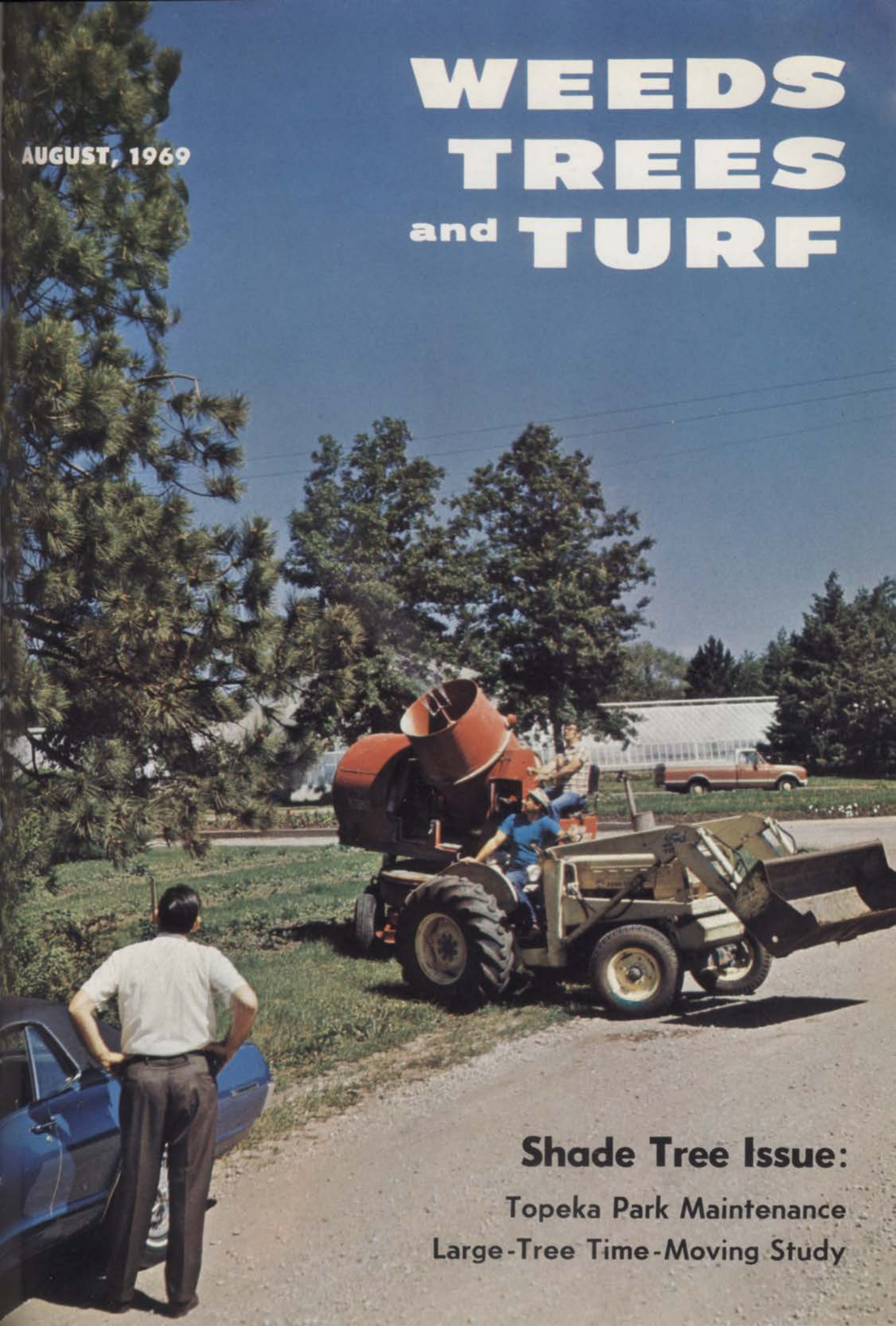


AUGUST, 1969

WEEDS TREES and TURF



Shade Tree Issue:

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Large-Tree Time-Moving Study**



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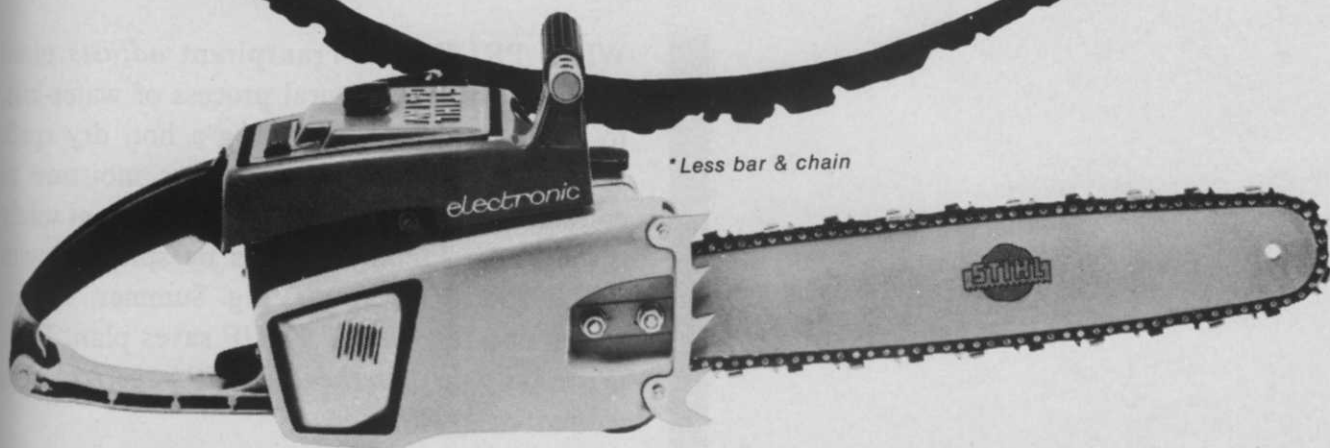
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The Cover

Topeka, Kan., park superintendent Dennis Showalter watches as a John Bean Rotomist douses a pine with a Bordeaux mixture. The operator is Don Foltz, forestry foreman. Marvin Wimer, park horticulturist, is on the tractor. The sprayer is used on the pines for rust and needle diseases. It was purchased to fight Dutch Elm disease that increased considerably after a 1966 tornado. DDT was used until the Audubon Society complained; now the park is fighting a delaying action with methoxychlor. A feature about the Topeka park system begins on page 8.



WEEDS TREES and TURF®

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Member Business Publications Audit



Be Prepared to Fight Positively for Chemicals

We think you ought to be well-versed on what's being said against DDT. That's the reason for the story beginning on page 22.

Sen. Gaylord Nelson of Wisconsin has a bill in Congress to ban the nationwide sale of DDT. We called his office for the name of an anti-DDT exponent. Our source suggested Dr. Charles Wurster, Jr., citing him as "one of the world's foremost authorities on DDT."

Quite a few other leading authorities disagree with Dr. Wurster's conclusions. These disagreements are capsulized in a story beginning on the same page.

This pro-con presentation is the background for asking this question:

Who really is responsible for educating the public about chemicals?

A second question may answer the first. Who stands to lose business when ignorance and emotion are allowed to make the decision on whether to use chemicals or on what chemicals are to be used?

We think the answer to both questions is: *You, the chemical applicator.*

Sometimes it isn't enough to talk about the good things chemicals do. Sometimes it's necessary also to counter charges against chemicals.

If you don't already have one, we suggest that you initiate a "public relations" file on chemicals. Organize it in such a way that when a controversy arises in your community, you'll be able to react quickly and positively. Be prepared to provide comprehensive information to local officials and local news media.

You might approach your "chemical public relations" program under the headings of *prudence, priority and perspective.*

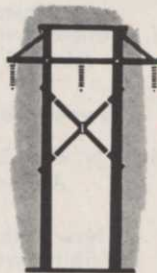
Of course, it's elementary to suggest the need for *prudent* selection and use of chemicals. Still, the ounce-of-prevention/pound-of-cure worth ratio is far too conservative a philosophy for the chemical industry.

A *priority* of preservation needs to be established and understood. Your customer, whether an individual or an entire community, should at least tacitly approve the use of a chemical with

(Continued on page 8)

September

WEED & BRUSH CONTROL PLANNER



Timing Is Everything

September marks the end of foliage brush spraying and yet is too early for starting your dormant cane winter brush spraying program. How to make

productive use of labor force and equipment? Go after those hard-to-kill perennial weeds and grasses. Amchem has 2 new chemicals that will get rid of them for a full year.

Why Apply Now?

Two reasons. Next spring you are going to need your men and equipment to fight brush problems. Applying chemicals now gets weed killing out of the way and avoids expensive, wasteful down-time for men and machines. September is also the time when fall weeds and grasses are starting to grow. Soil sterilants applied now receive enough moisture to give a long-term residual kill.

What to Apply Now?

Here, Amchem offers you flexibility and broad spectrum kill. If weeds and grasses have not emerged, use Fenavar[®] Granular. It is a clean, dust-free, easy-to-handle combination of Fenac[®] and bromacil that kills weeds before they emerge. **Tip:** Using Fenavar Granular enables you to clean and repair spraying equipment now. If weeds and grasses are up to 1' high, use Fenavar[®], a combination of Fenac, amitrole and bromacil. Fenavar is readily soluble in water, requires no agitation, and may be applied with any type of spray equipment. **Tip:** To control johnsongrass and Bermudagrass, apply 10 gals. Fenavar with 1 gal. Trans-Vert in 50 gals. of water per acre.

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Be Prepared . . .

(from page 6)

the understanding of what possible adverse effects exist.

The anti-DDT people are outrageously off base on this matter of priority. On the basis of questionable adverse effects upon wildlife, they cry for an outright ban at the expense of the very real possibility that one result will be to condemn perhaps thousands of human beings to death.

Because such a warped sense of judgment can develop regarding chemicals, it is imperative whenever a problem does arise to see that it's reported in proper perspective.

Repeating: The cry is for a ban on DDT, although there is not one shred of evidence that any human being has died from the effects of it.

Yet there is another "DDT"—Drunk Driver Traffic—that has been statistically tagged with being directly responsible for killing between 15,000 and 20,000 people in the U.S. every year.

So who's excited? So who has a bill before Congress to ban either alcohol or the automobile?

A chemical public relations program is essential to your business. It must be in depth and overwhelmingly convincing.

It must be capable of overcoming that oft illogical aspect of human nature—emotion—that in the case of DDT has said:

A dead bird in hand is stronger proof than 200 healthy birds flitting in the bush.



