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Some typical bridges for logging railroad construction

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SOME TYPICAL BRIDGES FOR LOGGING RAILROAD CONSTRUCTION

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LIST OF ILLUSTRATIONS

In some of the pine regions of the Ozark Mountains, a considerable portion of the country is rolling and rough, comprising a succession of hills and hollows. The most efficient method of logging such a tract is obtained by locating the logging road so as to secure a down grade haul for the logs, with consequent up grade return for the empty cars. This necessitates locating the main line of the railroad along the principal creek, and then laying spurs up the different tributary creeks as they are met. Such a procedure requires much crossing and re-crossing of creeks and therefore the building of bridges, which may constitute a very important item in the cost of the road.

The type of bridge required for logging operations usually depends on several factors, as for instance, the character of stream bed and size of stream, the permanence of the road, whether for main line or spur, and minimum cost.

For stream beds with soft bottom, piling or cribbing is necessary to support the trestle work. But for streams having rock bottom, as they nearly all have in this particular section, the use of mud sills is universal for trestle foundations.

For main line work, the element of permanence should have first consideration, as the cost will be distributed over a number of years and may thus be less per thousand feet of logs hauled over it, than the cheapest sort of bridge built on a spur track. Framed bents of square timbers, built according to standard railroad practice, are customary on main line work. For example, see Illustration No. 1, Page 5. In this particular case sills, caps, and posts are 12" x 12"; stringers are 7" x 15", three on a side for 14' 0" spans; cross ties are 6" x 8" x 10' 0" long; guard rails are 6" x 8"; sway braces are 3" x 10" planks, spiked to caps, posts, and sills.

For work on spurs, where the track is temporary, its life being only a few months at the most, the item of minimum cost usually governs the type of bridge to be built- the cheapest structure possible to build that will carry the traffic.

For a small drainage area, the drain box is well adapted to this class of construction. For example, see Illustration No. 2, Page 6. Two logs are placed crosswise of the grade leaving proper space for the water-way; then smaller logs are placed across on them, spiking the two outer ones. The structure is then covered with dirt to bring it to the proper grade line.

Where down timber is readily available, a quick and cheap method is to fill in with old logs, branches, etc, then cover with dirt to give even bearing for the ties. For example, see Illustration No. 3, Page 7.

Illustration No.1
Framed Bent of Square Timbers.

Illustration No. 2
Drain Box.

