. Men came on ahead of the drive each spring to fashion the booms of 40' logs chained end to end, from bank to pier. The upper end of the boom acted like a gate, swinging back and forth to let logs in and out, sometimes 50 acres of dancing, fighting trees and water. (59)

The logs were boomed next to the Vermont shore about 1 mile above Bellows Falls, before other drives came through, then were herded across the river a few at a time to the opposite shore where they were heaved onto the bank by a donkey, or engine on a raft to be sawed and trucked to a mill. (60)

Gove, William. "Development of Lumber and Railroad Industry Victory and Granby, Vt."

"The first income from the forest was realized from the manufacture of potash. As hardwoods were cleared.. it was piled and buned. The ashes were leached and boiled into lye salts for making soap."

First timber species sought by the local lumbermen (early 19th c.) was the white pine. King of the lumber industry during this era. Mostly gone by 1860 (3)

Until commercial sawmills were available (1841 for Moose River) almost all the logs cut in Victory were driven downn the river.

"The Moose River remained an important log transportation avenue for many generations. In 1874, at a time when a number of water-powered and steam-powered sawmills were located on the river, the Moose River Improvement Co. was chartered to further improve the channel for the many sawmill operators to float down their logs or manufactured lumber."

#### THE FIRST SAWMILLS

In 1791, the year after the first settlers came to Granby, the town fathers offered a land gift to the one who could establish the town's first saw and grist mills.

The earlys sawmills were quite small in size and used an up-and-down saw.

Power was obtained by harnessing the rivers and streams, at that time usually offering a more dependable flow than in the era after the virgin forest was removed. A small "flutter wheel" was a common type of waterwheels with samills.

#### DEVEL. OF COMMERCIAL SAWMILLS

In the 1840s the circular saw became improved to the point that its use was practical on a commercial scale, and a mild revolution occured in the sawmill industry. Production much greater. By this time the use of pulleys and belts had improved also.

Also evident by this point was the development of the water turbine, an encased wheel on the end of a usually vertical shaft that made more efficient use of water.

The timber cut during this era of early expansion of the sawmill industry was almost exclusively the softwood or conifer species. Markets for softwood lumber were still partly local ones, as yet lacking suitable transportation facilities to reach the populous regions.

With railroad opened a market for rr ties.

During the 1850s and '60s large areas that had been clear cut of timber were burned over to make blueberry fields and yielded large crops for years.

The real impetus to major lumbering activity began in 1871 when the Portland and Ogdensburg RR was completed. 25 years of glory followed for Victory.

#### LARGE SAWMILL ERA (1882- 1911)

C.H. Stevens and Co. build their own logging rr.

As many as 3 sawmills operating in Steven's Mills. All circular sawmills, powered by steam, and equipped with edgers, trimmers and planers. Also clapboard mill and box shop. Products made from the 10 million board feet of logs sawn annually were framing lumber, boards, spruce and hardwood flooring, spruce clapboards, box shooks, turned and sawed hardwood chair stock, shingles and lath.

Whole villages, such as Bog Pond Mill settlement, came and went with the loggin industry.

By 1905, with the last of the large areas of virgin spruce gone, there was no hope of sustaining the era of the big sawmills.

Telephone Interview with Bill Gove, Friday Feb. 23, 1990

Lumbering begins in early 1800s. The big log drives begin after 1850; smaller ones before.

With coming of rr and ability to move large amounts of lumber you get big lumber mills. RR is impetus to large-scale lumbering and logging. Markets increase. Could get large tracts of land cheaply.

There were half a dozen logging rr's in Vt at one point; no tracks remain.

Sawmill villages, such as Victory

Logging camp typically included: bunkhouse, barn for horses, cooking and eating shacks

Sawmill village might include sawmill, residences, warehouses, and might have store and/or church.

French Canadians were big loggers; farmers often logged, too

Some logging for pulp. 6-8 pulp mills in Vt over time. Big one in Readsboro. One in Sheldon Springs, in Middlebury. Often side by side with paper mill. (Georgia-Pacific Paper mill used to do its own pulping)

Pulp mills: 2 process- mechanically chew into fiber; chemically break down; combination of the two. Need large vats in which wood is broken down, cooked, washed, pressed into mats. Involves alot of water.

Logging in Vermont reached hieght around c.1880. Primarily spruce. Most of the big logging/lumber operations went out of business by about WW I. All accessible old growth had been cut.

1920s- ag in upper elevations declined. reversion to woodland.

Today Vermont is 76% commercial forest land??? Cutting more than ever (if you include firewood, chipping). 50% softwood- construction; 50% hardwood- primarily furniture and industrial.

More goes out than comes in (LOGS?)

Problem with logging tracts in Northeast Kingdom. TAXES. So expensive to hold that land. Also, transportation better, don't need to be close to source so can go to Canada.

Today Vermont forests are being cut as much as ever;

Advent of crawling tractor in '30s made lumbering a year round operation

Gove, William. "Mountain Mills, Vermont and the Deerfield River RR." Northern Logger and Timber Processor. 17 May 1961, pp.16-20, 36-38.

Mountain Mills, VT- describes "skeletal remains of what was once a major forest-based industrial complex employing hundreds." (16)

"Submerged under the waters of Harriman Reservoir lie the foundations of an industrial town conceived and built by four brothers who were real pioneers in the pulp and paper industry in the United States.

**PROPERTY TYPE:** Logging and Lumber Production

**HISTORIC OCCURRENCE/SURVIVAL:**

Sawmills were among the first forms of industry in a new settlement. One area would often have many examples. Often water-powered. Many were replaced by other industries, often using same buildings. Some older sites survive as standing buildings, but many were replaced, torn down in late 19th, early 20th c. (most remain only as archeological sites). Often only remnants of a millrace and a fieldstone foundation are the only remaining signs. Dams and log cribbing were often associated with these sites.

Potasheries- starts with first settlement

Lumbering big in Lincoln/Starksboro/Bristol/Ripton...in late 19th c. and early 20th c.

There is a huge pile (maybe 50' tall) of saw dust in Griffith- Mt. Tabor- probably site of a portable sawmill.

Survival- several people in Woodbury and Greensboro still log with horses.

**SIGNIFICANCE:**

Logging and its related industries were very important in the early mid-19th c. in Vt. (archeological remains of charcoal kilns are numerous all over the state)

Logs -> Lumber and Paper

Supplying lumber to national market

-down lake-> canal-> Hudson-> N.Y.C.

-down Ct River to MA (and beyond)

-related to paper production context

-early on, lumber went north to Canada (then shipped to England?)

Temporary dams- used to float logs

" camps, bunkhouses, booms, roads, railroads, landing areas.

Also, boarding houses, sawmills, paper mfg

There is a book on logging in Maine, New Hampshire and Vt that describes the camps, etc. well

Logging products provide power for many industries- iron (charcoal), maple sugaring

Technical changes in milling contributed to big changes in building technology, i.e. balloon framing, scroll saw, cut details, etc.



### IDEAL CHARACTERISTICS:

Often these sites have significantly deteriorated, but often have penstocks, bits of machinery, or remnants of dams are visible with sawmills. Charcoal kilns often survive as only a slight mound in the upland woods today.

Sawdust piles from portable sawmills

Logging roads often iced to easily bring the logs down from the mountain

Lord's Prayer Rock in Bristol: was carved on the rock to keep the loggers from swearing as they came down from Lincoln and were carting their heavy loads up that rise into Bristol and the lumber mills.

### VARIATIONS:

### CHANGES OVER TIME:

Originally sawmills were dependent on water power and the strength of oxen/horses to haul and cut the lumber. As other forms of power became available, the mills, camps, etc. moved further upland. With the advent of logging trucks in the 20th c., railroads of the 19th c. became obsolete and more remote areas could be logged.

### NAMES/LOCATIONS OF SPECIFIC EXAMPLES FROM RESEARCH:

see Vic Rolando surveys for charcoal kilns, etc.

Lane Shops- portable sawmill manufacturer, Mpl  
Robinson sawmill, Calais- in NRHD, grant project  
Weathersfield (see Constits)  
Burlington Waterfront- see Bygone Burlington  
Shelburne Museum sawmill

### GEOGRAPHIC DISTRIBUTION:

Early lumber operations found along waterways- even seemingly very small streams of today, as water levels change over time. When rr became available to ship lumber, forms of power other than water became available. Lumber operations moved further upland but still hauled distances to the rr. With advent of trucking, operations moved still further upland.

Logging in the mountains, i.e. Ripton, Lincoln, NE Kingdom.

### RESEARCH QUESTIONS:

How did technology effect production and distribution of local industry?

How was the landscape affected by this industry?

How many people worked in occupations involved in this industry?

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Beer's Maps

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Natural Resources pple  
John Ostrum (Robinson Sawmill restoration in Calais)  
Shelburne Museum

State has list of all loggers. (see Jane)

Ephraim Salls, Jr. in Greensboro logs with horses

LOGGING AND LUMBER

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# THEY FELLED — THE — REDWOODS



By **HANK JOHNSTON**



*A Saga of Flumes and Rails in the High Sierra*

TRANS-ANGLO BOOKS  
Glendale, California

**POOR QUALITY**  
**ORIGINAL** *c/o Light*

early inclines, signals were given to the hoist engineer by means of a telegraph line paralleling the route. By shorting the bare wires with a metal-tipped pole, directions for stopping or starting were transmitted using prearranged signals.

Despite the most careful precautions, there were many wrecks and derailments in the hoisting operation. The story is told by old timers that the hoist engineer was offered a new suit of clothes by the company if he could run the incline two full weeks without an accident of any kind. No one ever collected the bonus!

At Millwood, great stacks of lumber filled the drying yards. Busy flume crews performed their clamping and shipping tasks from dawn to dusk. On Saturday nights, Millwood's pleasure palaces boasted capacity business as thirsty loggers flocked into town from the basin on special "passenger trains." Tourists from as far away as San Francisco were seen hiking, fishing and riding the trails in the invigorating Sierra air.

"Bloomers are out in force this year," reported the *Visalia Delta* on June 10, 1897. "The tourist season has started early and the hotels are very busy. There were 70 guests at the White House alone last week."

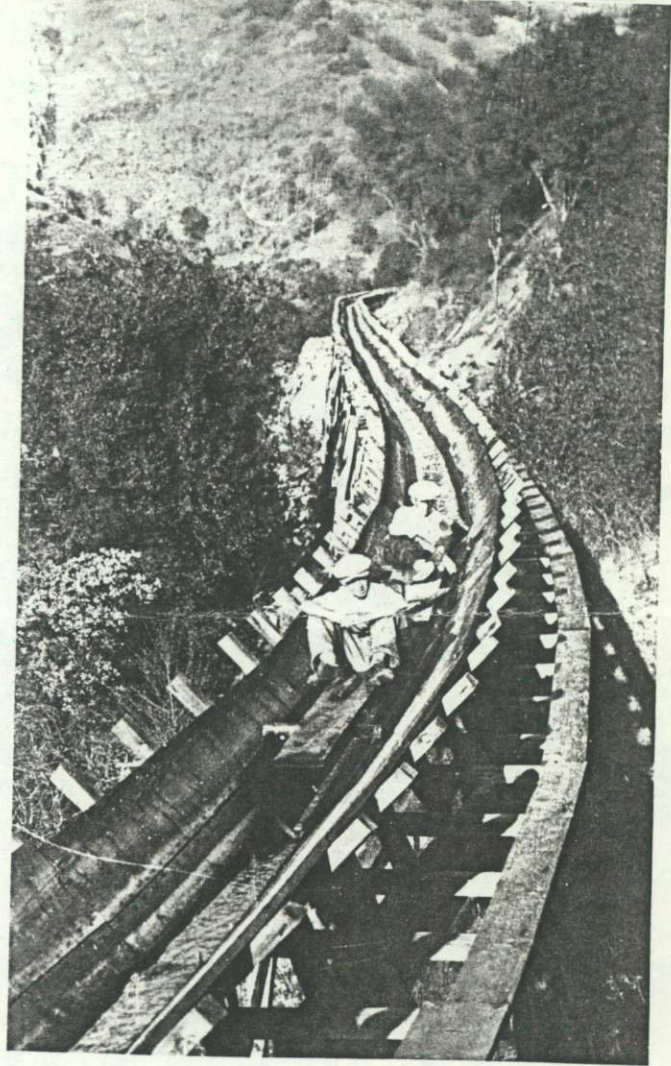
Millwood was little affected by the moving of the mills to Converse. Its function as a resort, supply center and shipping outlet seemed to assure its prosperity for the immediate future.

\* \* \*

Maintenance of the flume was a considerable concern for the Sanger Lumber Company. The big trough required constant upkeep as leaks or jam-ups could result in costly shutdowns. On the lower end of the route, provisions for the lonely flume herders were hauled by wagon from Sanger. On the upper portion, supplies were sent by flume boat from Millwood.

Flume boats were constructed in an assortment of styles and sizes depending on the whim of the builder. Generally they were V-shaped to conform with the trough itself, and usually from 12 to 20 feet in length. The rear end of the "V" was closed, but the front end was left open so water could enter and hold down the boat on the curves. A flat board across the top held both passengers and supplies.

No one was ever seriously hurt riding the Millwood flume, although two men were dumped out of their boat on one occasion and had their luggage thoroughly soaked by water. The company doctor rode the flume one night on an



Flume boats like these were common on the route. Boys appear to have outrun the water. (Don DeVere Collection)

emergency case. Another time, a nurse brought an expectant mother down the flume to the Kings River where they were transferred to a wagon for the remainder of the trip to Sanger. Lumberjacks often used flume boats on Sundays to ride to the river for a day of trout fishing. On such excursions, the eager anglers faced a 10-mile, uphill hike back to town. Flume boats were returned from Sanger to Millwood by wagon with an upcoming load of clamps or supplies.

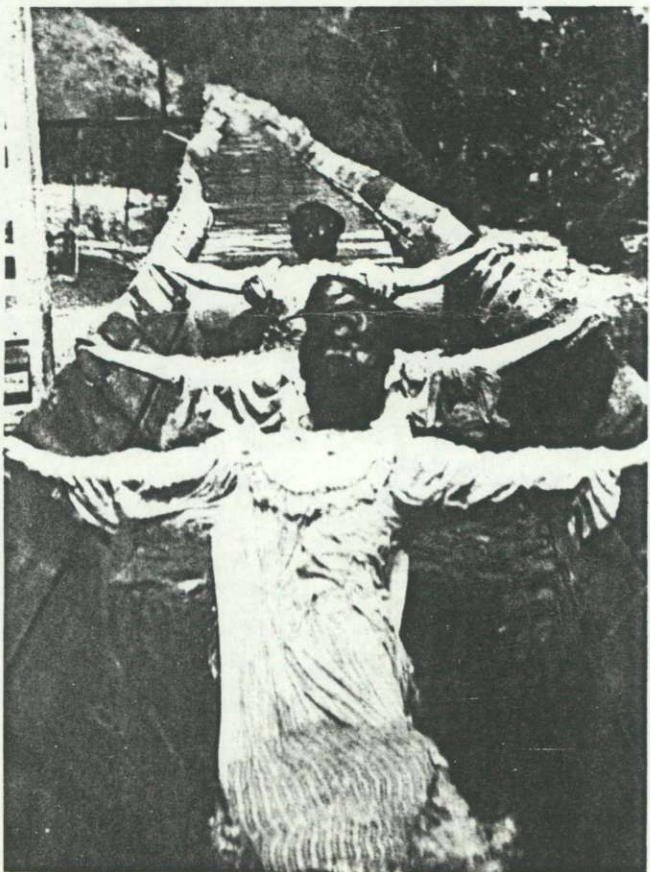
A ride on the flume was called "one of the greatest pleasures in the world" by the author of an article appearing in an 1897 issue of the *Visalia Times*. The writer, Edmund Norton, made the trip along with five other passengers and gives a vivid account of his experience.

The start was made at 3 p.m. after the last lumber had been placed in the flume for the day, carrying with it the familiar "joker" that signified the final shipment. A 16-foot boat was then placed in the flume and nailed to the side while





Two examples of feminine flume activity. Woman in flume boat (above) seems quite sedate for such a circumstance. Girls (below) have a rather long, narrow swimming pool. (Dick Challacombe Collection)



it was being loaded. Into the boat were placed two 100-pound kegs of nails, a box of groceries, a bag of barley and several other articles for the various stations along the way. The six men then climbed aboard and the nails were pulled releasing the boat.

"There is a splash and a gurgle as the suspended end drops into the water. A slip and the next moment you are going a mile every three or four minutes. As we approached the lower mill, the boat hit a steep pitch in which gravity took over and caused it to drop faster than the water. This slide was one of the great thrills of the trip."

The boat stopped at the mill and three men, whose destination it was, got off. Below the mill was Devil's Slide, a place where the flume dropped sharply for two miles and made a series of sharp curves. Next were three trestles, all more than 100 feet in height, which presented such wonderful opportunities for scenic views that "no thought was given to the possible dangers." Lower down, at flume station Number Four, the boat was exchanged for a flat raft with box seats for the trip into Sanger.

Norton was most impressed by the never-ending maze of changing mountain scenery. "In eight or ten hours you have passed through all the gradations of the season!"

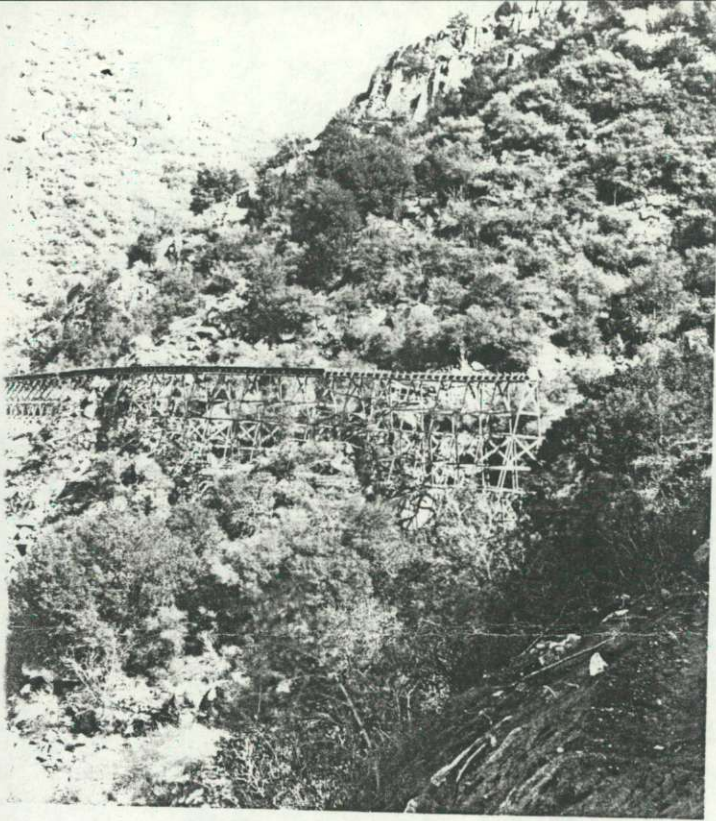
In more ways than one, a ride in a flume boat was a never-to-be-forgotten experience!

\* \* \*

The first season at Converse Basin was a complete disaster for The Sanger Lumber Company. Any hopes that Hiram Smith entertained for reversing his previous misfortune vanished after only two months.

