Rents Heavy Equipment

As equipment gets bigger and more sophisticated, and labor costs rise, Showalter has to choose carefully, yet keep a vigilant eye on the budget. This year, the Topeka park department is working with a budget of about $485,000. That seems like a lot, yet it doesn't permit purchasing the more expensive equipment coming on the market.

Last summer, the Topeka park people rented a six-plow tractor from a farmer, for use during the re-seeding period. This year, bids were asked with the idea of buying a six-plow unit. The lowest bid was $7,300.

It was reasoned that for the six weeks' span during which this piece of equipment is needed most, renting would be more practical. This year, a local equipment dealer came up with the lowest rental bid of $120 per week.

The six-plow is a handy unit for use on areas like the golf course fairways where the goal is to reseed and get grass up quickly. The park's own three-plow tractors simply can't get the job done. Experience is that about 40 acres per day can be plowed with the six-plow models.

Mowing is done with a fleet of five 88-inch Heckendorn mowers. About 30 or 40 acres are cut per day on 8 to 10 gallons of gas.

Tree Planting

Showalter is a vigorous tree planter. Equipment is a key, the dominant piece a Vermeer tree spade. It was bought for the City Forestry Department, but is used most of the time by park crews.

Costing $5,500 when purchased two years ago, the tree spade enables the park to buy large trees at reasonable prices from local nurserymen. Frequently, the park will buy when a nurseryman is cleaning out his inventory.

It is unfortunate, Showalter feels, that Gage Park, oldest and most developed park, is dotted with Chinese Elm. The elm was fine for the Depression era, because it was cheap, easy to establish and drought-resistant. Now the trees have reached maturity and many break up during icestorms and windstorms, creating extra chores for already hard-pressed park crews.

Elms are being systematically replaced with birch, hybrid locust, linden, pin oaks, maples, ash and pines. Pin oaks, however, aren't being planted to heavy quantity because of the chlorosis problem they present as a result of the high ph count in the area. The soil ph usually runs 6.3, but the city water (often in excess of 8) pushes the ph factor above 7. This alkalinity makes most of the iron present in the soil unavailable. The result is leaf yellowing and in worse stages, dying branches and trees. Pin oaks also create a leaf problem from fall through April.

With some 100 species to care for, Showalter relies heavily on Bob Foster, chief horticulturist. Basically, the tree program centers on the use of long-lasting hardwoods. In some low, swampy areas, willow and cyprus are planted.

Instant Pine Forest

The tree-planting program received an exciting boost recently by the addition of what Showalter calls his "Instant Pine Forest." The park purchased a 65-acre site not long ago that was entirely devoid of landscaping. The opportunity then came to buy some 100 eight-foot pine trees from a Christmas tree

A Vermeer tree spade enables the park department to purchase larger trees at more reasonable prices, and ones that survive vandalism better. Photo by Lowry.

farm at the bargain price of $3 each.

The trees were lifted with the tree spade, balled and transported to trucks with a front-end loader.

A crew of a dozen men, using a backhoe to dig holes and transplant the trees, accomplished the feat in one day.

The master plan for the Instant Forest is to develop an arboretum where people can get "lost in a forest" in the heart of the city.

Without DDT, No Elms

In normal times, all pruning of trees and shrubbery in the parks would be charged to the City Forestry Division. Lester Terry, Chief City Forester, heads up a 32-man organization. But these aren't normal times.

Last year, the Forestry Division removed more than 4,000 trees hit by Dutch elm disease. This year, the figure will be higher. The job is proving so arduous and time-consuming it's about the only chore the department can squeeze in, even with three aerial tower units available. A stump remover grinds the stump and a Good Roads Scavenger vacuums the chips.

DDT was used to fight the disease beginning in 1960, but the Audubon Society complained and the spraying was halted. A delaying action is being used by spraying with methoxychlor. The problem is that this runs into more money than the city cares to spend, and more time than the city foresters have to spare. Chief Forester Terry is convinced it is only a matter of time until all elms in the city will be wiped out.

1966 Tornado Damage Remains

The disease has spread sharply since the tornado of 1966, which cut a four-block-wide swath through the center of the city. And Terry knows the disease worsened after the tornado. His theory? The tornado left in its wake a tremendous quantity of broken foliage that budded out with new growth. He believes the new, tender growth was more exposed to beetles that came along after the tornado.

