SLEEPERS THROUGH TIME

A distant steam whistle, a piercing headlight, billowing clouds of smoke and the hiss of steam as cylinders stroke massive drive wheels were the sights and sounds of an approaching steam powered railroad locomotive. The sleepers rested quietly below, supporting the steel rails.

An idea was born in 1832 when Robert Stevens, the president and chief engineer of the Camden and Amboy Railroad of New Jersey, ran out of stone blocks on which to mount the rails. As a substitute material, ties were hand hewn from logs cut from nearby forests. Later, it was noticed that the wood ties provided a smoother ride, and wood has now been used for ties for over 160 years.

From the small narrow gauge engines that pulled logging and mining cars to the giant steamers built to pull mile-long freights, railroads ran on steel rails. Wood railroad ties, called sleepers, secured the track and provided a level base, holding the rails firmly and keeping them parallel.

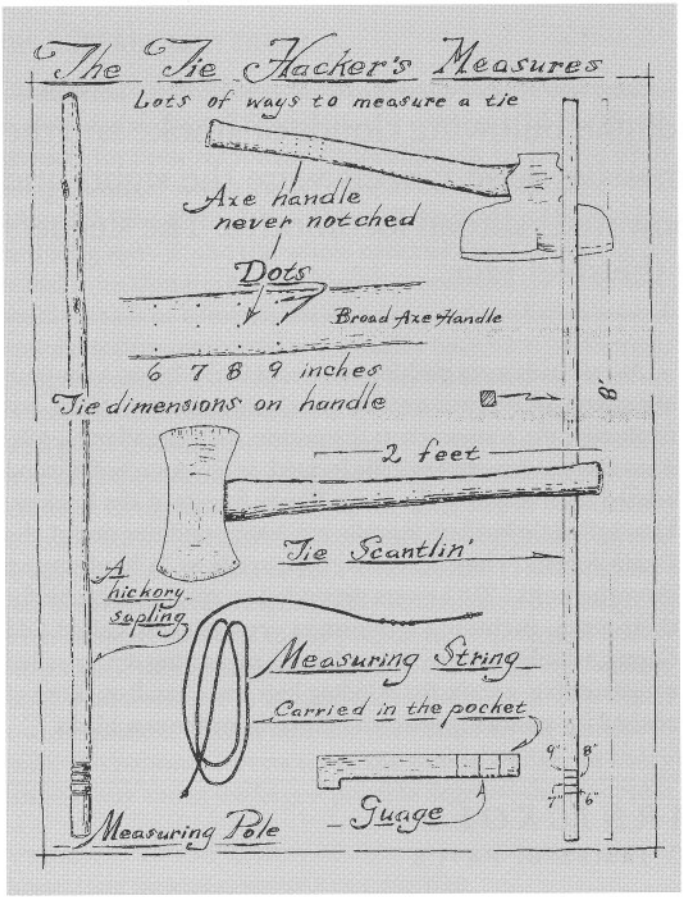
As railroads were pushing westward in the 1800s, a continuous supply of ties was needed to not only maintain track, but to pioneer the routes across the prairie. To railroad men, Missouri forests were strategically located, as few sources for wood existed until reaching the Front Range forests of the Rockies. Men called tie hackers literally cut 300-pound ties out of the Ozark forests. They described their trade as "a hard way to serve the Lord." Tie hewers depended on specialized tools for their work, including a two-man crosscut saw called Old Gappy, a double-bit axe, a broad axe, a measuring device called a tie scantling, a mule for skidding logs and a small quantity of coal oil for removing resin and gums from the saw blade.