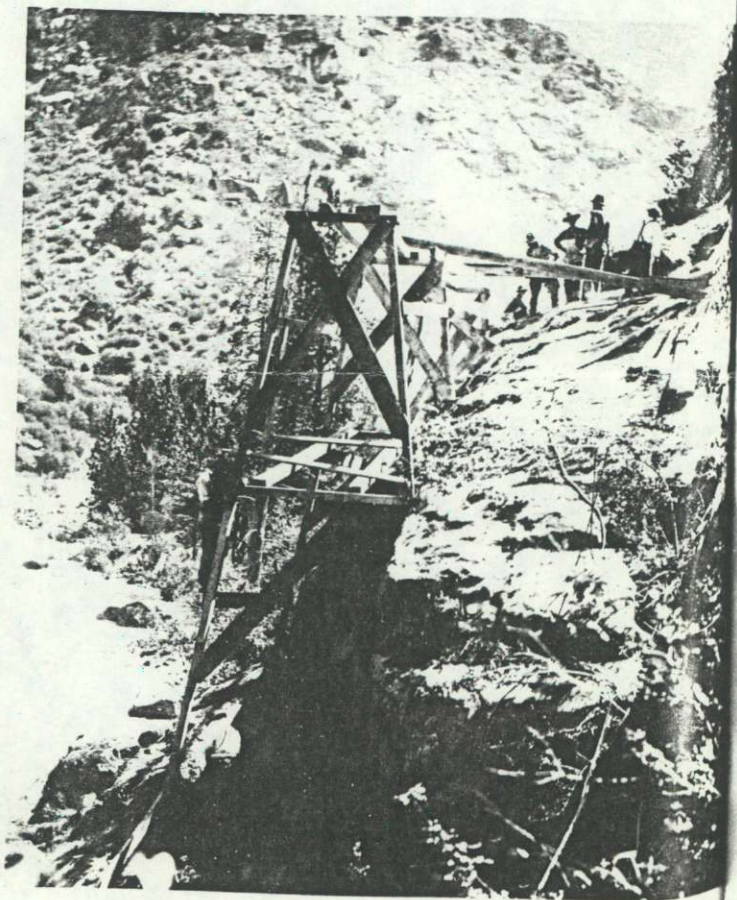
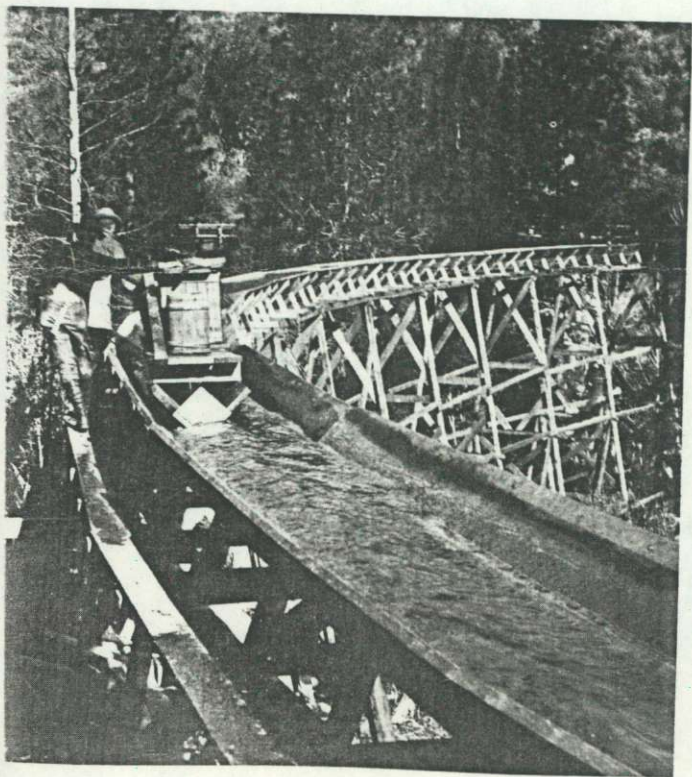
"Hardly a day goes by at Converse without a breakdown," reported the *Visalia Delta* in July, 1897. "There is a great lack of steam power although nine furnaces are kept going all the time. Fuel is largely wet sawdust and green wood. The loggers are having great difficulty handling the big trees and there are many accidents. Two men were killed this week. Cutting is much slower and considerably less than was done previously at the two mills."

A lumber load with passengers is lowered down the Millwood side of the hoist. From here the Shay locomotive will carry the car to the drying yards at Millwood. (Mac Grosse Collection)



## THE HUME FLUME

These remarkable pictures of the building of the 17-mile flume addition from Hume to the junction with the old flume belong to John Cummings, whose father was a member of the construction crew. The country was unbelievably rugged and the job was a monumental one. Note the flume boat (below) which is loaded with supplies as it crosses one of the highest trestles on the route. (All photos John Cummings Collection)



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— a lengthy and highly unusual party line!

Unlike the upper Millwood flume, the new section from Hume to the Kings River was NOT recommended for flume boats. Only the most audacious riders dared to venture down the wicked Tennile Creek section on one of the V-shaped rafts. The route traversed a seemingly endless succession of sharp curves, high trestles (one was 107 feet tall) and breathtaking descents. At the worst point, the grade was so steep that a boat, rushing downward at a tremendous pace, would push all the water before it. At the bottom of the abrupt fall, the rider could look back and see the flume dry for some distance. All at once the water would come rushing up to the boat again and suddenly, with a great bumping and splashing, the clumsy craft was once more in rapid motion along the perilous course to the river far below, the frantic rider hanging on for his very life.

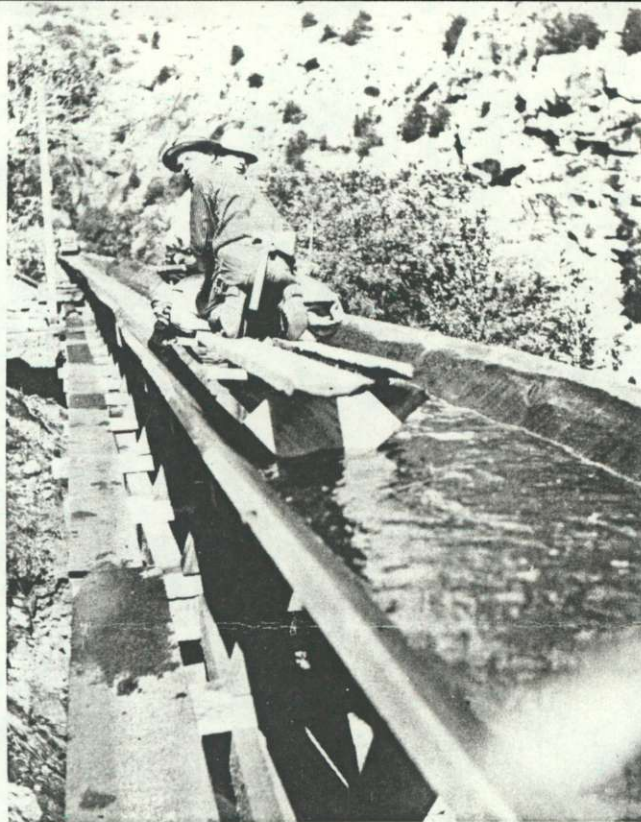
Several persons were severely injured in separate accidents while attempting to ride the Hume flume. Even those who made the trip unscathed were loathe to try it a second time.

"I was attracted to that doggone flume like some people are to rattlesnakes," recalls one old-time Hume lumberjack. "It was the quickest way to the river when I wanted to go fishing, and I'd get up just enough nerve to set out a boat. Then I'd take one look down that crazy, winding devil of a route and decide that it was better to walk and arrive late than to push off on that boat and maybe not arrive at all. At least not in one piece!"

\* \* \*

The new Hume operation did not really begin full production until the summer of 1910. Although some 8,000,000 board feet of lumber were cut at the mill in 1909, construction and moving activities occupied the major portion of the season.

The Hume Lake area resembled a wild-west camp in many ways. The sawmill stood immediately adjacent to the dam. Built at a cost of \$150,000, it was a sturdy, three-story structure, 50 feet wide by 133 feet long, set on concrete piers. As with most early mills, the ground floor contained the heavy machinery; sawing was conducted on the second floor. Logs were dumped into the lake from a railroad landing above the opposite side of the dam, and stored in the water until needed. A little car, set on wide-gauge railroad tracks, ran up a ramp from the lake and entered the mill at the second-floor level. On its downward run, the carriage car dropped below the water



Workmen heading down to the construction point while building the Hume flume. (John Cummings Collection)

surface so a log could be easily floated into proper position atop the car. At a signal, the hoist operator reeled in the cable and pulled the car with its load into the mill.

The log was received on what was called a log deck. From there it was rolled on the carriage with a log turner, sometimes called a "nigger." The carriage then propelled the log into the big band saw — a narrow ribbon of endless steel running at great speed over two pulleys. The first sawing consisted of cutting slabs from two sides of the log; then the carriage might be returned and each board cut off, one at a time, or the trimmed log might be sent on to the smaller band saw depending on the size of the timber in question.

The main floor also held the edger, rollers and gang circular saws which sliced out many pieces of the proper-sized timber with one forward movement. The saw-filing room was in the third floor loft.

From the mill, the boards were conveyed over a trestle into two huge dry kilns which could accommodate 2,000,000 board feet of lumber at one time. After only three days in the kilns, the raw lumber was ready for clamping and fluming. At Millwood, the seasoning process had

# The Sugar Barrel Railroad On The Nulhegan

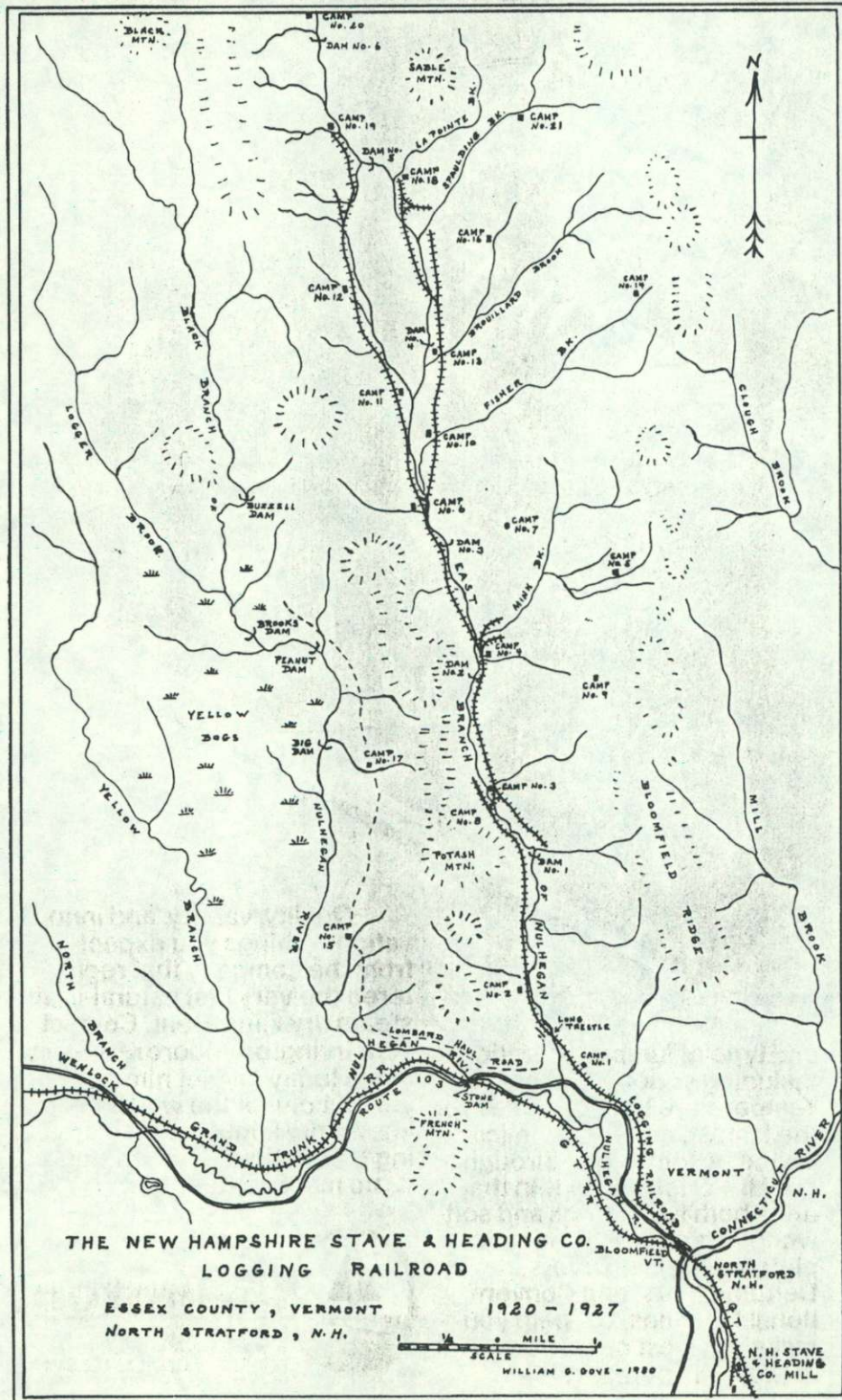
Part I  
by William Gove

The northeast corner of Vermont has always stood apart as a country all its own. It's a part of Vermont vernacular to refer to that far flung and distinctively different corner of the state, provincially, even admiringly, as the Northeast Kingdom.

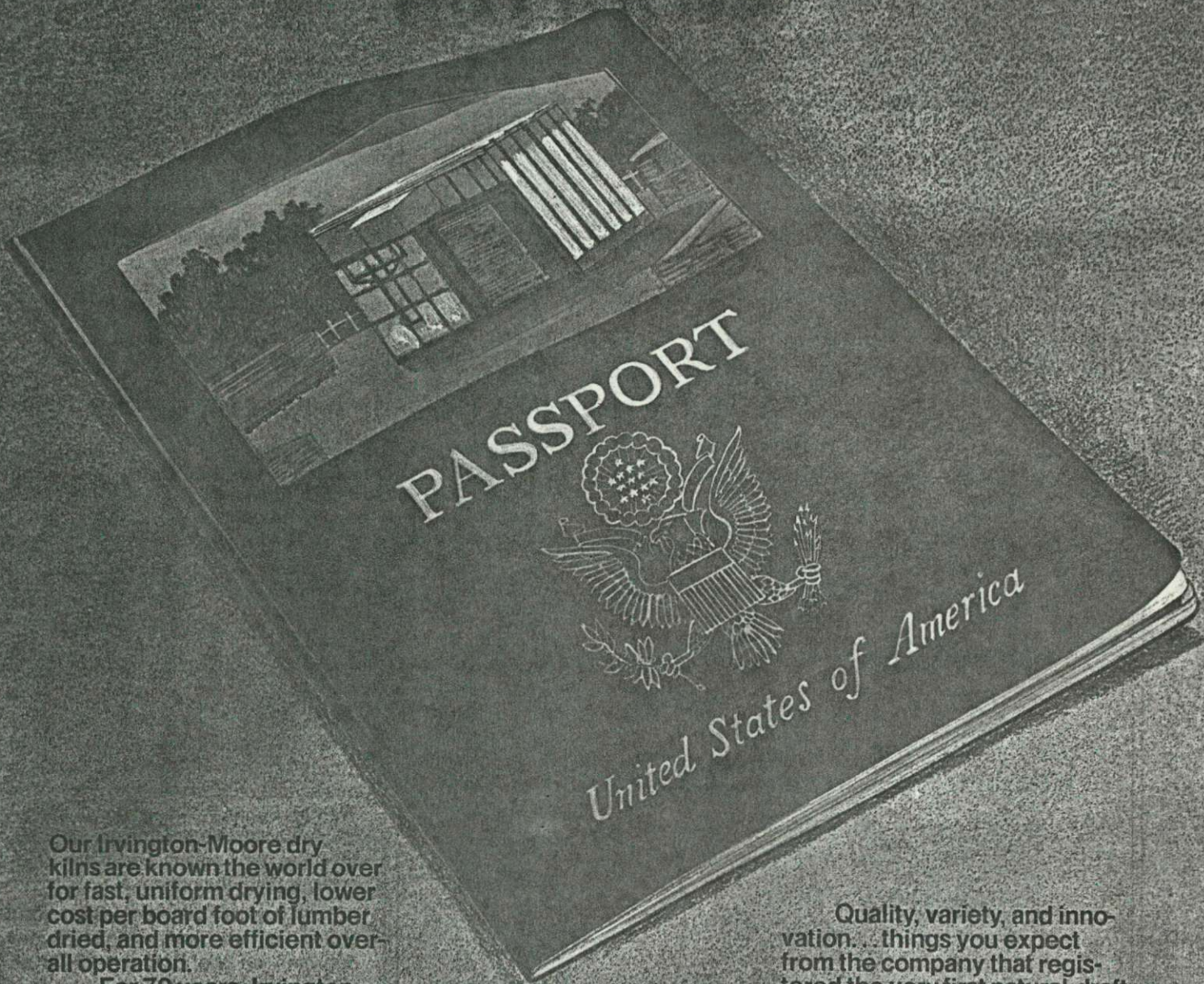
Among the attributes that the almost forgotten natives of that Northeast Kingdom can rightfully boast as their unique possession is the rich forest growth of its low lying rounded mountains and boggy lowlands. It was Essex County in Vermont (still 94% forested) and neighboring Coos County of New Hampshire that provided the spruce and fir timber for 47 years of long log driving on the Connecticut River, probably the longest river drive held in the United States as far as mileage of a single drive was concerned. And it was the hardwood growth on the hills of Essex County that once fed one of the most picturesque logging railroads ever built in New England, that of the New Hampshire Stave and Heading Company, feeding what was reputed to have been the largest barrel factory in the United States. It was sugar barrel railroading up the East Branch of the Nulhegan River in the 1920's.

The Warner Sugar Refining Company had been making sugar barrels for many decades in the eastern U.S. and in the early part of this century was located in Roulette, Pennsylvania where the company had set up about 1907. But as with many forest product companies of that era, they found it didn't take many years to deplete the accessible old growth timber, and like many others they pulled stakes and headed north. The Warner Sugar Refining Co. found an ideal situation in the Northeast Kingdom, up near the headwaters of the Connecticut River in northern New England.

For many decades the old Connecticut Valley Lumber Company had reigned supreme on the Connecticut River, sitting on a vast timberland wealth in northern Vermont and New Hampshire surrounding the origins of this mighty river which once served as New England's major artery of commerce. After the last of the huge long-log drives on the Connecticut River in 1915, the company ceased to operate its sawmills and turned to the sale of softwood pulpwood and standing hardwood saw timber as a source of income. Large pulpwood cuts of spruce and fir began that year in the Nulhegan River valley on the Vermont side of the Connecticut River, but it was four years later that the big deal was consummated to move mu



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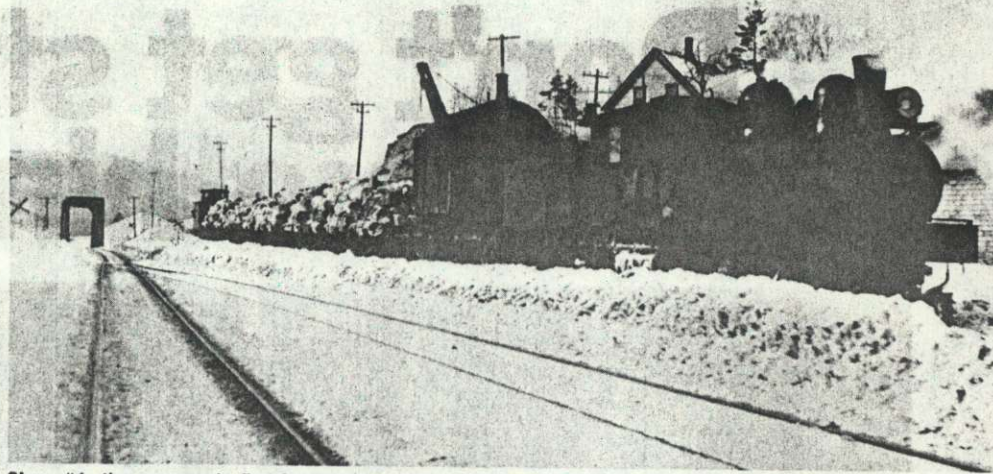
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of the heretofore unwanted but plentiful hardwoods.