The $25 million tornado took its toll of the city's trees and park system. Some 4,000 trees were damaged. Three weeks elapsed before the park department and city forestry departments could clear debris from alleyways and streets.

Even now, the gaunt, grim outlines of trees disabled by the sausage-grinding impact of the tornado are visible in the area.

The comeback from the tornado has been heartening to Showalter and his staff. In one showplace park in the center of the city, damage to buildings and growth was almost total. Citizens of the neighborhood donated more than $4,000 to rehabilitate the park. The government matched the donation. Today, the park has a new ball diamond, picnic tables, sidewalks, a few small buildings, and is being reforested.

With the city forestry department's time and energy taken by the elm disease and tornado, the park department handles fertilizing and spraying of trees. No deep fertilization is attempted, but some phosphate with nitrogen is used.

Along with trees and turf to care for and weeds to control, there are extensive flower gardens to maintain in the1450-acre Topeka park system. Bob Foster, chief horticulturist, is spraying.

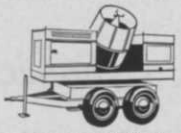
Calls Leaf Machine Essential

Among pieces of equipment Showalter feels are worth their investment many times is a leaf machine, bought in 1963. It attaches to a three-point hitch at the back of a tractor equipped with large turf tires. Operating by power take-off, the machine holds 45 cubic feet of leaves in the hopper. Leaves are dumped in a central location to form a compost, used as organic matter for flowerbeds.

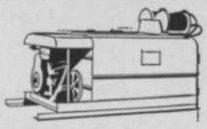
The Topeka park system attracts young, bright, capable people at the skilled level. Typical are Bob Foster, the chief horticulturist, and his two assistants.

A big influence in drawing these

This Rotomist® sprayer has the greatest "rate-of-work" capacity ever developed for shade tree work. It is a design that provides a *controlled air pattern*, all the way to the top of the tallest trees. This means adequate coverage, as well as more efficient use of your chemicals. It means versatility, because the Rotomist pivots 110° vertically, rotates through 360° horizontally. Which means you can put your spray material—either dilute or concentrate—anywhere you want it. Up in trees. Over an embankment. Down, to windrow leaves. And, of course, John Bean makes many Rotomist models to match your requirements. They all mean business.



ROTOMIST available in a wide range of capacities.



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MODEL 1010 TURFKEEPER has flotation tires for golf course use.

ROTOCAST broadcast air sprayer effectively handles all weed-killing programs.

Spray control is straight-through air

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POWER SPRAYING EQUIPMENT

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For More Details Circle (116) on Reply Card

Dynamic ISTC Growth Coming—Davey

The International Shade Tree Conference, meeting in Portland this year, is going into a dynamic growth change of chapter regional meetings.

All chapters have enthusiastically developed extra meetings during 1969, and are planning many more to give local conference activity.

Dr. L. C. Chadwick, our retiring executive director, backed by the active executive committee has strengthened our international leadership by the establishment of a new office headquarters at Lincoln Square Center, Urbana, Ill., with two full-time executives.

Lincoln Square Center not only will give added space and improve facilities but in addition give ISTC a modern headquarters worth visiting.

Dr. Eugene B. Himilick, Illinois Natural History Survey, one of the conference's better known academic members, will become International Director.

Mr. Ervin C. Bundy will assume the duties of International Secretary and be directly in charge of our new office. Both Mr. and Mrs. Bundy will give this office their full attention. They have outstanding talent and will put new blood into our Chapter-International activities, especially to back the chapter membership drives.

The Portland conference is unique in having a very high percentage of academic speakers and papers covering timely subjects of importance to our commercial, municipal and utility arborists. Field trips for municipal arborists and commercial exhibitor sessions will show the development in their respective fields.

Numerous local trips to the many beautiful spots of this hospitable state will be enjoyed by the members through the special events for the family. In this way, ISTC continues its policy of emphasizing the importance of the family.

