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Tie-Making On The Medicine Bow

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THERE are three national forests in Region Two whose main products are railroad cross-ties, manufactured from lodgepole pine. These forests are the Medicine Bow and Washakie, both in Wyoming, and the Roosevelt in Colorado. The altitude at which lodgepole occurs in these areas ranges from 8,500 feet to a little over 10,000 feet. Ordinarily the topography is not very rugged, being generally rather gentle in character. In fact the Medicine Bow is, because of its existing roads and easy topography, the most accessible national forest in Wyoming.

The coming of the railroads created the first general use to which the timber located in this area was put. To this day the outputs of these forests are assimilated by these same railroads. The Chicago Northwestern Railroad uses a great share of that produced by the Washakie, and the Union Pacific Railroad, by far the greatest user of the lodgepole cross-ties, obtains theirs from the Medicine Bow and the Roosevelt. These first cuttings, attending the construction of the railroads, were made in the 80's. Later, until coal mines were developed, wood was cut for fuel for the locomotives.

In spite of this early lumbering, some losses by fire and continued operations, the Medicine Bow, about which this article is concerned, contains the largest amount of timber found upon any national forest in Wyoming. The estimated volume is very nearly 5 billion board feet. Eighty percent of this is lodgepole pine, the remainder consisting largely of Engelmann spruce, which is also utilized for the manufacture of ties. The spruce occurs at the higher altitudes and is ordinarily not as accessible as the pine.

DURING and after the World War the operations were somewhat concentrated about the area traversed by the Laramie, North Park and Western Railroad. Because of this crowding, several sales were made in other areas, and the ties were driven to the landings as they were in the old days. During the
late 20's this production had reached the peak; in 1929 the total annual cut allowed was reached, 40 million board feet. The production declined after that, but for the past few years the number of ties produced has increased by leaps and bounds, and, during the past year, 1937, again this total annual cut was reached.

The Medicine Bow National Forest is drained by the North Platte and Laramie Rivers, which drain north out of Colorado. The tributaries of these streams are driveable and this method of transportation is still largely used.

At present there are two major operations on the forest, the R. R. Crow sale on the west side of the forest, and the Wyoming Timber Company sale, located in the central part. The railroad working circle, located on the Foxpark district, in the south-eastern section still supplies some of the ties, but the area is very nearly completely cut over, and will not be able to make any but small sales for some time without jeopardizing sustained yield. On the Wyoming Timber Company sale both hewed and sawed ties are produced, but on the Crow sale only sawed ties are manufactured. The Foxpark area, on which there are a number of smaller sales, produces both sawed and hewed ties.

The actual hewing process is simple enough, being the same as when the pioneers first hewed out their house-logs with a broadaxe. Selected trees are cut and trimmed as far as ties can be cut out 9 1/2 inches at the small end). Lopping and scattering is the method of brush disposal used. When there is a market for the products, mine ties and props are cut out above this diameter. A good tie tree, suitable for hewing, measures between 11 and 13 inches, d.b.h. Anything above 15 inches is unsuitable for hewing and the logs are sawed. Usually an average of 3 tie lengths can be cut from one tree, depending on the taper. When this merchantable length is trimmed, the two selected sides of the bole are scored as deeply as desired with an axe, then sliced off with the broad-axe. Some of the "tie-hacks" are so expert with the broad-axe that these surfaces look as though they had been planed.

Then the hewed log is bucked into tie lengths, the bark peeled from the rounded sides and decked on the cutting area ready for scaling, skidding and hauling. The Forest Service scale is made at the landings, however; only the company scale is made in the woods. Since the tie-hack is paid by the piece, on the grade of tie produced, this scale is necessary.

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In the winter the tie-hack works under difficulties, due to the heavy snows occurring at these altitudes. Since the regional policy on the stump height is “as low as practicable,” this means shovelling out each tree so that the stump may be cut just above the root swell. Sometimes there is as much as five feet of snow. An average day’s work is about 20 ties, with no snow and good timber. Some individuals have made as many as 50 in a day, which is not a record by any means. Each tie-hack is allotted a certain area in which to work, usually being about an acre or so. On this plot he works by himself felling, hewing and bucking, using an axe, one-man cross-cut saw and broad axe.

Not so very long ago sawing ties with portable mills was introduced. However, their use has increased tremendously and today over half the ties produced are sawed. On the Wyoming Timber Company sale, about 60 percent of the ties are hewed, while in other places on the forest, where virgin timber is not available, the ties are largely sawed. Since the mills can utilize logs too large for hewing and our virgin, selected stands are disappearing, the future trend will be toward sawed ties altogether. On the two major sales on the forest there are about 15 mills, and there are half again this number on small sales throughout the forest.
The mills are typical American portable outfits, differing only in minor details. Generally they are powered by varieties of Diesel-type motors, the mills ordinarily cutting 8-foot logs, but capable of sawing 16-foot lengths. On the Crow sale, 16-foot lengths are sawed, but there are some disadvantages of this, caused mainly by the difficulties of skidding, the small amount of man-power available for handling the logs at the mill and the necessity of having another power unit, a cross-cut saw for bucking and trimming the double tie-lengths.

