

*Suggestions for***PRUNING SOUTHERN PINES****GEORGE I. GARIN, Forester**

Quality pine timber of sawlog size is scarce. Its scarcity becomes more and more apparent every year. At present most timber in the South is cut and manufactured into lumber before it grows to large size. Second growth trees now cut for sawlogs are small compared to the old trees cut in the virgin stands. The lumber sawed from these small trees is usually knotty. Clear lumber is difficult to find on the open market and it commands a high price. Standing timber that will yield clear logs is sold at a premium. Second growth timber can yield quality logs provided the trees are pruned when young.

**HOW CLEAR WOOD IS PRODUCED
in A TREE TRUNK**

A tree grows in thickness each year by producing new bark and wood between the old bark and wood. When a tree trunk is pruned clear, new wood grows over the pruning scars. Outside of this wood new bark is formed. Any additional growth around the core of old wood is clear material, that is free of knots. As long as live branches are present there will be tight or red knots in the wood. As the tree grows and the lower branches are shaded by other trees, these branches begin to die. As long as dead branches persist on a tree they become embedded in the trunk. This

will result in loose, or black knots being present in the new wood that is added every year.

NEED for ARTIFICIAL PRUNING

Trees grown in the open do not prune themselves. Those that grow in dense stands are pruned naturally, but this is a slow process. In natural pruning very few trees are completely pruned when small. Only when limbs are completely gone is knot-free wood produced. If this happens after the tree trunks grow to sawlog size, the knots are right under the bark even in large logs. Loblolly and shortleaf pines often retain their lower branches for as long as 50 years. Slash and longleaf pines keep their lower branches about half as long.

If trees are pruned artificially, they can be completely pruned when small. The knots will be found in small woody cores at the center. Such trees are very valuable. They can be sold for poles or piling if they meet other required specifications. If they are allowed to grow to sawlog size they will yield clear lumber. Even the center core can be squared into clear timbers. The clear lumber produced usually is sold for at least twice the price of ordinary run of lumber.

Several pruning projects have been un-

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der way at the Agricultural Experiment Station of the Alabama Polytechnic Institute as a part of research in forestry. Natural loblolly pine stands were pruned when the trees were about 4 inches in diameter. As soon as some of the planted pines reached a suitable size, pruning plots were established in plantations. Pruning scars have healed and pruned trees are now producing knot-free wood. The size of trees at the time of harvesting will determine the amount of clear lumber they will yield.

WHAT TREES TO PRUNE

All four species of southern pines commonly grown in Alabama need artificial pruning when small to produce clear wood. When young stands of pine are pruned, it should be kept in mind that only 100 to 150 trees per acre will grow to full maturity. Those trees will be harvested for sawlogs as a final crop. The other trees in the stand will either be shaded out and die or be cut in thinnings. It is not economical to prune those trees that will not be left to grow to large size. In every case, regardless of number of trees, they should be carefully selected. The largest and fastest growing trees of good form, free of disease, and without defects or deformities are the ones to prune.

On experimental plots at Auburn, an attempt was made to select 100 crop trees per acre at an early age. This proved to be an impossible task. As time went on some of the trees were damaged, others were slowed down in their growth, and still others had to be removed in thinnings for various reasons. To insure the required number of trees for final harvest, more than 100 trees per acre need to be pruned. When pruning is done very early in the life of a stand, a minimum of 150 trees per acre should be pruned. Even 200 trees per acre would not be an excessive number. From these, harvest trees will be selected for a final crop. They are not cut in periodic, intermediate thinnings that take place before a harvest cut.

WHEN TO PRUNE

Pruning can be done in any season of the year without harmful effects. The best time to prune is in the winter when trees are dormant. Pruning of young trees can be started when they are 3 or 4 inches in thickness at $4\frac{1}{2}$ feet above the ground. Loblolly and slash pine plantations can be pruned for the first time at the age of only 8 or 10 years. At that time the largest and fastest growing trees are 15 feet or more in height. They can be pruned to a height of 7 feet (Figure 1). Research results show that young trees should not be pruned to more than one-half of their total height. If more than one half of their length is pruned, they will slow down in height and diameter growth.