—Keith L. Davey
ISTC President

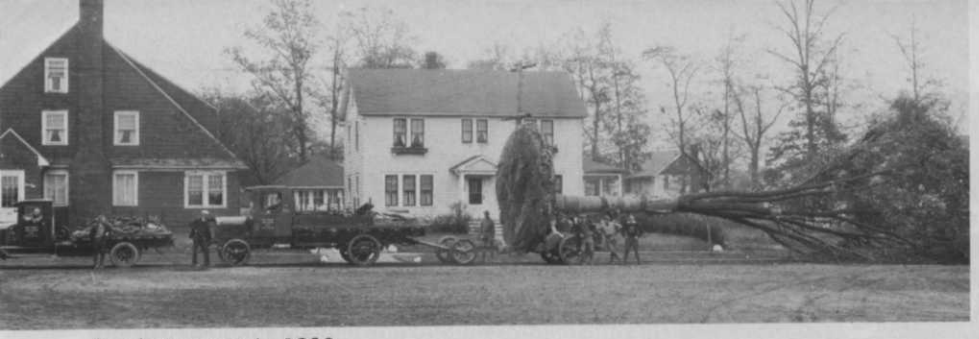
well-trained people is the professional freedom they're given. They are urged to develop and execute their own programs. Among projects conducted are a test garden of mums for Kansas State University in Gage Park. Results are published along with results from five state experimental stations. The mum testing proved so successful that the horticulturists were asked to carry on a similar testing plan on annuals.

A smaller nursery is maintained at park headquarters. Items such as flowering pear, planted around the zoo building (also in Gage Park), are kept for replacement.

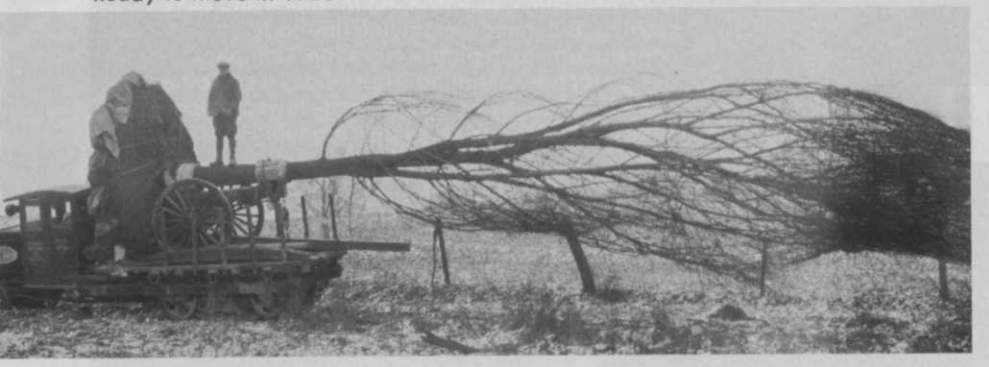
Takes Parks to People

If there is one overriding philosophy behind the entire Topeka park program, it is the idea of locating parks where the people are, then tailoring them to the people's needs.

The newest park to join the roster, the small one near the Capitol grounds and the senior citizens' home, is Showalter's idea of a people-located park. That park is just now in the process of being equipped and planted. But the plans reveal that the Capitol employees who will enjoy coffee breaks and luncheon periods in the park, and the residents of the senior citizens' home, are both being considered.