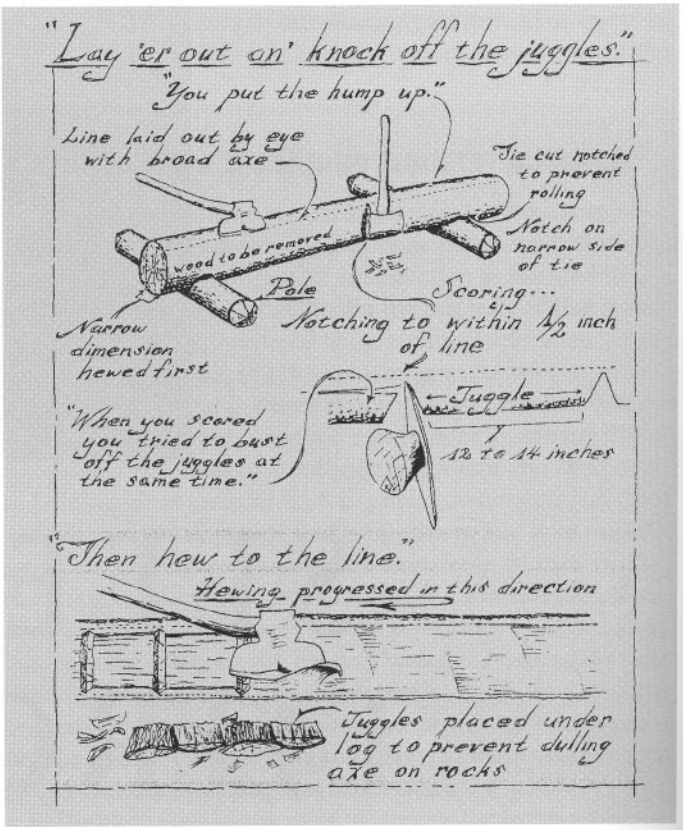
BY LYNN BARNICKOL
ILLUSTRATED BY DR. JAMES E. PRICE

Men called tie hackers literally cut 300-pound railroad ties out of the Ozark forests. Skill and a sharp axe were needed.

Dinner was also packed along, because working in the forest was an all day affair, requiring lots of hard work. A Mason jar, covered in a tow sack and wrapped with a string, kept the hacker's water cool. A lard bucket protected his lunch, which often consisted of beans, fried pork, cornbread and an onion. He either walked or rode the mule to the work area.

Trees selected for ties had straight grain but were not too large in diameter, usually 11 to 13 inches, at the small end of the log. The trees selected had to be free of rot and holes. Logs that were too large in diameter yielded a tie and lots of chips, but men were paid for ties only, not the chips.





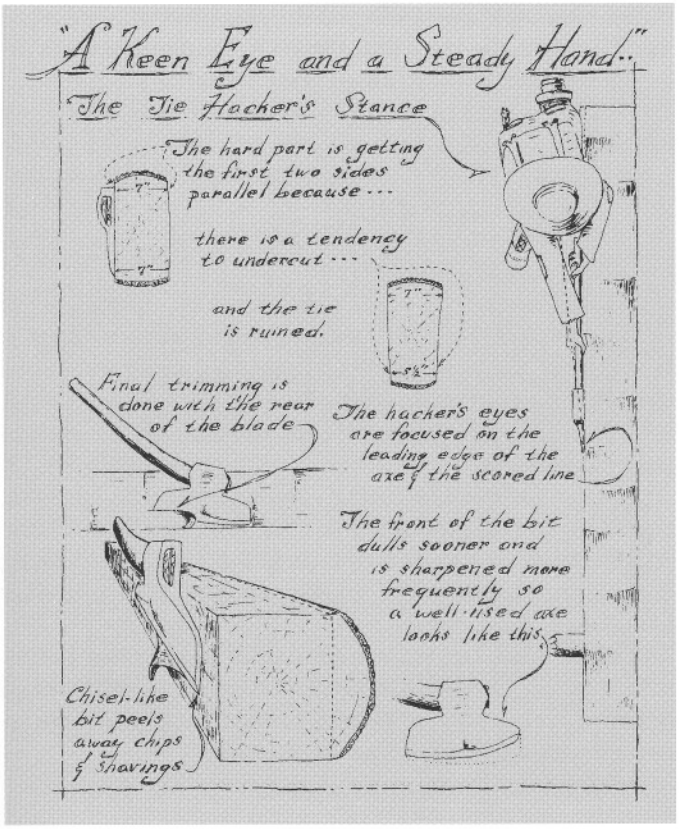
Railroad ties were 8 feet, 6 inches long. Switch ties, cut on special order, ranged from 9 to 16 feet in length and supported multiple rails at the switch assemblies. Until the 1940s most ties were hand hewed and, in Missouri, tie hacking represented a significant farm income.