Dennis E. Showalter's pen rests on the headquarters site for the park domain that he supervises. Most — but not all of it — is indicated by the shaded patches on the city map of Topeka, Kan. The system includes 59 parks, an 18-hole golf course and 15 lighted ball diamonds.

Dennis Showalter, Topeka Superintendent:

Stretch Resources To Place the Park Where the People Are

By GRIER LOWRY
Independence, Mo.



A massive tornado that swept through the heart of the city in 1966 and an accelerated spread of Dutch Elm Disease have demanded the maximum capability of the city's three aerial bucket units. Cleo Campos is working from the bucket of Reach-All unit manufactured at Duluth, Minn.

TAKING a good basic program and continuously upgrading it usually is a pretty sound success formula for any undertaking. It's the strategy for developing the turf, weed and tree program for the park department in Topeka, Kan.

The park system in this city of 130,000 encompasses 59 parks, an 18-hole golf course, 15 lighted ball diamonds, five swimming pools, three recreation centers, and nine shelterhouses.

It adds up to 1,450 acres to keep looking nice for Dennis E. Showalter, superintendent of parks.

Topeka residents take more than the normal pride and interest in their system. Usage is uniformly high, from the new downtown park near the Capitol and a senior citizen's home to any one of the suburban playground-recreation centers. The task, therefore, for Showalter, who holds a degree in ornamental horticulture from Kansas State University and has had varied experience in several nurseries, is all the

more challenging, demanding and rewarding.

Weeds and turf are thought of together, for Showalter believes the most effective way of controlling weeds is through good turf.

However, in early spring, the park crew of 31 employees does unleash a weed-control program, spraying with the lowest volatile 2-4-D ester on dandelions and other broadleaf weeds.

The low volatile is employed to reduce damage to trees and growth on private property adjoining parks.

Re-Seeds With K-31

When Showalter came to Topeka in 1961, he noticed that K-31 fescue used in re-seeding park areas was developing beautifully. He decided the technique warranted continuance and upgrading.

Poor turf areas are plowed up in late July and August and re-seeded. Weeds not controlled through re-seeding are sprayed in fall and spring. Re-seeding on poorest turf

is conducted on about 200 acres each year.

"It is our experience that if we can get the seed into the ground by Aug. 15 and up past Labor Day, we never have a failure due to hot weather," said Showalter.

"If we have a hot, dry fall and try and get the seed into the ground after Sept. 10, our chances of failure increase. I know most bulletins state that planting this early isn't advisable, but it works for us."

The method includes plowing up the ground with a disk plow if the land is rocky or is full of tree roots, or with a moldboard used on good, open land. The ground is plowed to a depth of about eight inches. A "Rotovator" is employed in the second step to "mix everything together."

A smoothing harrow prepares the ground for actual seeding, accomplished with a "Viking" seeder. About 200 pounds of K-31 fescue per acre is sown. Fertilizing is delayed until a good stand is established, which usually arrives by October.

As a seed, K-31 has numerous cardinal virtues, says Showalter. He points out that the area is in the so-called "Crabgrass Belt," sandwiched between the cool and warm weather grasses. K-31, he says, has proved to be a tough, relatively drought-resistant, easy-to-establish grass, one that withstands the heavy traffic it receives on the ball diamonds. His single qualification: As long as a thick stand is established.

"It is interesting how K-31 changes by the second year of growth," Showalter notes. "The first year it is usually fine-bladed. But the second year, it often starts to get a little coarse."

"I think you'll find more and more institutions, including schools, and more homeowners, turning to K-31."

"It responds well to fertilization, yet it gets along well without it. One drawback is that the grass during May grows rapidly as it shoots up its seed head. This means a lot of mowing, at least once weekly. So May is the month when things get pretty frantic around the city park department."

Re-seeding is done by a crew of three or four men, all classified as equipment operators and all with grass-seeding experience. Driving a straight line with the tractor, with no doubling-back, skips or gaps, is regarded as part of the good re-seeding technique.

An entire park is seldom re-seeded, chiefly because the park people don't want to deprive youngsters of



Leonard Cutting has variety in his work — some 400 varieties of trees and shrubs in the city's arboretum. The home, part of the six-acre park and two-acre arboretum, is the Ward-Meade mansion built in Civil War days. It overlooks the Kaw River and is now the center for garden club and conservation meetings.

the entire play area. The usual plan is to re-seed one third or half of a park in one season.

Some areas of the system, such as the golf course fairways, are given special treatment. The whole idea in re-seeding the fairways is to get them back into play as quickly as possible. The crews jump in and plow them up, get the seeding done, turn the sprinkling system on so the seed will germinate rapidly. Zoysia sod is used on the summer tees, bluegrass on the winter tees.

Fertilization and Weed Control

After the grass is established, the crew fertilizes with a 30-10 mixture, since tests reveal the soil doesn't require potassium, only nitrogen and a little phosphate. In areas with a lot of trees and shrubbery, the 30-10 gets the call. In straight grass sections, a straight nitrogen is often applied.

Last year, the park department got straight ammonium nitrate at the low price of \$43 a ton (this figures out about 6.4¢ per pound of actual N. from a fertilizer bulk plant in nearby Lawrence, Kan. The fertilizer was trucked in by the park crew.

"I am convinced that one of the keys to getting K-31 established," Showalter said, "is to get it in the ground at the right time. It should be fertilized with discrimination; mowed at the proper summer cutting height. Weeds don't invade thick turf. The only areas in which we do some spraying is where parks are bordered by private homes and there is some dandelion seed blowing. We don't spray for crabgrass.

"We do use Dacthal in high-use park areas, such as the walks around the rose garden, in the arboretum and around flower beds."



There is good reason for Joe Sherwood to duck as he maneuvers this 88-inch Heckendorn around some of the larger park trees. The park has five Heckendorns and smaller mowers such as the Allis-Chalmers B-10 in the top picture that's still powerful enough to pull a trash and clippings trailer.

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 re-seed 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 be-

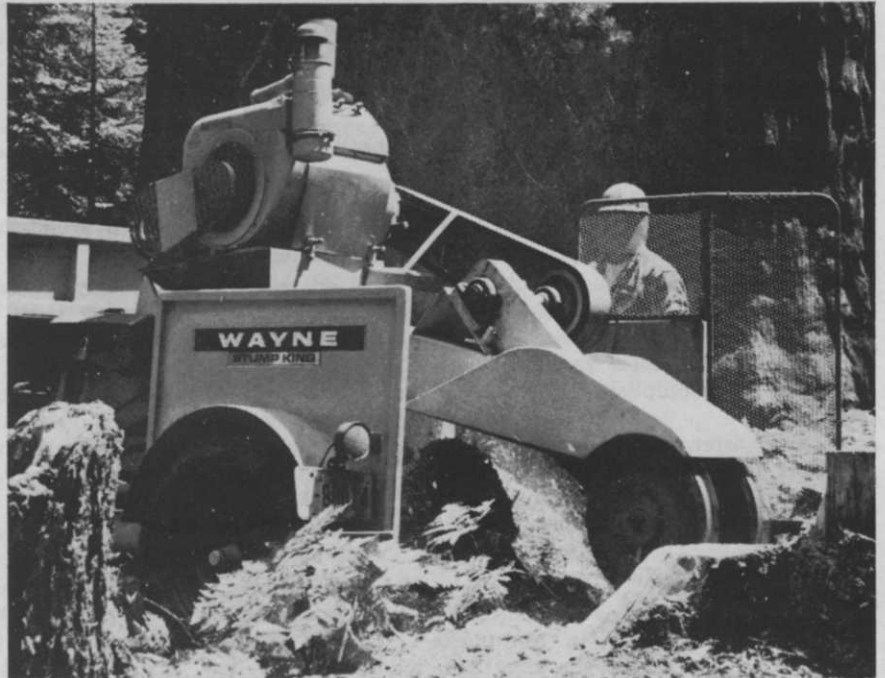
cause of the chlorosis problem they present as a result of the high ph count in the area. The soil ph usually runs 6.3, but the city water (often in excess of 8) pushes the ph factor above 7. This alkalinity makes most of the iron present in the soil unavailable. The result is leaf yellowing and in worse 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. Basic-

ly, 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



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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

Along with trees and turf to care for and weeds to control, there are extensive flower gardens to maintain in the 1450-acre Topeka park system. Bob Foster, chief horticulturist, is spraying.



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.

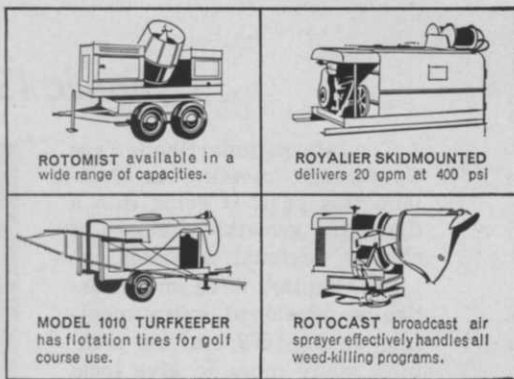
Calls Leaf Machine Essential

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.