Ready to move in 1928



On track in 1934

Wagon-wheeled cart of 1927

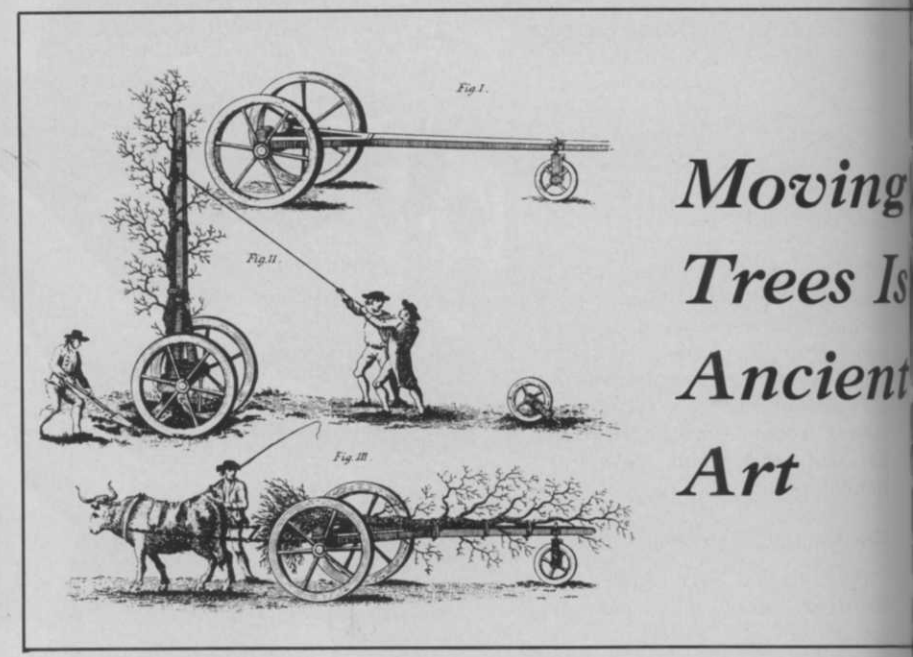
At school in 1930

Lacing—1988 and now

By HAROLD DAVIDSON
Department of Horticulture
Michigan State University

Photos Courtesy of the
DAVEY TREE EXPERT COMPANY

The old illustration of tree-moving (to the left of the headline) is from a book published in 1794 entitled "A practical Treatise on Planting and the Management of Woods and Coppices" published by the Dublin Society.



Moving Trees Is Ancient Art

ALTHOUGH we have little information on the early history of tree moving, it is known that the Greeks and the Romans must have moved large trees, as it is recorded in their writings that when they wanted to designate something that was impossible or at least difficult to perform, they said, "it was like transplanting an old tree."

Also, we find reference to a Greek physician, Anatolius, who was a contemporary of the Emperor Constantine, who undoubtedly had some skill in the art of transplanting since he wrote:

"To transplant a tree successfully, be careful to prune the smaller branches, without injury, to the larger ones; also it is important to leave the entire root system untouched. Place the tree carefully in

a large pit and cover up the roots with a quantity of good mold and manure."

Marco Polo recorded some 700 years ago that the Great Mongol Emperor Kublai Khan had large trees transplanted to his hill.

The hill, within a bow-shot of the Great Palace, was 100 paces in height and a mile in compass, entirely man-made, and was covered with trees that never lost their leaves.

The trees were dug with all the roots and earth attached and were transported with the aid of elephants. No matter how big the tree, the Emperor had it transplanted to his "Green Mount," and in this way he had the most beautiful collection of trees in the world.

Louis XIV, in developing the gardens of Versailles, tried to equal the glories of Greece and Rome by having extensive plantings made around his palace. It is recorded that the gardeners for Louis developed "a great transplanting machine" to move large trees considerable distances. In fact, the forests around Versailles still exhibit evidence of the tree movings that were accomplished during this period in history.

Rootpruning was first practiced as an aid to transplanting by Lord Fitzharding who was the Lord Treasurer to King Charles II. Fitzharding had the trees pruned one or two years prior to transplanting. This was accomplished by removing the earth and cutting all of the "collateral" roots, forcing the tree upon its side and then severing the taproot.

First Transplant Machine

Up until the early 1700s, most of the trees were lifted out of the ground with the aid of large wooden cranes braced with iron and worked with ropes and pulleys. Trees were placed upright on low platforms and dragged by the strength of men and horses to their new locations.

However, sometime in the 1700s "Capability" Brown, a noted professor of landscape horticulture, developed a transplanting machine. This consisted of a strong pole about 15 feet in length attached to two high wheels acting on an iron axle. After the tree had been dug, the transplanting machine was backed into place, the pole lashed to the bowl of the tree, which was then literally ripped out of the ground by the strength of men and horses pulling on a large rope attached to the upper part of the pole.

Sometime around 1750, a nurseryman by the name of Boutcher who lived in Edinburgh, Scotland, began the practice of conditioning trees, somewhat like Lord Fitzharding. He transplanted his trees periodically so that they would develop a fibrous root system and a good top prior to transplanting. This conditioning period took between 12 to 16 years.

At about the same time, Dr. Robert Graham, a professor of botany at the University of Edinburgh, transplanted a large number of rather rare plants at the Botanical Garden. These plants had to be moved to make way for new buildings.