Men worked as a pair until trees had been felled and cut to tie length. Then, working individually, they hand hewed a tie out of the logs. A tie hacker might say, "lay'er out and just knock off the juggles." However, skill and a sharp, focused eye guiding a razor sharp axe were required to successfully hew ties.

Once a tree was down, workers measured logs to length using one of several methods. A pre-measured, 8-foot-long stick about 1-inch square, an 8-foot-long hickory sapling, an 8-foot string or an axe handle marked in 2-foot increments could be used. On the tie scantling, workers cut axe handle grooves for gauging the 6- by 8-inch and 7- by 9-inch dimensions of the two sizes of ties that were hewed. The tie hack's traditional method of measuring log length continues with some log cutters today.

A tie hacker notched a log slightly, to prevent rolling as work progressed, and laid it across two poles to elevate the work. If the log was not perfectly straight, it was laid with the "hump" up so the work cleared the ground. Next the hacker scribed a line with the broad axe by cutting along the length of the log, down its length. The cut line established the dimension of the tie. The double-bit axe was used to score to within one half inch of the line and at the same time to break off chips (also called juggles). A slight twist of the wrists, as the axe stroke scored the log, allowed the juggle to split off.

The hacker stood so that his eye focused on the leading edge of the broad axe as he cut. The broad axe was used to hew to



the line and to smooth the face. Hewing began at one end and moved backwards along the log. The hard part was getting the first two sides of the tie parallel.

There was a tendency to undercut and ruin the tie. A gauge, marked on an axe handle, showed the widths of ties and was used to measure for the final trimming and smoothing cuts that were done with the rear of the broad axe blade. The process was repeated on three faces.

Juggles are 12- to 14-inch-long chips which could not be sold, but they did have a key function. Juggles accumulating at the work area made a bed of wood that protected the blade of the axe from cutting into the soil and rocks below. Payment was based on the number of ties produced. Time spent sharpening the axes, after hitting rocks, was wasted.

Sharpening saw blades and axes was done with file and whetstone. An improvised filing vise was made by cutting a high stump from a small tree and then making a vertical saw cut. The crosscut saw was placed in the saw kerf, teeth up. The high stump allowed the filer to sit on the ground with the saw teeth about eye level.

The saw was held tight by wedging a small chip between the saw body and stump. One end of the saw was supported by a split length of limb driven into the ground, holding the saw body stationary. Teeth were flat filed and the hacker paid close attention to maintaining the correct tooth angles for best sawing. Saw teeth were of three types. Right and left hand cutters severed the wood fibers while rakers removed saw dust from the cut.

A broad axe head weighed about 5 pounds with a single edge, 12-inch-long blade. Sharpening the blade involved using a file and stone, but was only done on one side of the blade. The other side of the blade was flat, resembling a chisel, and resulted in a flat surface on ties.

Sharpening a broad axe involved supporting the blade against a small diameter log and stroking the file toward the sharp edge. The toe of the blade dulled rapidly, resulting in frequent filing and a blade that was wide at the heel. A corn cob served as a file handle. A tie hack owned only the essential tools, which were expensive and hard to get. Tool accessories, like file handles, were either home-made or nonexistent.

