ported. Otherwise, it will be shipped directly to a buyer, usually the firm that will do the spinning.

Cotton farmers in the United States grow principally upland cotton, which is ginned on saw gins. Considerable interest has developed in the Southwest in the growing of the extra-long staple cottons, but even so it represents a small portion of the total crop. Extra-long staple cotton is used for the manufacture of sewing thread and the fancier items of clothing.

Roller gins are used on extra-long staple cotton because gin saws damage the long, silky fibers, but the same or similar equipment is used for handling, cleaning, drying, and pressing the extra-long staple varieties as for upland cotton.

The roller gin has a fixed blade held against a roller covered with material to which the cotton adheres. The space between the blade and the roller is insufficient for the seed to pass; hence, the fibers are pulled from the seed as the roller revolves. A vibrating knife, operating in conjunction with the stationary knife and roller, assists in separating the seed and fiber.

Annual consumption of raw cotton in the United States has been 8 million to 9 million bales of 500 pounds each. The per capita consumption of cotton in the United States is approximately 25 pounds annually. Some fluctuation has occurred, but cotton consumption was substantially the same in 1958 as it was in 1920 despite the development of synthetic fibers.

Both farmers and consumers benefit from the many processes for preparing agricultural products for market. Product preparation aids the farmer by broadening the market and increasing returns for his crops. It helps him to reach customers who live greater distances from his farm. It lengthens his marketing seasons. It expands his sales by making it possible to offer some crops in both fresh and processed forms.

Consumers benefit from the greater variety of products available at all seasons of the year and from the many forms in which these products are prepared.

Every additional preparation operation adds to the cost of marketing agricultural commodities—but how many consumers would want or could use these commodities if they had to take them without the preparation that has come to be an accepted part of marketing in the mid-20th century? Few of us would willingly return to unpasteurized milk. Not many would agree that we could easily do without commercially canned and frozen fruits and vegetables or prepared baby foods. Many would be the complaints if fresh produce were delivered to retail stores orchard-run or ungraded, direct from the field.

Harvesting the Woods

Fred C. Simmons

Several new machines are designed and priced for use by the farmer who works in his woodlot only a few weeks out of the year. Some are logging accessories he can use with his ordinary farm tractor.

Other specialized devices help the custom or commercial logger who spends most of his time logging on his own and his neighbors' properties.

Besides this new equipment, farmers and commercial loggers are working out methods to do their logging with greater efficiency and safety and in ways that will leave the woodlots in good condition for future growth.

Specifications and methods are being developed to enable farmers and loggers to recognize, cut, and market
woodlot products, other than logs, that often are overlooked by the small operator. Among these products are such high-priced items as oak stave and birch turning bolts, softwood poles and piling, and hardwood and softwood veneer bolts.

An example of efficient woodlot logging is the work methods of John Calhoun III, a consulting forester of Keene, N.H. For the owners of small woodlots he estimates and maps the timber stands and recommends the forestry operations that should be carried out to improve them.

If thinning or harvesting operations are needed, he will mark the timber to be cut and do the logging with his own crew. Then he will market the products of the operation among local mills to the best advantage.

The owner is assured of getting a good job of forest management on his lands, with a minimum of damage to reserved trees, and a reasonable return from the sale.

Mr. Calhoun maintains small and mobile crews of experienced woods- men, equipped to log efficiently most of the nearby small timberlots. Usually each crew is composed of two men—a chopper, who works with a gasoline-powered, one-man chain saw, and a man who drives a small, diesel-powered crawler tractor equipped with a blade, a winch and boom, and a trailing scoot. This scoot, a sturdy sled, brings the logs from the stump to the roadside free from embedded grit and gravel.

On a timberlot of average accessibility (about one-third mile skidding distance from stump to truck road), this two-man crew cuts and delivers to the landing about 4 thousand board-feet of logs a day.

When skidding distances are shorter, another chopper is added to the crew to make logs and help run the tongs in loading the scoot. Under these conditions, the third man increases production by another 2 thousand board-feet a day.

This productivity is being attained in previously unmanaged stands of dense young white pine, where the trees being cut are generally short-bodied, crooked, and limby, and the average log diameter is only about 9 inches. The better, straighter trees are saved for continued growth.