Parisian Successes, Failures

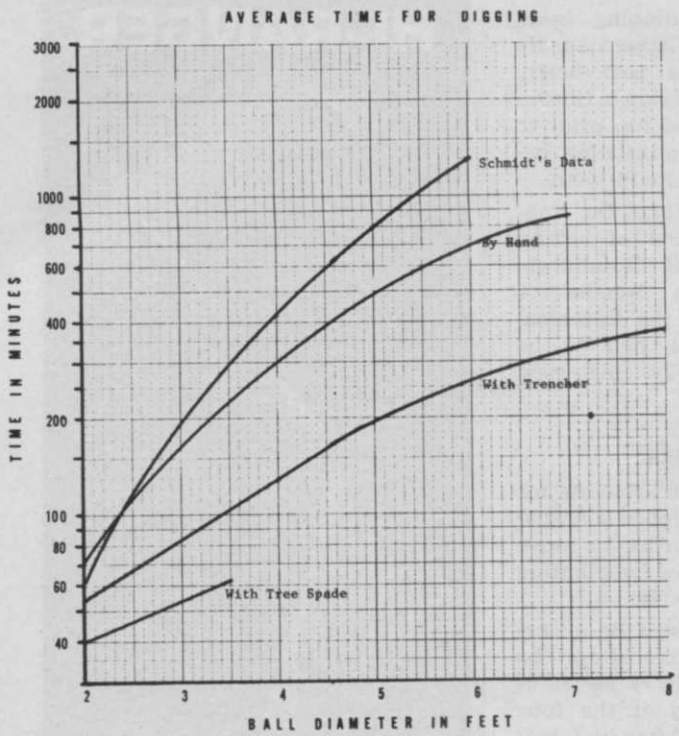
In the mid-1800s, the arborists for the city of Paris developed a transplanting machine in order to move large quantities of trees for planting along the streets of Paris.

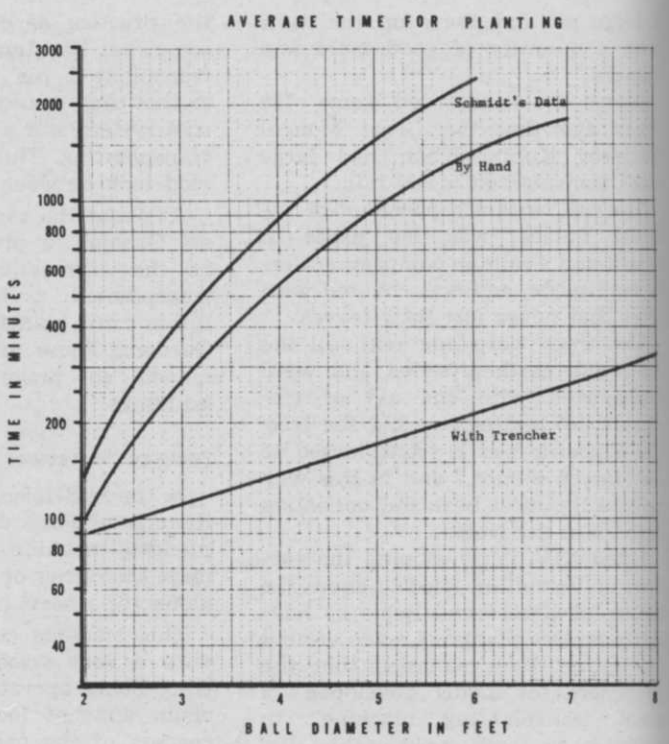
This machine consisted of a cart with a very strong tree sling; the sling being operated by a series of chain winches located at the four corners of the cart. After the ball had been excavated, the cart was backed in place on wooden planks, the chains lowered and placed around wooden beams which were slid beneath the ball. The tree was then hoisted out of the hole by having four men simultaneously turn handles attached to cast iron winches which raised the tree out of the ground, which was then transported with the aid of the transplanting machine to a new site.

The Parisian arborists apparently had considerable success in transplanting: elms, planetrees, horsechestnuts, ailanthus, catalpa, paulownia, and willows; but they had little success in transplanting: robinia, crataegus, birch, laburnum, and honeylocust.

In the United States, tree moving was practiced by some of the early Long Island nurseries. Hick's Nurseries developed a large tree-moving machine in 1870, and it is recorded that by 1895 it was moving trees 60 feet tall and 24 inches in diameter. In fact, some of the large trees were transported on barges which caused considerable consternation among the mariners of New York harbor.

Few improvements were made in the art of large-tree-moving up until the time of World War II, but shortly thereafter many new devices for transporting of large trees, once they had been dug and properly burlapped or boxed, were placed on the market. Within recent years, a number of large tree diggers have been introduced into the trade which have completely revolutionized the art of transplanting large trees.