When the fastest growing trees reach a height of 35 feet or slightly over, they should be pruned for the last time. This final pruning operation may come after the

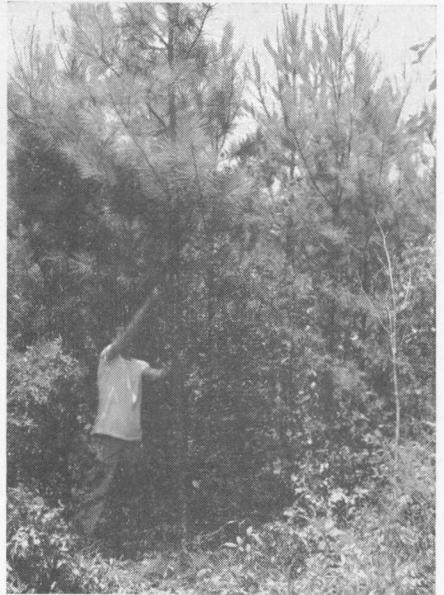


FIGURE 1. This 17-foot, fast-growing tree is being pruned from the ground up to 7 feet. This pruning height can be reached conveniently with a hand pruning saw. A tree's growth is not retarded if less than half of its total height is pruned.

first thinning of a young stand. In plantations this thinning operation can be performed when trees are 15 to 20 years old. After thinning, visibility in the stand is improved and the selection of potential crop trees is made easier. The pruning operation is facilitated by the creation of more adequate working space adjacent to the crop trees.

HOW TO PRUNE

Trees can be pruned in one operation when they attain a height of 35 feet. However, it is better and more convenient to prune them in two or three successive operations. Regardless of the method applied, trees are pruned to 17 feet above the ground. This will produce a tree with 17 feet of its trunk free of branches. When the tree grows to maturity it will yield one standard 16-foot log that is free of knots. About a foot at the base of a tree is allowed for a stump and trim.

In pruning trees it is very important that branches, dead or alive, be cut flush

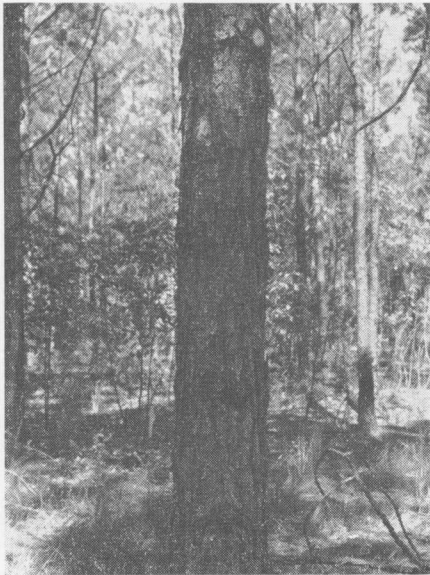


FIGURE 2. A good pruning job leaves tree trunk clean of branches or branch stubs. Tree trunk must not be injured or ragged edges left where branches are cut.



FIGURE 3. This is how NOT to prune a tree. Branch stubs will persist for many years. New wood added in an outside ring around core of old wood will have black knots. Lumber sawed from this wood will be degraded.

with the tree trunks (Figure 2). Care should be exercised not to injure the trunk. The cut should leave no stubs or ragged edges (Figure 3). Improper pruning that leaves branch stubs or seriously damages the trunks is far worse than no artificial pruning.

The best tool to use is a special pruning saw. This saw has a curved blade, and cuts on a pull stroke. Such a saw can be obtained with a special head that holds it rigidly to the detachable handles. The detachable handles are made of tough but light wood. Aluminum handles especially designed for the purpose are very light but are more expensive. The same saw can be mounted on a single-bit axe handle. This type of saw, named for the man who developed it, is called the Meylan pruning saw (Figure 4). It is exceptionally well adapted for reaching to the ground and up to a height of 9½ feet.