Usually there are four men employed at the mill proper, a Sawyer, a log-turner and two off-bearers. On the Crow sale, where the mills are owned by the company and all the men are paid by the piece, there are only a Sawyer and an off-bearer, taking turns. The number of teamsters required for skidding depends largely on the length of haul, the type of timber and the out-put of the mill. It might also be mentioned as a point of interest that the mills on the Crow sale operate all winter, unless the snows become exceptionally heavy. The controlling factor here is the difficulty attending the skidding of the large logs through the deep snow.

Under favorable conditions, a mill is capable of turning out as much as 500 ties a day, the average being somewhat less. Depending on the country and the timber, as many as 5,000 ties have been sawed at a setting. But a mill will move after sawing as little as 400 or 500. The present tendency is to make fewer settings and longer skid hauls, even though the time involved in setting up a mill has been decreased from two to several days to a few hours.

On the Crow sale a considerable amount of lumber is sawed, many logs not being large enough for ties. The contract on this sale specifies trees to be marked as low as 9.6 inches d.b.h. In addition the company utilizes the tops down to 7 inches d.i.b. The market for this rough lumber is very good, and a by-product, lumber, is in danger of becoming one of the main products. The price per 1,000 board feet at the railroad siding for this lumber is around 30 dollars.

This brings up the subject of the other products made from lodgepole pine as by-products of the tie-making industry. Formerly one of the main by-products was mine props, but this has fallen off until there is practically no demand for these at present. However, there still is some demand for mine ties, which have already been mentioned. Telephone poles, although not in

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the true sense of the word a by-product of tie-making, are often-
times cut along with the ties. On the sale in the eastern part of
the forest this is one of the principal products. There remains
only lumber. On the Wyoming Timber Company sales no lum-
ber is manufactured except what little is utilized for the con-
struction of the woods camps. On nearly all of the operations,
wherever the wood is at all accessible, the slabs are used for
fuel wood as well as some types of construction.

Probably the most interesting as well as the most impor-
tant part of the present industry is the transportation of the
ties to the railheads. At present there are two methods used,
trucking and driving. The Wyoming Timber Company ties are
driven down Douglas Creek, which drains west into the North
Platte River. This is the only method of transportation used in
removing their yearly output, which is nearly 300,000 ties. On
other forests within the Region the same method is used. On
the Washakie, there is a flume through the gorge of Warm
Springs Creek for over 6 miles. From there the ties are moved 100 miles down Wind River. On the Medicine Bow ties are driven down the Laramie and Little Laramie Rivers to the railheads at Laramie.

In the future more and more ties will be transported by motor trucks, due to the construction of better roads. Also the country about the drivable streams is rapidly becoming cut over. On the Crow sale all of the ties and lumber produced are transported by truck 18 miles from the main camp. Ordinarily 1½ ton trucks are used for this job, about 75 ties being hauled to a load. Since 15 ties approximate a ton, this makes a load of 5 tons for these light trucks. However, the roads are usually not in condition or of the type to haul any heavier loads, so larger trucks are not considered profitable to operate.

These problems of transporting the ties after they arrive at the landings and decks are comparatively simple. The real difficulties are usually in getting the ties from the timber to these landings. Many methods are used, horse skidding, sledding, tractor hauling, and even truck hauling on the greater distances.

With reference to driving the ties are hauled from the woods by these various methods and then decked in large piles along the driveable streams. These decks are strung out along the entire length of the open areas along the streams, and here is where the forest officer scales the ties. After the break-up in the spring, the old method was to push or pull the ties into the stream with pike-poles and pickaroons. Recently bull-dozers have been used, backing up behind 2 or 3 tiers of ties, piled 8 to 10 high, and shove them into the river. A hundred thousand ties a day have been rolled into the stream by one bull-dozer.

BEFORE discussing relative costs, it would be best to cite the advantages and disadvantages of hewed versus sawed ties. All these are quite obvious and generally well-known. In the production of sawed ties both the Forest Service and the consumer gain an advantage. The Forest Service is thus able to obtain utilization on the larger, overmature timber which is too large to hew. In this case, the present mechanical marking system will be revised and the remaining stands bettered by a closer approximation of the selection system of silviculture. This also raises the problem of marking to obtain a stand which will, at the next cut, be suitable for hewing, or whether, by that time, only mills will be used for manufacturing ties.

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OTHER advantages which sawed ties have over hewed ties are the desirability in treating with creosote. Due to their uniform size the absorption can be accurately calculated; the hewed ties, because of the sap-wood in the rounded sides absorb varying amounts of preservatives. Then, too, the sawed ties are further desirable because they present a more uniform surface for the plates and rails, as well as being more easily replaced in the roadbed due to their standard size. To balance all this, hewed ties are still cheaper to make, caused mainly by a much smaller investment. Since the railroads do not yet discriminate between hewed and sawed ties, the former are still manufactured where the type of timber allows it.