In October of 1919 a sale agreement was signed with the Warner Sugar Refining Company, granting it the right to purchase all hardwood timber except poplar on 87,000 acres of land in Vermont, primarily in the large Nulhegan River valley and the Paul Stream drainage. The stumpage price was \$5 per thousand board feet and all merchantable hardwood 12" and up (stump height) was to be cut. The Connecticut Valley Lumber Co. stipulated that 5 million board feet were to be cut the first season, reaching 10 million by the third season and each season thereafter. In addition all the softwood and the poplar was to be cut in four foot lengths for the CVL Co. The original scheme, as then envisioned, was to sell the Warner sugar barrel people 500 million board feet of hardwood timber over a fifty year period. It was a large logging contract and one that would require an effective logging system and a large manufacturing facility.

'Hegan woods, as the woodsmen once called the area, had been logged for many years to remove the extensive stands of old-growth pine and spruce, at first by the old Nulhegan Lumber Company which had a relatively large sawmill at the mouth of the Nulhegan River in Bloomfield village and later by George VanDykes' Connecticut Valley Lumber Co. For years this timber was floated down the Nulhegan, especially the Black Branch and East Branch, as evidenced by the many log-driving dams which could be found there and can still be identified in some cases. However, it was the undriveable hardwoods for sugar barrels that was to be logged now and the decision was to build a logging railroad up most of the length of the East Branch. A million dollar sugar barrel plant was to be built in North Stratford, N.H., just across the Connecticut River. The Warner people formed and financed a local corporation, the New Hampshire Stave and Heading Corporation, as owner and operator of the enterprise.

Activities began to take shape the next March (1920) that were to alter N. Stratford for decades to come. Superintendent Charles A. Ridlon arrived from Roulette, Pa. along with an engineer from the company headquarters in New York City and set up a temporary quarters in a well-known old Bloomfield, Vt. landmark, the CVL Co. boarding house. On April 10th the first survey stake was driven on the 50 acre



Shay #1, the company's first locomotive, with a full load in Bloomfield Village where the company railroad junctioned with the Grand Trunk. The view is west, looking down the GT tracks at the iron bridge over the Nulhegan. Below, at Camp #6, from left to right, Tom Pattee, clerk; Jim Lavole, camp boss of #6; Jack Kingston, walking boss of woods operations; Charles Ridlon, plant superintendent; Arthur Stone, road master of railroad.



meadow tract along the New Hampshire side of the Connecticut River which had been purchased from the Town of Stratford for a little over \$19,000. The town had voted in March to exempt the company from local taxation for ten years. The building contractor, Snare and Triest Engineering Co. of New York, moved in a work force of 200 to build what would supposedly be the largest barrel factory in the U.S., capable of consuming 15 million feet of hardwood logs annually. In addition to the many factory buildings the company also built sixty dwellings and a boarding house. The old Connecticut Valley Lumber Co. sawmill at Wenlock was reactivated to saw out two million feet of spruce construction lumber for the undertaking.

The beginnings of a logging railroad were also evident that April when the renowned surveyor Will Richardson of Littleton began to lay out a line up the East Branch. Arthur Stone of Lancaster was hired to oversee the railroad con-

struction and then act as roadmaster when the logs began to roll out. The construction contract for the woods pike was given to one Santo Puchia who brought in a work force of 200 Italian immigrants and set up camp on the Rowell meadows near the mill construction site. The sidings and tracks around the mill site were built by a crew from the Grand Trunk Railway, the railroad corporation which operated the main line through N. Stratford and Essex County of Vermont to Montreal.

It was not an expensive railroad right-of-way to construct. The grades were relatively easy with little cut and fill. In order to cross the farm properties before reaching company land, a lease was obtained with a provision that returned all rights to the owner with termination of the railroad. In most cases a quick claim deed to the right-of-way was given the owners when the railroad was abandoned.

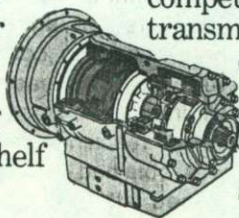
(Continued on page 12)

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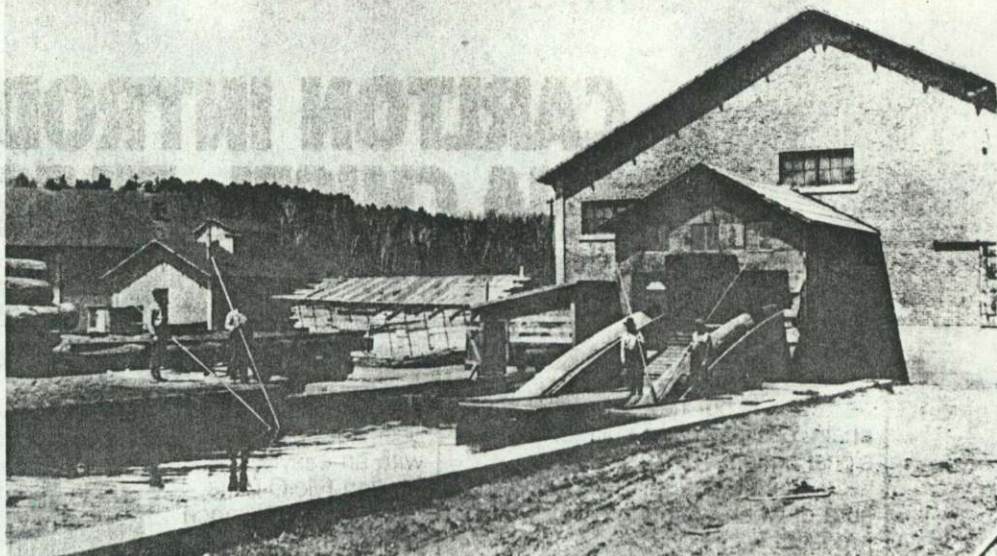
Not wanting to put all their trust and reliance in the huge timber proposal scheme by the Connecticut Valley Lumber Co., the newly formed New Hampshire Stave and Heading Co. embarked on a land purchasing program of their own. In August of that year 30,500 acres of Vermont and New Hampshire timberland were purchased from the Vermont Products Company.

To reach the company railroad on the East Branch, the New Hampshire Stave and Heading Co. used the Grand Turk tracks to cross the Connecticut River from the mill yard in New Hampshire, switching over to a side track on the Bloomfield, Vermont side of the bridge. At a point just east of the Nulhegan River iron railway bridge the logging line began its own course and veered to the northeast, paralleling the Island Pond road (Route 105) on the north side of it for about two miles before turning north and traversing up the valley of the East Branch of the Nulhegan River for most of the river's length. The distance from the point where the company tracks left the G T line to the end of the logging pike was almost 12 miles, but there was about 18 miles of track in all.

An order was placed with the Lima Locomotive Co. for a new Shay geared locomotive and that July (1920) delivery was made of their first engine, a handsome 3-truck Shay. The Shay was a gear driven locomotive ideal for logging railroads because of its slower pulling power and flexibility on rough track.

Construction of the railroad and the mill complex continued through the summer and fall preparatory to the big start-up planned for 1921. Arthur Stone built the new highway underpass in Bloomfield which made it possible to relocate the state highway and

**The logs were taken to the railside loading areas by two-sled. Walking Boss Jack Kingston standing on right; location is Camp #7.**



**The log dump where the logs were unloaded from the cars into a hot pond and conveyed into the stave cutting plant.**

eliminate the grade crossing over the GT tracks. The thousands of ties needed for the railroad were sawn at the leased Wenlock sawmill. Before the large force of laborers and carpenters was let go for the winter a set of logging camps was built a short ways up the East Branch, allowing for the commencement of winter logging activities.

By the end of April of the next year (1921) there were at least 300 employed in the plant and building construction and 100 at work on laying the railroad. House construction foreman E. C. Gale was scheduled to build at least 25 new homes on the property, and July 1 was optimistically forecast as the date the mill would start cutting staves. Experienced labor would be needed for the start-up, because the cutting of staves and heading was completely foreign to this neck of the woods. Therefore, twenty families were moved in from the vacated millsite of Roulette, Pa. in the middle of June and another ten families the first of July, even though there were as yet no homes available.

The mill began cutting by August, almost on schedule, and by the end of the month was cutting 25 thousand feet of logs per day, less than one third the anticipated capacity. More families arrived from Pennsylvania, but in December the gossip channels were quick to relate the news that fifteen local men had just been hired to learn the trade of cutting staves and headings. The future certainly looked bright for North Stratford, N.H.

The slack cooperage barrel industry was at this time in the early 1920's still a major forest product industry, and the recent competition from paper containers and cartons had little effect on the growing production of barrels for a wide variety of commodities. Although a great variety of woods were used in making the barrels, the northern hardwoods of beech, birch, and maple were preferred for the higher grades of barrels used for the shipment of sugar and flour, because no disagreeable odors or discoloration were imparted to the commodity.

In the manufacture of the barrel components, the better grade of logs was routed to the stave cutter because staves had to be cut thinner than the headings and also had to withstand the strain of bending over the bilge when later assembled into the barrel. The logs were first cut into shorter lengths and these stave bolts were quartered or halved, steamed for about twenty-four hours under a pressure of 100 lbs. or more, sent to the stave bolt equalizer where they were bark peeled and trimmed for length, and then cut up on the stave-cutter. The stave-cutter was a tumbler with a 36" knife mounted along the side. The bolt was held inside the tumbler in such a way that with each

*(Continued on page 62)*



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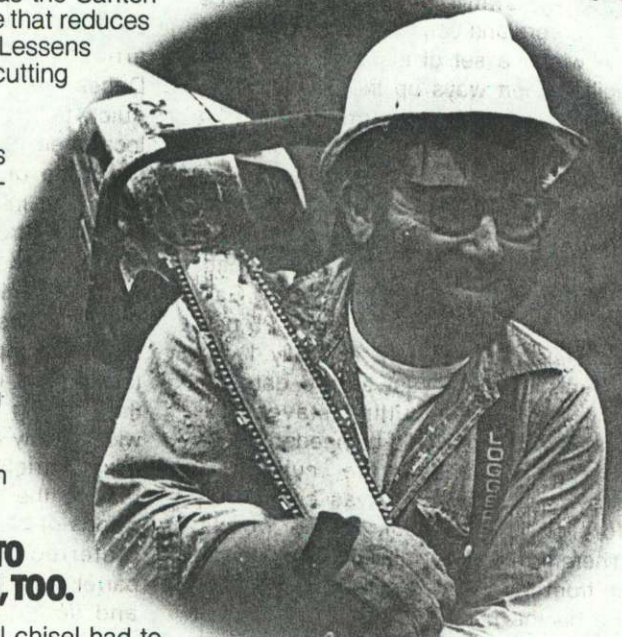
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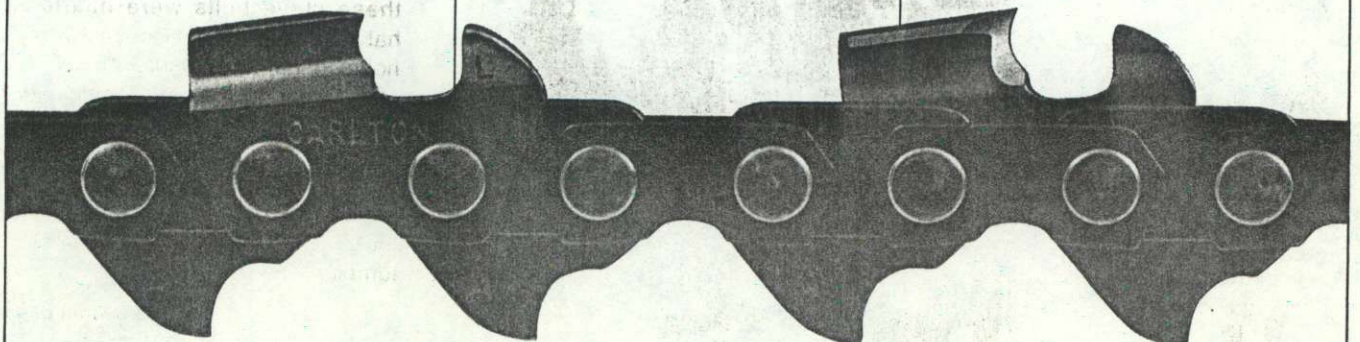
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## SUGAR BARREL RAILROAD

(Continued from page 12)

revolution a rounded stave was cut from the advancing bolt. The speed of the machine was set at 150 to 170 strokes per minute and was so demanding on the operator that he would usually work one hour on and one off.

The bolts designated for heading stock were sent to another cutting room where they were trimmed to a 22" length, rossed, possibly quartered or halved and then sent to the heading saw which was an upright pendulous-swing saw that swung the bolts down against a 56" saw to cut off 7/16" thick boards. These were the boards that would make up the end sections of the barrel.

The staves and headings were air dried in 600 foot long sheds south of the mill, staves seasoning for one to three months and headings for one month or less, after which they were dry kilned. There was about one and a half

miles of these drying and storage sheds built at North Stratford. Both the staves and headings had to be jointed after drying, and in the case of sugar barrels, the staves were often tongue and grooved. This was the extent of the operation at the North Stratford plant, the barrel assembly itself being accomplished elsewhere. However, for the manufacture of the two major barrel components, the staves and the headings, it took a large physical layout, and the major portion of the New Hampshire Stave and Heading Co. plant was completed that summer of 1921. Superintendent Charles Ridlon's son, John C., served as assistant superintendent.

Logging activities were strong that winter of 1921-1922, the winter season then being the time of major logging activity. Hardwood logs of standard 12' to 16' lengths were skidded or sledged to large rail side landings, at times jackstrawed into huge piles containing a million board feet or more where a high bank allowed considerable dumping in one place. The pace of winter logging was intense, operating at least a half dozen camps with two or three hundred loggers in the woods plus a large hovel of horses at each camp.

The Nulhegan River valley was heavily cut for spruce and fir pulpwood during the era 1921 to 1926, but the customary four foot length for river

driving down the Nulhegan into the Connecticut River and on down the Connecticut to either Wilder or Bellows Falls, Vermont. Until 1927 all of the CVL pulpwood went to the International Paper Co. at those locations.

It's probable that in that winter of 1921-22 the Connecticut Valley Lumber Co. also had crews cutting in the Nulhegan valley for the pulpwood removal. However, after that season CVL Co. decided there was more profit in stumpage sales than in operations, and the New Hampshire Stave and Heading Co. operated the softwood also.

Locomotive #1 worked hard that winter with engineer Ed Wise at the controls, usually hauling out ten car loads of logs with each trip. Twelve cars were the most that could be handled going out because of the upgrade encountered on the long trestle across the East Branch below Camp 2, just before leaving the East Branch valley to turn east toward Bloomfield. Logging boss Jack Kingston built that impressive trestle, a half mile long and 75 feet high over the river as it angled across a flat area not far up the East Branch.

The log cars used were flat cars with trip bunks on the side that would accommodate two tiers of logs, 23 to 26 logs on a tier, 7 to 8 thousand board feet on a car. The cars had a set of railroad rails fastened on the platform which enabled the steam powered Barnhart loader to move down the length of the train on top of the empty cars loading the car behind it each time. The company had 10 new iron log cars and about 17 old wooden ones, equipped with both air and hand brakes.

Loading with the Barnhart loader was much faster than the more common system of rolling the logs onto the cars by hand from a deck, as was commonly done with softwood logs. A skillful operator such as Norman Parks or Ed Swatag on the Nulhegan operation could throw the tongs a long way into a jumbled pile of logs and apply tension

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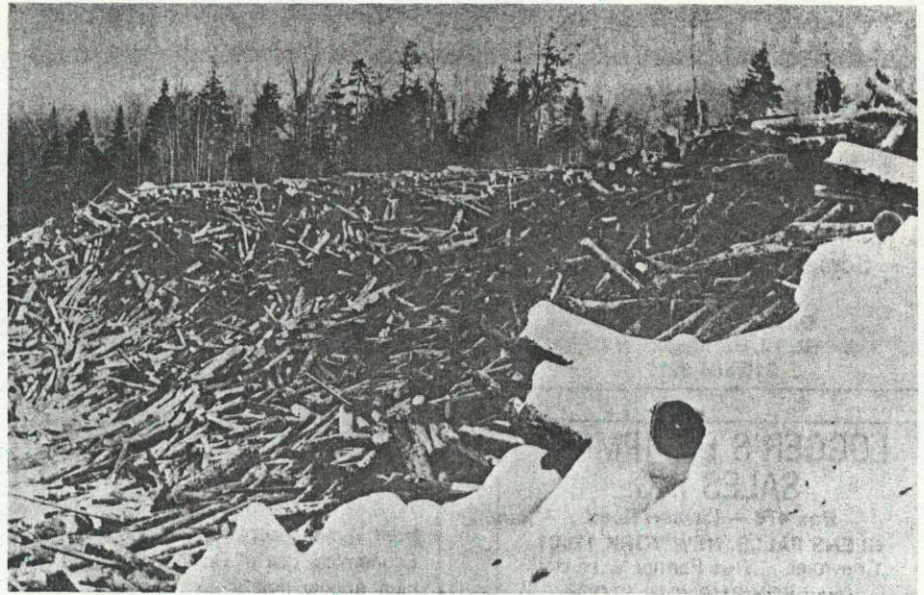
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just at the right moment to make fast to a log which could then be pulled free enough to allow the helper to center the tongs on the log. Or he could swing the tongs in a big arc and almost place them deftly right into the hands of the hooker who was standing far up on a pile. And some of those trackside log piles on the Nulhegan were monstrous, the one at Camp 4 said to have contained over four million board feet of logs. An ex-CVL river driver named Perley Hurd was in charge of the log loading operation.

There were two Barnhart loaders, for the company was soon to put on a second train, the loaders being left in the woods during the summer hauling, but taken back to the mill at night during cold weather. Loading the cars was a bitterly cold job during the winter months; that is, cold for about all except the locomotive engineer and firemen. It was cozy and warm in the locomotive cab with a canvas up to keep out the cold.

By the middle of that next March (1922) the ground had broken up and the several camps closed down awaiting the time when summer logging could begin. Summer logging was done in locations where there was a good downhill skid but never to the extent of the major winter activity. The log train con-



It was said that this log pile at Camp #4 contained over five million feet when full. Since Camp #5 was not on the railroad, its cut was also hauled down to this high landing. Note the men standing on the logs in the upper right hand corner of the picture.

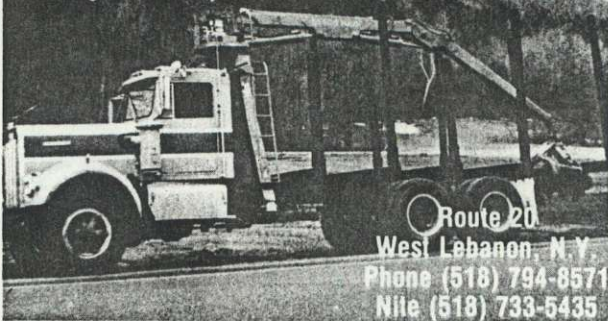
tinued to operate through the mud season because there were yet about four million board feet of logs railside when the camps broke up.