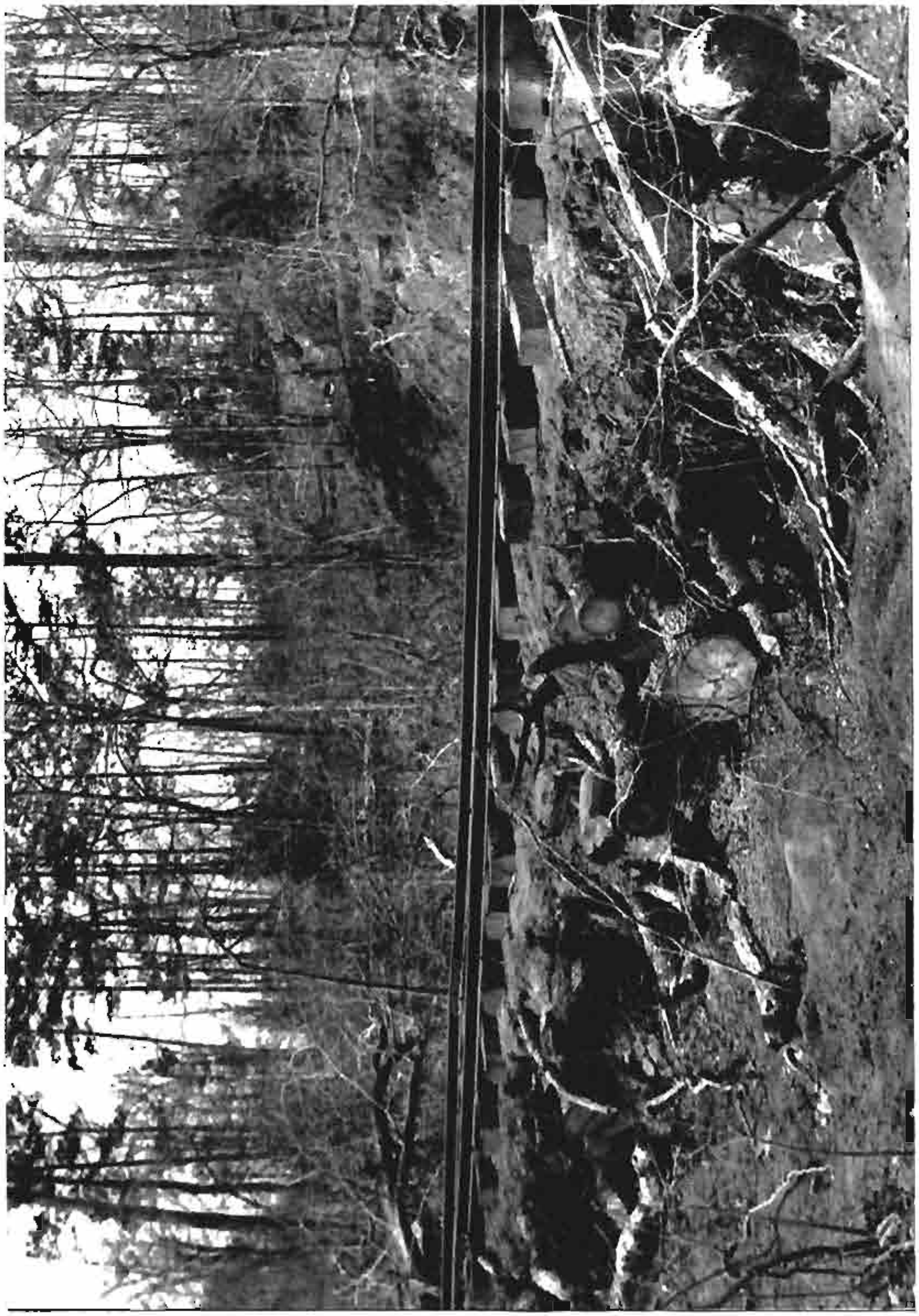

Illustration No.3
Log Fill.

A bridge in common use, where the supply of rock is unlimited and close at hand, as is the case on some spurs, is made by filling the water-way entirely with rock, placing the ones on top so as to give an even bearing for the ties. For example, see Illustration No. 4, Page 9.

But where the bridge is of such height and length that any method involving a complete fill would prove excessive in cost, a framed trestle of round timbers is used If the structure is to be in use for more than a year, the logs should be peeled to prevent the worms from attacking the timber; but if for less time than a year, the peeling is not necessary. For example, see Illustration No.5(a), Page 10. In this instance, sills are made of logs not less than 18" diameter at the small end, and hewed on two sides to a 12" face. This gives a flat bottom for resting on mud sills, and a flat top to receive the ends of posts, which are toe-nailed to it with 3/8" x 10" boat spikes. Instead of hewing top face of sill for its entire length, it may be "dapped" at proper intervals to receive ends of plumb and batter posts. Caps are of logs not less than 16" diameter at the small end. They are hewed to 12" faces for the entire length on both top and bottom, but may be dapped to receive ends of posts and stringers. Plumb and batter posts are of logs 12" to 14" diameter at small end. They are drifted through caps with 5/8" x 18" drift bolts. Stringers are of sawed material, 7" x 15", but