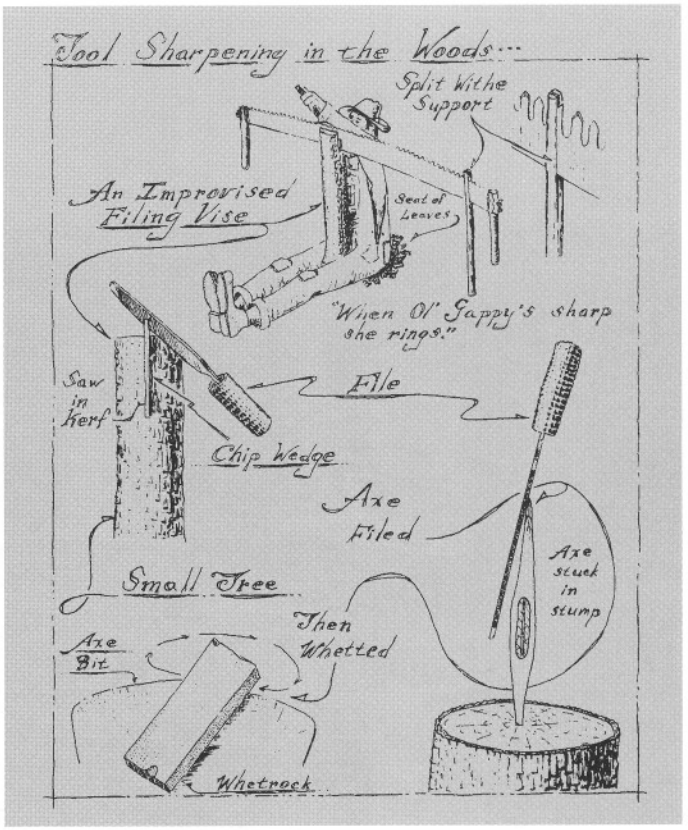
Double bit axes weighed about 2 pounds and had two cutting edges. Tie hackers sharpened an axe by first sticking the blade in a stump and then filing the exposed blade. A whet stone was used in a circular motion to get a razor edge.

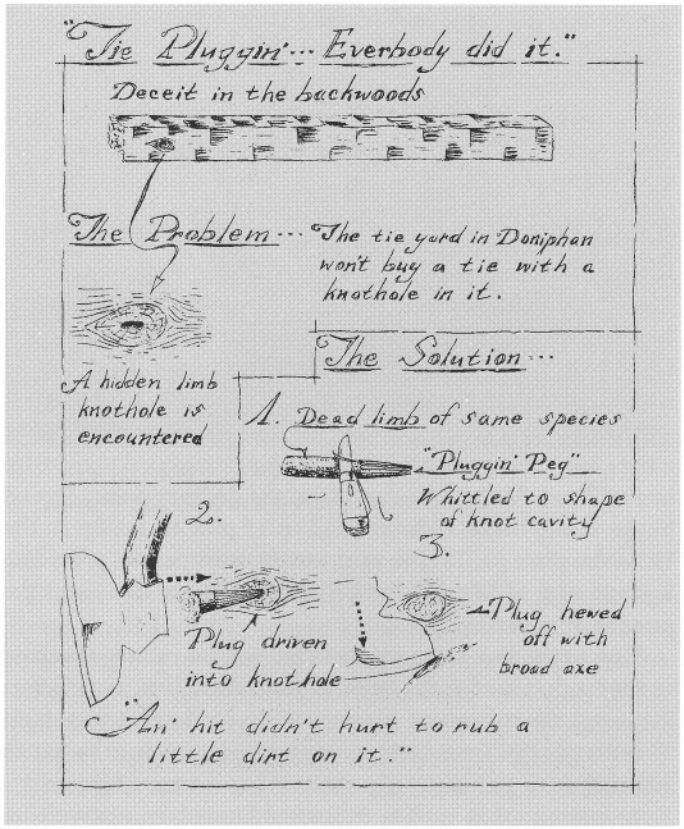
Once hewn, ties were transported by wagon or delivered to a river bank for assembly into a raft for tie drives downstream to a railhead. Tie hacks were paid at the delivery point. A good hewer could make 10 hardwood or 15 pine ties daily. In the 1930s the price paid at the yard was 50 cents per tie, providing a grand sum of $5 to $6 for a standard 12-hour day. Later the price increased to $3 per tie.

Due to the low value received for ties, no money was paid to the landowner for the trees. During the 1930s, as tie prices increased, the customary payment to the landowner was about 25 cents per tie. Trees containing two tie logs would be worth 50 cents.

At buying yards, such as the one at Doniphan, ties were inspected for rot, knotholes and the correct size. If the tie had a defect it had no value. Even a small knothole caused ties to be rejected, resulting in no payment. It was sometimes difficult to judge if the underlying knot would be sound.

