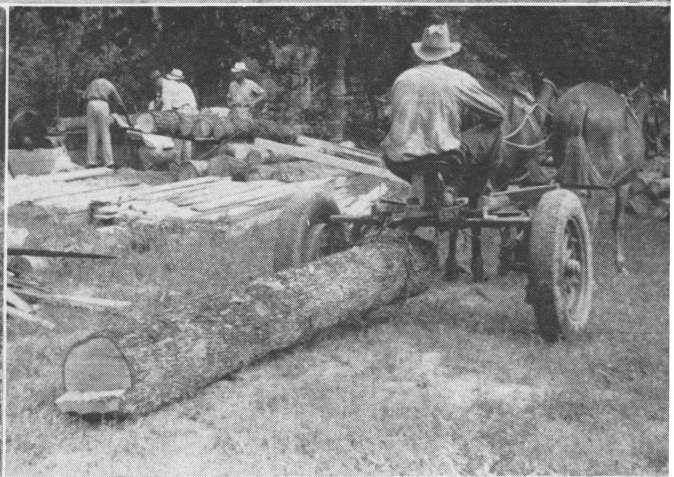
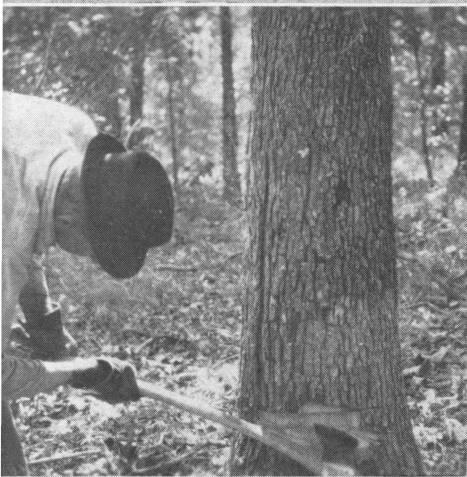


# Cutting and Logging Equipment for Farm Forestry Work



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Ide P. Trotter, Director, College Station, Texas

## FOREWORD

Farmers have the necessary hand equipment for tree felling and making rough wood products, but lack suitable logging equipment. Many items of logging equipment selected for farm use in this publication are never factory made but are easy to build on the farm or in a local shop. Most of the vehicles are long time tested logging types which are more efficient than trucks and wagons for the woods but are built smaller with some modern improvements for farm use and for small or second growth timber which farmers have in great abundance. Models were used for making some of the pictures. Many opportunities for improving farm forest management, income and uses of forest resources depend upon the farmer to change from tree selling to wood products making and selling, and secondly his willingness to make, try and improve suitable tools, machines, and processes that will meet his requirements.

Other publications relating to the use and management of farm and ranch timber in Texas are: "The Suitability of Native Woods for Farm Use," "Fence Posts and Other Wood Treatments for the Farm," "Single-Unit Sawmills", "Tree and Log Scale Card", and others on fuelwood, pulpwood, charcoal, pruning, reforestation, fires, diseases, insects, marketing, etc. These bulletins are available for free distribution by the Extension Service, College Station, Texas, or by your county agricultural agent.

### ON THE COVER:

With a few simple tools and equipment, such as shown on the cover, many farmers can thin, harvest and move their own timber. Profitable production of forest products on farms will help to provide more timber at lower cost and with more income for the farmer.

The tools shown in the upper photo are, left to right, cross-cut saw, maul, wedges, single-bit axe, lugger, and a cant hook. Lower left photo shows making the undercut on a hardwood tree to direct fall of the tree and prevent it kicking back on the cutter. Lower right photo illustrates the use of the Perry cart for moving logs to a farm sawmill.

# Cutting and Logging Equipment for Farm Forestry Work

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Almost half the number of Texas farms and ranches have fourteen million acres or more of small sawtimber widely distributed over the eastern half of the state and some along drainages farther west which can be logged and utilized by farmers and ranchmen. Many kinds of products can be made from annual cutting of about one billion board feet from these woodlands with better production of timber, livestock and wildlife resources. Approximately one-third of the sawtimber is pine and two-thirds or more is hardwood. The growth of most hardwoods exceeds its cut and is rapidly invading the pine and cedar forests. More profitable uses should be made of the hardwood and better forestry should be developed especially

for pine. The sawtimber is small, about 90% is less than 24 inches at the stump and averages about 12 to 14 inches. Small types of old and new logging equipment, small sawmills, and many other wood-working industries of small sizes, some preservative treating of wood and other simple processes have been found to utilize small timber efficiently and profitably.

Some of the "chemurgic" processing of wood and some types of wood-using industries must necessarily be large and are expensive to build. On the farm small and simple things can be made with small tools and machines. Small machines on the farm increase the power of the farmer. They only need a fair opportunity. After working with a few "haywire" out-

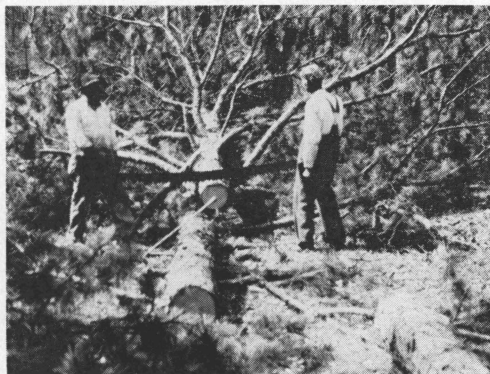


Fig. 2. A "worm" killed pine salvaged by farmers for lumber making. Should they trim the top? Lumber is lumber. It will also make pulpwood or fuel.

fits, one is convinced they too can be made to do satisfactory work. Some industrialists and agriculturalists agree that the farmer should develop more woods work and some wood working which may be a better way to stabilize farm and farm forest management in timbered regions.