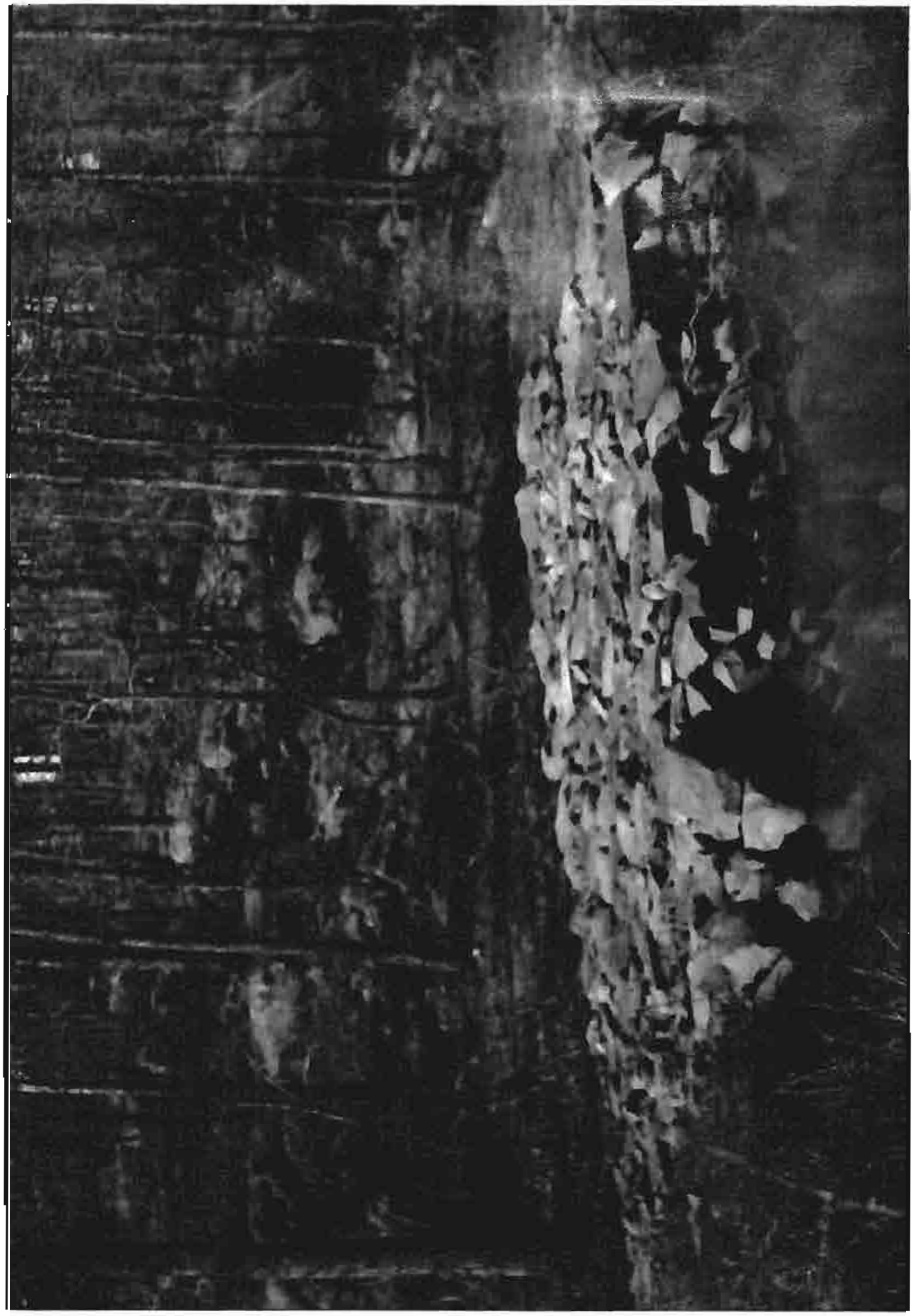

Illustration No.4
Rock Fill.

Illustration No. 5(a)
Framed Bent Bridge of Round Timbers.

round logs may be used. Their size is proportioned to length of span and weight of rolling stock. Stringers are drifted at each end to caps with 5/8" drift bolts. 6" x 8" sawed ties are used. Guard rails are 6" x 8", mortised to keep ties spaced; sometimes 2" x 6" material is used, spiking to each tie with large nails. This serves to keep ties spaced, except in case of de-railment, when they are liable to be "bunched".

Illustration No. 5(b), Page 12, shows a framed bent of round timbers. In this case, caps and sills were"dapped" instead of being hewed for full length. Owing to the depth of the water(about 4'), and character of creek bed, which was rock bottom and covered with loose boulders, the difficulty experienced with this bridge was in placing and anchoring bents. But this was accomplished by means of log pens filled with rock. These pens were 7' wide x 20' long x 7' high and made of about 8" logs. The logs had 1" holes bored through each end, according to templet, and assembling was done by means of a log loader. A 7/8" x 7' 0" bolt was used at each corner of pen. Poles were spiked diagonally across pens to keep them in shape while being handled. After the pens were completed on the bank, they were lifted by the log loader and placed in position in the creek. Enough rock was dumped in pens to fill them to the level of the water, when the bents were assembled and the pens then entirely filled with rock. One span was finished at a time and the steel laid, when the