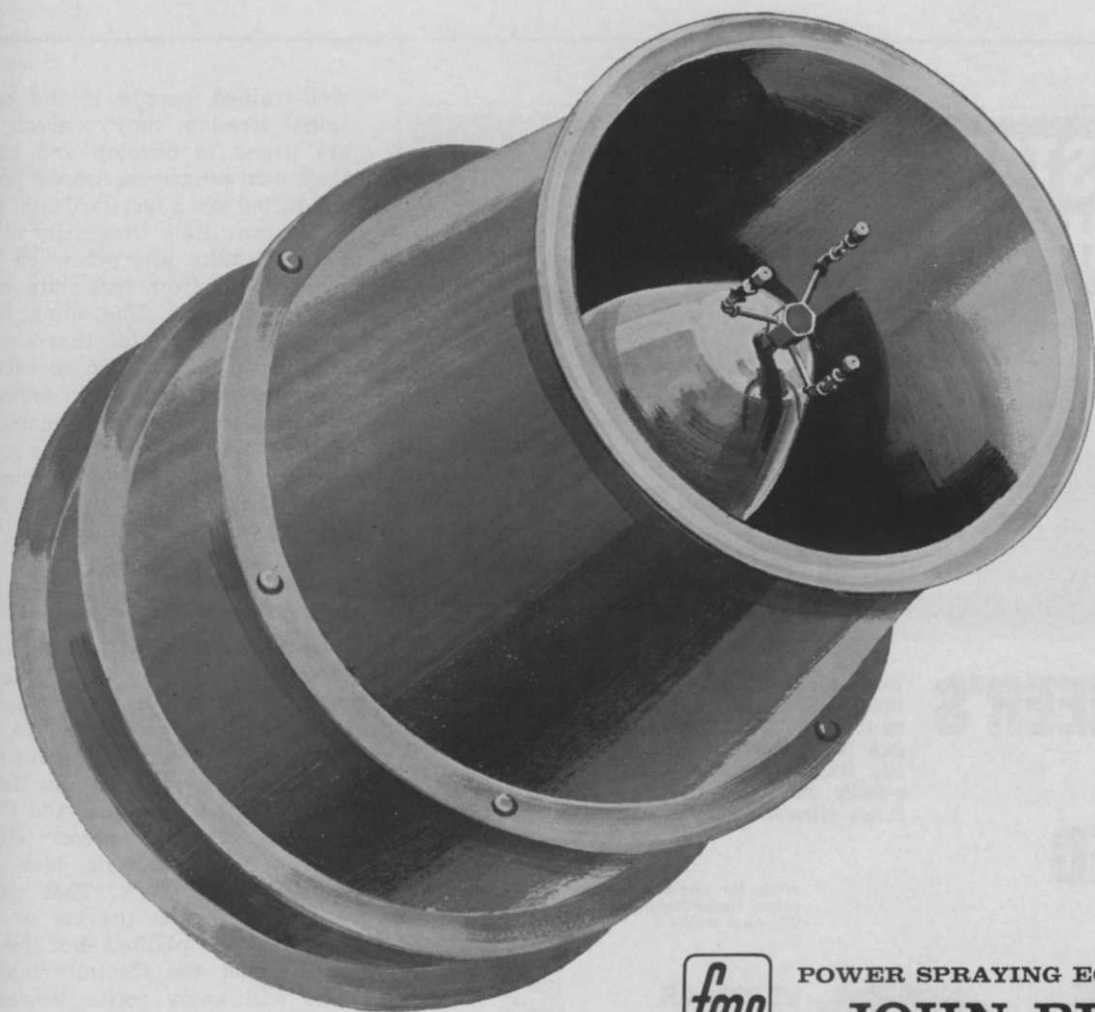
The Topeka park system attracts young, bright, capable people at the skilled level. Typical are Bob Foster, the chief horticulturist, and his two assistants.

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.



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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



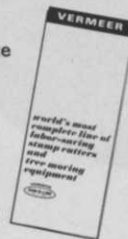
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well-trained people is the professional freedom they're given. They are urged to develop and execute their own programs. Among projects conducted are a test garden of mums for Kansas State University in Gage Park. Results are published along with results 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.

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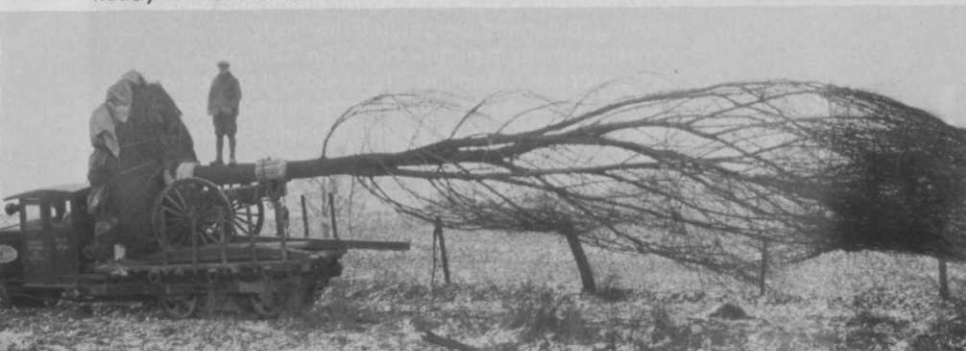
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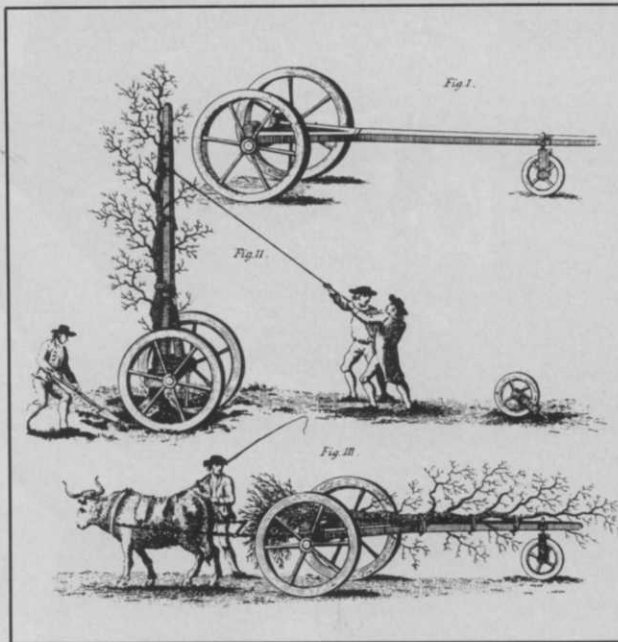
Wagon-wheeled cart of 1927



At school in 1930



Lacing—1988 and now



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



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.

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 Boucher 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.

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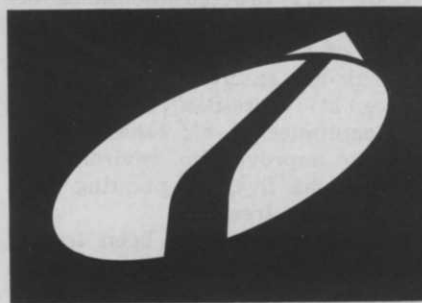
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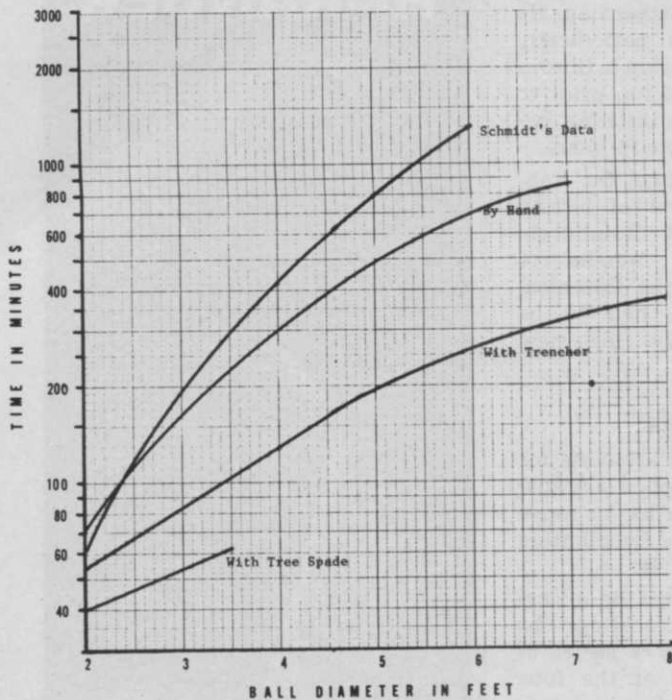
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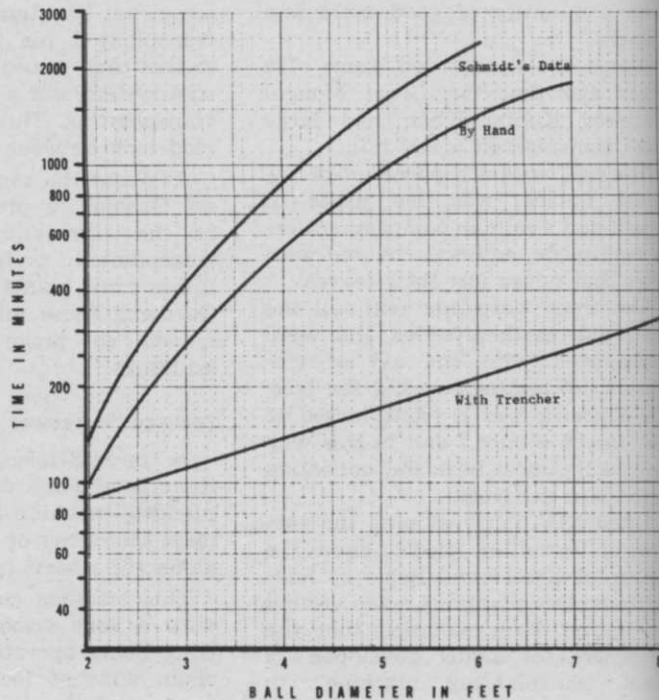
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AVERAGE TIME FOR DIGGING



AVERAGE TIME FOR PLANTING



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 plain. 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 burllapping 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.)

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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.

Unightly 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.

chipping vs. burning balance tips in favor of the former.

For one thing, considerable time is saved. The actual work of clearing can be done much faster; the chain saw work load is drastically reduced, burning crews are eliminated; thus man power can be used more profitably. Work crews per chipper normally vary from three to seven men and the number, of course, helps determine the time required to remove wood wastes from any given area.

But it is not unreasonable for a wood-chipping operation to achieve an overall reduction in man-hour requirements as high as 50%.

Lost time because of weather conditions or burning restrictions is minimized or totally eliminated. Chipping operations can be carried on, even on no-burning days in the highest of smog areas. The speed at which the chippers can be run is a factor, as well, and a chipper properly chosen for the job function to be performed will chip brush up to eight inches in diameter faster than two men can feed it.

Further opportunities for savings are found in trucking requirements. Wood chips take up far less room than do branches. The ratio may be as high as seven to one—thus, fewer trucks are needed to make fewer trips. In some circumstances, chip trucking time has been reduced by as much as 86% of that required to remove a comparable quantity

of branches to the burning or disposal area.

Many chipper owners have found uses for chips replacing material normally purchased. When spread around shrubs, flower beds, trees, etc., as a mulch, chips reduce the need for constant weeding. They hold moisture and permit soil aeration.

Indications are that when chips are spread around plants, they actually seem to assist in speeding healthy growth. When used in this manner, chip trucking may become essentially a productive function.

These day-by-day savings are only a part of the story. Operating and maintenance costs also contribute to the overall effectiveness of wood-chipper processing. The normal service life of chippers ranges from five to 20 years, depending upon severity of running conditions.