With hand-and-horse methods, production under these conditions would only be about 1 thousand board-feet per man-day.

Mr. Calhoun also has a three-axle, short-bed truck, equipped for self-loading the logs and bolts he selects and sorts to meet the requirements of various local wood-using industries. The loading device is known as a timber tosser. It consists of a pair of swinging arms, hinged to the side of the truck bed, with cradles at their ends. One medium-sized log or several small ones are rolled into the cradles. Then the arms are lifted by a cable attached to a winch under the truck, and the logs are tossed over the side stakes onto the bunks. This truck can pick up logs anywhere along the roadside, without the need for building skidways or any accessory loading device.

Mr. Calhoun believes that the loggers' traditional list of disadvantages pertaining to marked cutting are not valid today with the type of organization and equipment he has:

"As a forester marking timber for others to cut, I can say that if there is material to be cut suited for the market, it can be marked so that a careful operator can remove it and still leave a healthy stand for the next cut. Winches and logging booms have made possible the type of operation that could not have been imagined 15 years ago, except as a showcase example, a real exception."

Mismanagement on the farm woodlots in many instances has been the result of the owner's ignorance or indifference. Often, when the owner needed money and a timber operator would offer him a lump-sum payment for the salable products on his wood-
lot, he would accept it with no restrictions on the methods of cutting and no concern for keeping some thrifty young trees or a few seed trees. Such operations very likely are inefficient and wasteful. Trees not taken are knocked down or skinned up, and washouts and gullies follow cuttings. As a result, growing stock has been so depleted on many woodlots that they will produce little valuable material for many years in the future.

The farmer who desires to manage his woodlot more productively and more profitably has many sources of help—Forest Service, State forestry agencies, the extension service, industrial extension foresters, and private forestry consultants. These agencies supply leaflets, bulletins, and sometimes personal visits to the woodlot. Any county agent can direct the woodlot owner to the proper local source for such aid and advice. Few of them, however, provide logging services.

It is usually assumed that farmers will do their own logging. They do in many sections—usually the agricultural areas interspersed with commercial forest lands where many farmers traditionally work in the woods part of the year. Frequently they own such logging equipment as chain saws, log trucks, and skidding tractors. They can do the work they have equipment for and call on neighbors to help out with the rest.

In places away from large timber tracts and commercial logging operations, many farmers hesitate to undertake a woods job. Lacking experience, they feel that such work is dangerous and unprofitable since they do not have the special skills and equipment to handle it properly. These are the types of woodlot owners most apt to deal with unscrupulous or indifferent logging operators.

Even in these more settled areas, some farmers are logging successfully. They have found that equipment is now available to make it easier to do a safe and efficient job in the woods and that the equipment is priced low enough to justify its purchase even for part-time use.

For example, many woodlot models of power chain saws are now available at prices under 150 dollars. These economy models do not have the high horsepower ratings or the durability of the more expensive industrial saws, but they will work well when used a few weeks out of the year, particularly when the timber being cut is not too large.

Inexpensive saws are available in direct-drive models. The sprocket driving the chain is attached through an automatic clutch directly to the engine crankshaft. There are no speed-reduction belts or gears. This makes for higher chain speeds, so that there is almost complete freedom from any tendency to kick or grab in the cut. With a direct-drive saw, cuts can be safely made out toward the end of the bar, top or bottom, and limbs and even brush can be cut safely and easily. A direct-drive saw with an engine rated at 5 horsepower or less is recommended only for cutting hardwoods less than 15 inches in diameter or softwoods less than about 18 inches in diameter.

For part-time use in larger timber, the woodlot logger ought to buy one of the inexpensive reduction-drive saws. These machines cut more slowly than their direct-drive counterparts; the operator must be careful constantly not to be caught by kicks or grabs.

Learning to use a power chain saw is not hard. Instruction books are available from most manufacturers, and local dealers can provide additional help. Once mastered, the chain saw is a useful tool. It will make logging two or three times faster than with handtools. It can also be used in much construction work around the home place. The modern saws, for example, rip just about as well as they crosscut, so they can be used for squaring up timbers and even for cutting out mortises and flat-bottomed notches.