Summer logging had already begun on May 31 when a fire broke out at the "Y" near camp 3, set by the locomotive it was said, and started north up the East Branch. One hundred and fifty

loggers were hastily summoned from Camps 2, 3, 4, and 5 to put out the fire, but not before it burned over 200 acres of cutover land. Possibly some of the fire fighters were railroad construction workers because work had already begun to extend the railroad line another

Continued on page 67

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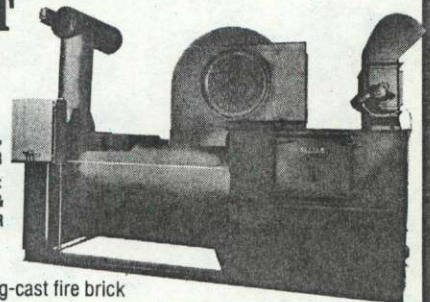
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Camp #10 located on the upper end of the East Branch. Both hardwood sawlogs and four foot pulpwood are evident on the landing.

Continued from page 63

five miles north and to build new logging camps.

Charles Duggan was hired as salesman in March and business couldn't have been better. By August the mill was at capacity production, shipping 30 cars of staves and heading per week. In

March construction also began near the stave mill of a new band sawmill capable of sawing 25 thousand feet of hardwood per day. Also under construction was an additional 6,000 feet of stave sheds, 2,000 more feet of drying sheds and 15 more houses.

It was obvious that more logs were needed, and the call went out in October for more local loggers to increase the winter woods force that was now setting up for the season. In July a second new Shay locomotive had been purchased from the Lima Locomotive Company, an 80 ton 3-truck engine similar to the first one. Number plate #3 graced the front end of the boiler. It was planned that the railroad would reach all the way to Little Averill Lake, and thus in November surveyor Will Richardson was sent in to lay out the extension. Contractor Peter Bove began cutting out this right-of-way the next spring, but the line never did reach Little Averill.

To Be Continued  
Next Month

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More on page 68

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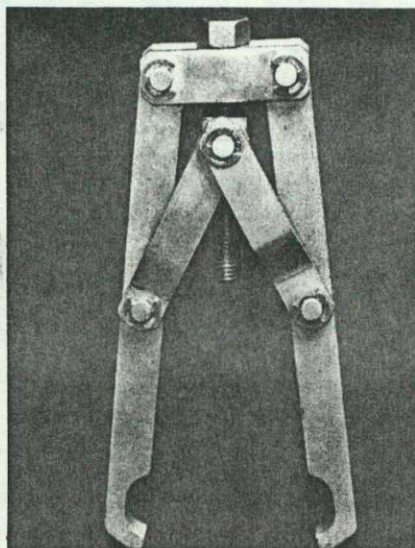
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**CHAIN SAVERS**

From: The Northern Logger and  
Timber Processor June  
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# The Sugar Barrel Railroad on the Nulhegan

Doc 17114

Part II  
by William Gove

In the April issue of *The Northern Logger* the historical account was related of the establishment of the "sugar barrel railroad" along the east bank of Vermont's Nulhegan River. It was back in 1920 that the New Hampshire Stave and Heading Co. erected a large mill in N. Stratford, N.H. and built a 15 mile logging railroad into the Nulhegan woods on the Vermont side of the Connecticut River. Two new Shay locomotives were purchased to handle the motive power for hauling out the train loads of hardwood logs.

With two locomotives now working the logging line that winter of 1922-1923, operations had to be coordinated so that one train could work the main line while the other loaded on the spurs. There were two wyes or turnarounds on the line, at Camps 3 and 6, and the locomotive would run on the front end of the empties coming in until the wye at Camp 3 was reached, at which point the empties were switched around to be in front of the engine for the steeper grades beyond. Here is where the conductor really earned his money — he had to ride on the front end of the cars

going in, even in below zero weather.

David Wise continued as engineer on engine #1 much of the time, relieved at times by Fred Bailey. One of the engineers on engine #3, Leonard Heath, was little appreciated by the many firemen who tried to please him, reportedly 13 different ones one year. He was careless and at times would put the fire 'right up the stack,' as the engine crewmen called it, and a stop had to be made to build a new fire.

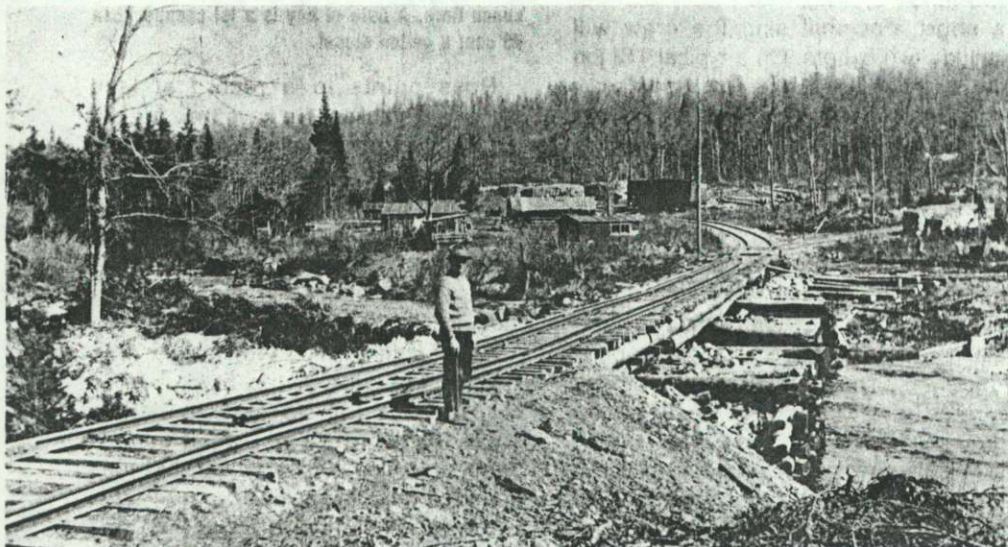
It was a slow trip going in with a string of empties, the geared drive of the Shay locomotive not capable of any speed. An hour was needed to reach the wye, plus at least another half hour to go the length of the line. The company had old box cars which were used to take in hay and grain for the horses and were loaded with pulpwood for the trip out. It was a long working day for the train crew, usually 12 to 14 hours.

Since the Grand Trunk tracks had to be used to cross the Connecticut River and pass through North Stratford village, it often required a wait at Bloomfield with the log train before access was granted onto the GT. An operator at the North Stratford station controlled both the switch and a derailing device on the logging line to detrack any runaways that might occur.

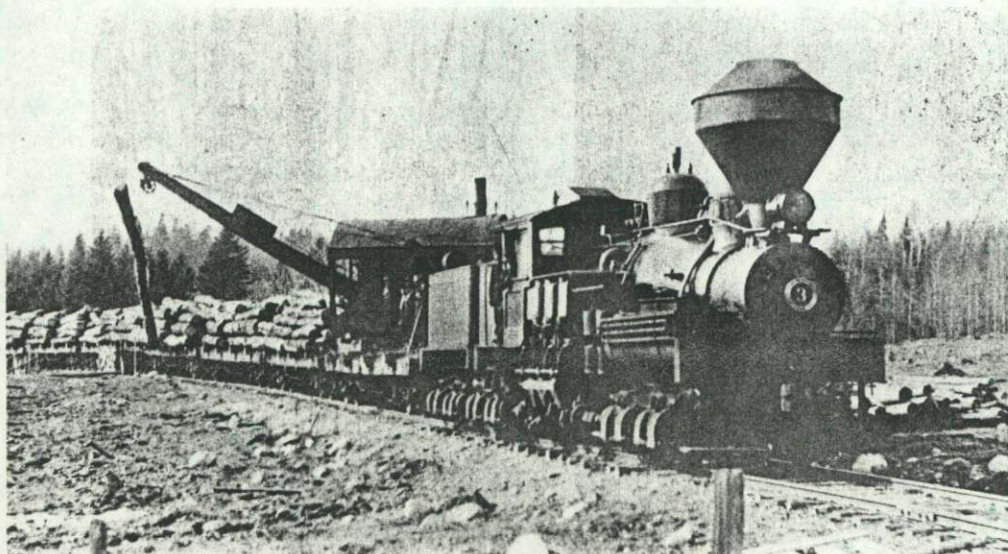
The two Shay locomotives made up the roster for the motive power in the woods, but a third old cast-off engine was acquired for use as a mill yard switcher. The relic was an ex-CNR Baldwin 4-4-0 that only carried about 80 pounds of steam. In addition to switching duties, it was used to haul gravel into the mill yard which was quite a chore for the old engine. Fireman Frank Carr reported that a spirited run had to be made to surmount even the slightest grade.

Frank Carr started as night watchman at the plant, a job which included the preparation of the locomotives for the trip up the mountain early the next morning. The ash pan was cleaned out and from a platform built along-side the track, six tons of coal were shoveled into each locomotive.

By the next spring (1923) business prospects looked better than ever. President G. E. Warner of the parent com-



Above, a view of Camp #3 shows the lower wye in the railroad line where the incoming train switched around to put the empty cars in the front for the steep grades ahead. Behind woods boss Jack Kingston is the East Branch. In the background can be spotted piles of hay bales, brought up in the Old Grand Trunk box car. Below, Locomotive #3 was a handsome 80 ton 3-truck Shay built new for the company in 1922. The train is fully loaded but the Barnhart loader operator is showing off a little for the photographer.



# Mules Step Back Into Skidding

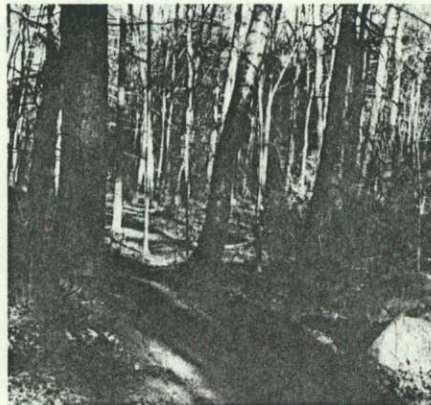
by George Mitchell

There are many ways to get the product out of the woods — tracked vehicle, rubber tired skidder, as chips in chip vans, horse or even oxen. Add to that list mules.

A young couple in Massachusetts have combined their interest in animals with their interest in forestry. Russ and Laura Barnes, Lincoln, Ma., are using two mules in the suburban woods that ring the metropolitan Boston area. It was Laura who bought the first mule about two years ago primarily for riding and it was Russ who thought of using the animals in the woods. Russ works as a forester for the Conservation Commission of the Town of Lincoln and he knows that many people resist harvesting or timber stand improvement because they fear that their woods will be "ruined."

The answer: mules. Tulip, the smaller of the two mules at just under a thousand pounds, was the Barnes' first animal later to be joined by the larger Hercules who weighs in at around 1700 pounds. Because of the difference in sizes the two mules cannot work as a team but they do the job singly.

Laura is the woods boss since Russ is busy with his full-time job with the Town. The day the *Northern Logger* caught up with her she had a full crew working on ground owned by the Sudbury Valley Trustees, a conservation group in Sudbury, Ma. Here, Hugh Putnam of the New England Forestry Foundation, Inc., Boston, had marked diseased and deformed hardwoods to be removed from the stand for sale to a firewood wholesaler. Laura and the crew were skidding the lopped stems to a



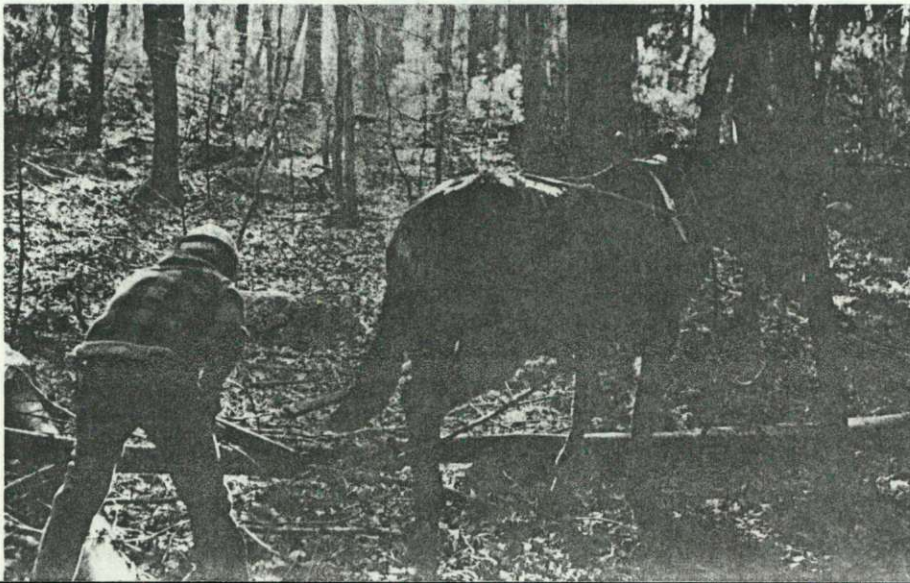
Main skid trail for mules is little more than a foot path.

landing at the edge of the woods to be picked up by the purchaser.

One experienced cutter will keep the two mules and teamsters busy but with a short, downhill skid the crew will include two cutters. On a typical TSI job the mules will deck five to six cords per day. Production will jump to 10 cords per day when the mules are pre-bunching for rubber tired skidders.

Laura and her fellow teamster Nadie Lowe drive the mules to the felled stems but once hooked up the animals head for the landing with little if any direction from the teamster. The condition of the woods is remarkable on a "mule job." The Sudbury stand had been worked in a warm, wet spell but the ground disturbance, even on the main skid trails was practically non-existent. Laura prefers the mules over horses because they are more sure-footed. She points to the record. In the year they have been working in the woods there has not been one hoof or ankle injury to the mules.

Tulip backs up so Laura Barnes can hitch another stem.



Lunch time. A bale of hay is a lot cheaper than 96 cent a gallon diesel.

Russ points to a record of land owner satisfaction. He says they are doing jobs that no one else can. First, they can do the job with less damage to the residual stand and second, many loggers with a large capital investment in equipment could not afford to handle many of the small scale jobs that seem ideal for the mules.

A passing fancy? Not hardly. The Barnes are now in the market for a team which will be able to handle larger stems. They are interested in a team of young mules which they can train and raise themselves.

So, just as there is more than one way to skin a cat there is more than one way to get the product out of the woods and one of those ways is mule power.

Teamster Nadie Low and Hercules head for the landing.



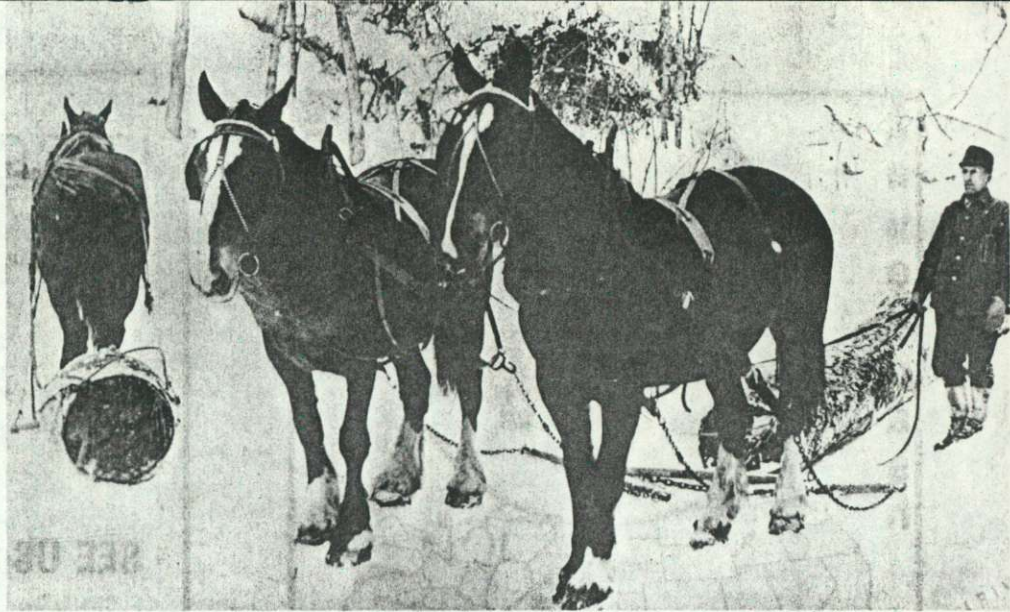


pany announced a twenty percent pay raise would be given to all employees, by then numbering 450 in the mill, woods and yard. Locomotive engineer David Wise resigned, but there were plenty of willing applicants for his job. The old sawmill at Wenlock which the company had purchased from Conn. Valley Lumber Co. was dismantled in May and the machinery installed in the new sawmill building south of the stove and heading plant. The sale of pulpwood from their logging operations had not been profitable, and the management decided to cut spruce sawlogs and produce dimension lumber instead.

The six mile extension of the logging railroad toward Little Averill Lake was under construction, but other log sources were needed. Arrangements were made that year to secure hardwood timber on other large tracts owned by the Connecticut Valley Lumber Company. Large softwood pulpwood sales had just been made by CVL Co. to Groveton Paper Co. in Stratford and Columbia, N.H. and to Thomas Blandin in other areas of Vermont and N.H. It was agreed that New Hampshire Stave and Heading Co. would have the hardwood stumpage as part of the original scheme to receive 500 million board feet.

Construction of the railroad extension was delayed that summer of 1923 because of a shortage of labor, a shortage which was especially felt when making up the woods crews that fall for the big logging season just ahead. The new iron laid had opened territory for four new logging camps with an increase of 200 more men in the woods. Pat B. Carr contracted a large job with the company in October and advertised widely for 50 men and 16 or 18 horses. It was proposed to cut 15 million of hardwood this winter plus 5 million of spruce and fir sawlogs.

**The work force of horses at Camp #4 with their skeleton of lead harnesses on, used for skidding.**



**Another method of skidding logs down the steep slopes is shown here. Logs were hooked together, end to end, with a grab and swivel chain, sometimes as many as 36 logs in a train. This handsome team shows evidence of good care. Note the watering barrel behind the horse on the left which was used to ice the trails where the train of logs was skidded down. Holes would be punched in the barrel for sprinkling and an old horse put on the job.**

The new sawmill was started up the first week in November, awaiting some of the fine spruce logs still growing on the Nulhegan. During the era 1921 to 1926 the Nulhegan valley was cut quite heavily for softwood, removing what the old Nulhegan Lumber Company had not cut during their many years of logging prior to World War I. The Nulhegan Lumber Co. drove the spruce and pine logs down the Nulhegan River to their large sawmill at the mouth of the river in Bloomfield. Most of the cut during the 1920's was four foot pulpwood to be driven down the Connecticut River, but New Hampshire Stave and Heading Co. did remove some sawlogs.

Over the short life span of the railroad there were 21 camps operated in the valley of the East Branch, 11 of them being on the railroad line. For the most part the buildings were of log construction and each camp held upwards of 50 men. Camp 6 was the depot camp. The supply train for the camps went in every Fri-

day, and although there were to be no riders without passes, the gift of a little Canadian whiskey bought many a logger a free ride during this prohibition era.