The purpose of this publication is to furnish information on methods and equipment for cutting and logging found practical for farmers and ranchmen to use. See inside cover page for companion publications on other forestry subjects relating to farm and ranch conditions.

**FOREST INCOME CAN BE INCREASED BY THINGS THE FARMER CAN DO:** Ordinarily the farmer prefers to sell timber or any products during periods of high prices, but boom times are not necessary in order for farm forest management to be profitable. The farmer who sticks to a forest program of cutting or selling a small amount of timber each year or every few years and also renews, protects and improves his forest resources finds forestry an important item in his farm program even in times of depression. There is much value in a forest if it can be worked out.

The principal items of production from which some income can be derived are stumpage, cutting, logging, hauling, and the operator's profit. The more the farmer can do efficiently the greater his profits

and savings. The principal wood products used on the farm are lumber, fuel and fence posts. In other publications we try to explain how the farmer can do more wood work, including lumber making, post treating, and making things to use or sell. The costs and income will vary, of course, from time to time, and farm to farm, or by tools and machines used, and by things made for use or for sale.

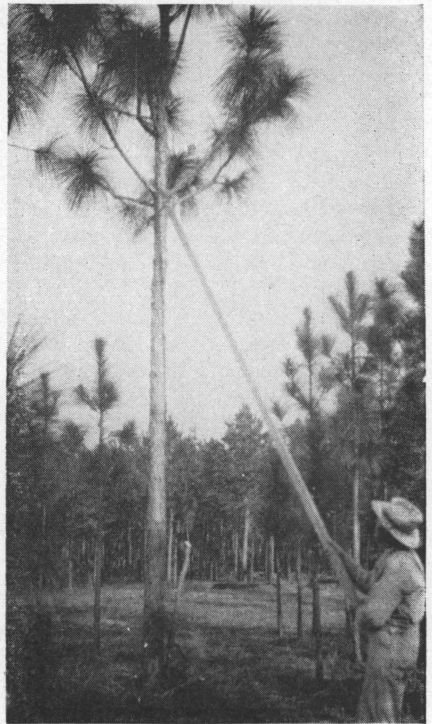
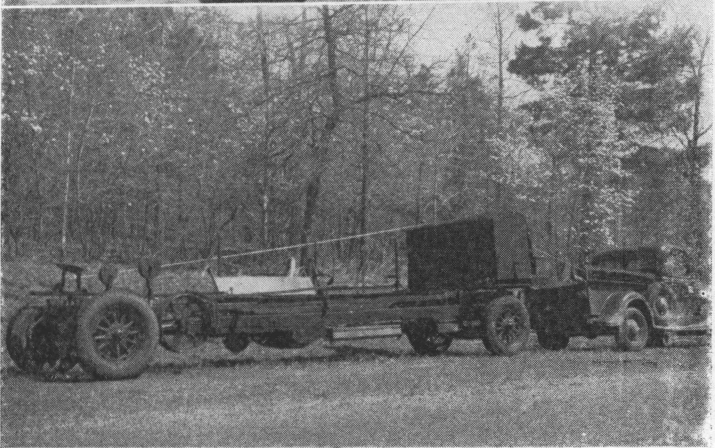


Fig. 3. Thinning and trimming (pruning) done years ago have paid the farmer, like this demonstrator, big dividends in years of grazing and fire proofing and have grown more and better sawtimber within 15 to 20 years than others may accidentally grow in a lifetime.





**Fig. 4. Pictures show an ideal cart for farm forestry purposes. It can be used to carry logs or end of the mobile, single-unit sawmill illustrated above.**

Practically all farmers have equipment for cutting and hauling their home supply of fuel wood and fence posts, but much of this equipment is not suitable for logging. We have a more difficult situation in developing sawtimber logging on the farms. Skidding,

(snaking) the logs, even for short distances, is hard and expensive work for a small team or tractor and, too, the logs pick up grit which will dull the mill saws in short order. Some stirring of the soil assists nature in establishing and growing valuable species of trees,

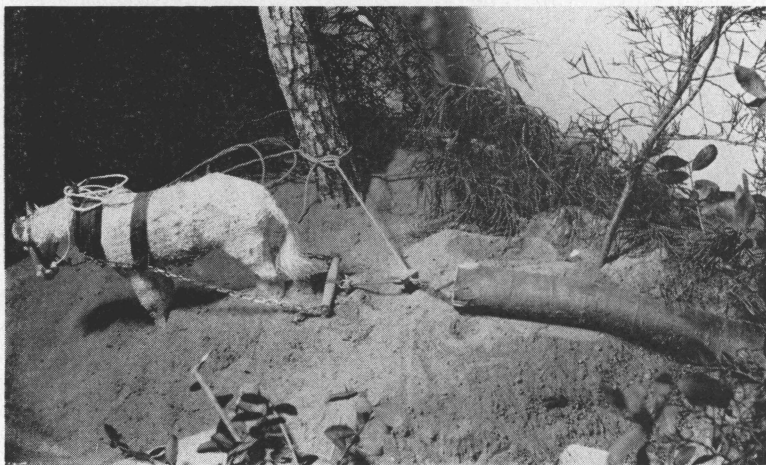


Fig. 5. By use of a sheave attached to the grabs, this horse is able to pull twice his ordinary power. One end of the cable is attached to the tree, and the other runs through the sheave and attaches to the singletree.