Maintenance is relatively simple and minimal, consisting mainly of sharpening the blades at intervals as required. The usual procedure is to carry a spare set of blades with the chipper. When blades are dulled, the spare set replaces them on the spot in a matter of minutes; however, on those chippers equipped with double-edge blades it is only necessary to turn the blade around and this can also be accomplished on the job.

Gas consumption is low, with one tank of fuel being enough for one day of operation under normal operating loads.

Chips Now a "Cash Crop"

Frequently the brush and wood chips, formerly regarded as outright waste, have a dollar value for operators. They can be sold as fuel, mulch, animal bedding, or even for cooking purposes.

Many a backyard barbecue has been made a roaring success when the steaks were flavored with the smoke from hickory, maple, cherry, apple or oak chips.

Among the several areas where wood disposal by chipping is most worthwhile, the lumber industry stands out. Because of the excessively high fire hazards inherent in logging and forestation, one of the most important responsibilities is obviously the prevention of such fires.

Piled chips present less danger of flammability than piled-up slash and brush. Because of this extremely low flammability, chipping can be carried on even during the fire season without increasing danger.

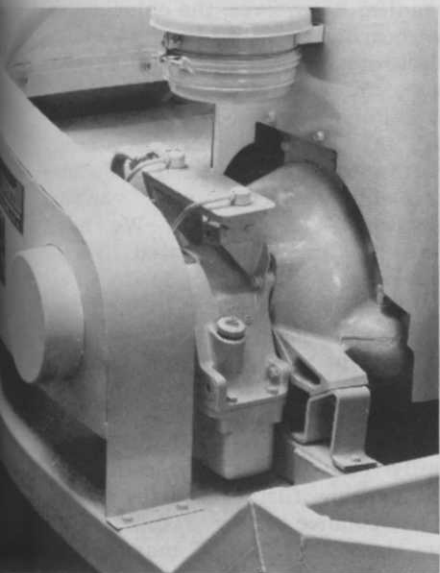
In fact, chipping even eliminates virtually all of the peril.

Less solid advantages—but only a bit less important—are found in the use of chips as a light mulch around young trees and shrubs. By spreading the chips on skid trails, most of the plaguing problem of erosion can be prevented. And when green slash piles are eliminated, so are the breeding places of which many twig insects are so fond.

Chippers Pay for Themselves

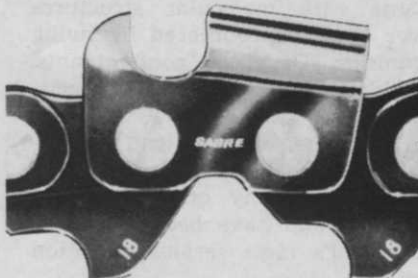
As stated previously, determining the savings made possible by chipping rather than burning waste wood and brush is difficult because of the wide variance in operating conditions. It may be safely said, however, that direct costs may be reduced by as much as 50%.

Even if chipping vs. burning costs were the same, the prevention of just one forest fire would pay for many fleets of these efficient, rugged, mobile machines, and with a sale potential for the by-product, one can truly say, "they pay for themselves."



Engine runs smoothly, efficiently when a torque converter is incorporated in the chipper. The engine is shielded from shock and vibration for reduced maintenance, increased service life. Photos courtesy Mitts & Merrill.

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Opponents Call It Danger to Environment; Killer of Many Life Forms



By Dr. CHARLES WURSTER, JR.

Dr. Wurster is assistant professor of biological sciences at State University of New York at Stony Brook. He was recommended by the office of Sen. Gaylord Nelson as one of the leading authorities on DDT.

DURING the past quarter-century, man has subjected his environment to an increasing variety of chemical insults in the form of pollutants with molecular structures never before encountered by living organisms. Of these contaminants, the chlorinated hydrocarbon insecticides (those, such as DDT, that contain chlorine, carbon, and hydrogen) are probably more widely distributed than any other synthetic chemicals and have become one of the world's most serious pollution problems.

Residues of DDT and some of its relatives seem to be almost everywhere—in soils never treated with the chemicals, in birds and seals that never leave the Antarctic (although DDT has never been used on that continent), in most other animals and probably all humans, in the air, even in remote parts of the world, and even in the rain. Yet, after 25 years of use, the physiological mechanism of action for the chlorinated hydrocarbons is poorly understood, and we are only now discovering some of its environmental effects. We are, in a sense, conducting a biological experiment of colossal proportions, using the entire world as a laboratory.

How will it all come out? No one knows. Clearly some parts of the experiment have gone sour, and the

flow of bad news increases as the data come in. Not all is mystery about these chemicals, however, for there is a great deal we do know about them.

DDT was first made in 1874, but its insecticidal properties were not discovered until World War II. With a high toxicity, great persistence, and side effects that were neither of concern nor well understood at the time, DDT was the miracle insecticide that played a heroic and glamorous role in the war, saving thousands of lives that would otherwise have been lost to malaria, typhus, and other insect-borne diseases. After the war it became a panacea for all insect problems, and its usage was greatly expanded.

While DDT has been the most widely used and extensively studied, and its residues are the most widespread within the environment, most other chlorinated hydrocarbons have similar properties and should be expected to have comparable ecological effects. These include dieldrin, aldrin, endrin, heptachlor, chlordane, lindane, and others commonly used against insects under a host of circumstances, including gardens, farms, and forests.

Properties Cause Unique Problems

In order to understand the movement and consequences of these materials within the natural environment, it is first necessary to know something of their properties. The chlorinated hydrocarbons present a relatively unique environmental problem because they combine four important characteristics in the

same molecule:

1 Broad Toxicity and Biological Activity—Rather than having a toxic action that is limited to insects, as is popularly supposed, the chlorinated hydrocarbons are toxic to a broad spectrum of living organisms, including most of the animal kingdom and all vertebrates. All are nerve poisons. They cause instability or spontaneous "firing" of nerve cells, and increased doses result in tremors or convulsions—typical symptoms of acute poisoning that can occur in organisms ranging from houseflies to man. In general, if an organism has nerves, the chlorinated hydrocarbons can kill it.

Recent studies have uncovered other, more subtle, yet probably more important, mechanisms of action. At sublethal concentrations, organisms show increased nervousness, hyperactivity, and various behavioral abnormalities. We now know that most chlorinated hydrocarbons are enzyme inducers, i.e., they can induce enzymes in the liver that modify the steroid sex hormones, thus changing their biological activity and affecting vital physiological processes. At the same time, some members of the DDT family can function as estrogens, thus perhaps further upsetting hormone balance. Very recent work now suggests that DDT may inhibit carbohydrate metabolism, that it may affect the genetic material to influence future generations, and that it may be carcinogenic; each of these mechanisms needs further research.

(Continued on Page 24)

Defenders Say Environment —And Especially People— Endangered Without It

A BILL has been introduced before Congress to ban the nationwide sale of DDT.

Sen. Gaylord Nelson of Wisconsin has forced upon our elected representatives the necessity of making a decision.

They must decide who shall have priority of protection—people, or certain birds and fish.

The decision should be easy.

There is even a question of whether defeat of the bill would mean defeat (much less doomsday) for the birds and fish. There is strong evidence, however, that banning DDT could eventually impose death or a life sentence of misery upon literally thousands of people around the world.

Lawmakers will be weighing the merits of the case against DDT with the findings of a recently completed 18-month study conducted at the request of the U.S. Department of Agriculture.

Fifteen scientists of the National Academy of Sciences and National Research Council heard 83 principal witnesses. These spokesmen included authorities from scientific and conservation organizations, industry, universities and government agencies.

A full report of their study may be obtained from Press Service, Office of Information, USDA, Washington, D.C. 20250. A summary of the committee's conclusions and recommendations follows:

Conclusions

1. Persistent pesticides are contributing to the health, food supply,

and comfort of mankind, but, in the absence of adequate information on their behavior in nature, prudence dictates that such long-lived chemicals should not be needlessly released into the biosphere.

2. Although persistent pesticides have been replaced in some uses and are replaceable in others, they are at present essential in certain situations.

3. No decrease in the use of pesticides is expected in the foreseeable future. On a world basis, increased use is probable.

4. Although the use of DDT has decreased substantially, there was no important change in the use of other organochlorine insecticides in the United States during the 10-year period ending June 30, 1967.

5. Available evidence does not indicate that present levels of pesticide residues in man's food and environment produce an adverse effect on his health.

6. Registration requirements for persistent pesticides appear to provide adequate safeguards for human health, but continuing attention must be given to accommodating new knowledge and insuring against subtle long-term effects.

7. Residues of certain persistent pesticides in the environment have an adverse effect on some species of wild animals and threaten the existence of others.

8. The availability and low cost of effective persistent pesticides have slowed the development and adoption of alternative methods of control.

9. Work on nonchemical meth-

ods as alternatives to persistent pesticides has been emphasized in recent years, and continued support for this work is needed.

10. Inadequate attention and support are being given to developing pesticidal chemicals and to improving techniques for using them.

11. Persistent pesticides are of special concern when their residues possess—in addition to persistence— toxicity, mobility in the environment, and a tendency for storage in the biota.

12. A few organochlorine insecticides and their metabolites have become widely distributed in the biosphere, appearing in the biota at points far from their places of application.

13. The biosphere has a large capacity for storage of persistent pesticides in the soil, water, air, and biota, but little is known concerning amounts of persistent pesticides and of their degradation products that are stored in the biosphere.

14. Knowledge is incomplete concerning the fate and degradation of persistent pesticides in the environment, their behavior in the environment, the toxicity of the degradation products, and the interaction of these products with other chemicals.

15. Present methods of regulating the marketing and use of persistent pesticides appear to accomplish the objectives of providing the user with a properly labeled product and holding the amounts of residue in man and his food at a low level. However, they do not appear to insure the prevention of environmen-

(Continued on Page 25)

DDT Opponents . . .

(Continued from Page 23)

2 Mobility—Unfortunately, these insecticides do not remain where they are applied, dispersal through the environment being facilitated by a variety of transport mechanisms. Obviously the chemicals can travel about within living, mobile organisms, though this mode of transport seems minor. Despite low water solubilities and vapor pressures, large amounts can be carried by vast quantities of moving water and air, and dispersal is further facilitated by the tendency of these materials to form suspensions in both air and water. Since many insecticide application procedures intentionally produce atomized droplets or particles, substantial amounts are thereby passed into the atmosphere. Less than half the amount sprayed from a plane may reach the ground. Once in the air, these materials can circle the globe in a few weeks; fallout from the air probably contributes about the same quantity of pesticides to the oceans as do major river systems.