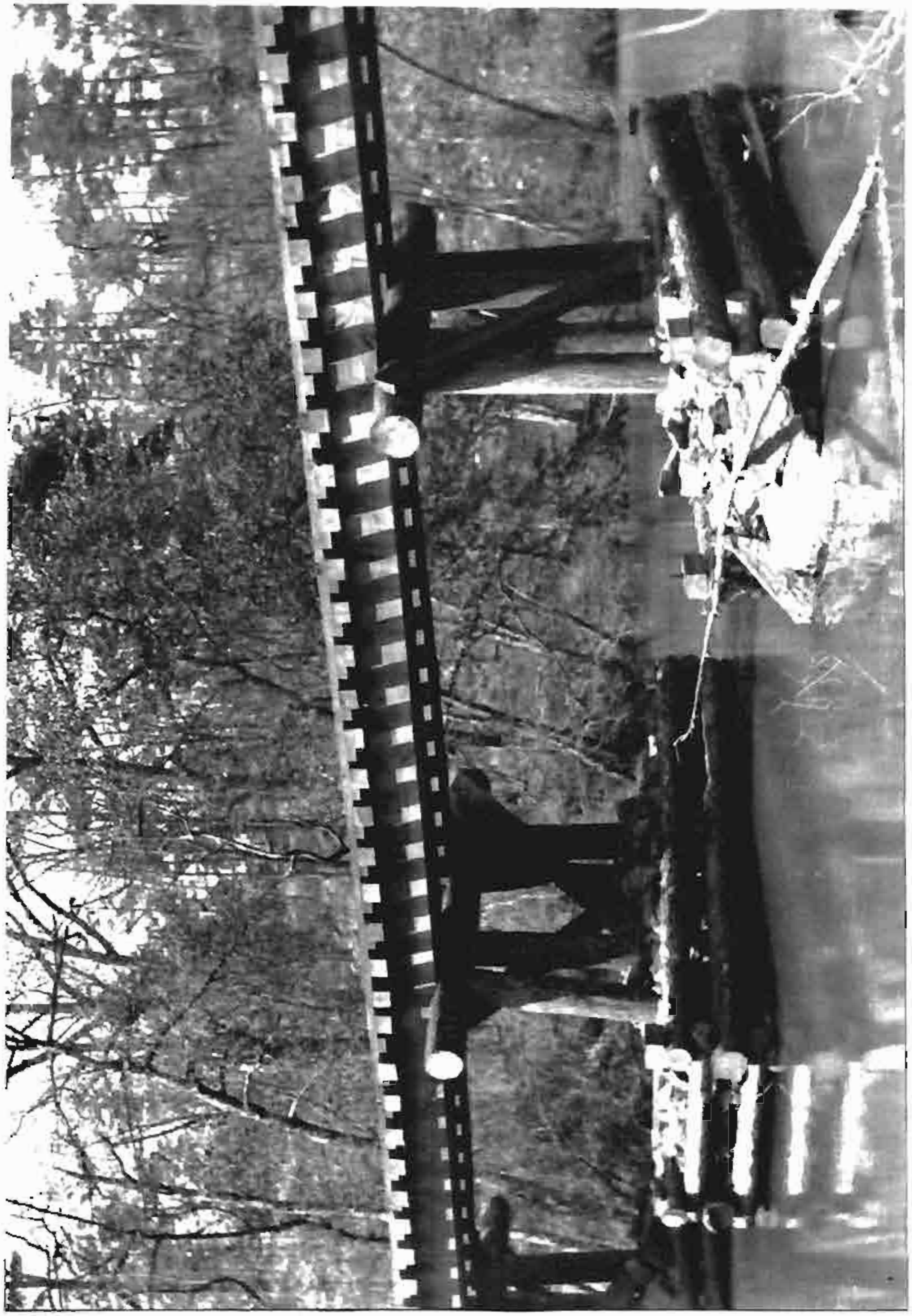

Illustration No. 5(b)
Framed Bent of Round Timbers- Method of Anchoring

loader could be backed out to the end and place next span. And although it was mid-winter, no one was obliged to get into the water.

Another type is known as the "Low Water" bridge. This is well adapted to streams that have a limited flow of water most of the time, but are occasionally subject to floods for a short duration; and especially where there is an abundant supply of rock at hand. The usual custom in constructing bridges is to put them high enough that the stream at flood stage may still have passage room under the bridge. But the "Low Water" type is built so that when the floods come, the bulk of the water and all the drift goes over the bridge. This may stop traffic for a few hours, or perhaps for a day, but it is seldom that such conditions occur. Trains may still cross if the water is a foot deep over the bridge; see Illustration No. 6(a), Page 14. In that case, care must be exercised to see that no drift has lodged on the bridge so as to cause a de-railment.