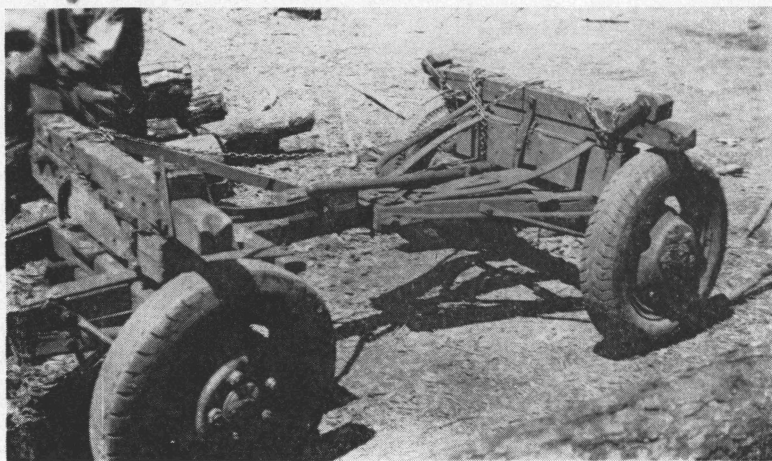


Fig. 6. An old log wagon chassis with truck wheels makes the best log wagon.

especially is this true of pine, but snaking logs down hill may start gullies. For these and other reasons snaking of the logs is not

desirable. Trucks and log wagons are efficient for hauling logs over good roads for distances of half a mile or more, but they do not lend

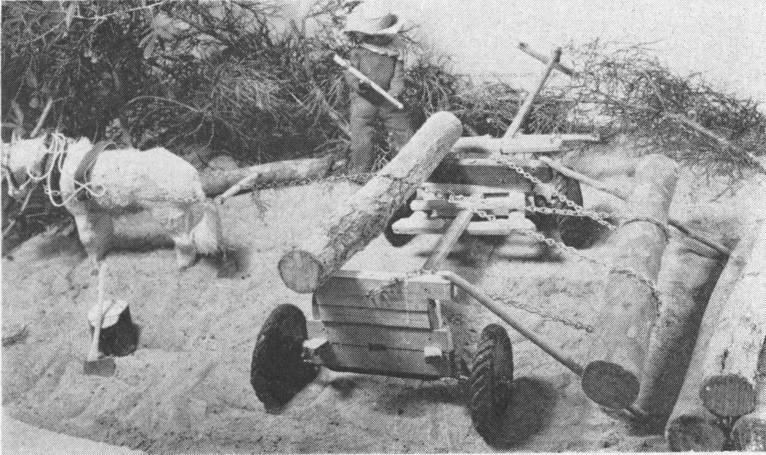


Fig. 7. Cross-haul loading. A fast tapering log is rolled straight by hooking snap chain closer to small end.



Fig. 8. Two cross bunks fastened to automobile chassis make an easy pulling light log wagon.



themselves well to handling logs within the present day forests which are thick usually with undergrowth; nor are they suitable for logging on wet ground when the farmer has more time and cooler weather for woods work. The logs can be picked up and moved easily and safely over short hauls from stump to mill or to a concentration point during any season where only the front ends of the logs are carried on sleds or carts. This equipment, beginning with simple kinds, will be discussed for various logging conditions under special headings later in this publication.

**TIME OF YEAR FOR CUTTING TIMBER:** Many of the theories which have been advanced regarding the durability of wood attribute too much importance to the time of cutting. As a matter of fact the time for cutting has little effect upon the durability of the wood if the timber is properly cared for after it is cut. The manner of handling timber at different times of the year affects its durability.

Timber cut in the winter dries more slowly and with less checking than during summer months. Fungi and insects do not attack wood out of doors during the winter, and by the time warm weather arrives, the wood has seasoned sufficiently to become less susceptible to their attacks. It is for these reasons that winter, late fall, or early spring cuttings are more advantageous and not because of the smaller amount of sap that is in the wood. For many reasons, winter woods work has been a long time practice on the farms and is a good one.

**ESSENTIAL HAND TOOLS:** Certain equipment is necessary in the first stages of working up farm timber. If a planned program of cutting is to be used, requiring the right amount and kind of timber, the first item necessary in the cutting operation is an accurate tree and log scaling card. These cards are available from the Texas A. and M. College Extension Service, College Station, Texas. The following timber felling and hand-



Fig. 9. One way to save trucks and farm wagons is to bunch pulpwood or firewood along woods roads with a wood rack; front end can be carried on a bumper with bolster.





ling equipment should be available: (1) One or two canthooks; (2) a two-man crosscut saw (see bow saw below for small timber); (3) at least one double bit axe (a heavy single bit axe is useful for chopping, splitting and light wedge driving tool); (4) two wood wedges (use persimmon or iron wood and save the dogwood trees). (5) a bottle of kerosene, files, saw-set tools, and whetstone. All tools should be kept sharp; the axe should be shaped occasionally on the grindstone or emery wheel. The saw should have ample cutter tooth setting, and most woodsmen prefer to have four cutters to one raker.

Fig. 10. An International Log Scale Card gives farmer a close estimate of lumber in a log or tree. Here good seed trees about to be harvested have reforested a pure and even-aged stand of pine. The new crop of saplings has been thinned and pruned one time and fast responding grasses are grazed which assures greater fire proofing and profitable use.