As the winter logging season was winding up the next March (1924) and the railside landings receiving about all the logs they could hold, woods boss A. A. Bennett quit and was replaced by A. J. Clark of St. Regis Falls, N.Y., formerly with American Sugar Co. and an experienced sugar barrel railroader. Contractor Peter Bove soon after relinquished his railroad construction contract with the company, and a company crew took over the continued extension of the line, superintended by Charles Carcavette who came in from Pennsylvania.

Winter logging had been halted only a week when on April 7th the railroad suffered its first and, as it turned out, only fatality. The train working on the main line near Camp 4 would often spot some loaded cars into a siding on a flat nearby, letting the cars roll back on their own into the side track. On this particular day there was a new crew on the train which somehow failed on the braking duties, and three flat cars each loaded with about 3 thousand feet of logs went hurtling wildly down the mountain grade. Telegraph warning was immediately sent from Camp 4 and the way was cleared below so that the cars careened safely through. Down at the foot of the steep grade, just above the long East Branch trestle, a section crew was putting in a new siding to load cars with logs brought in from the Black Branch with the Lombard tractors. The unsuspecting section men suddenly heard the cars almost on them and scrambled for

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safety. At this point the middle car turned over, scattering itself and the car behind it along with 16 thousand feet of hardwood logs. One of the section men, Corliss Gendron, was hit by a log and lived only a half hour. The first car continued on, eventually slowing down on the incline toward Bloomfield village and coming to a stop before reaching "Little Canada," the row of workers homes near the Grand Trunk Railroad. After stopping the solitary car rolled slowly back to the wreckage site.

Fireman Frank Carr recalled another incident which had the potential of being a disaster. Carr was firing on Shay No. 1 and the conductor, inexperienced on the job, had failed to have the hand brakes on the cars "wound up" all the way. The engine couldn't hold back the full load and eventually was out of control as the wheels began to slide on the steep grade. The Barnhart loader was on the train, as per custom in cold weather, and the signal whistle on the loader was blown steadily to give warning down below. The uncontrollable train with its scared occupants, urged onward by the weight of 75 thousand feet of hardwood logs, slid on for about two miles before leaving the iron and scarring up the real estate a bit. Fortunately there were no injuries — just a mighty frightened crew.

The company continued summer logging in that year of 1924. The men in one of the camps walked out because of a wage dispute, complaining over the pay of \$2 per day plus board. Although their places were soon filled by some of the many unemployed men in the area, it was one of the visible signs that the financial picture of the New Hampshire Stave and Heading Co. was suddenly beginning to darken.

In August the company began con-



Logger Fred Jones is dwarfed by a railside pile of three million feet of hardwood logs. It's March of 1922, and the logs will soon be on their way out of the "Hegan Woods."

struction of a bridge across the Connecticut River from Rowell meadows to the Gilkey meadow in Vermont which could be used by Lombard log haulers and teams the next winter. Logging operations were being planned for that winter in Maidstone Lake and the upper portion of Granby, and the long haul would be done with the 10 ton gasoline Lombard tractors.

Another ominous sign of deteriorating conditions within the company was the resignation in September of superintendent Charles A. Ridlon, the able man which the Warner Sugar Refining Co. had sent to New Hampshire four years previously to plan construction of the plant and the railroad and built it into "the largest and most complete stave and heading plant in the world," as the Coos County Democrat labeled it. Ridlon was reported to be a strict but wonderful boss and a grand man. He announced his leaving as a retirement move, but the following year took temporary employment with another firm desirous of locat-

ing a stave mill in Tennessee. Before resigning he had confided to some that the future of the New Hampshire Stave and Heading Co. was quite questionable.

To replace Ridlon, vice president and general manager W. L. Gerry of New York, brought in F. O. Barden of Boyne City, Michigan. Unpopular austerity moves brought unrest as one of the logging trains was taken off and workers let go. Conductor William Farrell and engineer Fred J. Bailey resigned soon after, no doubt dissatisfied with the turn of events.

New faces appeared in the woods that winter of 1924-1925 as the company contracted out much of its logging in an effort to cut cost. Contracts were let to contractors Hunt and Covill, Rioux and Lemelin and Wilbur A. Marshall of Marshall McDonald Company who took a large contract for many million feet. The new log hauler bridge across the Connecticut River was put to use as Lombards came in with loads from the Dennis Pond area in Brunswick.

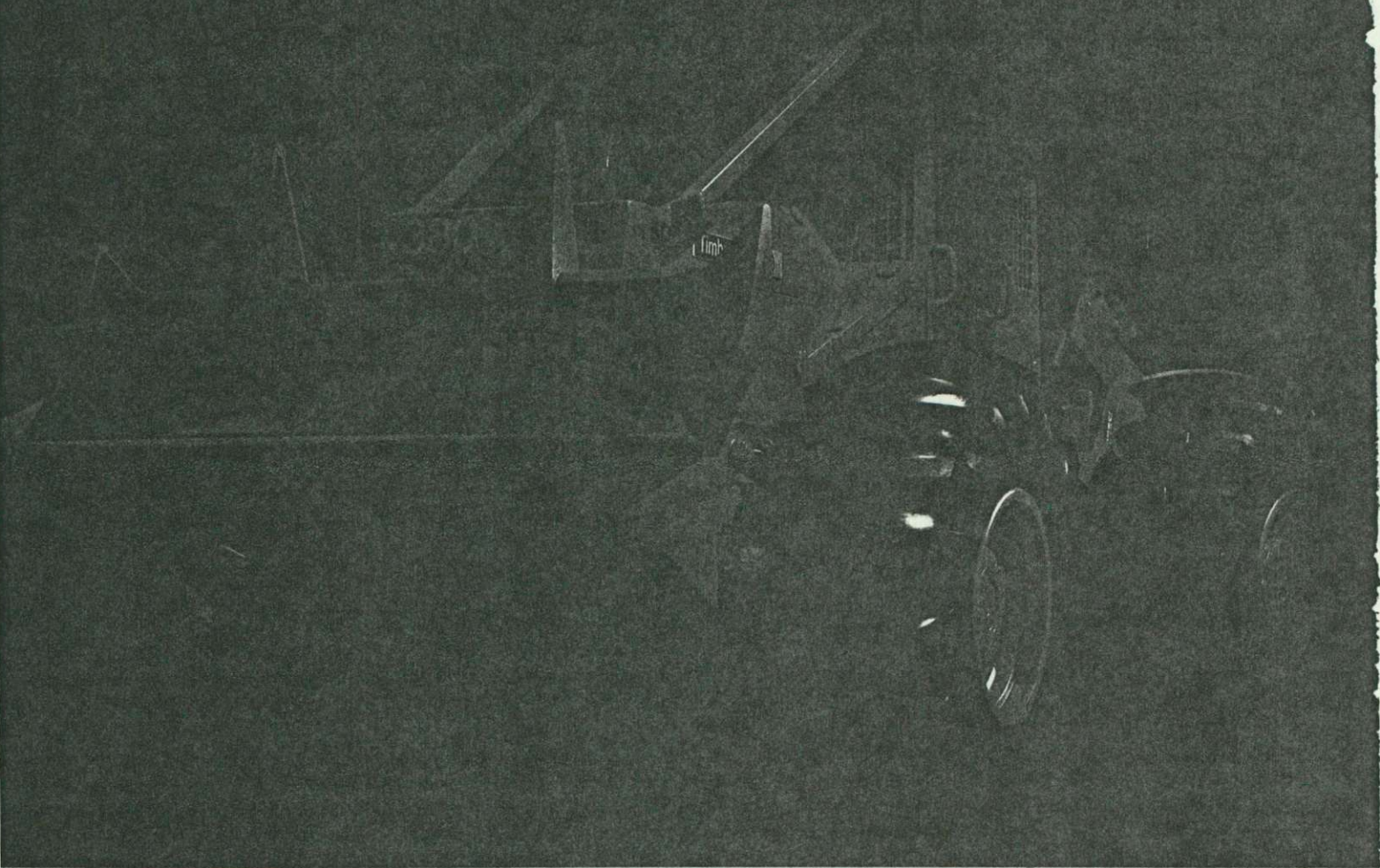
Financial problems for the company continued to mount in 1925, compounded by a decline in the sugar barrel market. New Hampshire Stave and Heading Co. was still in debt to the sum of \$5 million to the parent corporation, Warner Sugar Refining Co. of New York, and in an apparent effort to safeguard these debts in the event of company failure, which appeared to be inevitable, Warner instituted a \$5 million law suit against the company in April of 1925. Attachments were made on the mill properties, the company owned houses, the Vermont timberlands and the 15 miles of railroad, and Warner sent up Thomas Varney to set up office in N. Stratford and act as direct representative of the New York office.



A gasoline Lombard hauler brings a train of log sleds from the Yellow Branch into Wenlock siding where they will be loaded on the Grand Trunk.

(continued on page 40)

# Timberjack



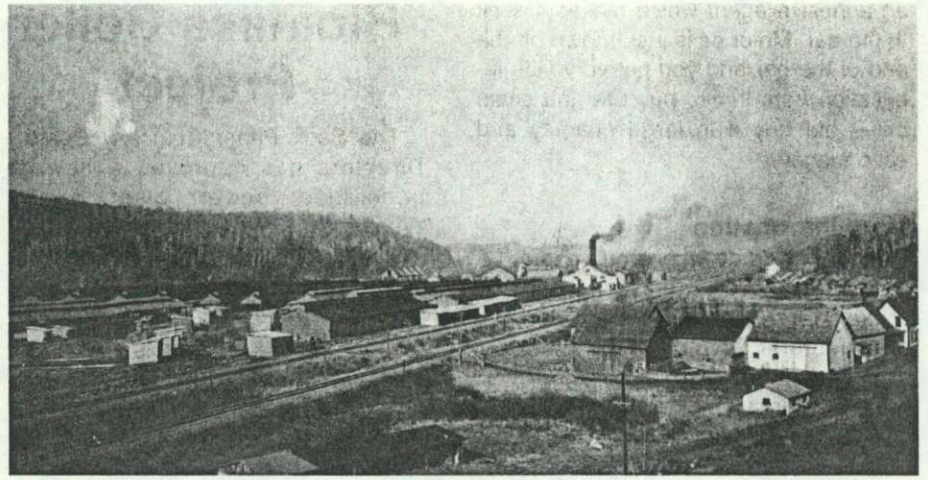
## SUGAR BARREL

(continued from page 23)

Although there were over 200 still employed at the mill at this time, resignations increased throughout 1925, the workers often returning with their families to their Pennsylvania homes again. Charles Ridlon's son, John, who had been purchasing agent for the company for four years, left the area and purchased a hardware business in Coudersport, Penn.

Logging operations on the East Branch continued the following winter of 1925-1926, however. Wilbur A. Marshall completed his operation on the Black Branch of the Nulhegan, using Lombards to haul the logs over to the railroad on the East Branch where they were loaded at the siding just above the big trestle. In February a party of ladies from North Stratford rode up as passengers on the log train to have a snow shoe party and dinner at one of the company's log camps.

The Black Branch hardwood cut was not all of the stave wood quality, however. In April Edward Bateman agreed to purchase 1½ million feet of cull logs from the company on the Black Branch, quite a volume of culls by any standard, which he proposed to cut up into



A 1941 view of the plant when it was owned by St. Regis Paper Company still shows the extensive area of stave drying sheds and the long row of company built houses on the right.

cordwood fuel for the city markets. Before the end of April he had a large crew camped on the Black Branch where they set up to make the six mile haul of the wood to Stone Dam where it would be loaded on the Grand Trunk the next winter.

The company made preparations to cut another 5 million feet on the Black Branch in November, but in the meantime the work force at the mill continued to dwindle as more of the Pennsylvania

transplants saw the handwriting on the wall and left to return to the homeland. There are reports that Connecticut Valley Lumber Co. was having difficulty collecting stumpage payments by now, possibly even taking court action.

When the Warner Sugar Corp. sold its refinery in New Jersey to the National Sugar Refining Company the next January (1927), C. M. Warner let the local folks know that he intended to keep operating his floundering stave and



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International	F2575	NTC350	12513	12/40	174	Tractor
International	F2575	NTC350	12513	12/40	162	Tractor
International	1700's	Various	Various	Various	Various	Various
Mercedes	Various	Diesel	Various	Various	Various	Various
International	F4370	NTC350	12513	12/40	176	Tractor
International	F4370	CAT380	12513	12/40	176	Tractor

USED						
	Model	Engine	Trans	Axles	WB	
72 D-Reo	C11664DB	BV-71	9513	12/38	155	Tractor
74 Mack	R686ST	ENDT676	5SP	10 8/34	160	Tractor
75 International	4070B	BV-71	9513	12/38	152	Tractor

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Secondly, get help from the oil supplier. Even if you're a small logger who buys his oil at the local gas station, that guy has the right to go up through the "chain of command" and get to the oil company tech-representatives — so he can get information for you. 



## Biomass Boiler Project

The Scott Paper Company Board of Directors has approved a new cogeneration power plant for its Westbrook, Maine, pulp and paper mill. This mill, one of three Scott operations in Maine, produces 600 tons per day of high quality printing, publishing and industrial specialty papers and employs approximately 2200 people with an annual payroll exceeding \$40,000,000.

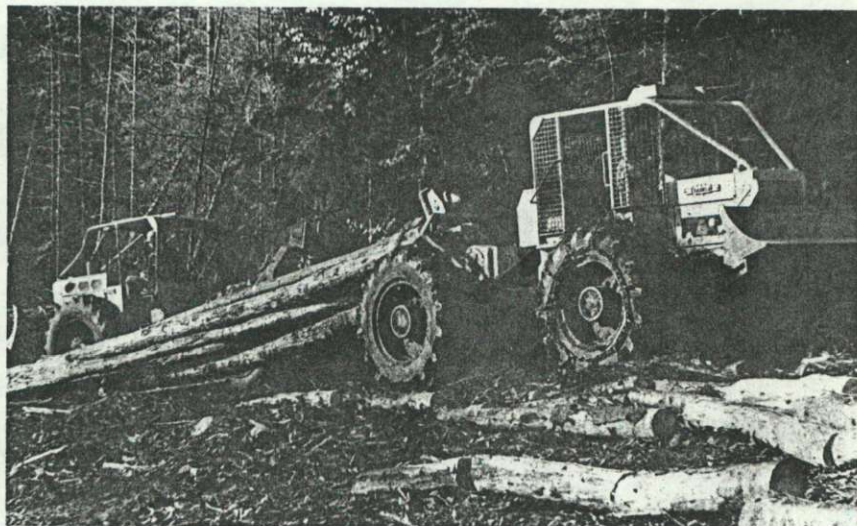
The new plant — construction is to start in 1980 and the facility should be in operation in 1982 — will ultimately supplant older existing steam and electric generating capacity at the mill for which replacements have been under study and design for several years.

The plant will generate steam at 1300 pounds per square inch pressure which will drive a turbine generator producing approximately 31,000 kilowatts for mill operations and for sale to utilities. Exhaust or low pressure steam from the turbine will be used for mill operations such as pulping, paper drying and building heating.

Because of the petroleum shortage, alternative fuel sources were thoroughly investigated and the optimum fuel for the new installation was found to be solid fuel in a combination of coal and biomass — or forest residues from local woodlands. This wood-based fuel will consist of "on site" or in-the-woods chipped tree thinnings, limbs, tops, etc., in addition to residues from local wood products plants, such as shavings, sawdust, bark, etc. Studies by universities, government and private agencies have determined that there is an ample supply of this biomass-type fuel within a radius of approximately 50 miles of the mill.

The wood fuel will be in the form of chips and will be used at the rate of some 350,000 tons per year. One dry ton of wood chips yields as much energy as 60 gallons of residual oil, and wood burns much more cleanly than fossil fuels. This fuel, along with coal, will save approximately 700,000 barrels of oil a year. Sophisticated environmental improvement control equipment and constant monitoring will ensure that the plant will meet or exceed all state and federal environmental requirements.

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heading mill in N. Stratford. The problem remained, however, that the market for sugar barrels was fast dissipating as the cloth and paper products made fast gain in popularity for sugar containers. It's ironic that in this same year of 1927 one of the nation's largest manufacturers of paper products, St. Regis Paper Co., purchased the vast timberlands of the Connecticut Valley Lumber Co., the lands that had supplied the sugar barrel logs. St. Regis made this purchase through an operating subsidiary, the New Hampshire-Vermont Lumber Co., C. V. Martin superintendent and John Locke local manager.

That winter of 1926-27 was the last season that the sugar barrel railroad operated, for as soon as the Nulhegan woods were cleaned of the winter's reduced cut, the costly company railroad-ing ceased. In August, F. O. Barden sent the crew in to begin rail removal at the upper end, completing the job by the first of October, 1927. CVL Co. had some pulpwood cut on the East Branch during the peeling season but it was planned to drive the four foot wood down the river with high water.

The mill continued to run that winter of 1927-28 under manager F. O. Barden, even though mill superintendent Charles V. Hylen left in October. Although the corporation was still the New Hampshire Stave & Heading Co., the production of staves and headings was

now taking a secondary role to the more profitable sawing of hardwood grade lumber in the company sawmill.

Barden was seeking to buy quantities of delivered hardwood logs to feed the sawmill and hired John L. Mills as general woods superintendent to increase purchases. An agreement was made with the New Hampshire-Vermont Lumber Company in December for a delivery of one million feet of hardwood logs that winter. The New Hampshire-Vermont Lbr. Co. put contractors Harry Marsh and Cleve West to work with four Lombards hauling out of the Black, Yellow, and North Branches of the Nulhegan River, landing the logs at Wenlock siding where the logs were loaded on Grand Trunk flat cars for the journey to N. Stratford. The Lombard tractor could usually haul six sleds, each loaded with four thousand feet of logs.

This was also about the time that logs were drawn by truck for the first time in the north country. Harry Marsh trucked

logs from a hardwood cut in Columbia, N.H. to Cone's siding on the Maine Central RR where they also were loaded on rail for delivery to the New Hampshire Stave & Heading Co. mill.

The New Hampshire Stave & Heading Co. plant continued to operate sporadically through the year 1928, but the production emphasis was on grade lumber, chair stock and turning squares. Some of the low grade logs were put into production of barrel heads, but sugar barrels had had their day.

Activities picked up somewhat that fall, and the company even went to the expense of remodeling the plant. Winter logging was contracted out on company lands in Averill, Vt. and Stratford, N.H.

(continued on page 44)

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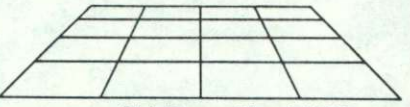
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### SUGAR BARREL

*(continued from page 41)*

James H. Murtha, a jobber from Jackman, Maine, took a contract to cut 6 million feet near Lewis Pond at the head of the Logger Branch of the Nulhegan River and another 2 million feet on Meridan Hill in Stratford. Lombards log haul-

ers were used again that winter to bring the Lewis Pond cut into Wenlock.

However, this was the final spurt by George Warner to recoup some of the large investment he had made at N. Stratford, and that winter operation of 1928-29 didn't exactly provide a finale of blaze and glory. The entire mill property plus 26,734 acres of timberland was sold "lock, stock & barrel head" to the New Hampshire-Vermont Lumber Co. (St. Regis Paper) in 1929. St. Regis Paper Co. continued to operate the sawmill until 1942, dissolving the subsidiary New Hampshire-Vermont Lumber Co. in 1940, and even though the plant has undergone a number of ownership and physical changes since, it is still to this day in use producing secondary paper products.