For transporting logs out of the
HARVESTING THE WOODS

woods many accessories are available for the ordinary wheeled farm tractor. One of the most useful is a set of rear wheel crawler tracks. These rubber and steel track assemblies generally run around the rear tires and a set of small bogie wheels installed in front of the rear wheels. The tracks greatly improve flotation and traction in soft ground and snow. They stand up well in rough going in the woods and across rocky places. They also are useful for such jobs as snowplowing.

Another useful accessory for a tractor used in the woods is a rear-mounted winch. Equipped with wire rope, the winch makes it possible to pull logs out of gullies and rocky places where a tractor could not be driven. When an upgrade or a boggy place is encountered in skidding logs to the truck road, it is possible to drop the load, run the tractor ahead to firm ground, and then reel the load in with the winch, which gives up to twice the power to be had at the drawbar.

Logging arches or lifts of various models are also available. Some are attachments for the hydraulic-lift drawbar with which many tractors are equipped. Others are trailing devices, which run on their own rubber-tired wheels. These raise the front ends of the logs for towing, thus preventing their lodging behind rocks, roots, or other obstructions. They increase the size of the tow load and also deliver cleaner logs.

As an alternative to the arch, many farmers use a trailing sled or a wheeled trailer, on which the logs are carried completely off the ground. These are favored in glaciated areas, like northern New England, where the grit and gravel in the woods are especially abrasive, and where the small mills buying the logs are not equipped with log cleaners or debarkers.

Many farmers who do their own logging find that they can sell their logs at the roadside. This eliminates loading and hauling to the mill, which call for specialized equipment, or else much slow, hard, dangerous work.

If the material logged is to be cut into lumber for home use, the farmer can call in a mobile, truck-mounted sawmill. Such units can be driven to the individual farm and put into operation in a matter of minutes. They will saw the farmer-logger’s accumulated logs to his particular orders for a set price per thousand board-feet or for the job. In this way he is relieved of hauling his logs to a permanently located mill and hauling the lumber back home again.

Other pieces of equipment are available on a contract or rental basis in many places. They include heavy crawler tractors equipped with bulldozer blades, which are sometimes needed to make a truck road into his woodlot; mobile debarkers for pulpwood and posts; mechanical splitters, which often are needed to make fuelwood or charcoal wood; and chippers to convert slabs, limbs, and brush into stock bedding or mulch.

A dependable commercial logger, equipped to operate efficiently in the local woodlot, will continue to provide the best answer to forest-management problems for many farmers.

His specialized knowledge and equipment enable him to conduct a more efficient logging job than almost any individual farmer and to market the products of such a job to the best possible advantage. This latter task calls for a detailed knowledge of log and bolt grades and specifications and the measurement and payment practices of the wood-using industries in the locality.

Most commercial loggers use industrial-quality chain saws. Payment of the higher price for such saws is justified by their faster cutting rates and greater durability in continuous use. Direct-drive saws of this quality have become available with engines rated at 9 horsepower.

The commercial logger’s other equipment will vary, of course, with the particular area and type of woodlots in which he operates. For example,
John Calhoun is equipped to operate efficiently in only the most accessible woodlots (those woodlots that merit the most intensive management). His woods tractor is too slow to operate effectively more than about a half-mile back from an existing truck road, and he is not equipped to build a new truck road.

Construction of truck roads is usually no longer necessary for woodlots a mile or more back from the truck road. Specialized four-wheel drive skidding tractors, with winches and integral arches, can operate efficiently, when the going is reasonably good, over skidding distances up to 3 miles. Special off-the-road tires inflated to 20 to 30 pounds of air pressure give these vehicles good traction through mud and snow, and over rocks, stumps, and other obstacles.

The best skidding tractors are completely articulated, so that all wheels remain in contact with the ground at all times in the roughest going. They are equipped with no-slip differentials, so that they continue to travel when only one wheel is getting traction. The soft tires resist injury for a surprisingly long time.

A manufacturer on the west coast, Garrett Distributors, of Enumclaw, Wash., has introduced a small four-wheel drive skidding machine. It weighs only about 6 thousand pounds unloaded, but 70 percent of this weight in the unloaded machine is on the front wheels. When a load of logs is pulled up into the arch, 9 thousand pounds of weight are available for traction on the wheels. Loads of a thousand board-feet of tree-length logs can be hauled if conditions are favorable.