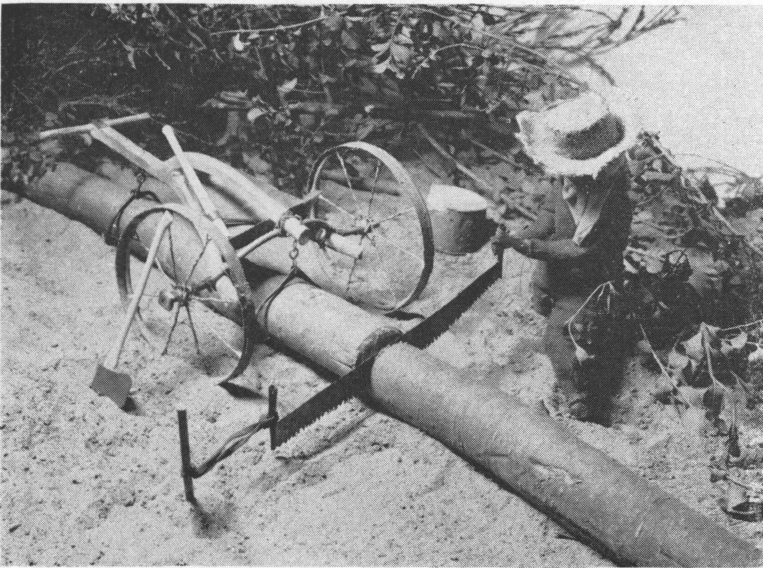


Fig. 11. There are many opportunities to use inexpensive hand equipment, as shown above, in farm forestry work, even with a limited amount of timber and money.

Bow saw settings should make a kerf of five-cent coin thickness. The cutters should all be the same length and about 1/32 of an inch

longer than the rakers and about the same for the bow saws. Cutting may be increased by filing cutter points to longer taper and bevel.

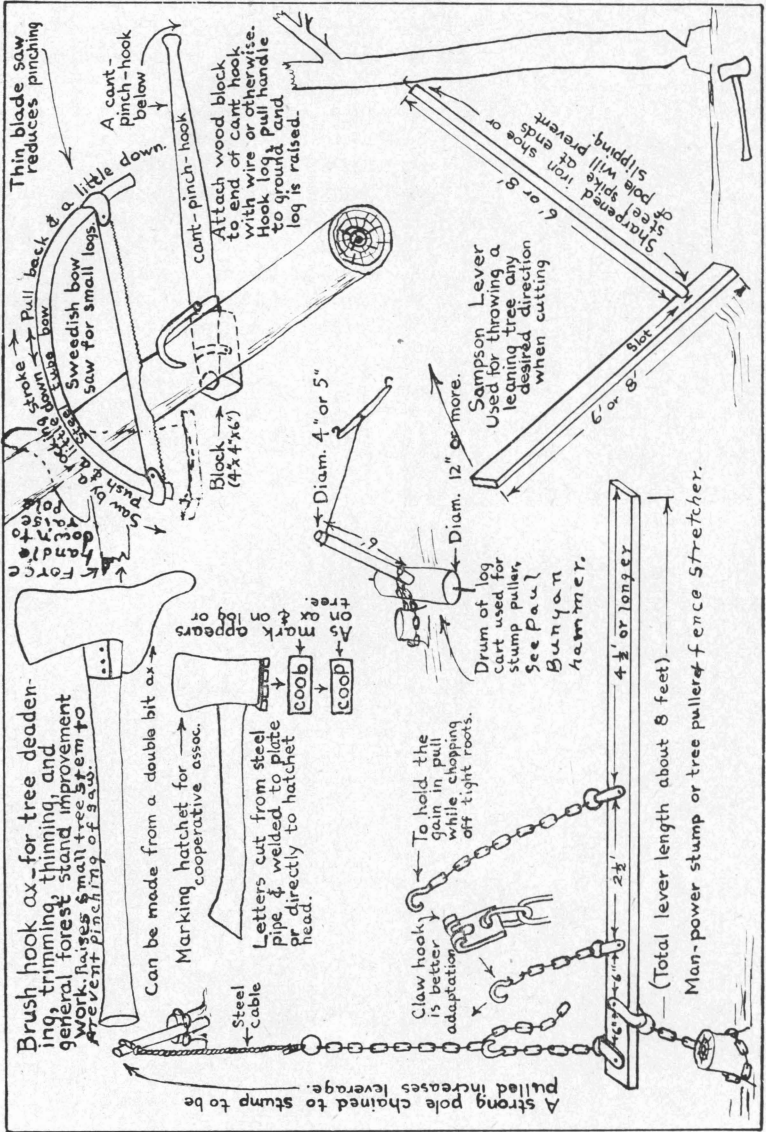


Fig. 12. Many simple tools, devices and useful tricks improve the work of woodsmen.

A few teeth and raker may be maintained at one end of the saw as patterns of the original tooth forms. Raker points, two to a shank for breaking and raking out chips in opposite directions should be sharpened straight across. The better grades of tools, of course, perform better and require less conditioning. Good booklets on the care of these tools are available, and may be supplied by the manufacturers or local hardware dealers. By knowing your tools and the use of simple equipment, you can with training, avoid lots of back-breaking work and disappointing breakdowns.