Many other tools are sometimes used for pruning, but none are as good as a prun-



FIGURE 4. Shown here is the Maylan saw, which was especially designed to prune trees in forest stands. It is highly recommended for this purpose.

ing saw. An axe is particularly bad because it injures the tree trunk. It should never be used for pruning.

PRUNING IN ONE OPERATION

If the pruning operation is delayed until the potential crop trees reach a height of 35 feet, the entire pruning job can be accomplished in one operation. This can be done with a pruning saw attached to a handle that is about 13 feet long. To avoid the inconvenience of a long handle, a second saw with a short handle can be carried at the same time. This method of pruning leaves a relatively large central core of knotty wood in the first log.

THREE-STEP METHOD of PRUNING

To grow trees so that the first log would have a very small knotty core, it is necessary to commence pruning when trees are about 4 inches in diameter at breast height. When the fastest growing trees are 15 to 20 feet in height, they

should be pruned to a height of 7 feet (Figure 1). This first pruning job can be easily done with a pruning saw to which is attached an ordinary handgrip handle (Table 1).

As soon as the trees reach a height of 25 feet or more, they can be pruned for the second time. At this time they should be pruned to a height of 12 feet from the ground. For this operation it is convenient to use a pruning saw with a 7-foot handle (Figure 5).

When the best trees in a forest stand are 35 feet in height, a third pruning to a height of 17 feet is done. This is the last and final pruning. For this operation it is convenient to use a pruning saw with a 13-foot handle (Figure 6).

In addition to being convenient, there are certain advantages to three-step pruning. In the early pruning of the three-step method, limbs are cut when they are still small (Figure 7). The pruning therefore can be done rapidly and economically.

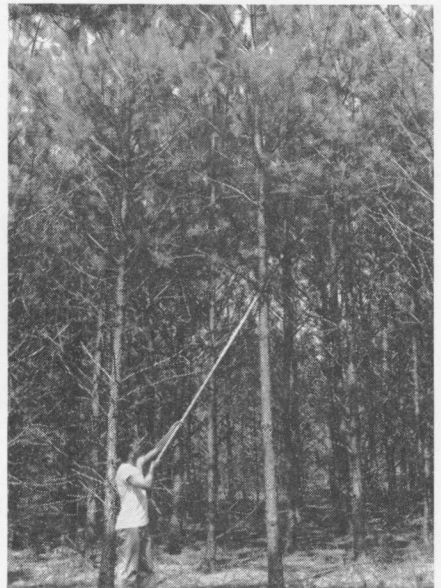


FIGURE 5. A good, fast-growing, 28-foot tree is pruned to a height of 12 feet. Intermediate pruning to this height requires approximately a 7-foot handle on the pruning saw.

A further advantage of the early pruning is that many branches affected by southern fusiform rust are removed before the disease progresses into the trunk of the tree. It is only in the trunks that this rust causes appreciable damage to the tree.

TWO-STEP METHOD of PRUNING

One operation can be eliminated in pruning by using the two-step method. Initial pruning is delayed until the best trees are 20 to 25 feet in height. At that time they are pruned to a height of 9½ feet or slightly more. This operation requires the use of the Meylan pruning saw to make it convenient (Figure 4).

For the second and final pruning, trees must be 35 feet in height. A pruning saw with a 13-foot handle will be needed. The trees are pruned from 9½ feet to 17 feet (Table 1).

This method of pruning leaves only a slightly larger knotty core in the first log



FIGURE 6. Being pruned here is a tree of a little over 36 feet in total height. A pruning saw equipped with 13-foot handle is used in this final pruning. This tree will grow clear wood of premium quality in the first log for rest of its life.