The chlorinated hydrocarbons also readily adsorb to particulate matter like soil particles, which are carried away by wind and water. Escape into the air is further aided by the process of codistillation, whereby the chemicals pass into the vapor state associated with evaporating water. Thus a wet field will release pesticides into the air much more rapidly than will a dry one. It is clear, then, that these insecticides can be transported about much of the earth to points far distant from the original application site by currents of water and air, as well as by mobile organisms.

3 Chemical Stability—In the environment, the chlorinated hydrocarbons are very stable compounds; they probably have a half-life of many years or decades, but exactly how long they persist we do not know. Mechanisms for effectively metabolizing or breaking down these exotic materials apparently have not evolved, although certain tissues, particularly liver, can bring

about gradual breakdown. DDT is slowly metabolized into DDE, DDD, and eventually other compounds, but unfortunately most of these, too, are toxic and induce liver enzymes. DDE, apparently more stable than DDT, is probably the world's most widely distributed synthetic organic chemical.

Treated areas show declining residues during subsequent years, but this "disappearance" is sometimes falsely equated with decomposition. The two are not the same. Increasing evidence indicates that much of these materials have simply gone elsewhere in their original, or slightly modified, form, retaining their biological activity.

4 Solubility Characteristics—DDT is insoluble in water—almost. DDT saturates water at only 1.2 parts per billion (ppb), making it one of the most insoluble organic substances known. Conversely, the chlorinated hydrocarbons are soluble in lipids (fats or fat-like materials). They are, therefore, invariably more soluble in any biological material, living or dead, than in water, since all organisms contain lipids. If we divide the biosphere into the inorganic (nonbiological) and the organic (biological), we must always expect the chlorinated hydrocarbons to flow from the former into the latter. Organisms, therefore, remove these chemicals from their environment and retain them.

DDT Travels Far

These four properties mean that biologically potent chemicals will contaminate non-target organisms far removed by both time and space from the site of application.

Chlorinated hydrocarbons may be absorbed by organisms through the gills, the skin, from the diet, and from the air via the lungs. Muds and other solids that hold these chemicals by absorption serve as reservoirs, feeding the chemicals into the water as they are absorbed by organisms. Living organisms accumulate these residues and become contaminated, often from an environment that may appear relatively

"clean." For this reason some measurements of environmental quality are misleading. One must analyze living organisms, rather than water, to monitor water quality. Water and air are the transport media, but they contain only minute amounts of these chemicals.

Biological Concentration Occurs

Once these insecticides get into food chains, something else happens—the phenomenon of biological concentration, often called biological "magnification." Each organism eats many organisms from the next lower trophic level, i.e., the next step down in the food chain. A robin, for example, eats many earthworms, and a large fish eats many smaller fish. These food organisms are digested and excreted, but the chlorinated hydrocarbons are retained. The chemicals remain in biological material and therefore accumulate, the concentration depending on rates of intake, breakdown, and excretion.

The use of DDT in attempted control of Dutch elm disease is a clear and relatively simple example of food chain contamination. Since DDT is sprayed when the elms are leafless, only a small fraction remains on the trees. The rest is either lost into the air or settles to the earth. That retained by the tree eventually also reaches the ground. Earthworms and other organisms that work the soil accumulate the DDT and become contaminated. Many species of ground-feeding birds eat the soil organisms, concentrate the DDT further, receive a lethal dose, and die with tremors.

Flying insects also become contaminated by contact with the trees and soil, especially those emerging from soil dwelling larvae. Insectivorous birds of the treetops thereby also become involved in this mass avian mortality. In some treated areas, robin mortality has been virtually complete and birds of all species have been reduced by as much as 90 percent.

Wide areas of the coniferous for-

(Continued on Page 28)

The Case for DDT

Up With People

And Down With the Venomous Foes of Chemical Pesticides

Scientist Testifies

DDT Defenders . . .

(Continued from Page 25)

- tal contamination.
- 16. Public demand for attractiveness in fruit and vegetables, and statutory limits on the presence of insect parts in processed foods, have invited excessive use of pesticides.
- 17. The National Pesticide Monitoring Program provides adequate information about residues in man and his food, but it does not provide adequate information about the environment generally, because it can detect changes in residues only in selected parts of the biosphere.
- 18. Contamination of the biosphere resulting from the use of persistent pesticides is an international problem. Changes in techniques for

using these pesticides and the substitution of alternatives here and abroad are questions of immediate concern to all mankind.

Recommendations

- The Committee recommends—
- 1. That further and more effective steps be taken to reduce the needless or inadvertent release of persistent pesticides into the environment.
- 2. That, in the public interest, action be increased at international, national, and local levels to minimize environmental contamination where the use of persistent pesticides remains advisable.
- 3. That studies of the possible long-term effects of low levels of persistent pesticides on man and

- other mammals be intensified.
- 4. That efforts to assess the behavior of persistent pesticides and their ecological implications in the environment be expanded and intensified.
- 5. That public funds for research on chemical methods of pest control be increased without sacrifice of effort on nonchemical methods.
- 6. That the present system of regulation, inspection, and monitoring to protect man and his food supply from pesticide contamination be continued.
- 7. That the objectives and procedures of the National Pesticide Monitoring Program be reviewed and that the feasibility of obtaining data on quantities of persistent pes-

(Continued on Page 26)

USDA Pesticide Suspension Order No 'Confession'

USDA's suspension from use of nine pesticides should not be interpreted as an "admission" that these chemicals are harmful to wildlife and people, a Department spokesman told WTT's editor shortly after the announcement was published in mid-July.

One of the pesticides is DDT, which Sen. Gaylord Nelson of Wisconsin is seeking to ban nationwide through a bill now before a congressional subcommittee.

Questioned about the timing and effect of the USDA suspension with regard to this legislation, the spokesman spelled out USDA's position generally on chemical pesticides:

"We are categorically not in favor of any action that represents an across-the-board ban on DDT or any other pesticide. Any action that's taken should be on a case-by-case basis."

The spokesman added that he did not believe the Nelson bill would pass.

The suspension on the use of nine chemicals isn't necessarily permanent, the spokesman pointed out. Rather, it is for the duration of the review, expected to be completed within 30 days.

"Some programs may require a quick decision and be reinstated before 30 days," he said. "On other programs, the review (and suspension) may need to be extended."

The review was initiated, the spokesman explained, just to "show response to the NAS (National Academy of Sciences) study and recommendations and the request of wildlife conservationists."

A report by NAS and the National Research Council had recommended that "further and more effective steps be taken to reduce the needless or inadvertent release of persist-

ent pesticides into the environment."

The spokesman said the review is to see if in fact there are more effective steps that could be taken on those programs carried out by USDA.

"Basically, we'll be looking for effective alternatives," he said, since, repeating the words of the release, "USDA programs in the past have been carefully planned and carried out to insure maximum safety to man, animals and our natural resources."

It is the Department's intention, he said, to carry out the review so that it "won't unduly delay" critical programs.

The suspension order affects programs of the Agricultural Research Service and the Forest Service involving any planned applications of DDT, dieldrin, endrin, aldrin, chlordane, toxaphene, lindane, heptachlor, or BHC.

Bills Ask DDT Ban; Pesticide Commission

Summaries of Wisconsin Senator Gaylord Nelson's two bills affecting DDT follow.

Bill 1753 would amend the Federal Insecticide, Fungicide and Rodenticide Act by adding Sec. 17. The paragraph would make it unlawful for any person to distribute, sell, or offer to sell, DDT in the U.S. after June 30, 1970. It also would be unlawful to receive DDT from any foreign country.

Bill 1799 would establish a National Pesticide Commission. Under provisions of this bill, the President would appoint three representatives from government agencies, three from the scientific and medical professions, two each from conservation and agricultural organizations and two from private enterprises for a term of three years.

The commission would be responsible for:

1. Determining and evaluating the present usage of pesticides;
2. Reviewing existing limitations on pesticide use and



Senator
Gaylord
Nelson

current labeling requirements;

3. Recommending standards of safety for pesticides in water;

4. Developing a continuing monitoring program for pesticides in the soil, air, water, wildlife, fish and humans;

5. Fostering research in the development of less persistent, less toxic pesticides;

6. Initiating basic research into the degradability of pesticides;

7. Conducting research on the effects of pesticides on the environment, fish and wildlife and humans; and

8. Making recommendations on the elimination or limitation of use of certain pesticides to the President and Congress.

DDT Defenders . . .

(Continued from Page 25)

icides in the biosphere be studied.

No Danger to Humans

The strange aspect of the DDT controversy is that the cry for a total ban on usage comes at best on the basis of questionable evidence of damage to wildlife. And this absolute position is taken without apparent regard for the consequences that people would suffer.

Evidence to the contrary is too strong for opponents to contend that DDT is a threat to human life.

The summary of a study conducted by the National Communicable Disease Center at Atlanta, Ga., states:

"A study was made of 35 men with 11 to 19 years of exposure in a plant that has produced DDT continuously and exclusively since 1947.

"Findings from medical history, physical examination, routine clinical laboratory tests, and chest X-ray

attributable to exposure to DDT. film did not reveal any ill effects. It was estimated that the average daily intake of DDT by the 20 men with high occupational exposure was 17.5 mg per man per day as compared to an average of 0.04 mg per man per day for the general population."

Dr. Thomas H. Jukes, a biochemist at the Space Sciences Laboratory at the University of California, described recently the greatest "experiment" with DDT. It took place in India with American assistance. It began in 1953 and was stepped up in 1958.

The success of the program "depended upon the fact that DDT is a residual insecticide," said Dr. Jukes.

"At the start, there were 75 million cases of malaria in India, and life expectancy for Indians was 32 years. By 1962, 147,593,270 pounds of DDT had been used, and life expectancy had jumped to 47 years. By 1967, there were fewer than 100,

000 cases of malaria in India.

"DDT is safe, and has been studied more than any other pesticide for its effects on human beings," Dr. Jukes said.

"Without pesticides, there wouldn't be enough food to go around. Most important DDT is needed by the millions of people because it is a cheap, safe residual pesticide."

At one time malaria killed two million people and left millions of others debilitated from the disease each year, another biochemist testified recently.

Ban would Be 'Disastrous'

Dr. Wayland J. Hayes, former Chief of Toxicology for the U.S. Public Health Service and now a professor at Vanderbilt University, Nashville, Tenn., said that while malaria isn't a threat to public health any longer in the U.S., it remains a major killer of people in many parts of the world.

"DDT still remains the most important single tool for control of malaria," he said.

A ban on DDT would prove "disastrous," as undoubtedly there would be a resurgence of malaria without it.