**NEW HAND TOOLS:** The pulpwood saw (bow saw), which is new to this country, is very efficient for one man to use in felling and bucking (cross-cutting) small timber of all species up to about 11 inches in diameter. It is now supplied by most East Texas hardware stores. A fine quality sandvik forged steel blade, 36 to 48 inches long and thinner than a buck saw blade to reduce pinching, is fastened by clamps to the ends of small

steel tubing bow. Learn to saw by an easy rocking motion. (See Figure on page 10).

A brush hook axe, which can be made from a double bit axe, may be handy, especially in small timber. By hooking the brush blade under the trunk of the smaller trees and forcing the handle toward the ground with the foot, the pole is held firmly and pinching in sawing can be avoided. Besides chopping, it is useful for brushing out, low pruning or trimming of felled trees. (See Figure on page 10).

A straight weed cutting blade with corrugated edges fastened in a slotted end of an axe handle and with two mower blade sections riveted at end of weed blade is useful for fast hedge trimming, thinning small saplings, low pruning, small brush lopping or weed cutting for forest and forest range improvement.

**POWER EQUIPMENT FOR TREE AND BRUSH CUTTING:** Perhaps the most satisfactory type of power saw for felling trees,

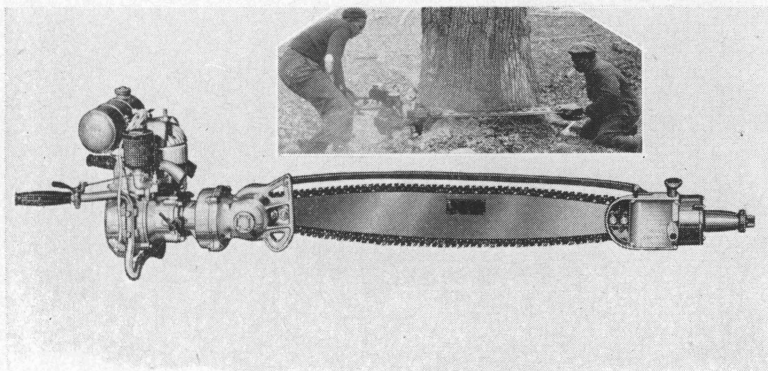


Fig. 13. A power chain saw and other power types are being developed and may be adapted to a farm forest program through cooperative ownership.

sawing them into logs or bolts, and for trimming off large limbs, is the power chain saw carried and operated by two men. A more expensive type with larger engine is self propelled on wheels. The type carried by two men has been in use for several years but is still too expensive for small farm use. It might well be used by neighborhood timber cooperatives.

Farm tractors, besides their use for agricultural purposes, are used in logging farm timber and furnishing power for small wood processing machines such as the farm sawmill, fuelwood power saws, etc.

Other types of mobile power saws mounted on tractors have been developed to cut brush or small trees for better management of some types of farm forests. They are useful for mowing worthless

brush, thinning saplings by narrow strips to reduce handwork selecting, clearing roads and fire lanes, and other forest and forest range improvement. One machine has been developed which operates a circular saw on the front end of any tractor, preferably a crawler type; another on the rear end similar to a tractor mower and has a hydraulic lift and control. Some types with light air cooled engines are pushed around on wheels while others with larger engines are self propelled with operator walking. Brush reduction is also accomplished by use of a heavy rolling cutter (stalk cutter type) with 4 to 7 blades pulled by tractor, also by bulldozers, or a cable dragged between two tractors. Cross-cutting work is done efficiently with drag and circle power saw outfits—the latter for light cuts of fuelwood.



Fig. 14. Skidding lizards are loaded by roll-up or by a method used with bumpers. The choke hook end of pulling chain grips the log to the bunk.



**HAND LOGGING EQUIPMENT:** Two men can bunch small logs and poles with a log lugger. (See a lugger on cover.) A light hand cart for moving small logs and poles a short distance can be made with a sweep axle cultivator using high cultivator wheels or higher one from a hay rake. Another cart can be made by using part of a small tree stem for a tongue and its two equal sized forked branches for hounds. (See picture on page 9), also shows how a piece of inner tube or coil spring can be substituted for one man on a cross-cut saw.

**LIZARDS, SLIDES AND SLEDS:** Picture page No. 12 shows the "A"-shaped sled about three feet long which can be pulled with one animal, a team, or tractor in moving logs over muddy land. Most hardwood trees have one or more forks suitable for making

one of these lizards. The bunk is placed about  $\frac{2}{3}$  back from the crotch. Picture on page 13 shows sleds. These vehicles, including the lizard, can be used satisfactorily for moving logs up to 100 yards. The sled bunk which should be arched below to clear low stumps and brush is fastened with only one bolt to each runner for the necessary flexible construction. Strap iron shoes can be attached to the bottom of the runners to give longer wear. (See picture, page 13 for method of constructing sled runners from tree forks. Cut off one fork).