Illustration No. 6(b), Page 15, shows the general method of constructing such bridges. Logs spaced 10' 0" apart, and equally distant from the center line, are laid in trenches the entire length of the bridge, so that the upper surface is just about level with the natural bed of the stream. Caps are placed crosswise, with the stringers resting on them. The whole structure is thoroughly drifted with 5/8" drift bolts driven

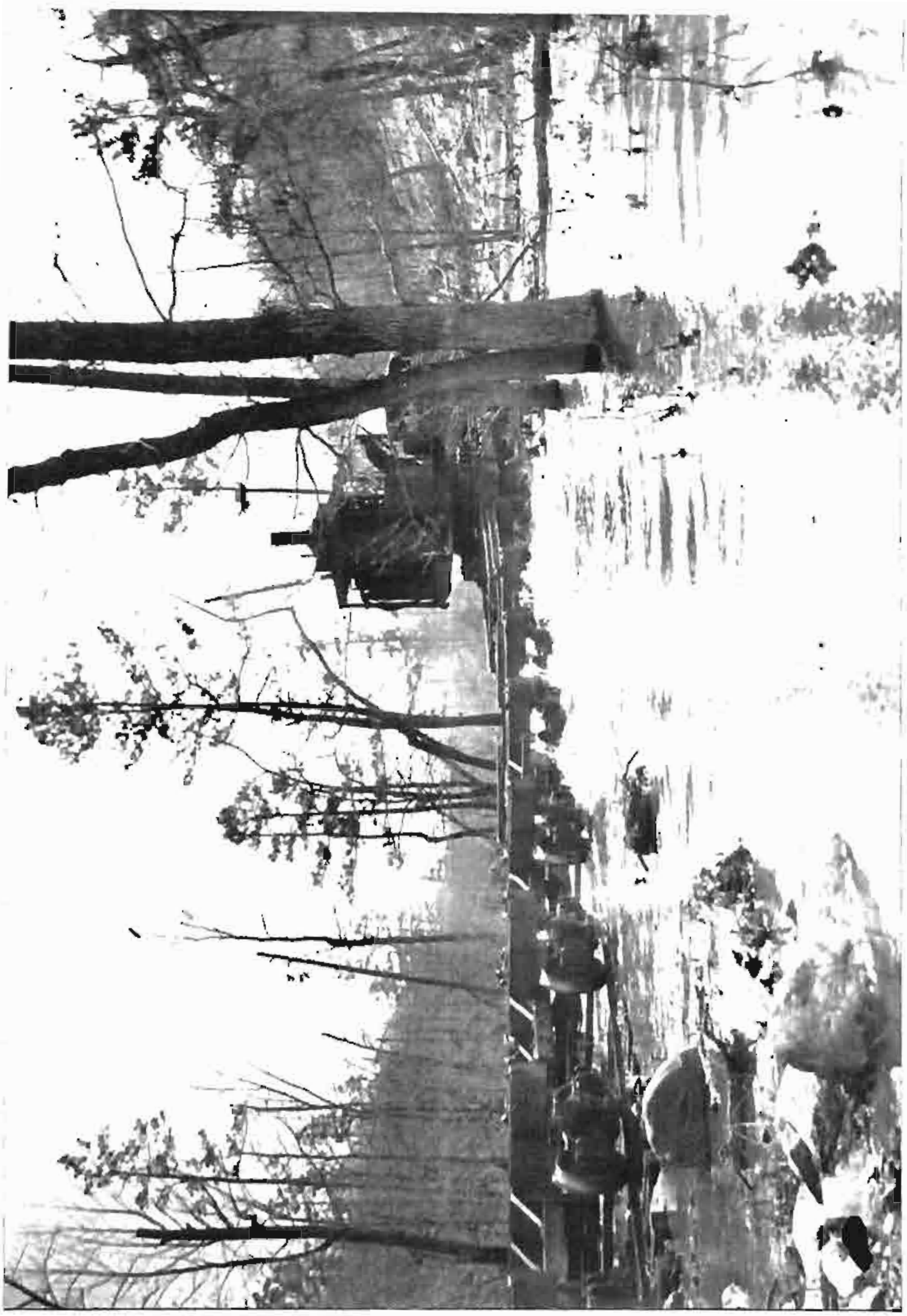

Illustration No. 6(a)
"Low Water" Bridge -- Under Water.