There would be a particularly adverse effect on the control of malaria in emerging nations which look to the U.S. for leadership.

Dr. Hayes said he feared people in other countries would feel that if DDT were banned in the U.S., it would not be safe for use in their countries, and that many human lives would be needlessly lost.

Dr. Jukes, agreeing, cited an article that predicted the campaign against pesticides could cause deaths and sufferings greater than those of World War II.

DDT Does Break Down

Dr. Hayes testified at public hearings on a proposal to impose a state ban on DDT in Wisconsin. Other witnesses questioned the very basis of Dr. Wurster's position against DDT that it is permanently stored and that the buildup is now endangering certain species of wildlife.

"I know of no natural situation where DDT is not degraded," stated Dr. Paul E. Porter, an associate member and consultant to pesticide commissions of the International Union of Pure and Applied Chemistry.

In addition, Porter said DDT does

not build up in plant life, soil water, fish, or mammals, beyond a naturally reversible plateau. When this level is reached, he said, it remains balanced between intake and dissipation.

Porter said DDT is broken down by nature in soil and degraded to far less toxic compounds by the action of micro-organisms present. On vegetation, it is broken down by sunlight and is additionally dispersed by rain and evaporation.

Since DDT adheres to soil particles it is not readily moved by water, making the compound relatively stable, he advised. However, what remains of DDT and its metabolites disappears at an approximate rate of 20% per year, regardless of concentration.

In streams, lakes, and ocean waters, DDT and its metabolite DDE are absorbed on matter which is present, with a considerable portion sinking to muddy water beds.

In mammals and birds, studies reported degradation of DDT through internal chemical action and excretion. A portion of the chemical components are stored in fat, but here again a stored level is reached, Porter testified, with no additional buildup of DDT residues in the animal.

Abnormally high levels of DDT residue reportedly found in many wildlife species may have been inaccurately measured and exaggerated, said Francis B. Coon, chief of the Wisconsin Alumni Research Foundation's chemical department.

"PCBs," polychlorinated biphenyls, Coon pointed out, are compounds that produce an almost identical picture to DDT when analyzed on a gas-chromatograph, an analytical instrument which "fingerprints" chemical compounds.

Until this confusion between DDT and PCBs was recently discovered, most gas chromatographic assays overstated the amount of DDT above that actually in the sample, due to the presence of the PCBs.

Birds Not Affected

DDT-fed pheasants, testified Dr. Frank Chermis, University of Wisconsin professor of poultry science, have exhibited no changes in reproduction rates.

In other tests, turkey and quail were fed 200 parts per million of DDT. The pesticide intake, Chermis said, resulted in no changes in the thickness of egg shells.

Many other factors found in the environment, he continued, could affect differences in shell thickness of wild bird eggs. If birds are frightened, by being chased, or disturbed by cars, dogs barking, horns, or jet airplane sonic booms, thinner egg shells can be the result.

In any experiments in wild birds to ascertain causes of shell alterations, it would be necessary to negate other genetic, disease, and environmental factors before DDT could be ruled the cause of egg failures, Dr. Chermis testified.

In denying that DDT is a threat to wildlife, William F. Gusey, wildlife specialist, noted that "the mammal population on a country-wide basis is in a 'sound state,' and thrifty; big game has increased in numbers for the past 30 years; and population of small game and upland game birds has been quite favorably maintained—as well as many song birds, including robins."

Gusey is a former assistant division chief of the U.S. Department of Interior's Bureau of Sport Fisheries and wildlife.

Dr. Jukes, the California biochemist, strengthens the "sound-state" appraisal of the bird populations by citing a comparison of Audubon Society Christmas bird counts for 1941 and 1960, before and after the widespread use of DDT.

"The greatest increases are in grackles, redwing blackbirds, cowbirds, starlings and robins—up 11-fold to 131-fold.

"I think by far the greatest effect of DDT on birds is to kill mosquitoes that carry serious diseases of wild birds, including malaria, Newcastle disease, fowl pox and encephalitis."

Ban Too Drastic

Banning DDT could bring many lesser adverse effects upon people, not the least of which include predictions that food prices would rise and many more Dutch elm diseased trees would fall, because substitute chemicals are more costly and less effective.

It is vital to realize that DDT still is an essential chemical for which there is no comparable substitute for certain afflictions.

American technology inevitably will solve the problem to the satisfaction of all of us. But to impose an outright ban on DDT at this time would be far more serious than to have outlawed the horse as a mode of transportation before the automobile was invented.

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DDT Opponents . . .

(Continued from Page 24)

ests of North America have been sprayed with DDT during the past decade to control the spruce budworm. In New Brunswick, Canada, where excellent salmon streams include the Miramichi River, DDT applications have caused severe and widespread losses of salmon, trout, and other fish. After an application of DDT in 1954, not a single salmon fry was seen that year. Harmful effects extended 30 or more miles below the spray zones and lasted for several years. And effects were not limited to fish. A single treatment changed the insect ecology of the area for at least three to four years.

Concentrations Eventually Kill

Since the chlorinated hydrocarbons are concentrated as they ascend the food chain, carnivorous birds at the top of this pyramid reach the highest concentrations and face special problems. Death sometimes occurs.

In North America, reproductive success of the osprey has declined sharply. A colony in Connecticut, its habitat and other factors apparently unchanged, declined from 200 pairs in 1938 to 12 pairs in 1965. Their eggs contained 5.1 parts per million (ppm) of DDT residues and productivity was 0.5 young per nest, while Maryland birds with 3.0 ppm produced 1.1 young per nest and normal productivity was 2.2 to 2.5 per nest. Ospreys are fish-hawks and DDT residues in the fish eaten by Connecticut ospreys proved to be five to ten times higher than in the food of the Maryland birds.

Studies of the peregrine falcon in Europe reveal a widespread and rapid population decline which began during the early 1950's. The decline was characterized by egg breakage and egg eating by parent birds, abandonment of nests, and other abnormal breeding behavior, and it coincided geographically and in time with the use of chlorinated hydrocarbon insecticides. Tissues and eggs of the peregrine contained DDE, dieldrin, and heptachlor epoxide.

A highly significant, sudden, and widespread decrease in eggshell thickness and calcium content occurred during 1946-48 in several British birds of prey, including the peregrine falcon. Shell thickness and calcium content were stable from 1900 to 1946, then declined by

7 to 25 percent within a few years with no subsequent recovery. The years of decline coincided exactly with the introduction of DDT into the world environment.

DDT Biological Makeup

But what do eggshells have to do with DDT and reproduction? Quite a lot. In birds, increased absorption of calcium from the diet, decreased excretion, and deposition of calcium in bone marrow are all mediated by estrogen, a steroid sex hormone. The calcium in the marrow is later transported to the oviduct where it becomes part of the eggshell. A subnormal estrogen level interrupts this crucial chain of events in the reproductive cycle.

Recent studies showed that DDT, DDE, and dieldrin induced liver enzymes to break down steroid sex hormones in pigeons, and caused mallards and sparrow hawks to lay thin-shelled eggs and have a lower reproductive success.

In aquatic environments, the chlorinated hydrocarbons may contaminate virtually all organisms at all levels of the food pyramid. This has happened to the Lake Michigan ecosystem. DDT residues in bottom muds averaged 0.014 ppm, but amphipods contained 0.41 ppm, nearly 30 times that of the mud. Several species of fish carried residues 10 times higher than the amphipods, and herring gulls at 99 ppm were 20 to 30 times more than the fish. The gulls showed low breeding success and behavioral abnormalities, and could not withstand stress. When starved, the birds developed tremors and died of DDT poisoning while less contaminated gulls easily withstood the same treatment. (Starvation depletes fat reserves that store DDT residues, thus releasing the toxins into vital tissues.)

Fish Accumulate Residues

The Coho salmon, being a top carnivore, also accumulated residues in Lake Michigan and these were passed into the eggs. Recently almost 700,000 salmon fry died shortly after hatching. The fry were poisoned by residues in the egg yolk during final absorption of the yolk sac. Heavy mortality of trout fry occurred similarly in several New York lakes. For several years, mortality of fry from Lake George was 100 percent.

Clear Lake, California, offers another classic example of biological

concentration in action. Additions of DDT to the war in an attempt to control gnats, the last in 1957, were followed by the dying of western grebes, reduction of the nesting colony from 1,000 to 30 pairs by 1960, complete nesting failure among survivors for several years, and 500 to 1,500 ppm of DDD in grebe fat. In 1967, ten years after the last treatment, the grebes still averaged 544 ppm of DDD in their fat, and the colony of 165 pairs still had very poor nesting success.

Effects are by no means limited to the top of the food pyramid. A few ppm of DDT in the water can decrease photosynthesis in marine phytoplankton. These single-celled algae are the indispensable base of marine food chains and are responsible for more than half of the world's photosynthesis. Interference with this process could have profound worldwide biological implications.

The nature and movement of the chlorinated hydrocarbons indicate that they will be transferred from the earth's treated land areas to its ocean basins, where they will accumulate. Being so insoluble in water, however, we cannot expect them to "get lost" in the oceans; they will be picked up by its living organisms. Recent analyses of fish and birds from both the Atlantic and Pacific Oceans indicate that this process is occurring.

The Bermuda petrel is a rare oceanic bird of the North Atlantic that has no contact with any continent or area treated with insecticides. Yet its eggs and chicks average 6.4 ppm of DDT residues, and reproductive success has declined significantly since 1958. Only from its oceanic food chain could this bird become so contaminated.

There are more data from the Pacific, but the story is the same.

Clearly the chlorinated hydrocarbon insecticides cannot continue to be used in the natural environment without serious degradation of the world ecosystem. Fortunately we have a choice. Many biological techniques exist for controlling insect populations, and numerous other less stable, more specific insecticides are available. These alternatives are highly effective. Man's control of pests requires ecological sanity. Which way will we go?



A lift rake and brush chipper enable Jaflo to clear fast and clean with minimum damage to other landscaping.

Jaflo's Order: Selective Clearing

By PHIL LANCE
Philadelphia, Pa.

AMERICA'S beautification program has pushed the demand for related professional service into high gear.

This is particularly evident concerning shade trees. Instead of cutting these trees in right-of-way clearings, a program of selectivity has been initiated.

"This is particularly evident with utilities and power line companies who have changed their order from clearing to preserving wherever possible," says John A. Florio, Jaflo, Inc., Allentown, Pa.

"At one time, our orders were to clear out the right-of-way for pipe lines and overhead wiring. Today, this has changed. We preserve, retain and restore wherever possible when it comes to shade trees. Because of this order, a selected program of right-of-way clearing has been initiated. This has naturally led to the demand for professional tree service."