**BUMMERS:** The bummers shown in pictures on page 14 can be used effectively in moving the heaviest logs up to 400 feet over smooth or soft ground and low or scattered underbrush. They are more efficient in that they pull with about two-thirds the power

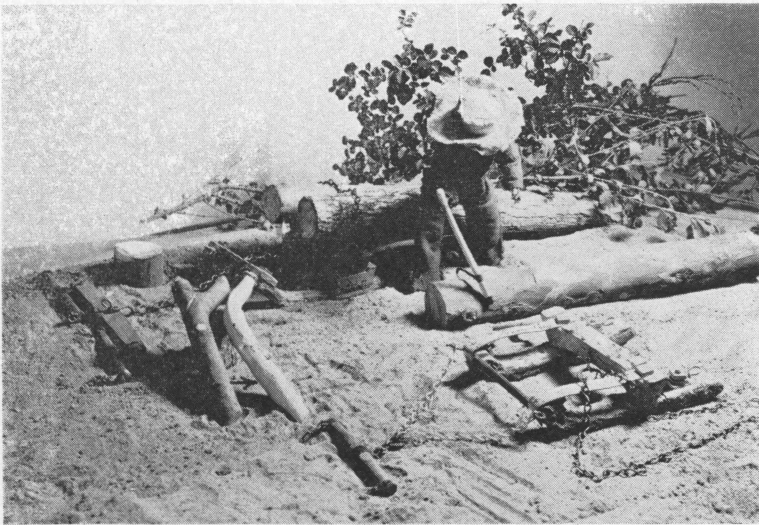


Fig. 15. Sleds are loaded by roll-up and a log binder grips chain around logs to bunk. This shows a simple way of making a runner from tree fork.

required for sleds. The tongs or grabs are fastened by swivel to a cross piece which is fastened to the "V" shaped tongue a few inches in front of the axle. The tongue should be about five feet long and may be made from the fork of a tree. The bumper axle, if made of hickory or pecan, should be about three inches in diameter and should be arched somewhat underneath. A steel shaft or pipe should be more satisfactory. The bunk is 24" to 30" long and sits level with the top of the wheels on the ends but is lower in the center. Solid wheels, about 5" x 20", are cut ordinarily from black gum. See pictures of bumper for loading.

The loading movements are reversed for unloading or by loosening the tongs from the log.

The rear section of some types of automobile chassis, preferably with tires, and with the drive shaft housing used for a short tongue, requires only the bunk built over the axle for a make-shift bumper. This type of bumper with a bolster, will support front of a wood rack or rear of a single-unit saw-mill for moving it.

Picture on page 15 shows the lazy bumper cart which can be backed up to a log, the end pulled down and fastened with grabs to lift the log. The pulling chain fas-

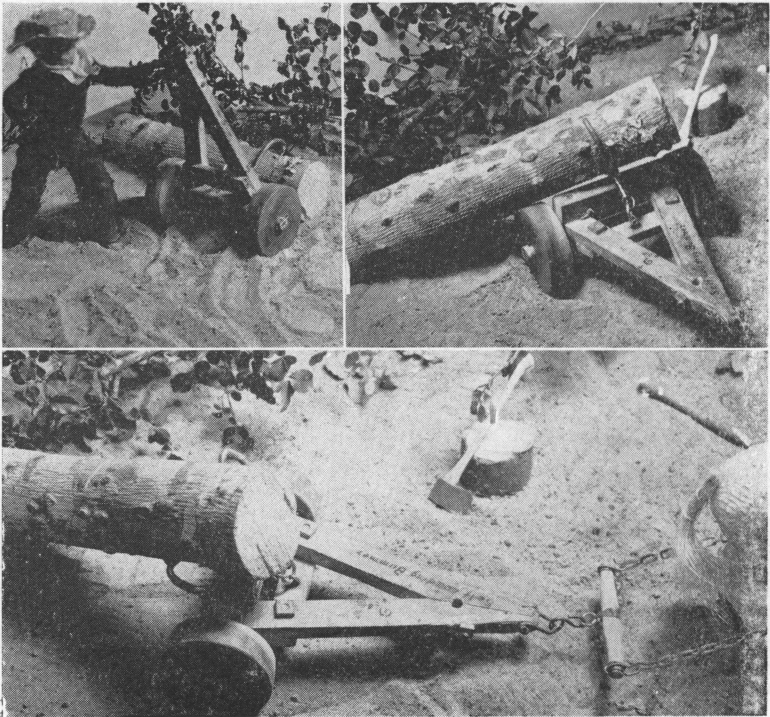


Fig 16 Loading a bumper; after tongs are fastened the tongue should be pulled down by horse and turned straight for complete loading.

tens to the end of the log near the grabs and runs under the axle then through a guide clevis at the end of the tongue to a double-tree, thus keeping the end of the log suspended and steadied somewhat when it is being pulled.

#### CARTS FOR MOVING LOGS:

Carts with sweep axles and wagon wheels as a rule are practical for moving logs. This is especially true where distances up to about  $\frac{1}{4}$  mile are to be covered and for forests which would require excessive brushing-out for other vehicles. There are several types of carts which can be used satisfactorily. The principles of each are about the same, each suspending the front end of logs under the axle, but of course one may be

better adapted to a given set of conditions than another.

Picture on page 16 shows carts which may be made with short tongues fastened rigidly to the axle, which is raised after unhitching the team to fasten the axle chain or grabs near end of one or more logs and is pulled down to raise the log ends. The tongue is chained securely to the suspended end of the logs before rehitching. Short tongues about seven feet long are more satisfactory on level to moderately level land. A pair of shafts might be used for one well trained animal. The axles of most of the small log carts are arched and are about the same length as wagon axles.



FIG. 17. This is a lazy bumper, an experimental device which raises log end only when pulled.