Time Study for Planting Trees

By HAROLD DAVIDSON
and TOM SPEAKMAN
Department of Horticulture
Michigan State University

TRANSPLANTING of large trees has interested man since the dawn of history.

The Hanging Gardens of Babylon, built centuries ago by King Nebuchadnezzar, undoubtedly had many trees transplanted from great distances, as the garden was created to provide a mountain environment in the midst of a great plains. Kublai Khan also built a "Green Mountain" and had beautiful trees transplanted from great distances with the aid of elephants.

Louis XIV ordered thousands of trees to be transplanted from the forests of Europe to create a pleasant park-like environment about the Palace at Versailles. And today, man continues in his ceaseless efforts to improve the environment in which he lives by planting and transplanting trees.

Although trees have been transplanted for centuries, little published information is available on the time required to perform the various operations associated with the process.

Some years ago, Surties* and Schmidt** compiled and published the results of their studies on digging and planting large trees. However, little has been done to up-date these studies with information that could be used by modern nurserymen and arborists to base estimates for transplanting of trees. Data published by Surties and Schmidt were based on hand labor using the techniques of their period; whereas, the plantsman of today needs data based on machines—used to dig and lift—supplemented with hand labor to complete the details of the job.

A series of motion and time studies was conducted in cooperation with a group of nurserymen and arborists in order to obtain the raw data from which time-sequence curves were calculated for the digging and the planting phases of the transplanting operation.

The digging phase was subdivided into three subphases: preparation, digging, and burlapping to include tying.

The planting phase was subdivided into four subphases: excavating, setting and facing, backfilling, and guying which also included clean-up.

In addition, data were collected on: species, soil type, weather conditions, and other special conditions.

Equipment Triples Work Speed

As might be expected, digging time and planting time were found to be functions of ball size. (Fig. 1). However, the average times were found to be considerably below those reported by Schmidt (Schmidt's data were averaged and plotted for comparative purposes); evidently, the combination of men and machines is more efficient than man alone.

Where it took 800 minutes (13 hours, 20 minutes) to dig and process a tree with a 5-foot ball, according to Schmidt; it took only 190 minutes (3 hours, 10 minutes) with the aid of a trencher.

In general, it took three times as long to dig and prepare the ball by hand as it did with the aid of a trenching machine or a backhoe. However, in each case, the skill of the men was the limiting factor; skilled men can do three times the work of less skilled employees.

The time required to prepare the tree varied considerably with size and with the type of tree. Small-sized trees required only a few minutes of preparation time, whereas for larger trees, it took 30 minutes and in a few cases up to two man-hours to prepare a large tree (8-foot ball) for digging.

It took about twice as long to

prepare evergreen trees for digging as it did to prepare deciduous trees with the same size root-ball.

Unfortunately, data on the digging of trees with the tree-spade were limited to trees with relatively small root-balls, but the data showed that there was a consider-

Where it took 20 to 30 minutes to dig a two-foot ball by hand, the same job was accomplished with the aid of a mechanical "power-spade" in 8 to 10 minutes. The maneuverability of the machine, either in the nursery or in the landscape, was the limiting factor.

Undoubtedly, the digging machines of the future will possess increased maneuverability, but it also appears that trees in the nursery will have to be spaced further apart to accommodate digging machines, as they were adjusted years ago when mules were replaced by tractors for cultivating in the nursery.

Planting Time Varies Most

Time required to plant trees varied with the size of the root ball and the method employed (Fig. 2). Digging holes for transplanting was most effectively done with the aid of a backhoe.

The time requirement was reduced to one-sixth of that required for hand labor. Where it took 30 minutes to dig a hole for a 2x2.5-foot ball by hand, the same job was accomplished in about 5 to 6 minutes with the machine.

The greatest time variable, encountered in the planting operation, was the time required to place and set (face) the tree. Small-sized trees were generally positioned in a few minutes (10-15), whereas it required about an hour to position a tree with a 4-foot ball, and in some cases, as long as 4 hours to position a large specimen tree.

It would pay arborists to know how large trees are to be positioned prior to setting in order to minimize "facing" time.

Backfilling about the tree-ball was greatly facilitated with the aid of a "blade" but most nurserymen seemed to prefer handwork for this operation; apparently, they feel that this part of the transplanting operation should still be done by hand.