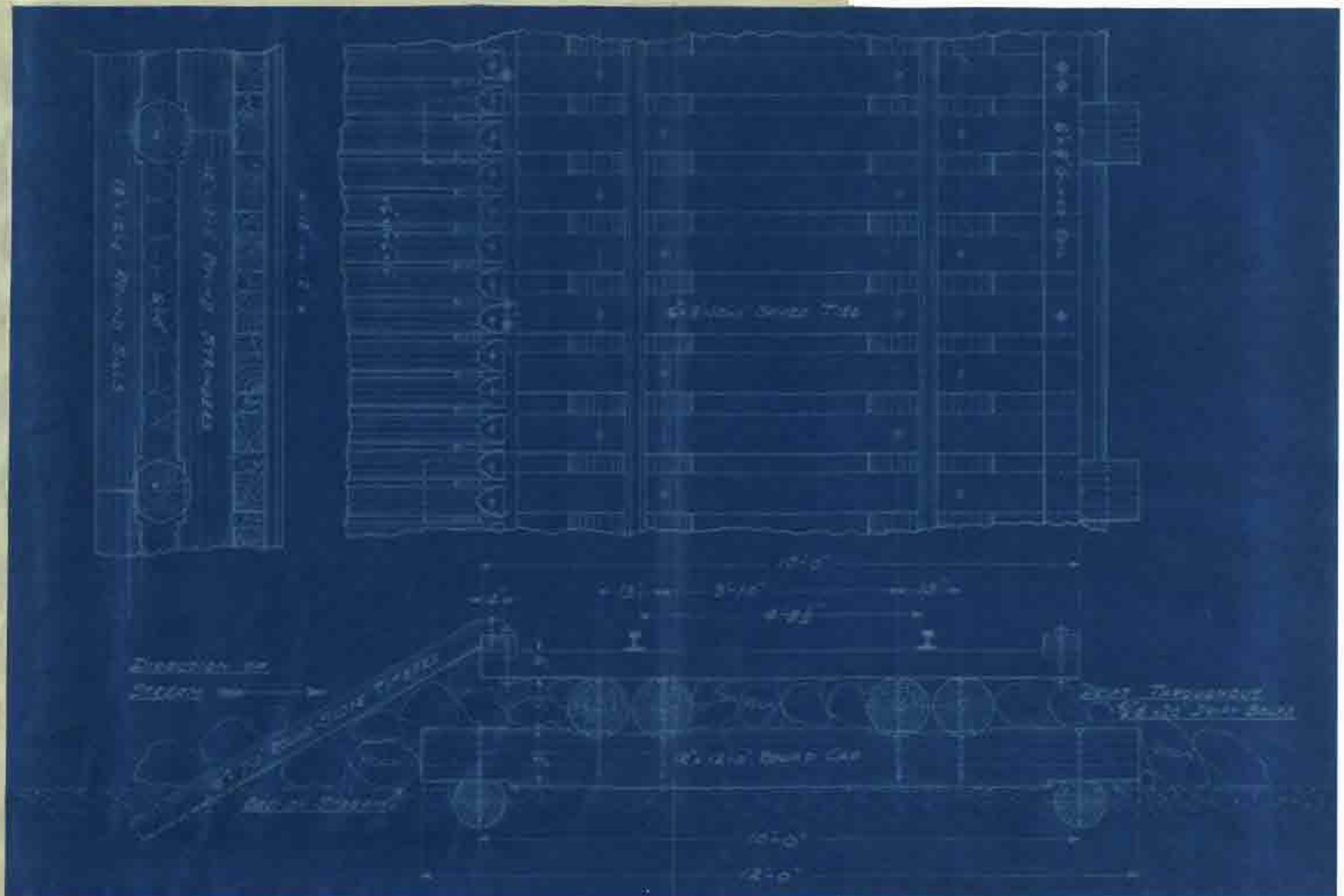

Illustration No. 6(b)
"Low Water" Bridge-- Construction Details.

into 9/16" holes. Next comes the filling with rock, wedging under caps, stringers, and wherever possible. 6" x 8" sawed ties are spiked to the stringers with 1/2" x 10" boat spikes; guard rails are bolted to the ties, and the slope timbers are spiked to the guard rail on the up-stream side. The function of the slope timbers is to provide a smooth surface so that drift will not hang on the bridge in time of high water. The slope timbers are sometimes omitted, merely filling in with rock on the upper side. Illustration No. 6(c), Page 17, shows a "Low Water" bridge <u>with</u> slope timbers, and Illustration No. 6(d), Page 18, shows one <u>without</u> the slope timbers.