Florio has been in the tree service for all of his professional life. He has been in business for himself several years, showing tremendous gains each year. After more than 25 years of experience as a foreman for a leading Philadelphia tree service, Florio initiated his own business several years ago.

Using the porch and then the basement of his home as a headquarters for a few years, Florio finally was forced by the demand for his services to relocate three years ago.

Today, he has a modern building on Route 309 which houses his offices, tools and some of his equipment. At present, he has five chippers, a truck equipped with an aerial bucket, a specially equipped

tractor, several trucks and a variety of related tree service equipment.

Save Trees When Possible

Florio specializes in tree service, landscaping and brush control for utilities and municipalities.

"Shade trees are saved wherever possible and even, in some instances, moved and planted to maintain pace with the beautification program and as a natural shield for right-of-ways," explains Florio, "particularly at road crossings where the topping and trimming of shade trees are specifically called for.

"In the clearing of right-of-ways, requests are made for more conscientious removal. We have equipped our tractor, for example, with a rake so that it does not rip up everything during a clearing operation. Good equipment is just as important as experience in safeguarding the landscape. By combining both, we do our part in America's beautification program."

Florio provides a full professional tree service that includes removing, pruning, feeding, bracing, cabling, stump removal, cavity treatment and tree diagnoses.

Experience and information gath-



John Florio, Jaflo owner, watches an employee tackle a stump.

ered from trade journals and attendance at meetings and conventions such as the International Shade Tree Conference, he said, are vital for increasing his knowledge and ability. He is a member of the International Shade Tree Conference and also the American Forestry Association.

Three-Way Advertising

Direct mail, advertising in the yellow pages of the telephone directory and personal contact are a continued source of inquiry and service estimates. Florio's experience enables him to give a firm estimate; and because of his reputation for adhering to the services required, he gets quick approval.

Florio has developed his crews from the bottom up.

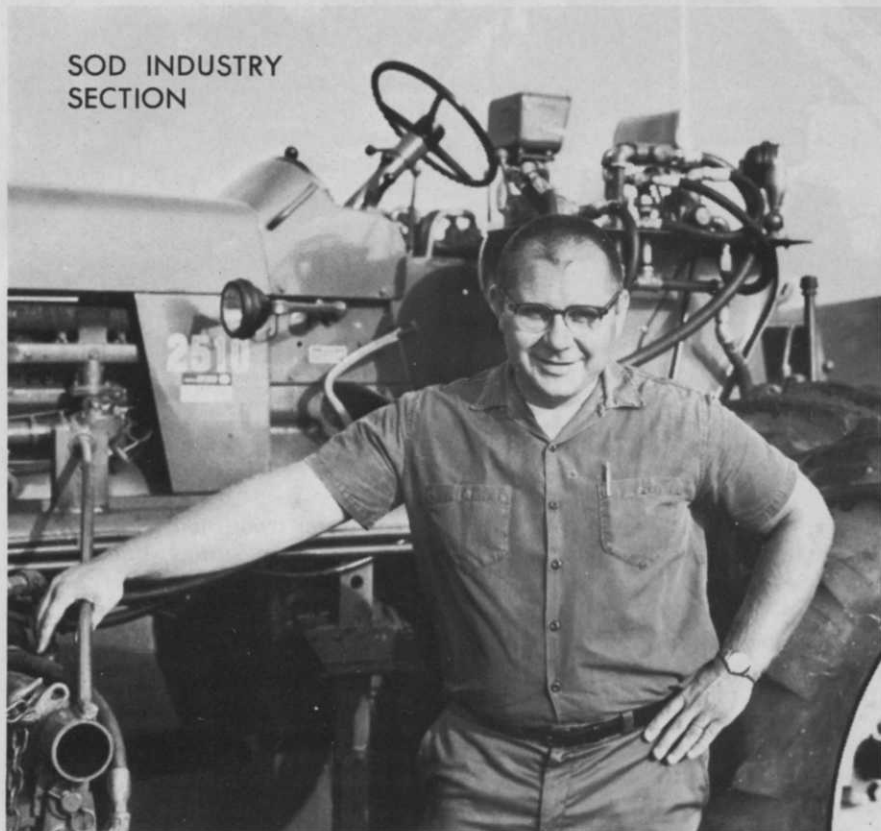
Young men are shown that there is a demand for their type of services and that there is growth potential, to attract them to this vocation. Florio feels that the industry as a whole should cooperate in attracting more qualified personnel to keep up with the ever increasing demands being made upon it.

"Modern equipment and advances are helping to take a lot of labor out of this activity," says Florio. "For example, we are now chipping rather than burning or trucking branches. This eliminates air pollution and minimizes labor. After chipping, we spread out the mulch.

"We also use powerful lightweight chain saws and this has taken a lot of labor out of this work. Our aerial bucket has been a tremendous time- and labor-saving device. Of course, there are many others.

"By building up a reputation as a specialist, particularly when it concerns shade trees, the demand for services is continually increasing. The future is bright indeed."

SOD INDUSTRY SECTION



Donald W. Morrill

'Here's What You Need To Start a Sod Farm'

By DONALD W. MORRILL, President
Shamrock Turf Nurseries, Inc.
Hanna, Ind.

MY VIEWS on developing a new sod farm are based on experience in the Chicago market, after working to develop three farms within the past dozen years.

Three principles are essential: management, site and market, and resources. I list them in order of importance to me.

Foremost, I think a person must really analyze himself before entering this business. As owner/operator qualifications:

1. *Feel a genuine love for this kind of business (to the extent that you realize the occasional need of living with it 24 hours a day).*

This is a manufacturing business unlike general farming. You can't

just plant it and forget it. There are always problems — nature changes, labor, marketing, trucking, etc.

It takes a love for the game to get you through the rough spots.

2. *Be capable of assuming the responsibilities of running a business.*

As I said, this is not quite like farming; it's a business with special complications.

3. *Experience in sod is essential.*

I worked for another sod grower for five years. This is the minimum experience I would recommend.

4. *Sales and marketing experience is valuable.*

My selling experience was with Swift and Company; but any selling or related experience will prove to be profitable later on.

5. *You must have management ability.*

It will be necessary for you to be able to set up a budget, make the

best use of labor, money, land and equipment. You'll need to know how to weigh investment against return; analyze consumer credit; and so on.

A turf farm manager must be a people motivator. He must be able to get his personnel to do what he wants them to do and exactly the way he wants them to do it. Teaching and training is what we need to do . . . not just order jobs done without ever explaining why.

Site and Market

Assuming you meet all these qualifications, let's consider site and market.

Today, 96% of the U.S. population lives in cities; the rest in rural areas. This means we must locate near the heavily populated areas.

Personally, I would not want to locate in any area that did not have a minimum population of 500,000 within a 50-mile radius.

One reason is that the distance from your market is a direct ratio to the number of loads you can haul per day and also is a yardstick to how many trucks are required.

Equally important is to avoid an area already saturated with existing or expanding sod farms. Examples are Detroit, Chicago and Milwaukee.

Let's presume you are entering the sod business to sell sod and not using it as a cover to speculate in real estate. In this situation, you will not want to sit right on the edge of a large city. Among reasons are to avoid rising property taxes, changing zoning laws, and complicated water problems, such as contamination and availability.

Let's place our model sod farm on a state highway. This location is accessible year-round; it provides good visual advertising; and in most areas it will exempt you from the frost laws that might tie up secondary roads during early spring harvesting.

The site should have adequate, clean water. Do not under rate the necessity of water. Check the average annual precipitation. Make sure an adequate supply falls during your growing season.

I would hate to figure on irrigating more than half of my requirements.

Check alternate sources of water — ponds, streams, rivers, and wells (check the water table depths to assure you can get enough volume).

I wouldn't consider a farm without putting down a test well first. In my area, we need a minimum of

CLAY

Advantages:

1. Doesn't blow.
2. You may dormant seed.
3. Good water-holding capacity.
4. Holds plant food for longer periods.
5. You can load trucks in the field.

Disadvantages:

1. Slow for root development.
2. Sod, when wet, is heavy.
3. Subject to cracking during drought.
4. Hard to work.
5. Water penetration is slow when dry.

Soil-Type Characteristics

MUCK OR PEAT

Advantages:

1. Sod grows like crazy.
2. Good water-holding capacity.
3. Holds plant food well.
4. Sales appeal.
5. Lightweight sod.

Disadvantages:

1. Blows.
2. Can't load in the field.
3. Subject to flood conditions.

SANDY LOAM

Advantages:

1. Easy to work.
2. Doesn't crack.
3. Enables good root development.
4. Absorbs water easily
5. Can load trucks in the field.

Disadvantages:

1. Blows.
2. Doesn't hold fertilizer.
3. Doesn't hold water well.
4. More susceptible to disease.

1000 gallons per minute for every 160 acres.

Consider drainage. This is almost as important as water itself. You must be able to get rid of excess water before extensive damage is done.

One of the major growers reported \$450,000 flood damage not too many years ago.

There are several ways to drain land—natural drainage, field tile, ditches, or pumps.

Last on my list of site requirements is soil type. Sod can be grown on almost any type of soil and in most cases successfully.

I would recommend that you choose a soil relatively free of stones.

There are three soil types I am familiar with—Clay, sandy loam, and muck or peat type. My personal reactions on each are described in the chart.

Resources

Concerning resources, a major grower told me this story several years ago: They had just sold their first yard of sod off a particular 200-acre plot. He figured this yard of sod cost about \$250,000 above capital investment (land and equipment).

After 10 years of inflation, I would estimate the same 200 acres would cost upward of \$300,000.

Add that amount to your first two years of living expenses while you're waiting to market yard No. 1 and you'll come close to your financial needs.

With some of this money, you must buy equipment... which I look upon as a necessary evil. Because our business is seasonal, the invested dollar in equipment is at the

bottom according to its return when compared with other expenses.

Steel mills work 24 hours a day, seven days a week just to make equipment pay. I just can't get excited over owning a lot of equipment, especially if I can lease it cheaper and write it off as expense.

We do own all the equipment we feel we need to function properly, but we still take off the plow to put on the disk.

Proper servicing of your machinery can double its life, and I'm a great believer in this. Don't misunderstand. We mechanize whenever and wherever we can profitably.

Incidentally, we hire all of our trucking.

When you're investing, spend some of that money for good men—ones that you can train to do your kind of job. Most of my men have shifted into their own niches automatically; those that haven't, don't stay. With diversified duties, each man can share responsibility, yet be a part of a team effort.