Guying and Pruning

Guying, wrapping, and pruning of transplanted trees was found to be a variable practice. Although most nurserymen pruned the trees, they were divided in how and when the pruning was done.

Some pruned the tree when it was in the horizontal position, still attached to the tree mover. However, others waited and pruned the tree after it was planted. In most cases, the pruning consisted of thinning out, although a few arborists did prune rather heavily.

The standard triangular system of guying was used by almost all of the arborists; however, a few did not guy. They indicated that the weight of the root ball was sufficient to hold the tree in an upright position without the aid of guy wires.

It is interesting to note that such a practice was recommended by Boutcher in 1775; in fact, he went so far as to state that "staking (guying) was only necessary to support the defect of good culture." Nevertheless, it took, on the average, 20 to 30 minutes to stake and clean up following the planting of a small tree, and from 2 to 3 man-hours or more to guy and clean up following the planting of a large tree.

Effects of Soil Type

Insufficient data preclude drawing any firm conclusions on the effect of the weather, soil type, or other special conditions, such as slope, obstacles, etc., on the transplanting operation. But it would appear that sandy or clay type soil slows the hand digging phase. Whereas soil type plays only a minimal roll when a "power-spade" is employed. Also, the "power-spade" can very effectively penetrate six inches of frozen ground. Its primary limitation was maneuverability within the nursery.

The average time curves for digging and planting, as presented in Figs. 1 and 2, are suggested for use only when more pertinent data are not available. Also, to these average times must be added time to transport the plant from site to site plus a time margin of some 30% to 40% for labor efficiency.

* Surties, John, 1940. Master Units of Landscaping, Series No. 2 and 3.
** Schmidt, Owen B. 1953 (Cited by H. S. Conover, Grounds Maintenance Handbook, F. W. Dodge Corp., N. Y.)

City-owned brush chippers—like this one of the City of Saginaw, Mich., 1969 All-America City—increase the efficiency and decrease the cost of free removal and pruning. Chips are frequently used as mulch for golf courses, parks and zoos.

Wood Waste Makes Money

By LEON BALDWIN, Sales Manager
Mitts & Merrill, Inc.

HOW MUCH WOOD would a wood chipper chip if a . . .

Today, there's really no question about it. The modern brush and wood chipper is proving to be the answer — and a profitable one — to the problems of the disposal of brush, logging slash, slabwood, fallen branches, trimmings, thinnings, prunings, and other unwanted material.

This was not always so. The common and seemingly the easiest and cheapest method of disposing branches, diseased trees and other cuttings was to haul them away and burn them. But this simple operation often created more problems than it solved.

Unsightly brush piles, fire danger, smoke, air pollution, insect breeding grounds, handling time, tied-up trucks—all added up to a wasteful and generally unsatisfactory solution to what was, on the surface at least, a simple enough problem. And there was a suspicion that this solution might not be as cheap as it seemed to be.

Enter the Brush Chipper

About 1947, the first models of portable brush chippers were developed and improvement has evolved since to keep pace with the demands of the industry.

There are two basic forms of such chippers—the staggered knife, multiple blade models and the straight-across-the-rotor knife type. The staggered knife models have up to 12 cutting edges—the straight across knife type usually has four cutting edges.

Blowers and directional discharge chutes are utilized on both types of chippers to discharge the chipped material into piles or directly into trucks. Chippers may be towed by a tractor or truck to reach most work areas by access roads or trails.

From a Problem to "Plus"

Wherever the chipper is put to work, it contributes important advantages in the care and maintenance of wooded areas.

To begin with, there are extensive benefits to be gained in public relations and acceptance. In this day of intense concern over air pollution, the use of wood chippers to eliminate burning and smoke is a factor meriting strongest consideration.

Aesthetic values, too, are of prime interest. Elimination of ugly, browning piles of brush awaiting hauling or burning, and an absence of scorched and charred trees and brush add to the public enjoyment of parks and forests.

Chip Brush and Costs, Too

For the arborist, tree expert, logger, farmer, forester, utility or forest project concerned with the everyday problems of wood and brush removal, the economics of chipper operation are of first-line concern.

Precise cost figures are difficult to develop because of the wide variances in operation, conditions, equipment, and so on. But there seems to be no question that the

Staggered knives cut smoothly, shave material uniformly on this cylinder-type chipper, a Mitts & Merrill. Knives are double-edged and are easily accessible for reversing and sharpening.