A tie hacker spent some time selecting a tree, felling it and





hewing out a tie. If he discovered a small knothole he might try to hide it. The solution was to whittle a dead limb of the same species into the shape of the cavity.

Then the tie hacker plugged the hole by driving the plug into the knothole and hewing off the plug head with the broad axe. He might also rub a little dirt on it. Tie pluggin' was a deceitful solution, but something many tie hackers did.

Hand hewing of ties was doomed to become a lost art, but not without a fight. At stake was a loss of jobs on a nationwide scale. To supply the 110 million ties needed in the year 1900 it was estimated that 60,000 to 70,000 men were hewing ties. Another 50,000 men were involved in collecting, stacking, drying, distribution and sales.

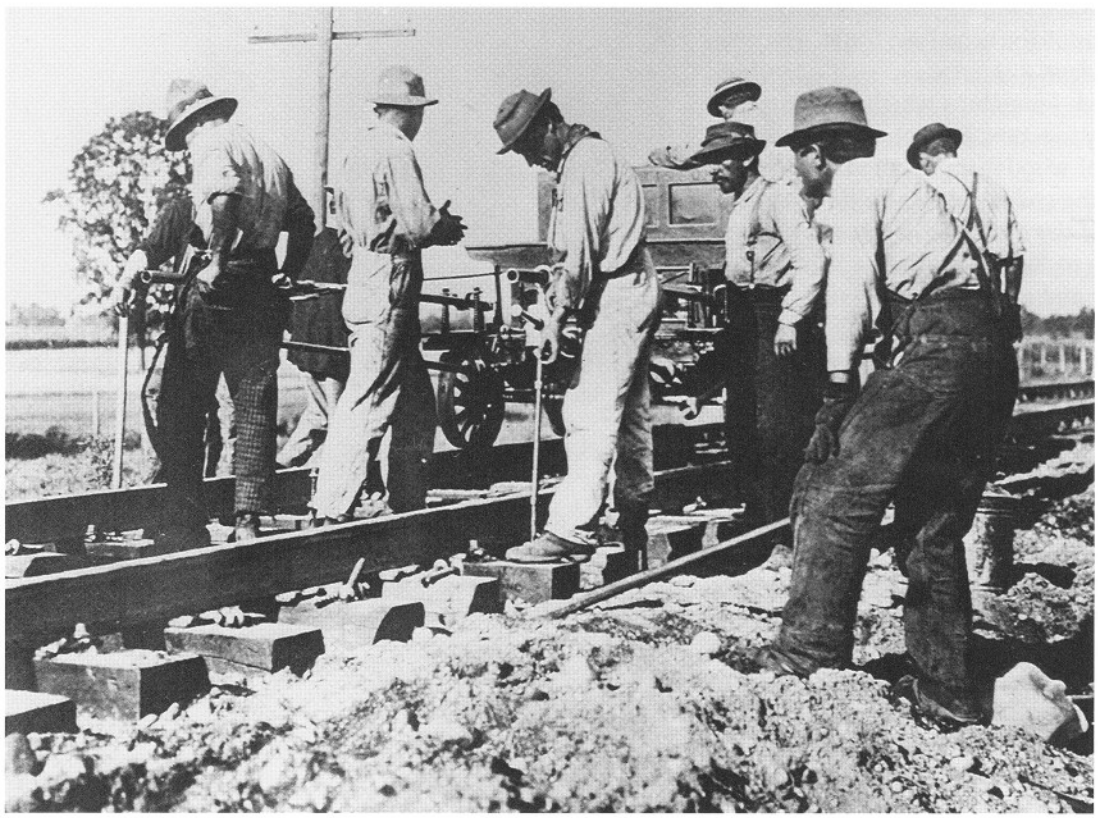
Debate compared hewed with sawed ties. Proponents of hewed ties cited better resistance against movement when installed, plus two false premises stating that an axe cut closed the pores of the wood, making the ties more resistant to decay, and that sawed ties offered more opportunities for the wood to hold moisture.