A short time ago, the cost difference between hewing and sawing was almost prohibitive but the mills have become so much more efficient, that the relative costs are practically the same. On the Wyoming Timber Company sale the price paid for No. 1 hewed ties is 29 cents. Since some of the mills are also paid by the piece produced, the prices are comparative. Here the price paid is 30 cents for a No. 1 tie. When the advantage of having the ties decked at accessible points, as they are at a mill set, is considered, this difference might not be significant. Actually, for sawing out a tie, the saw crew gets 16 cents and the skidders get 14 cents. When this is considered, it can be seen why no hewing is done on the Crow sale.

The turnout per man-day is much higher, also, for sawed ties. On sawed ties the average is probably about 100, while on hewed ties it is about 20. As the mills become more efficient this difference will increase. Therefore we may now arrive at an approximate cost for manufacturing the tie. First, there is the initial cost to the logging company of 30 cents for manufacturing the tie; next, there is an average cost of 12 cents for transportation to the railhead, where the railroad purchases the ties; then a lump overhead charge of 13 cents, for camp construction, roads and overhead payroll; and finally, the stumpage price of 10 cents, which makes a rough total of 65 cents for a No. 1 tie. Since the market price is about 85 cents, this leaves from 15 to 20 cents on each tie, out of which may be charged interest on the investment and finally net profit.

UTILIZATION differs greatly between the two sale areas in question. Where the only product is ties, as on the Wyoming Timber Company sale, tops are utilized only to 9 1/2 inches. However, on the Crow sale, where the tops are utilized as low

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as 7 inches, it is much more satisfactory. It seems strange that these small logs, out of which, at the most, only two 2 x 6's can be made, are profitable to manufacture.

As can be seen by these comments, the utilization is very commendable on the Crow sale. Although the tops are utilized as low as 7 inches, the logs are scaled only down to an 8 inch diameter by the Forest Service, that being the basis of the contract. Practically all logs are used, even culls out of which only poor grades of lumber can be sawed. It can be seen that in case the market for this lumber were to decline it would not be profitable to manufacture this type of material.

This discussion has been concerned so far merely with the utilization of lodgepole pine. On both sales there is a fair amount of Engelmann Spruce manufactured. The only product on the Wyoming Timber Company sale, of course, is ties. The railroad allows 10 percent of the annual output to be Engelmann spruce. Consequently the Forest Service marks as nearly 10 percent spruce as possible. Alpine fir is also utilized on some sales, depending on the sale contract. This latter species has been the sore spot, the big problem, in the policies of Timber Management in this region. It is, at present, utilized only for lumber; therefore, sales specifying smaller logs of this species are not made. When mature, fir is rarely over 16 inches d.b.h., and 40 or 50 feet in merchantable length. In fact, it is a weed.

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species, and a search is still being made to find a more profitable use for it.

This brings us up to the subject of marking and the marking policy. A selective cutting system is followed as closely as practicable. In some stands this can be done, while in others cutting must be quite heavy. This is caused by the preponderance of overmature timber in the remaining stands, both virgin and cutover. It is generally desired to remove about 50 or 60 percent of the volume of the trees 10 inches in diameter and larger. This will allow returning in from 30 to 40 years for another cut. However, many stands demand a much heavier cut, sometimes as much as 80 or 90 percent. The tendency is continually toward a heavier cut. The reasons for this are threefold. First, because of the majority of overmature timber; second, because in opening the stand up sufficiently, excellent reproduction comes in; and third, in a lightly cut stand spruce and fir become a problem. However, since a large part of the old stands are of sufficient size and age, much of the cutover area will come in to a fair stand of pine.

NOW comes the problem of how to go about this man-sized job. On the Wyoming Timber Company sale there were nearly 200,000 trees marked in 1937. On some forests this means a full-time job for a forest officer. On the Medicine Bow, however, small CCC crews were used. Even so the work was long and expensive. This was in addition to the stamping of the ties at the landings as well as the mill-scale studies necessary for a basis for conversion to board feet. The operators, too, are inconvenienced and the operation slowed up somewhat due to increased handling at the landings.

All this gives rise to another system of marking, sale by "tree measurement". In this method, besides merely selecting and stamping the trees in the standard manner, the d.b.h. is measured with a diameter tape and entered in the scale book. The trees are numbered so that in check scaling when they are cut, the volume may be checked. Local volume tables are used as a basis for entering the scale book volume. A flat cull percent is applied and the total volume later adjusted from the check scale.

THE operator is entirely satisfied with this method of marking; however, marking costs are a little higher, even taking into consideration time usually allowed for mill scale studies.

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and tie-stamping. Another thing is that cull is too variable by types to make accurate deductions. The merits and demerits of either system are many and varied but one forest officer offers the comment that the Forest Service must speed up its scaling, and its system must be in keeping with demands of modern operations.

Through this one industry, tie-making, the Medicine Bow supplies a number of economic services to the community. Besides furnishing ties it helps support local industry. The tie-treating plant of the Union Pacific Railroad is located in Laramie, where a million or more ties are treated annually with creosote preservatives. These industries, together with the lumbering and allied industries, represent an annual business turnover of over a million dollars in this area.

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