Larger models of four-wheel drive skidding tractors are to be had. They can handle loads of 10 thousand to 15 thousand pounds. They usually are driven at 12 miles an hour, loaded and unloaded, over the roughest of woods roads. They can maintain speeds of 25 miles an hour on the open highway.

A Canadian manufacturer—Bom bardier Ltd., Valcourt, Quebec—has developed specialized skidding machines that have some of the features and advantages both of the wheel tractor and the crawler tractor. They were designed as snowmobiles for use in the bottomless muskeg areas of northern Canada, but they are serviceable and durable for use over swamps in the South and rocky and slippery hillsides in northern woodlands. These muskeg tractors have four sets of rubber-tired wheels on each side to carry a nylon and rubber belt track. Curved spring-steel grousers engage the nylon and rubber sprocket at the front of the machine. Ground pressure of the unloaded machine is about 1 pound to the square inch.

One model of the muskeg tractor pulls a four-wheeled log trailer, which is also equipped with crawler tracks. A winch and boom is used to assemble loads of logs and to load the trailer. The logs can then be hauled to the landing, up slopes as great as 15 percent, and through mudholes and over rocks.

Another model has a tilting steel platform on the tractor itself. A winch behind the tractor cab, and a fairlead on an upright fence at the front of the platform, enable the machine to haul in its load of either bundled pulpwood bolts or tree-length logs. In this winching job, the trailing rear edge of the platform acts as an anchor for the machine. When the load is assembled, the platform is retracted so that it lays on the frame of the machine, and the products are transported to the landing.

These are just two examples of specialized log-skidding equipment, suitable in price and size for the woodlot logger, now available in various parts of the country.

Similarly there are many models of self-loading trucks, adapted to handling various sizes and types of logs and bolts.

Tubular steel and hardwood pallets are widely used for assembling, loading, and hauling packages of short-length wood, such as pulpwood, mine
props, and excelsior and charcoal wood. The trucks that carry pallets are equipped with winches and ramps for loading.

Timber tossers, which enable a log-hauling truck to load itself with small-to medium-sized logs, are available in both mechanically and hydraulically actuated models. For loading themselves with even larger logs, trucks are now being equipped with built-in crosstabs, powered by winches (under the bed) operated from a power takeoff on the truck transmission.

Even more versatile and useful in certain areas is the type of truck that has a swinging boom attached to a mast just behind the cab. A winch at the base of the mast, with the cable running up to the base of the boom and then out to a sheave at its tip, provides the means for assembling logs over a considerable area and then lifting and loading them on the truck. They can be operated either mechanically or hydraulically.

Generally the hydraulic machines are more responsive and easier to control, but the mechanical ones can carry longer lengths of cable and so can assemble their loads over a wider area. Some of them make the trucks suitable not only for loading and hauling, but also for skidding-in material over a 200- to 300-foot radius.

A Massachusetts logger, Dick DeMaranville, of Hanover, has carried this idea one step further. He has provided a radio control for the winch on his truck, which can be operated by a pushbutton control attached to a walkie-talkie radio. Consequently, in assembling his load of logs he can put the winch in free-spooling, and then pull the log tongs on the winch cable out into the woods. When the tongs are attached to a log, he pushes the radio control button, the winch starts reeling in the cable, and the log is pulled toward the truck.

Mr. DeMaranville walks along behind. If the log lodges behind a stump or some other obstruction, he punches his pushbutton control again, the winch stops, and he rolls the log clear and starts it on its way again. This is repeated until the truck load of logs is assembled. In his operations the radio-controlled equipment is usually used to load the logs onto another truck to increase overall productivity. But when picking up an isolated load of logs, the radio-controlled truck can do both the bunching and hauling. The entire radio-control device was assembled from surplus Army material for about 200 dollars.

Many other devices have been developed by ingenious loggers and equipment manufacturers throughout the country to solve other specialized problems of the small woodlot loggers.

I hope I have said enough to indicate that these problems are being solved, and that woodlot logging is well on the way to becoming an easier, more profitable, and more effective practice than it has ever been before.

In the years ahead we can expect efforts such as these to result in more of our country’s woodlots being left in a productive condition after cutting.