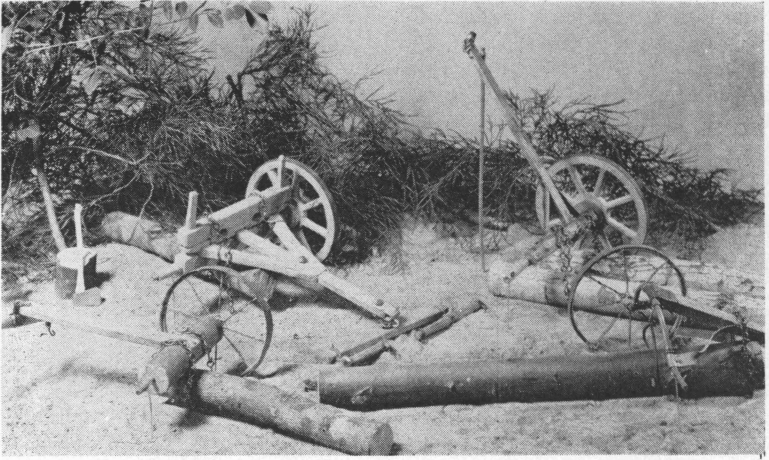


Fig. 18. Carts like these move the logs easier and farther than lower devices in brushy woods.

Wagon wheels are strong but rake or cultivator wheels will be stout enough for small logs.

The drum cart shown in Figures 18 and 19 is made by using a large pole a few feet long and with some crook or arching underneath for an axle. Wheel spindles are driven into holes in each end of the drum axle somewhat closer to the lower side. The cart is backed over the log and the tongue is raised. A chain around the log is run over the axle from the back

and fastened around the base of the tongue. The tongue is then pulled down and fastened securely to the front end of the log.

**PERRY LOG CART:** This cart is one of the best for farm use and most any condition of woods and topography and moves logs economically  $\frac{1}{4}$  mile or more. The team does not have to be unhitched while loading and dumping. Farm wagon wheels or high truck wheels with pneumatic tires can be used for moving logs up to about 20

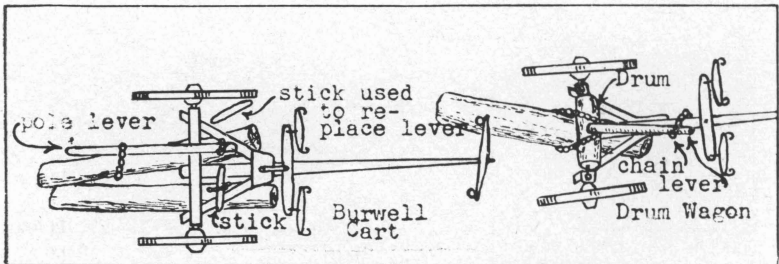
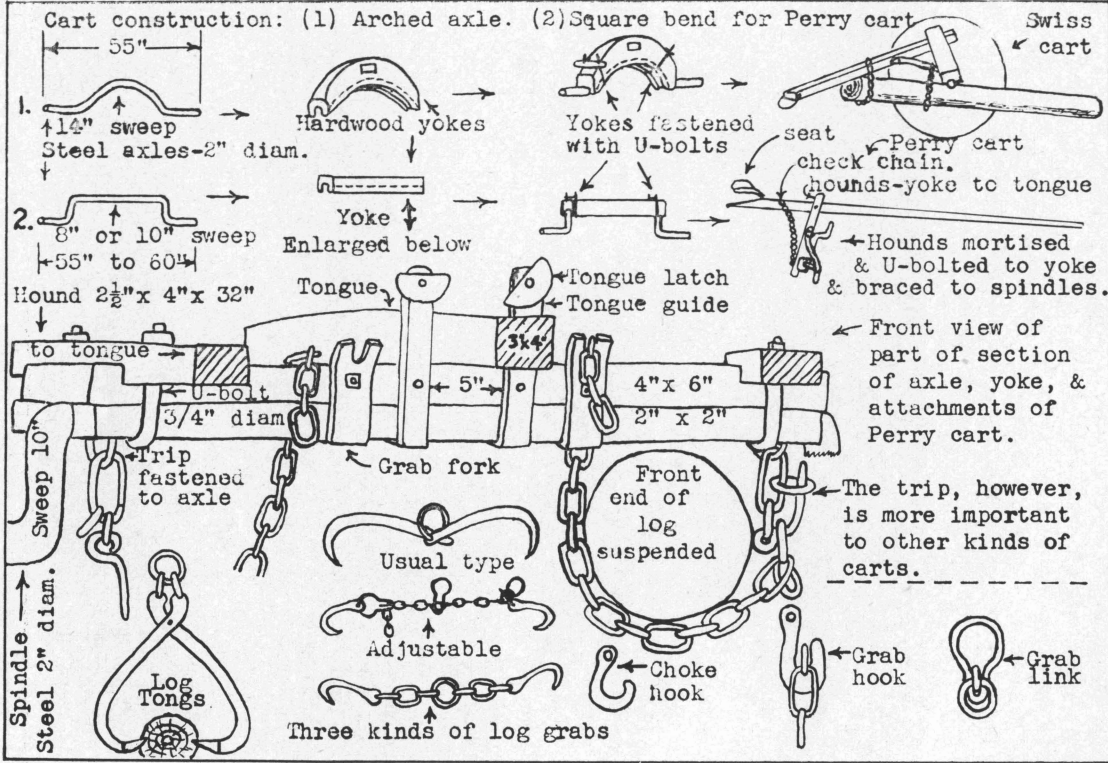


Fig. 19. Cart adaptations of wagon gears are shown. The drum cart axle and tongue can be fastened to a bolster to raise and hold up logs. Team stays hitched.





inches in diameter. Its steel axle is given about an eight to twelve inch sweep, either bent at right angles near the spindles or arched, and should have a wood or steel yoke fastened above the axle for reinforcement and for making the attachments more easily. A long tongue a few feet longer than a wagon tongue, is fastened to the

Fig. 20. Above are shown some details of carts and logging equipment.

hounds with a 3/4" kingbolt for a perpendicular swivel or hinge. A shorter tongue can be used for tractor pulling.