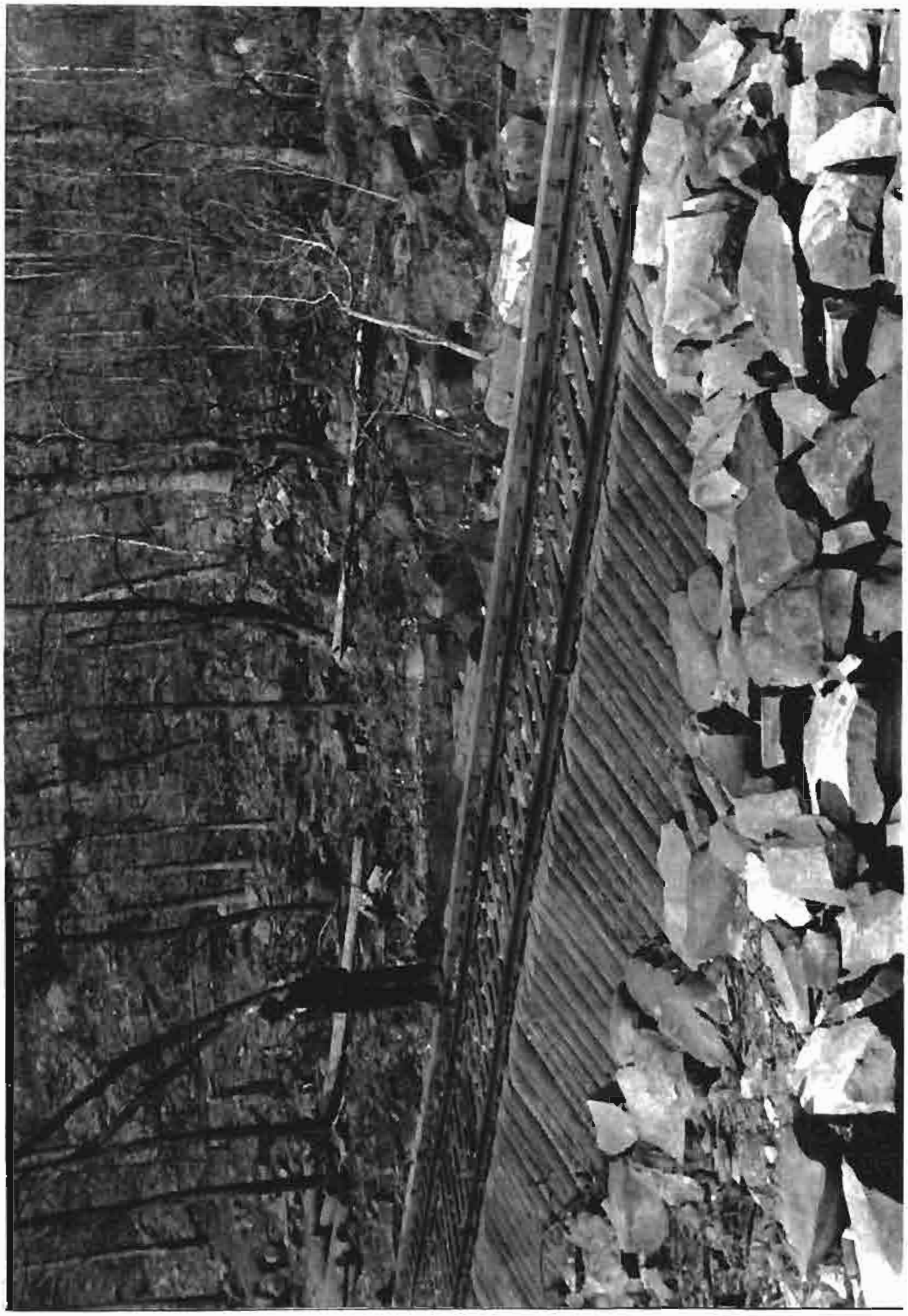

Illustration No. 6(c)
"Low Water" Bridge-- With Slope Timbers

Illustration No. 6(d)
"Low Water" Bridge-- Without Slope Timbers