Warner had sold Shay No. 1 in 1928 to an Alabama firm, and in 1929 he shipped off Shay No. 2 to the Valley RR in Kane, Penna.

The Shays didn't last long in the 'Hegan woods, but they left an impressive mark on the ground. The road bed is easily recognizable and has become the foundation for much of the excellent road system that St. Regis has recently built up the East Branch. If some thought that the sugar barrel railroad had cleaned out and devastated the 'Hegan woods, and indeed they may have after viewing the rail side log piles of four million feet each, they would see now that it ain't so. Hardwood logs and spruce-fir pulpwood began rolling down the Nulhegan again in 1964 and have continued since. This recent winter (1979-80) was an active one for the timber stand improvement cuttings that St. Regis Paper Co. has recently intensified on the 320,000 acres they own in the north country. And hardwood sawlogs and pulpwood are the major products.

But now the logs are rolling out on trucks — the sugar barrel railroad in the 'Hegan woods is but a faint memory.

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 Woods 502M Flooring Matcher, 10 knife, DMD, 4" x 2".  
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 Buss 55 Double, DMD, 30" x 14".  
 Buss 4A Double, DMD, 36" x 7".  
 American 666 Double, DMD, 30" x 7".  
 Woods 450B Double, Belt, 30" x 6".  
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**DAN HUDON SALES**  
 Rt. 12 Barneveld, NY (315) 896-2217

## WANTED

**WANTED:** Complete sawmill for small operation, would consider portable. Also shingle mill. 603/654-6722, Mon. & Wed. 5-7 p.m.

DEVELOPMENT OF LUMBER AND RAILROAD INDUSTRY

VICTORY AND GRANBY, VERMONT (UPPER PORTION OF MOOSE RIVER)

By William Gove

Virgin Timber Type

The original forest cover in the Moose River drainage contained a large proportion of softwood species, spacious and towering trees that provided the early settlers with a resource readily available. The conifers predominated in the lowlands, spruce and fir with an intermingling of cedar and tamarack in the bogs and swamps. Elm were numerous along the river banks and swamp margins. White pine was plentiful in some of the drier lowland sites and was magnificent in stature. Swamps and bogs don't make the best timber growing sites and much of this lowland area has never supported or grown any merchantable timber. However, the variety of plant and animal life in this region has been most unique.

Hardwoods were thick on the ridges, especially beech, birch and maple, but it was also here that the mighty spruce reigned supreme; they reached their greatest potential where intermingled with their shorter hardwood associates. Smaller amounts of hemlock could be found, but it was the towering spruce and pine that were to sustain the first settlers, beckon the lumbermen and support over 100 years of industrial activity before the Moose River country was laid to rest.

### Early Lumbering

Although some of the earliest known logging in Vermont occurred in this part of Essex County, the Victory Bog area and surrounding ridges were among the last areas to give up the old growth timber to the axe and crosscut saw. Unlike so much of Vermont, these Essex County soils were never found to be conducive to agricultural development.

As the first settlers moved into Granby in 1790, followed by migrations into Victory soon after the turn of the century, land clearing slowly crept over the more tillable sites and permanent farms were established by the mid - 1820's. But with rocky soils suitable for growing only potatoes and the coarser grains, agricultural development seldom expanded beyond the immediate needs of the family.

The first income from the forest was realized from the manufacture of potash. As the hardwoods were cleared from the stubbornly resisting land, it was piled and burned. The ashes were leached and boiled into lye salts (potassium carbonate) for making soap. Money was scarce among those early 1800 settlers, and the product would be hauled all the way to the Guildhall or Lancaster market on a drag rigged up behind the family horse, using two parallel poles with the front ends supported in the harness and the load secured to cross pieces on the poles. If the family had an oxen they might even use what was called a "go cart", a wide spread crotched stick dragged behind the beast to support the load. Some would even carry it on their back; it was then reckoned that any good man could easily carry a hundred pounds for at least ten miles.

Spruce gum was a favorite commodity in those pioneer days, almost as popular as chewing gum today. The gum would be gathered from bruises in the trunk of the spruce where it would exude and harden and was collected with a long pole, possibly ten feet, that had a knife and gathering can on the end.

The higher elevations, particularly in the western portion of Victory, had some fine maple stands and sugar maple groves were maintained for syrup production.

The first timber species sought by the local lumbermen was the white pine, not the most plentiful in the Moose River area but found in many lowland areas. The Town of Victory once had a reported area of 3,000 acres of white pine in mixture. The pine was the king of the lumber industry during this era because of its select quality and workability. With the concentration on the preferred white pine, which was also the most accesible of the softwoods, it didn't take many years to cut it off, even though the lumbering was not then on a big scale. By 1860 about all of the large pine was gone, and the new growth that came along afterward contained fewer pine.

#### Log Drives on Moose River

Until 1841, the year of the first mill on the Moose River that could be termed a commercial sawmill, almost all of the logs cut in the town were driven down the Moose and Passumpsic Rivers to be sawn up by sawmills on down the rivers, possibly down on the Connecticut. The Moose River is not a large river and of course presented many obstacles to efficient log driving. As far back as 1835 the Vermont legislature granted one of the more enterprising lumbermen the right to improve the course of the Moose and Passumpsic Rivers, removing obstructions from the north line of Victory clear to the mouth of the Passumpsic on the Connecticut River in Barnet. For his labors the right was also given him to charge a toll on all logs floated down his improved river bed.

The Moose River remained an important log transportation avenue for many generations. In 1874, at a time when a number of water powered and steam powered sawmills were located on the river, the Moose River Improvement Company was chartered to further improve the channel for the many sawmill operators to float down their logs or manufactured lumber.

## THE FIRST SAWMILLS (1810 - 1841)

The early settlers found this vast country quite inhospitable, at times cantankerous, but lumbering was really the only thing the Moose River country had to offer the stubborn pioneers. In 1791, the year after the first settlers landed in Granby, the town fathers offered a land gift to the one who could establish the town's first saw and grist mill. It wasn't until 1810 that a certain General Seth Cushman seized the opportunity and constructed a small mill that lasted until 1826. It didn't run during the "cold spell" of 1813 - 1818 which was severe enough to discourage all but three of the 25 families from living any longer in the hills of Granby.

The settlement of Victory began with the first permanent homestead in 1822 at North Victory and the first sawmill in 1830. The mill was built by Joseph Woods on the Moose River, near the beginning of the present road onto Victory Hill and on what was then the town line between Victory and now defunct Bradley's Vale Township. Moose River was at that time known as Gaswell's Stream.

### Earliest Sawmill Types

These early sawmills were quite small in size and used an up-and-down saw, a straight steel saw with coarse teeth and about six feet long. The saw blade was held tight in a vertical position inside of a wooden frame which slid up and down between two grooved "fender posts". The log was held on a crude carriage which was slowly gighed forward by a rack and pinion after each downward cut stroke of the saw. Production was necessarily limited, slow enough to allow the sawyer opportunity to go off and tend to other chores before resetting for the next board. This was usually the only piece of machinery in the building.

Power was obtained by harnessing the rivers and streams, at that time usually offering a more dependable water flow than in the era after the virgin forest was removed. A small "flutter wheel" was a common type of water wheel with sawmills,

small wheels that, though ineffecient, gave the speed necessary to produce a rapid motion for the upright saw. Overshot wheels were occasionally used but required elaborate gearing to obtain the required speeds.

Sawmill development progressed slowly on the Moose River since the only market was of course the local one. By 1841, the year Victory became organized, population in that town had reached 140.

#### DEVELOPMENT OF COMMERCIAL SAWMILLS, MEDIUM SIZE (1841 - 1882)

In the 1840's the circular saw became improved to the point that its use was practical on a commercial scale, and a mild revolution occured in the sawmill industry. Production was so much greater that few of the mills hung onto their old up-and-down saws, and one of the last of these to go was an old mill just south of Gallup Mills that was washed out in the flood of 1888. By this time the use of pulleys and belts had been improved also, and the requisite shaft speed could be reached, even with the slower water wheels.

Also evident by this point in history was the development of the water turbine, an encased wheel on the end of a usually vertical shaft that made much more efficient use of water available.

The first of the medium sized sawmills built on the upper Moose River was in 1841 when Willard Read built a mill in Bradley's Vale, now North Concord. Another mill was later built on the opposite side of the river from the Read mill, and these two mills operated extensively with logs cut in Victory and floated down the Moose River. This mill location was about where the present Victory road crosses the Moose River in North Concord. Until the time that this mill was built about all of the logs cut in Victory were floated on down the river to mills down below.

The Moose River offered a number of excellent 'mill privileges' along its course; that is, there were some ideal locations where the flow could be dammed and a good head of water maintained for power generation. By 1868 there were three sawmills operating on the river within the township of Victory and two others shut down and out of repair.

The timber cut during this era of early expansion of the sawmill industry was almost exclusively the softwood or conifer species. It is said that in the period 1840 - 1868 there were twenty million board feet of pine, spruce and hemlock timber cut in the town of Victory. Markets for softwood lumber were still partly local ones, as yet lacking suitable transportation facilities to reach the populous regions.

With the completion of the Connecticut and Passumpsic Rivers RR northerly from White River Jct. to St. Johnsbury in 1850 and its gradual extension northward over the next 12 years to Newport, there became available a market for railroad ties. Cedar was cut in the Victory swamps and teamed westerly over the hills to the railroad market or to the adjoining towns to make fencing. One operator had a crew of twenty cutting cedar in the swamp all one winter.

Logging was done with both horses and oxen, either skidding the logs for short hauls or using sleds for greater distances. The Victory Bog and surrounding swamp lands always presented difficulties to those wanting to move logs across them. Not that the best logs were cut in the swamp; the swamp often had to be traversed to get the logs riverside. It was reported that in the early 1800's a man could stomp on the ground and shake half an acre of land on the so called Beaver Meadow near the mouth of Bog Brook (later known as Damon's Crossing). Horse skid roads were laid out with care, even during the winter months, but by the 1880's the ground at this point had firmed up enough to permit use by a horse and cart.



During the 1850's and 1860's large areas that had been clear cut of timber were burned over to make blueberry fields and yielded large crops for years.

### The Coming of the Railroad

The real impetus to major lumbering activity began in 1871 when the Portland and Ogdensburg RR (soon to become the St. Johnsbury and Lake Champlain RR) completed the rail line from St. Johnsbury to Concord and in doing so laid rail along side the lower portions of the Moose River. Now the lumber wagons from Victory had a closer outlet as they made the trek to the North Concord depot instead of the laborious climb over the hills to the west.

Population was slowly growing along the upper flowage of the Moose River, reaching 515 in Victory and Granby together by 1880, and now there was talk of extending the railroad up through the region to develop its vast resources. A charter was granted by the Vermont legislature in 1882 to build a railroad from Concord northerly up the Moose River and culminating at the Canadian boundary; only  $11\frac{1}{2}$  miles was ever built, however.

The "common carrier" railroad built through Victory and into Granby and connecting with the St. J & L C RR at North Concord was to be the all-important link that opened up Victory. Twenty five years of glory followed. At least it was glory for the lumber industry; Victory has never been the same since. The railroad was built by Odber M. Gallup under contract to the St. J. & L C, and Gallup was a man with considerable experience in railroad building.

Gallup had settled in the small settlement known as Moose River Ville in the upper part of Victory in 1880 where he bought and renovated an old sawmill built in 1847 with steam power. The former owner had drawn much of his manufactured lumber over the mountain to Saint Johnsbury by team in the winter time.

Gallup then put much of his own money and time into securing the railroad branch; so grateful were the townfolks that they renamed the now fast growing settlement Gallup's Mills.

Construction on the railroad began in 1882 and the eleven mile length to Stevens Mills over the line in Granby was completed in January of 1885. Mill owners were eagerly awaiting the new railroad and its anticipated economic benefits. At the top end of the new rail, at Stevens Mills, was a new mill complex and a large one, with a yard filled with freshly sawn lumber before the railroad had even arrived. Hopes for a bright future were boosted by the arrival of the first passenger train to the top end of the line on February 6, 1885. The year 1885 opened up the short-lived era of large sawmills on the Moose River.

#### THE LARGE SAWMILL ERA (1882 - 1911)

##### Stevens Mills (Moccasin Mills)

The first large sawmill, actually built shortly before the railroad arrived, was constructed on the Moose River in the westerly corner of the town of Granby at a place formerly called Granby Mills. There had been a sawmill and clapboard saw on the location previously to saw some of the large pine once found along the river course, but it was in 1881 that Charles H. Stevens of St. Johnsbury moved in with his partners to set up the C. H. Stevens and Company. The business of manufacturing lumber and allied products was to thrive at this site for about twenty two years.

Later corporation names that this mill complex operated under were the Northern Lumber Company, incorporated in 1890, and the Granby Lumber Company, the owner at the last end until its closure about 1904. Because Charles H. Stevens was the principal owner through most of the village's tenure, the complex became known as Stevens Mills, but it also took the name of Moccasin Mills because of the style of leather moccasin foot wear worn by the French Canadians that constituted the majority of the work force.

There were apparently as many as three sawmills once operating at the location, one of them concentrating on hardwood logs. These were all circular sawmills, powered by steam, and equipped with edgers, trimmers and planers to produce a much better grade of lumber than had been possible during the era of the small mills. Also to be found at the location was a clapboard mill and a box shop. Products made from the 10 million board feet of logs sawn annually were framing lumber, boards, spruce and hardwood flooring, spruce clapboards, box shooks, turned and sawed hardwood chair stock, shingles and lath.

The St. J & L C Railroad, Victory branch, ran as far north as Stevens Mills where a turn table was located, and at the height of activity was running a passenger car daily down to the junction at North Concord. There were then about 300 on the payroll and 50 families in the settlement. Freight business was brisk on the branch, the first year totaling over 2,700 car loads from all operations.

The C. H. Stevens and Company also built their own logging railroad northerly from Stevens Mills, about seven miles of rail reaching to the head waters of the Moose River in the center of the town of East Haven. A 24 ton Shay geared locomotive was used to haul the logs down to the mills from landings along the railroad where the logs were skidded out by horses and oxen.

#### Bog Pond Mill

The first large development in the town of Victory was the mill and village built at the foot of Bog Pond by Lucius D. Hazen in 1882. This development also was stimulated by the building of the Victory branch railroad which reached Victory in 1883 and established a half mile long spur into Bog Pond.

Business prospered here also with the fine virgin stands of spruce along the base of Umpire Mountain. In 1885 the site became the largest settlement in

the town of Victory with 20 dwellings, a store and a school.

The large circular sawmill was originally water powered and later converted to steam. No doubt Bog Pond with the large stone dam at the outlet was unable to supply a large enough and steady enough volume of water needed to turn the wheels of a mill this size. Yearly production included 5 million board feet of lumber, 700,000 shingles, 2,400,000 lath, 300,000 feet of clapboards, spruce piano sounding boards and hardwood chair stock. Employees, probably including those in the woods, numbered from 80 to 100.

Hazen sold the entire property to the Olcott Falls Company (Herbert Wilder) in 1889, and the mill burned about 1900. The site was never rebuilt and soon abandoned completely. Today, Victory's once largest settlement is all but forgotten, and even the sawmill and house locations can be found only with difficulty.

#### Damons Crossing (Moose River Lumber Company)

The demise of the Bog Pond industrial site was followed almost immediately by another at a nearby location which was even larger in size. Herbert Wilder had been buying other property in the area about the turn of the century, and in May of 1901 he organized it all into the Victory Lumber Company. A new large sawmill was built at the point in Victory where the Victory railroad branch diverged away from the Moose River, known as Damon's Crossing. It is said there was a small steam sawmill there previously.

What machinery could be salvaged from the Bog Pond fire was moved to Damon's Crossing for the new project. A large steam powered sawmill was constructed that was capable of sawing as much as 50,000 board feet daily. The head saw was circular, there never was a band mill on the upper Moose River, and the log carriage large enough to require two riders to operate it.

In the fall of 1902 the mill and property rights were leased to the firm of

Russell and McKelvey but were soon thereafter transferred to George L. Johnson and H. B. Stebbins who operated the mill for about eight years as the Moose River Lumber Company. Timber was purchased from the land owner, Herbert Wilder's Victory Lumber Company, which then owned about 15,000 acres in Victory and Granby.

An interesting innovation was attempted by Johnson and Stebbins to log out the timber along Hay Hill Brook. A crude railroad was built with a homemade locomotive that ran on log rails and winched itself along a cable laid out between the rails. The rig was laid out for a mile or two up into "snake alley" and terminated at the Moose River where the logs were rolled into the river to float to the mill. But the contraption was not successful; it wouldn't stay on the log rails on the corners and actually ran only a few weeks.

In 1904 a genuine logging railroad was laid out in an easterly direction from Damon's Crossing to tap the softwood timber supply in the east part of Victory. A 36 ton Shay geared locomotive was used for motive power, and the railroad was quite successful in amassing some huge piles of spruce logs in the pond behind the sawmill, formed by damming the Moose River.

To reach the timber farther north in Granby a long two-sled tote road was constructed northeasterly from the mill at Damon's Crossing and ending north of Granby village. A two-sled was a large log sled arrangement that had a separate sled under each end of the long load of logs and the sleds joined together by cross chains. The two-sled would be hauled by four horses usually, and because of the large loads possible on the well graded and well iced roads, it could be used over quite a long haul.

In addition to the large quantities of lumber sent out by the two big sawmills, other activities kept a brisk activity going on the St. J & L C's "Victory branch" for a few years. Carloads of logs were being shipped out

from the Victory Lumber Company lands to the big sawmill at Miles Pond, sometimes as much as 50 carloads a day. Pulpwood was loaded in box cars and even a few exceptionally long logs loaded for shipment to Maine for shipmasts, requiring two flat cars to hold them.

#### THE END OF THE ERA

By the year 1905, the upper Moose River drainage had been quite well cut over. With the last of the large areas of virgin spruce gone, there was no hope of sustaining the era of the big sawmills.

The last train on the logging railroad out of Stevens Mills ran north on February 14, 1902, and the mill operated for possibly a couple of years longer. Traffic on the Victory branch then dwindled considerably, and in 1908 the upper half of the branch was abandoned and all the rails north of Damon's Crossing removed.

The large mill at Damon's Crossing was closed permanently in August of 1911, and this closed the era. Small amounts of outgoing lumber and pulpwood shipments kept the remnant of the Victory branch barely alive during the First World War, but the rails were completely removed down to North Concord in 1917.

With the extensive softwood stands removed there was no opportunity left for a larger mill, but a few small sawmills, often portable, did continue to exist for short periods of time at various locations until the end of the Second World War. The last sawmill in the entire basin was located just north of the Stevens Mills site and closed down in 1948, twenty four years ago.

A count of the various sawmills known to have existed during both the small and large sawmill era shows a total of at least 25 sawmills operating in Victory, western Granby, and North Concord. Most of these were located on the Moose River itself or on tributaries, but an occasional small steam mill or portable gasoline

powered sawmill was to be found up on the higher ground. It is said that there were once as many as fourteen sawmills operating at one time up along the Moose River.

The forest type today would hardly be recognizable to the early pioneer. Where once the mighty white pine lorded it over its smaller neighbors, there now may be an alder or spruce swamp, a young growth of cedar or a medium sized stand of maples. Where once grew the majestic spruce so thick as to deny most sunlight to the forest floor, there now grows a thriving stand of northern hardwoods (beech, birch and maple). The only areas where the softwood returned prolifically are the wetter sites where often is found a dense growth of spruce and fir.