The length of the hounds from hinge bolt to axle should be longer than wagon hounds or about 4 times the depth of the axle sweep (32 inches if the sweep is 8 inches) is ample leverage and sweep. The hounds are attached to the upper

bend in the axle by U-bolts and are braced to the spindles. On top and in the middle of the axle are two guides between which the rear end of the tongue fits and they should be self-latching. When the rear end of the tongue falls to meet the upward sweep of the axle as the cart is pulled forward the latches trap the tongue securely to the axle. Either two spring latches or two

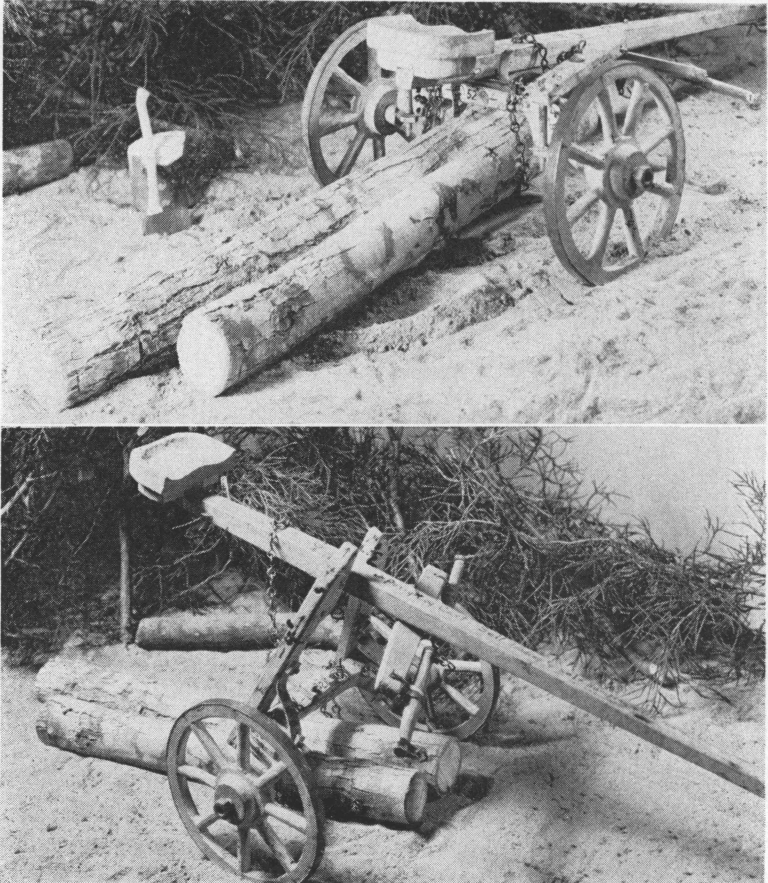


Fig. 21. The Perry log cart is self loading and dumping with aid of the team. Rake wheels may fit the steel axle and wagon wheels require wood or metal spindle bushings.

half-round discs fastened to the guides will trap the tongue. Hooks or a trip link fastened to the axle hold the log chains or grabs. The end of logs are fastened to the sweep axle when lowered and the axle is raised and latched to the tongue when the cart is pulled forward. (See Figure 21). The driver unlatches the tongue and lifts up the rear end to dump the logs.

An adjustable check chain running from the tongue to both hounds prevents them from opening too far. The rear end of the tongue should extend back of the axle about 18 inches for the driver to grasp and raise easily. A team soon learns to slack their traces to aid the logger in raising the

tongue which turns the sweep axle down for fastened or unfastened logs.

An old wheel scraper, although practically obsolete as a dirt mover, has an ideal sweep axle and well constructed trip hounds which are easy to convert to tongue hounds. The axle should be reinforced with a piece of heavy bar iron welded along the top for any heavy logging. When a tongue, guide and latches described above are attached, this implement, especially if the spindles are shaped to fit bearings for a pair of truck wheels and tires, makes the best cart for moving logs or stems not exceeding about 20 inches in diameter from stump to truck or mill moved to the woods. (See Figures 4 and 22).

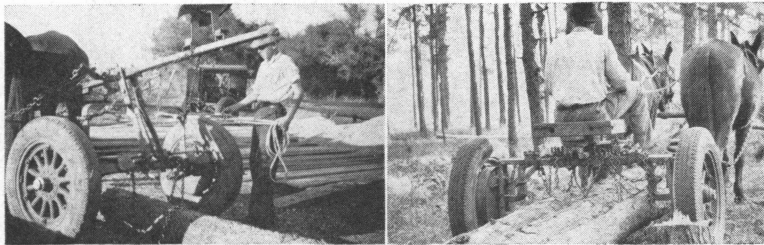


Fig. 22. A Perry cart made from a wheel scraper and improved with rubber tired wheels is pictured. It carries rear end of the mobile mill shown on page 5.

A strong and smooth running Perry cart can be made from front axle with wheels from an old motortruck. The axle should be arched sufficiently and spliced for usual length, if desired. The spindles are aligned and welded or braced rigidly to the ends of the axle.

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