Equipment manufacturing companies developed small, simple to operate and affordable sawmills suited for farm use. A farm tractor or a steam engine provided power for operating the mill. As mechanical technology evolved, fewer ties were hand hewn.

The life expectancy for the 110 million untreated ties installed during 1900 was four to six years. Ties are now treated with coal tar creosote, a chemical preservative, and the life expectancy for a tie averages about 30 years.

In Missouri, a leading tie producing state, there were preservative treating companies in Springfield, Kansas City, St. Louis, Piedmont and Ellington. There are fewer but more efficient operations today. Environmental regulations control the application of creosote, and the demand for wood ties has been reduced. Fewer plants are needed to meet today's demand.

The Missouri Department of Transportation reports that in 1991 about 7,052 miles of track were in service in Missouri. About two-thirds was in mainline quality track and the other third was in mainline quality track and the other third was in sidings, spur lines and rail yards. Main line track requires about 3,700 ties per mile and a better grade of tie to withstand the rapid movement of heavy trains. The lower maintenance tracks required about 2,900 ties per mile, including ties of a lower grade.



SANTA FE RAILWAY PHOTO

The life expectancy for the 110 million untreated ties installed in 1900 was four to six years.

One of the great railroad construction feats of all time was the westward extension of the St. Paul, Minneapolis & Manitoba Railway to Helena, in Montana Territory . . . in a single season. Work that year began just west of Minot on April 2, 1887, and the rails reached Helena on November 19. Although there were no track-laying machines, steam shovels or trucks, man and horsepower established records which were unsurpassed more than a half century later.

The photo at right of a track-laying crew was made September 8, 1887 between Havre and Fort Assiniboine, in Montana Territory. Seven miles of track were laid that day, and as construction approached Fort Assiniboine the 20th Infantry Band serenaded the workmen. Soldiers from the Fort can be seen in the picture.

PHOTO BY PUBLIC RELATIONS DEPARTMENT, GREAT NORTHERN RAILWAY, ST. PAUL, MINNESOTA.

Research is on-going to improve designs of spikes, rail bearing plates and ties made of concrete. To date, concrete ties, reinforced with steel, are in service in the Kansas City and St. Louis areas. In certain applications, such as high speed curves, concrete ties are holding up well. However, on most mainline track, wood remains the tie of choice.

Builders use retired railroad ties in retaining walls, raised gardens and other landscaping projects. Researchers are looking for solutions for disposal of retired landscape ties. One possibility is the use of the old ties as boiler fuel.

Railroads are important to consumers, farmers and related businesses. Bulk cotton for clothing, lumber products for the construction of homes, fruits, vegetables and grain, as well as autos and their parts, travel by rail. Although farmers no longer hand hew ties for an income, they continue to supply the wood needed for railroad ties and depend upon railroads to help link farm products with city consumers.

Magnificent steam powered locomotives have given way to the impressive, but not quite as romantic, diesel powered engines. Only a handful of steam locomotives remain in service, most on excursion lines. Although wood ties have undergone several modifications in their manufacture, it remains a fact that wood sleepers, made from a renewable natural resource, helped to support rails and trains.

Lynn Barnickol is a forest products specialist with the Missouri Conservation Department.

TIE VIDEO AVAILABLE

The Conservation Department tells a historical video about the production of railroad ties in Missouri. *Stamp of Character* sells for $10. In it the 1920s come alive through archival black and white footage of the last railroad tie drive made on the Black River by the T.J. Moss Tie Company of St. Louis. Intense manual labor, animal powered wagons, steam driven loaders and the creosote treating process are featured. This sound-enhanced footage provides a unique look at the process of making a railroad cross tie during a period when forests covered two-thirds of the state.

To order the video, write to:
Missouri Department of Conservation
Media Library, PO Box 180
Jefferson City 65102-0180.
Shipping: $2.00 for one video, $5.00 for two or more.
Missouri residents should include 62 cents sales tax. You can also telephone (573) 751-4115, extension 205 or fax (573) 751-2260 and purchase the video with a credit card.