The area has yielded an abundance of resources; its now enjoying a much deserved rest. But let none suppose that the heavy cutting practice so well typified in Victory during the big sawmill era are ruinous to the forest resources. The rich forest stands of the Moose River country now growing in remote solitude are eloquent testimony that trees are a continuing and renewable resource. Today the region is truly a wild country, more remote in fact than it was 125 years ago when agriculture was attempted on its shallow soils. Certainly more remote than it was 80 years ago when the whistle of the railroad and the whine of the sawmills kept pace with the vigorous lumbering activity of Victory.

**POOR QUALITY**  
**ORIGINAL** Light

2 pages



PARTIAL HISTORY OF THE NORTHERN LUTHER COMPANY

ST. JOHNSBURY, VT.

Jan. 1955.

FORESTS AND PAPER  
MILLER, VERMONT  
73 OCT 15 AM 10:12

October 25, 1890 the Company was Incorporated. Incorporators C.H.Stevens, Elmer O. Lake and J.C.Clark who voted to purchase the lumber property of C.H.Stevens in Granby and East Haven, Vt., known as Stevens Mill, P.O.Gallups Mills. Served by branch of the St.J. & L.C.R.R.open sometime before 1886, discontinued 1918 or 1919. There were several other mills on the Line. Storehouse of Company on railroad about 150 ft. from Retail Store. Flour was bought in barrels in carload lots, oats in bulk in carload lots, cracked corn in bags and bailed hay in carload lots, as well as other merchandise in proportion, which was for Retail and supplies to jobbers in the logging camp.

The Village had saw mill, hardwood mill and dressing mill, store Boarding House, large barn and about 40 huses, school and Catholic Church. A privately owned railroad running back in the woods 7 or 8 miles where delivery of supplies were made once a week.

Officers elected, C.H.Stevens, President, Treasurer and General Manager. E.O.Lake Clark. Lambert W. Hastings was bookkeeper and manager of store. L.V.Hastings went to work as Clerk in store in the spring of 1892 at \$15.00 per month and board and room over the store, taking the place of Herbert Lougee, late of St.Johnsbury, who had resigned.

Sometime around 1894 the store goods were sold to Lambert W. Hastings, and moved to Concord, Vt. L.V.Hastings acting as clerk for about 2 years, while L.W.Hastings still acted as manager for the Company in St.Johnsbury. At his resignation L.V.Hastings succeeded in his place.

June 1897 the lands in Granby and East Haven estimated to be 11000 acres was sold to Danforth & Stevens, who later sold to St.Regis Paper Co.

About 1894 a dressing mill was built on the grounds now occupied by Miller and Tempered Maple. This was used for dressing and grading rough lumber bought in Canada and local mills. Later sold to Mr.Stimpson, and he in turn to Roy Skinner.

In March 1901 a sales office was opened at 71 High Street, Boston, Mass. with E.O.Lake as Sales Manager, J.A.Hamilton, Travelling Salesman, Miss McIntire, Stenographer.

April 21, 1903 officers elected at Directors Meeting, C.H.Stevens, President and Treasurer, E.O.Lake, Vice President, L.V.Hastings, Clerk.

1912 A.L.Stevens was appointed Asst. Treasurer.

Sept. 22, 1913, E.O.Lake withdrew his interests with the Company, and started business on his own. F.G.Newton was appointed Sales Manager of the Boston Office, and A.L.Stevens, was elected Treasurer.

May 1924 Boston Office was moved to the Rice Building.

July 3, 1926, Special meeting called on account of the death of A.L.Stevens. Directors elected J.A.Hamilton, Vice President, L.V.Hastings appointed Treasurer, and V.B.Ticehurst, Clerk.

1927 C.H.Stevens passed away.

Jan. 14, 1928 Directors elected J.A.Hamilton, J.C.Clark and L.V.Hastings.

May 7, 1928, J.A.Hamilton died very sudden after 48 years with the Company.

June 18, 1928, Directors elected, J.C.Clark, L.V.Hastings and F.G.Newton. L.V.Hastings elected President and Treasurer and appointed General Manager. F.G.Newton, Vice President.

Jan. 12, 1931. F.G.Newton passed away, and H.S.Mardon was appointed Sales Manager of the Boston Office.

Jan. 16, 1932. Directors elected J.C.Clark, H.D.Withers and L.V.Hastings.

Boston Office discontinued.

Jan. 1933 J.C.Clark passed away. Directors elected L.V.Hastings, H.D.Withers and V.B.Ticehurst. V.B.Ticehurst elected Vice President and Clerk.

Dec. 1945 capital stock reduced from \$75,000 to \$20,000. and L.V.Hastings retired and the following officers named, H.D.Withers, President, Sallie W.Withers, Vice President and V.B.Ticehurst, Clerk. Directors elected M.D.Withers, L.V.Hastings and V.B.Ticehurst.

Lula M.Fulford served as stenographer 23 years, resigning in 1926 she returned in 1939 and is still on the job.

Ruth Parks as stenographer July 1903 to August 1938.

Asst. bookkeepers in the time 1909 on was Ernest McFarland, Clayton Bond and V.B.Ticehurst.

TIME TABLE - VICTORY BRANCH

Trains North  
Read down

Trains South  
Read up

No. 1	Distance from North	Stations	Distance	No. 14
Freight	from North		between	Freight
A.M.	Concord		Stations	P.M.
8:25		North Concord	1.30	1:10
	1.30	Water Mill	1.75	
8:43	3.05	Colby's	0.62	12:50 12:45
8:48	3.67	Morrill's (Hadley)	1.73	12:41 12:36
8:58	5.40	Damon's	0.91	12:25 12:16
9:03 9:20	6.31	Hazen's Junction (Bog Pond)	0.99	12:10 11:56
9:26 9:30	7.30	Weed's	0.93	11:50 11:42
	8.23	Dodge's	0.98	
9:42 10:05	9.21	Gallup's	1.79	11:30 11:12
10:17	11.00	Steven's		11:00
A.M.				A.M.

**POOR QUALITY**  
**ORIGINAL** Light

4000.

VERMONT DIVISION FOR HISTORIC PRESERVATION: THE STATE PLANCONTEXT: LOGGING and LUMBER PRODUCTION

- 1) How it developed (geographic; cultural; social; other influences):  
 Production of lumber, charcoal, and potash were response of settlers to timber resources.  
 Shift from logging by oxen to horses to tractors to trucks. From clear cutting to selective cutting.  
 Demise of the portable sawmill as transportation improved.  
 Lumber mills shift from water power to steam from waste to gasoline and diesel to electric  
 First lumber was for local consumption. Champlain Canal (1823) and railroads in 1850's broadened the market. C. 1950 trucking dominant.  
 Number of active mills steadily decreasing since 1900  
 Export of pulpwood in 20th century  
 Christmas tree industry in 20th century  
 Social/economic effects on Northeast Kingdom. RR spurs and lines to serve logging industry. Log drives on Connecticut River. Wood pulp used for paper production beginning late 1860's.  
 (continued on reverse)

- 2) Limitations of development:  
 Competition with agricultural/diarying/stock needs for some of the same lands.  
 Ultimate depletion of the resource base by turn of 20th century  
 By 1850-60 three quarters of the state had been deforested.

## 3) known geographic distributions and patterns:

- Burlington - 1850's boom - logs from Canada  
 Chelsea 1790's 1st sawmill (moved 1961)
- 20th c. Northeast Kingdom, sparsely settled higher elevations, local pockets of small scale lumbering

## 4) Historic highlights (i.e., significant events (natural and social), people, technological advances, laws, social trends, etc.):

- 1840 - 4,000,000 acres total cleared (peak?)      -shingle maker
- pit saw      -clapboard maker
- up and down water power mill
- circular saw
- planer
- portable steam engines
- technological innovations resulting from charcoal making; i.e. design and efficiency of round and conical kilns in Readsboro

5) Time frame: 1760? -1940 (justification):

## 6) Property types known and/or expected:

- |                                 |                                                                                                        |
|---------------------------------|--------------------------------------------------------------------------------------------------------|
| - Sawmills                      | -woodworking mills (shingles, chair stock, architectural elements, sash and blind, etc.)               |
| - Logging roads, railroads      | - charcoal making-related sites: various types of kilns and associated hardware and structures;        |
| - Portable sawmills             | coaling villages; road/RR access; charging embankments; water systems; offices; blacksmith shops, etc. |
| - machinery                     | - logging RR beds      - horse hovels                                                                  |
| - lumberyards (i.e. Burlington) |                                                                                                        |
| - logging camps                 |                                                                                                        |
| - dams ( for river drives)      |                                                                                                        |
| - log booms, cribbing           |                                                                                                        |

CONTEXT: LOGGING and LUMBER PRODUCTION

Page -

## 7) Information gaps/research questions:

Identify all rivers that used to have log drives

## 8) Biases:

## 9) Relevant constituencies:

- current logging companies, paper companies; logging associations
- local historical societies
- manufacturers' associations
- U.S. Forest Service (large landholder)
- VT. Dept of Forest, Parks and Recreation
- Nature Conservancy
- 

## 10) Selected bibliography:

P. Merrill Vermont Under Four Flags pp 133-5  
William Gove - various publications

## 1) continued

Effects on charcoal industry; effects on upland industrial development  
Lane portable sawmills made in Montpelier used world-wide  
18th c. - logs rafted down the Richelieu River to be marketed in Quebec City  
Burlington - 3rd largest lumber port in U.S. around 1870

Prepared by: Leslie G. GoatDate: 8/85

Allen Yale, Weston Cate

(attached yellow sheets are conference notes that were later typed up on this page)

### Logging and Lumber Production

- #10 sources--David Sumner Archive at VHS, 1870-71
- #3 Burlington 1850's boom--logs from Canada. Should have been lumber coming down and resawn and shipped. Year is really 1850 for beginning, peak at 1870  
Sawmill manufacturing--covered under iron works? Lane Shops, foundaries  
Chambly canal 1843, allowed it to happen
- #4 Large mills went to bandsaws in 1870's  
Woodworking--bowl mills, buttertubs, buttons, wooden toys, bobbins, carriage trade, clapboards, furniture  
Settlement pattern resulting from sawmill--houses, commercial buildings  
Can make sense of construction technique--no hand hewn  
Heavy construction due to availability; easy.  
Balloon frame required dimension lumber  
Requires lots of small pieces--circular saws  
Circular saw--large impact on production--faster, produces more 1845  
Impact on lumber  
Up and down saws ran until 1890 (when Barnet quit, 1915 when South Royalton quit), 1900 when Weston quit)  
Check out a book on NY state--Saranac Lake was the location of the largest mill
- #6 Definition of portable sawmill? What about temporary ones--buildings set up for short work. Add to this category "Seasonal variations" which would include "thunderstorm mills"--see below  
Water power--used when heavy rains were present. Lumber put there awaiting the big event  
Log rafts of lumber on Champlain and Connecticut River  
Pit saw--find an example--a property type; includes the saw pit  
Sawmill--includes small operations up to larger ones with housing and camps and stores  
Residue of lumber and logging--left over is how land changed with clearing and roads  
Logging roads--skid roads and those for access  
Stables--horses needed to shelter--hovel  
Dry chutes and slides. Ascutney Mountain  
Trough with logs built up; another in East Dorset  
Submerged cribs and docks related to lumber yards--built by them, specifically Burlington  
Railroad sidings, basins used to transport from water to land  
Dams for river drives and for mill to water power  
Loading ramps built into hillside--skidway
- #1 "Number of active mills decreases"; but not really a decline though  
Went from little village mills to larger ones  
So should read "Number of active village mills  
More a case of decline of need of village mill, not as important
- #7 Patterns of land use: was lumber, charcoal, potash everywhere, or only in small areas?  
Charcoal earlier was where iron works were, then taken out of state  
Geographic distribution of taking of timber for various uses  
Geographic patterns of 1st use of cut timber  
Didn't cut logs to make potash or charcoal--a byproduct  
Was mountainside logged to make room for sheep, or because there was a need for timber?  
What was the cause of lumber production?  
Need to know dates of conversion from up and down to circular saw for each mill.  
Not a demand for hardwood--softwood--used for framing  
Flood impact on lumber industry--natural disaster  
White pine flooded market at 1938 hurricane  
Lane portable sawmills and other woodworking machinery--shingle, planers  
Clapboard mills

Logging and Lumber Production

- (attached yellow book  
conference notes that were  
Notes typed up on this page)
- #10 sources--David Sumner Archive at VHS, 1870-71
- #3 Burlington 1850's boom--logs from Canada. Should have been lumber coming down and resawn and shipped. Year is really 1850 for beginning, peak at 1870  
Sawmill manufacturing--covered under iron works? Lane Shops, foundaries  
Chambly canal 1843, allowed it to happen
- #4 Large mills went to bandsaws in 1870's  
Woodworking--bowl mills, buttertubs, buttons, wooden toys, bobbins, carriage trade, clapboards, furniture  
Settlement pattern resulting from sawmill--houses, commercial buildings  
Can make sense of construction technique--no hand hewn  
Heavy construction due to availability; easy.  
Balloon frame required dimension lumber  
Requires lots of small pieces--circular saw  
Circular saw--large impact on production--faster, produces more 1845  
Impact on lumber  
Up and down saws ran until 1890 (when Barnet quit, 1915 when South Royalton quit, 1900 when Weston quit)  
Check out a book on NY state--Saranac Lake was the location of the largest mill
- #6 Definition of portable sawmill? What about temporary ones--buildings set up for short work. Add to this category "Seasonal variations" which would include "thunderstorm mills"--see below  
Water power--used when heavy rains were present. Lumber put there awaiting the big event  
Log rafts of lumber on Champlain and Connecticut River  
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White pine flooded market at 1938 hurricane  
Lane portable sawmills and other woodworking machinery--shingle, planers  
Clapboard mills



LUMBER-

Carlough, Peter. Bygone Burlington. Burlington, 1976.

By the 1820s lumbering was probably the most important factor in Burlington's economy. Exported lumber to pay for goods not produced locally. Boat-building was also a large-scale enterprise.

1850s- Lumbering made a comeback. Lumber was brought from out of state (i.e. Canada, Maine, N.H.?). Planing mill was erected in 1857, and an industrial giant came into being which also aided the parallel growth of the manufacture of wood products.

(Bristol- Lord's Prayer stone. Engraved by teamsters hauling down lumber.

"milling" logs into lumber  
"manufacturing" lumber into wood products (i.e. sash and blind factories, etc.)

Affect of lumber industry on building- more trim, ornamentation, etc.

Big drives down the Connecticut River.

After 1850s? small-scale loggers push further into the mountains as resources get increasingly scarce. RR helps go into hinterlands.)

(Burlington: in 1854a gas works had been erected)

By 1870s boat traffice on LC reached its peak.

Burlington most important lumber port in New England.

1880s: "the lumber yards employed nearly 1,000 people with sales running 115 million feet a year. Mills buzzed. Boards and planks were transported to Europe, South America, and the Pacific. Dressed lumber was tongue and grooved for rail shipment to the southern New England market. Huge orders of doors, sashes and blinds were turned out." (34)

(By mid-1880s most of Burlington was electrified)

(1820s- Federal government erects a lighthouse on Juniper Island of the Burl. shore)

(Glass works: 1827: "Burlington's first extensive manufacturing operation, the Champlain Glass Works at Winooski Falls, was established... To be near their work, employees established a new neighborhood north of the village, and small brick houses on George Street are all that remain to remind us of Burlington's first factory. Dependent upon cheap fuel, the company declined in the 1840s because pine logs were too dear and valuable to be burned in this manner." (14)) Burl. Mill Co. (textiles) - 1835.

**POOR QUALITY**  
**ORIGINAL**

Light  
6 pgs

VERMONT DIVISION FOR HISTORIC PRESERVATION: THE STATE PLAN

CONTEXT: LOGGING and LUMBER PRODUCTION

1) How it developed (geographic; cultural; social; other influences):  
 Production of lumber, charcoal, and potash were response of settlers to timber resources.  
 Shift from logging by oxen to horses to tractors to trucks. From clear cutting to selective cutting.  
 Demise of the portable sawmill as transportation improved.  
 Lumber mills shift from water power to steam from waste to gasoline and diesel to electric  
 First lumber was for local consumption. Champlain Canal (1823) and railroads in 1850's broadened the market. C. 1950 trucking dominant.  
 Number of active mills steadily decreasing since 1900  
 Export of pulpwood in 20th century  
 Christmas tree industry in 20th century  
 Social/economic effects on Northeast Kingdom. RR spurs and lines to serve logging industry. Log drives on Connecticut River. Wood pulp used for paper production beginning late 1860's.  
 (continued on reverse)

2) Limitations of development:  
 Competition with agricultural/diarying/stock needs for some of the same lands.  
 Ultimate depletion of the resource base by turn of 20th century  
 By 1850-60 three quarters of the state had been deforested.

3) known geographic distributions and patterns:

- Burlington - 1850's boom - logs from Canada
- Chelsea 1790's 1st sawmill (moved 1961)
- 20th c. Northeast Kingdom, sparsely settled higher elevations, local pockets of small scale lumbering

4) Historic highlights (i.e., significant events (natural and social, people, technological advances, laws, social trends, etc.):

- 1840 - 4,000,000 acres total cleared (peak?)      -shingle maker
- pit saw      -clapboard maker
- up and down water power mill
- circular saw
- planer
- portable steam engines
- technological innovations resulting from charcoal making; i.e. design and efficiency of round and conical kilns in Readsboro

5) Time frame: 1760? -1940      justification:

6) Property types known and/or expected:

- |                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>- Sawmills</li> <li>- Logging roads, railroads</li> <li>- Portable sawmills</li> <li>- machinery</li> <li>- lumberyards (i.e. Burlington)</li> <li>- logging camps</li> <li>- dams ( for river drives)</li> <li>- log booms, cribbing</li> </ul> | <ul style="list-style-type: none"> <li>-woodworking mills (shingles, chair stock, architectural elements, sash and blind, etc.)</li> <li>- charcoal making-related sites: various types of kilns and associated hardware and structures; coaling villages; road/RR access; charging embankments; water systems; offices; blacksmith shops, etc.</li> <li>- logging RR beds      - horse hovels</li> </ul> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

CONTEXT: LOGGING and LUMBER PRODUCTION

Page -

## 7) Information gaps/research questions:

Identify all rivers that used to have log drives

## 8) Biases:

## 9) Relevant constituencies:

- current logging companies, paper companies; logging associations
- local historical societies
- manufacturers' associations
- U.S. Forest Service (large landholder)
- VT. Dept of Forest, Parks and Recreation
- Nature Conservancy
- 

## 10) Selected bibliography:

P. Merrill Vermont Under Four Flags pp 133-5  
William Gove - various publications

## 1) continued

Effects on charcoal industry; effects on upland industrial development  
Lane portable sawmills made in Montpelier used world-wide  
18th c. - logs rafted down the Richelieu River to be marketed in Quebec City  
Burlington - 3rd largest lumber port in U.S. around 1870

Prepared by: Leslie G. GoatDate: 8/85

Allen Yale, Weston Cate

CONTEXT: LOGGING and LUMBER PRODUCTION

1) How it developed (geographic; cultural; social; other influences):  
 Production of lumber, charcoal, and potash were response of settlers to timber resources.  
 Shift from logging by oxen to horses to tractors to trucks. From clear cutting to selective cutting.  
 Demise of the portable sawmill as transportation improved.  
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 Christmas tree industry in 20th century  
 Social/economic effects on Northeast Kingdom. RR spurs and lines to serve logging industry. Log drives on Connecticut River. Wood pulp used for paper production beginning late 1860's.