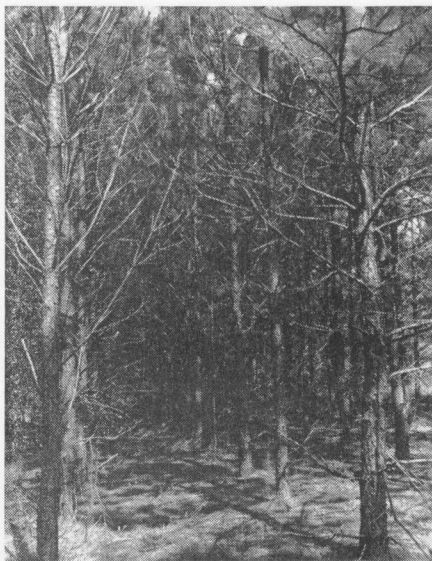


FIGURE 7. This slash pine plantation needs pruning. Early initial pruning would have left lower parts of tree trunks free of branches. Trees would then have commenced to grow clear wood and would have first log with a very small knotty core.

of a tree. It is a very good method and it requires somewhat less labor than the three-step method. Either method can be used. The choice depends on the person doing the pruning, amount of money to be spent, and the product to be harvested.

COST of PRUNING

It takes from 1 to 4 minutes for each step in pruning a tree. To prune a tree to 17 feet requires from 5 to 9 minutes total time. It takes more time to prune large trees than small ones. Trees grown in the open with many limbs (Figure 8) require considerable more time for pruning than trees grown in thick stands.

Any pruning above 17 feet increases the cost very rapidly. In addition, a second log in a tree is always smaller than the first. This means that by pruning higher than 17 feet, a relatively small amount of clear wood will be produced at a high cost. Pruning above 17 feet is not recommended.



FIGURE 8. Trees grown in open stands have many large branches, and produce only inferior lumber when harvested. The cost of pruning large trees is excessive. Pruning should be done when trees are small.

PROFITS from PRUNING

Pruning fast growing trees can be considered an investment that will pay its way. When mature trees are harvested, the butt logs will be free of knots. Clear logs will be converted into high grade lumber. If a pruned timber stand is sold on the stump, a timber buyer will generally pay a premium price for such timber. He can well afford to do so because he will receive a higher price for the higher grade of lumber.

Lumber sawed from mature trees pruned at an early age will bring one and one-half times as much or more per thousand board feet as lumber from unpruned trees. If the landowner gets a premium of only \$10 a thousand over the regular stumpage price pruning will be profitable. When a timber stand of sawlog size is harvested, several thousand board feet are cut per acre. The landowner will realize a sizable return for the few hours that it takes to prune trees when they are small.

SUMMARY and RECOMMENDATIONS

1. Second-growth pines need to be pruned to produce clear wood. Natural pruning is too slow and irregular.

2. All four pines commonly grown in Alabama should be pruned when they are small in order to produce clear wood.

3. From 150 to 200 of the best and fastest growing trees should be pruned on each acre.

4. Initial pruning should be done when trees are 3 to 5 inches in diameter and 15 to 20 feet tall.

5. It is recommended that pruning be

done by either the two- or three- step method. These methods result in freedom from limbs for 17 feet of a tree's trunk. At no time should over half of the total height of a growing tree be pruned.

6. All branches, dead or alive, must be cut clean and flush with the tree trunk. Injuries to the tree trunks must be avoided.

7. A special pruning saw with provision for attaching long handles is recommended for pruning.

8. Pruning of small trees does not take much time. A good return is realized for this work when mature timber is sold at a premium price.

TABLE 1. PRUNING RECOMMENDATIONS FOR SLASH AND LOBLOLLY PINES
(150 to 200 best trees per acre should be pruned)

Pruning method	Pruning height	Length of saw handle	Size of best trees in a young stand	
			Height	D.b.h.
	<i>Feet</i>	<i>Feet</i>	<i>Feet</i>	<i>Inches</i>
Three-step	1- 7	½ ¹	15-20	3-4
	7-12	7	25-30	4-5
	12-17	13	35-40	5-8
Two-step	1- 9½	2½ ²	20-25	3-5
	9½-17	13	35-40	5-8

¹ Handgrip type

² Meylan saw