*Effects on charcoal industry; effects on upland industry;*

*Lane portable sawmills manufactured in Montpelier were used world-wide*

2) Limitations of development:  
*By 1850-60 three quarters of the state had been deforested.*

3) Known geographic distributions and patterns:

- Burlington - 1850's boom - logs from Canada  
 Chelsea 1790's 1st sawmill (moved 1961)
- 20th c. Northeast Kingdom, sparsely settled higher elevations, local pockets of small scale lumbering

4) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

- 1840 - 4,000,000 acres total cleared (peak?)
- pit saw
- up and down water power mill
- circular saw
- planer
- portable steam engines

*- shingle maker*  
*- clapboard maker*

*No way*

5) Time frame: 1850-1940 (justification):

6) Property types known and/or expected:

- Sawmills
- Logging roads
- Portable sawmills
- machinery
- lumberyards (i.e. Burlington)
- logging camps
- dams ( for river drives)
- woodworking mills (shingles, chair stock, architectural elements, etc.)

7) Information gaps/research questions:

8) Biases:

9) Relevant constituencies:

- current logging companies
- local historical societies
- manufacturers' associations
- U.S. Forest Service (large landholder)
- VT. Dept of Forest, Parks and Recreation

10) Selected bibliography:

P. Merrill Vermont Under Four Flags pp 133-5  
William Gove - various publications .

Prepared by: Leslie G. Goat Date: 8/85

*Wes Cate*

X-ref w/ logging

## VERMONT DIVISION FOR HISTORIC PRESERVATION: THE STATE PLAN

## CONTEXT: VERMONT'S CHARCOAL MAKING INDUSTRY (1790-1900+)

**1) How it developed (geographic; cultural; social; other influences):**

Vermont's charcoal making industry developed in association with the development of its mineral smelting and production industries. Charcoal fueled furnaces (iron, glass, copper), forges, blacksmiths hearths, foundry cupolas, etc. Early charcoal making required no structure; it was made merely by mounding cordwood, covering it with sod, and allowing it to smolder. Much charcoal (and potash) was made by settlers as a by-product of clearing vast acreages of land for agriculture. Kilns supplied charcoal to local furnaces and forges that initially satisfied local needs. Industrial expansion after 1820, stimulated by the Champlain Canal, demanded more charcoal. By Civil War period, charcoal was being made in stone and brick-built kilns with much of it exported out of state. In 1880-1912 all of it was shipped out as Vermont ironworks phased out and charcoal resources in NY, Mass, and Ct became scarce. By ca. 1912, available forests in Vermont were exhausted and charcoal making ended.

*Coal process*

**2) Limitations of development:** Vermont charcoal making was limited in the early period (pre-1820) by the demand by local metal working industries, which mostly reflected domestic economics. Limitations of middle period charcoal making (ca. 1820 - 1860) still reflected local demand, but charcoal was made on a more regional supply and demand basis; local forests were becoming depleted through settlement and clearing for farmland. Following 1860, charcoal making became an industry unto itself, with charcoal being exported outside the state and forests being rapidly consumed by lumbering interests. Limitations by this period became the resources of the forest stands themselves, which were commercially exhausted by the turn of the century.

**3) Known geographic distributions and patterns:** During the early pre-1820 period, charcoal making generally centered about the iron making industries, then the largest single consumer of charcoal in the state. After 1820, as iron, copper, and glass industries developed, charcoal making chased the forest lines back into the hills. By the 1860's, it was not uncommon for charcoal to come to furnaces from a dozen miles away. As such, earlier charcoal making sites generally were close to developing industrial communities along the Lake Champlain plateau; later charcoal making areas reached well up into the Green Mountain highlands, with many last operations at 2000-foot elevations. Most kilns, however, still remained west of the center line of the Green Mountain range, with concentrations in the north in the Ripton/Middlebury area; the central area at Mt Tabor/Peru/Winhall; and southern at Glastenbury/ Woodford/Stamford/Readsboro.

**4) Historic highlights (i.e., significant events [natural and social], people, technological advances, social trends, etc.):** Largest single-owned charcoal making operation in Vermont was Silas L. Griffith of Danby, whose holdings in late 1880-1890's exceeded 50,000 acres, operating at Mt Tabor and nearby some 35 charcoal kilns, 9 sawmills, and 6 general stores. He was the first to use a telephone in the state, con-

## VERMONT'S CHARCOAL MAKING INDUSTRY (1790-1900+)

page 2

necting his lodge at Griffith Pond to his office; was an early advocate of using saws instead of axes to cut trees in order to reduce waste. He was a Vermont State Senator but declined candidacy for Governor. His charcoal plus that made farther south supplied fuel needs of ironworks in the Taconic regions of Mass., Ct., and NY until about 1912, when these resources failed; those ironworks then importing charcoal from as far away as North Carolina (the region's iron industry failed in 1923). Design and efficiency of round and conical kilns in Readsboro were recognized and written up in a technical paper in 1879-1880, published nationally (at least one Readsboro conical kiln located to date).

**5) Time frame: ca. 1785 to 1912 (justification):** archival research (see Selected Bibliography).

*add*  
↓  
*shipping sites*

**6) Property types known and/or expected:** Mound type kilns: circular gutters; collier huts; coal storage sheds; and oval areas coated with burnt pitch. Stone/brick kilns: stabilizing iron hoops; iron vents; iron top hole liners and doors; square and triangular front doors; lintels; battered, round, and conical foundation remains; road/railroad access and loading platforms; charging embankments; coaling villages (schools, postoffices, workers' housing); offices; saw mills; dams; flumes; stables; blacksmith shops; extensive charcoal-laden black soil.

**7) Information gaps/research questions:** What vegetation predominates in charcoal-laden soil? Where was hardware made for reinforcement and use in kilns (hoops, doors, iron vents, etc)? What was final (pre-collapse) configuration of stone built kilns (no known photos or sketches)? What generation forest generally stands today? Do any virgin forests remain from prehistoric period? What are the circular, dark areas on the ground in Shoreham located via satellite photos by Dunn of UVM/VAS, but unlocated by ground inspection?

**8) Biases:** Brick and stone kiln remains predominate in numbers over remains located to date of mound type kilns, due to latter having less distinguishable features. Earlier mounds also built closer to furnaces, later disturbed by furnace/industrial expansion, community growth, stream/river erosion. Stone kilns usually in better shape, higher walls than brick, seem to indicate more recent vintage, but brick usually cannibalized by locals for use (lighter unit weight, comparable to modern brick, nearer roads/drivable trails); stone kilns not generally cannibalized since stone not in high demand for construction (heavy, cumbersome, common everywhere in Vermont countryside).

**9) Relevant constituencies:** U.S. Forest Service; Vermont State Parks; SIA; town, county, and state historical and archeological societies; logging/lumbering associations; National Conservancy - Vermont Chapter; industrial and technological historical societies.

**10) Selected bibliography:** See: Rolando, V.R., 200 Years of Soot and Sweat (unpubl. manuscript) 1985, copy at DHF.

Prepared by: Vic Rolando

Date: August 13, 1985

*Antis J. 9-27-85*



VERMONT HISTORIC PRESERVATION PLAN

CONTEXT: Charcoal Making

- 1) Property types known and/or expected: - Copper making sites - Blacksmiths shops  
 Q. [Harry Atkin] distinct sites from iron making? Add  
 [Peter Haller] → geographically related? Shipping sites (Danby)  
 [Bill Badger] Vic - some are same as n't - Glass works [B.B. & V.R.]  
 Archaeological site: Griffith (Mt. Tabor)
- 2) How it developed (geographic; cultural; social; other influences):

Consensus separate context  
(possible inclusion under  
lumber industry)

- 3) Limitations of development:

Vic, C.J. Add - <sup>Development</sup> Coked Coal a factor in obsolescence of Charcoal industry

Bill Badger - Rutland RR. charcoal cars end c. 1910

- 4) Known geographic distributions and patterns:

- 5) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

C.J. Earlier charcoal sites - Middlebury, Brandon?  
 Col. Abbott - Use of charcoal in copper mines  
 Polly Parnell - switch from mounds to masonry?

- 6) Time frame: \_\_\_\_\_ (justification):

## 7) Information gaps/research questions:

Kelmsley - Ethnic groups in Charcoal? Italians?  
C.S. Earlier charcoal sites associated with iron-making?  
Polly Parnell switch from mound to masonry kilns.

## 8) Biases:

## 9) Relevant constituencies:

## 10) Selected bibliography:

Prepared by: \_\_\_\_\_

*J. Curtis*

Date: \_\_\_\_\_

*9-27-85*

VERMONT DIVISION FOR HISTORIC PRESERVATION

VERMONT HISTORIC PRESERVATION PLAN

CONTEXT: \_\_\_\_\_

*Charcoal Making*

1) Property types known and/or expected:

*Shipping sites Danby/Mt. Tabor*

*Archaeological site Village of Griffith, Mt. Tabor*

*Copper mining sites*

*Blacksmith shops*

*Glass works*

*Other sites using charcoal*

2) How it developed (geographic; cultural; social; other influences):

3) Limitations of development:

4) Known geographic distributions and patterns:

5) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

6) Time frame: \_\_\_\_\_ (justification):



VERMONT DIVISION FOR HISTORIC PRESERVATION

VERMONT HISTORIC PRESERVATION PLAN

CONTEXT: CHARCOAL

1) Property types known and/or expected:

Logging areas  
Mining - Iron, Copper, glass

2) How it developed (geographic; cultural; social; other influences):

2 stages - local needs  
- export product

3) Limitations of development:

COKE DEVEL.

4) Known geographic distributions and patterns:

5) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

switch from small scale to large scale (stone, brick)

6) Time frame: \_\_\_\_\_ (justification):

7) Information gaps/research questions:

~~Social~~ R.R. Cars (specific type) in car equipped register

8) Biases:

9) Relevant constituencies:

10) Selected bibliography:

Prepared by: WILLIAM C. BADKER Date: 9/28/85

VERMONT DIVISION FOR HISTORIC PRESERVATION

VERMONT HISTORIC PRESERVATION PLAN

CONTEXT: CHARCOAL

---

1) Property types known and/or expected:

2) How it developed (geographic; cultural; social; other influences):

add: competition from coked coal coincides with decline of charcoal mfg.

3) Limitations of development:

4) Known geographic distributions and patterns:

5) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

Rutland RR had charcoal cars until c. 1910  
switch to stone + brick kilns

6) Time frame: \_\_\_\_\_ (justification):

7) Information gaps/research questions:

Who were charcoal makers? any particular ethnic group

8) Biases:

9) Relevant constituencies:

10) Selected bibliography:

Prepared by:

*Polly Darnell*

Date:

*9/27/85*



VERMONT HISTORIC PRESERVATION PLANCONTEXT: Charcoal Making Industry

## 1) Property types known and/or expected:

*Robely museum has documents related to mound type kilns*  
*Chimney Paint*

## 2) How it developed (geographic; cultural; social; other influences):

## 3) Limitations of development:

## 4) Known geographic distributions and patterns:

*Addison Andport area*  
*Chimney Paint*

## 5) Historic highlights (i.e., significant events [natural and social], people, technological advances, laws, social trends, etc.):

## 6) Time frame: \_\_\_\_\_ (justification):

7) Information gaps/research questions:  
*relation to Port Henry NY iron works  
also Crown Point NY*

8) Biases:

9) Relevant constituencies:

10) Selected bibliography:  
*documents at Abbeby museum*

9-27-85

Session 1 Section 6

Iron Manufacture

Mining

Quarrying and Stone Milling

Added Contexts: Iron Foundry work

Glass making (include under  
Other Industries?)

Charcoal Making (include under  
Forest Products?)

Attendees: Collamer Abbott

Bill Badger

Almo Ceechini

Warren Cook

Lee Wilkinson

Polly Darnell

Vic Rolando

Bill Kemsley

Thomas Visser

Peter Haller

Larry Atkin

Eric Gilbertson

Curtis Johnson - recorder

**POOR QUALITY**

**ORIGINAL**

*Light*

*2 pgs.*

Bill Gore quiet but an expert

VERMONT DIVISION FOR HISTORIC PRESERVATION: THE STATE PLAN

CONTEXT: LOGGING and LUMBER PRODUCTION

see attached by Vic Rolando

What were effects on other industries? Rise & demise?

- 1) How it developed: geographical; cultural; economic; other influences:
  - Production of lumber, charcoal, and potash were response of settlers to timber resources.
  - Shift from logging by oxen to horses to tractors to trucks. From clear cutting to selective cutting.
  - Demise of the portable sawmill as transportation improved.
  - Lumber mills shift from water power to steam from waste to gasoline and diesel to electric
  - First lumber was for local consumption. Champlain Canal (1823) and railroads in 1850's broadened the market. C. 1950 trucking dominant.
  - Number of active mills steadily decreasing since 1900
  - Export of pulpwood in 20th century
  - Christmas tree industry in 20th century
  - Social/economic effects on Northeast Kingdom. RR spurs and lines to serve logging industry. Log drives on Connecticut River. Wood pulp used for paper production beginning late 1860's.
- (continued on reverse)
- 2) Limitations of development:
  - Competition with agricultural/diarying/stock needs for some of the same lands.
  - Ultimate depletion of the resource base by turn of 20th century
  - By 1850-60 three quarters of the state had been deforested.

- 3) Geographic distributions and patterns:
  - Burlington - 1850's boom - logs from Canada
  - Chelsea 1790's 1st sawmill (moved 1861)
  - South of Northeast Kingdom, sparsely settled higher elevations. Local pockets of small scale lumbering & also late 19th - ask Bill Gore
  - charcoal -

- 4) Historic highlights (i.e., significant events (natural and social, people, technological advances, laws, social trends, etc.):
  - 1840 - 4,000,000 acres total cleared (peak?) -shingle maker
  - pit saw -clapboard maker
  - up and down water power mill
  - circular saw
  - planer
  - portable steam engines
  - technological innovations resulting from charcoal making; i.e. design and efficiency of round and conical kilns in Readsboro

5) Time frame: 1760? -1940 justification:

- 6) Property types known and/or expected:
  - Sawmills
  - Logging roads, railroads
  - Portable sawmills
  - machinery
  - lumberyards (i.e. Burlington)
  - logging camps
  - dams ( for river drives)
  - log booms, cribbing
  - woodworking mills (shingles, chair stock, architectural elements, sash and blind, etc.)
  - charcoal making-related sites: various types of kilns and associated hardware and structures; coaling villages; road/RR access; charging embankments; water systems; offices; blacksmith shops, etc.
  - logging RR beds
  - horse hovels

CONTEXT: LOGGING and LUMBER PRODUCTION

7) Information gaps/research questions:

Identify all rivers that used to have log drives

8) Biases:

9) Relevant constituencies:

- current logging companies, paper companies; logging associations
- local historical societies
- manufacturers' associations
- U.S. Forest Service (large landholder)
- VT. Dept of Forest, Parks and Recreation
- Nature Conservancy
- 

10) Selected bibliography:

P. Merrill Vermont Under Four Flags pp 133-5  
William Gove - various publications

1) continued

- Effects on charcoal industry; effects on upland industrial development
- Lane portable sawmills made in Montpelier used world-wide
- 18th c. - logs rafted down the Richelieu River to be marketed in Quebec City
- Burlington - 3rd largest lumber port in U.S. around 1870

Prepared by: Leslie G. Goat

Date: 8/85

Allen Yale, Weston Cate

# Tall Trees, Tough Men

An anecdotal and pictorial history of  
logging and log-driving in New England



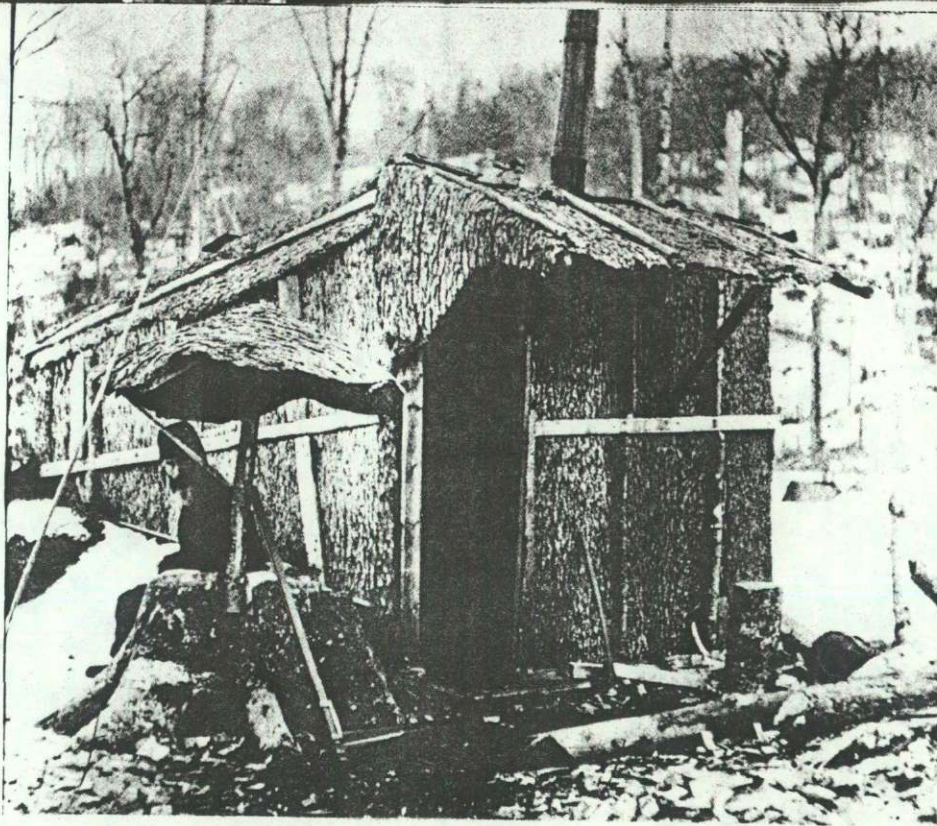
Robert E. Pike

## TALL TREES, TOUGH MEN

ng little to anyone. Then he disappeared.  
 e. A little later, when the ice had melted,  
 ey would go down to the river and sal-  
 of the drowned team. They found the  
 round the neck of one of his lead horses.  
 m on the bank of the river. A big boulder  
 on it the camp blacksmith chiseled the

Lumber Company teamster named Dan  
 teamster named Corrigan. Corrigan was a  
 d up to Fayston, Vermont, by a Boston  
 t do anything right, not even cookee, but  
 liked him, and so did the camp boss, who  
 re him, but never got around to it. Cor-  
 men thought he had once been a horse-  
 ne woods for his health. Finally, when a  
 t Corrigan's request, gave him the team.  
 bucking board, and he cherished the two  
 or, as if they were his children.

ice began to break up, when most of the  
 ward and the camp boss went out to ex-  
 ch passed their main tote-road. The boss  
 s leave the camp until he came back, but  
 e boss had not come back by the next  
 load up with boom-chains and go out.  
 nd the boss noticed a big hole in the ice,  
 ad. When they got to camp and learned  
 have killed the clerk if Steward had not  
 o the lake, and found that Corrigan had  
 h horses, all but one buckle. He had died  
 l him on the bank in the grave with the



Scaler Josiah Woodbury's hemlock-bark camp at Damon's Crossing, Victory, Vermont, 1906. Note his calipers, his measuring stick, and his parasol.

A timber cruiser (below) and his wigwam at Long Pond, Maine.



I doubt if  
 you will find  
 ANY of these  
 left.

ERL