For about 600 acres, I have seven full-time men (pay ranges from \$700 to \$1300 per month, with hos-

pitalization and income protection furnished) for an 11 to 11½ month year. We use about 15 seasonal employees. For migrant workers, we furnish modern housing, stoves, refrigerators, hot water, showers, laundry rooms with washers. We pay above average salaries for the industry.

Another note: The best return for your dollar spent is on a good accountant.

In summary, what makes a good sod farm?

GOOD LOCATION: Within 50 miles of several large cities, on a state highway, flat, square, well-drained, with water supply (and preferably on muck).

SPECIAL EQUIPMENT: Wheel-move irrigation is our answer to proper watering. It's time-saving, labor-saving and does the job right. Mechanized harvesting is a must for survival. We have cut, rolled, and loaded mechanically for five years; and whenever we find a better way, we'll switch.

GOOD PRODUCT: Don't knock it! Nothing sells like a good product. It's worth more time, more money, more effort.

AMERICAN SOD PRODUCERS ASSOCIATION

invites your participation

If you are a Sod Grower you should be a member of ASPA.

Keep in touch with progress.

Allied Industries are welcome.

For More Details Circle (106) on Reply Card

Representing
Weed and Pest
Control Company

Brazilians Visit



Alder Americano da Costa and Pedro Pieroni Neto

Two representatives of a large Brazilian weed and pest control organization were visitors in the office of WEEDS TREES and TURF magazine in mid-July.

They had come to the U.S. for a two-month study of this country's weed and pest control industries and to make contacts with a number of chemical suppliers.

Weed and pest control in Brazil is relatively new, flourishing, and almost totally reliant upon imported chemicals, primarily from the U.S.

That was the report from Drs. Pedro Pieroni Neto and Alder Americano da Costa. Their organization is MOSCA—Controle de Pragas e Saneamento Ltda., headquartered at Sao Paulo. Da Costa is the administrative manager and agronomist.

The two men hoped to establish new contacts, broaden the number of products their organization distributes and to learn ways to improve communications with their

customers. To help achieve the latter goal, the Brazilian firm will distribute WEEDS TREES and TURF magazine to its customers beginning with the August issue.

MOSCA was founded 10 years ago and has branches in a number of different regions in Brazil. There are several familiar words among the names of Brazilian companies that are MOSCA customers — General Motors, Ford, Squibb, Olivetti and Firestone.

Types of weed control work have included soil sterilization around industrial sites and right-of-way and utility line clearing. The MOSCA officials expect sizable contracts in the near future with several cities.

In addition to membership in three Brazilian weed and pest control associations, MOSCA is a member of the U.S. National Pest Control Association and has applied for membership in the Weed Society of America and The European Weed Research Council.

MSU Grass Plots Ready For First Field Day Sept. 10

The first Michigan State University Sod Producers' Field Day is Sept. 10 at the MSU Muck Experimental Farm, accessible by M-78 from East Lansing to Upton Road.

Registration will begin at 9:30 a.m., followed by field trials on 30 Kentucky bluegrass and several red fescue varieties, 11 bluegrass-red fescue mixtures, 11 blends from six varieties, comparison of seeding rates, sod heating, sod rooting, fertilizer studies, and the extent of soil loss from continuous sod harvest.

For further information, contact David Martin, Department of Crop and Soil Science, Michigan State University, East Lansing 48823.

St. Louis Botanical Garden Nears Fund-Drive Goal

The Missouri Botanical Garden, St. Louis, has reached the two-thirds mark in its campaign for \$3 million, according to Harry E. Wuerstenbaeher, Jr., campaign chairman and president of the Garden's Board of Trustees.

The funds are earmarked for research at Shaw's Garden into environmental problems caused by air pollution and natural resources waste, construction of new buildings to house the library, herbariums, educational displays, and restoration of display greenhouses.

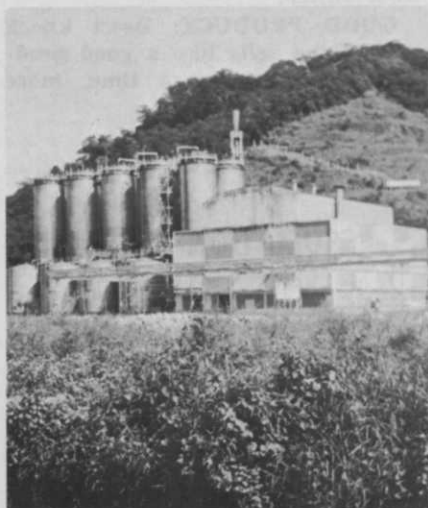
The Garden ranks along with the New York Botanical Garden as one of the two greatest research-oriented botanical institutions in the United States, Wuerstenbaeher maintains.

Ohio Bulletin Published On Mite, Insect Control

A 24-page circular with detailed recommendations for controlling insects and mites on ornamentals has been published by Ohio State University.

The publication tells how to detect infestation, where to get help, and what to do to eliminate the problem. Charts in the back of the booklet list the ornamental, pest, recommended pesticide, formulation that can be bought, mixture ratio, and when to treat.

For information about obtaining copies, ask for Bulletin 504, Cooperative Extension Service, Ohio State University, Columbus 43210.



Bromacil and Diuron herbicides produced this result for one of MOSCA's customers, the Refinaria Presidente Bernardes.

Meeting Dates



Dates for this column need to reach the editor's desk by the 10th of the month preceding the date of publication.

American Sod Producers Association, Third Annual Field Days, College of Agriculture and Environmental Science, Rutgers University, New Brunswick, N.J., and Princeton Turf Farms, Cranbury, N.J., Aug. 4-5.

Turfgrass Field Day, U.S. Department of Agriculture, at the Agricultural Research Center, Beltsville, Md., Aug. 6.

45th International Shade Tree Conference, Hilton Hotel, Portland, Ore., Aug. 10-15.

Ohio Nurserymen's Association summer meeting, Hueston Woods State Park, near Oxford, Ohio, Aug. 12-14.

National Fertilizer Solutions Association, Round-Up Program, Marriott Motor Inn, Atlanta, Ga., Aug. 13-14.

Golf Course Superintendents Field Day, University of Rhode Island, Kingston, R.I., Aug. 20.

Lawn and Utility Turf Field Day, University of Rhode Island, Kingston, R.I., Aug. 21.

Turfgrass Management Conference, Hawaii Turfgrass Association, East West Center, University of Hawaii, Honolulu, Hawaii, Aug. 27-29.

Virginia Polytechnic Institute Turfgrass Field Days, V.P.I. Experimental Plots, Blacksburg, Va., Sept. 3-4.

Annual Turfgrass Field Day, Michigan State University, East Lansing, Sept. 4.

Lawn and Ornamental Days, The Ohio Agricultural Research and Development Center, Wooster, Sept. 9-10.

Michigan State University Sod Producers' first field day at the Muck Experimental Farm northeast of East Lansing, Sept. 10.

Illinois Turfgrass Foundation, Inc., field day and open house, South Lincoln Avenue turf plots, Urbana, Ill., Sept. 12.

Virginia Cultivated Turfgrass Association sod field day at the Kidwell farm near Remington, Va., just off U.S. 29, Sept. 14.

Pacific Northwest Pesticide Applicators Association, Annual Meeting, Renton Inn, Renton, Wash., Sept. 19-20.

Midwest Regional Turf Foundation field day, Purdue University, Lafayette, Ind., Sept. 29.

Central Plains Turf Conference, Kansas State University, Ramada Inn, Manhattan, Kan., Oct. 15-17.

National Fertilizer Solutions Association, National Convention and Equipment Exhibition, Cincinnati Convention Center, Cincinnati, Ohio, Nov. 9-13.

Ohio Turfgrass Conference and Show, Sheraton-Cleveland Hotel, Cleveland, Ohio, Dec. 1-3.

National Aerial Applicators Association, Third Annual Conference, Roosevelt Hotel, New Orleans, La., Dec. 7-10.



Another Asplundh first... aerosol inhibitor tree paint.

For fast year-round applications try Asplundh's inhibitor fortified tree paint. Using the *newly developed one percent NAA formulation*, it is now packaged in a proven all-weather aerosol applicator. This spray method will greatly increase production compared to old-fashioned brush-on applications thus reducing unit cost. So when you look for reliability, economy and beauty look to Asplundh.

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For More Details Circle (120) on Reply Card

Noxious Aquatic Weed Control

Must Be National Goal, Says Southeast U. S. Group

Control of noxious aquatic weeds has become a national concern. Little is being done to pull together effective methods and chemicals for control work, except efforts of the Hyacinth Control Society, which is mostly a group located in the Southeastern United States.

This Society was formed several years ago for the express purpose of developing more effective control methods for water hyacinths. At the time, the hyacinth problem was the big one, especially in Florida.

Since, however, hydrilla, elodea, and several other aquatic plants have become as important or more so in the fight to preserve and clean up inland water. The Society, then and now, despite its limiting name, is dedicated to control of all types of noxious aquatic weeds.

The need for control, however, is not now and really never has been

limited to Florida and adjacent areas. Aquatics are a problem throughout the country and more industry weed control people are seeking answers than ever before. This likely accounts for the fact that representatives from five nations and 17 states attended the ninth annual meeting of the Society at West Palm Beach, Fla., June 15-18. Almost 200 applicators and company representatives of a total membership of 244 were on hand.

Such a high percentage of membership on hand at the annual meeting reflects the many problems of aquatic control—both those of actual weed control and those centering on permissive use of pesticides in public waters. It further demonstrates that the Society has a reputation for living up to its original goals, which included bringing together all possible information on

methods of aquatic weed control.

Each year more and more persons outside the area concerned with this type weed problem attend Society sessions. To the end that the problems centering on aquatics are extensive, the Society membership this year voted to hold its 10th annual meeting next July at Huntsville, Ala. This will be the first such annual meeting at a location outside the state of Florida. Aquatic weed problems and controls in the Tennessee Valley Authority will be visited.

Aquatic Weed Control Outlook

Frank Wilson, president of the Society for this past year, and director of the Polk County, Fla., Mosquito Control Department, opened the 1969 formal program with an outline of current aquatic weed problem. He offered some well

Stanley C. Abramson, newly elected secretary of the Hyacinth Control Society and technical representative of Southern Mill Creek Products Co., Inc., (center with ribbon), opens the field demonstrations.



founded ideas on the direction of such control during the coming years.

Our way of life, he said, has increased the amount of waste water produced by each person. All waste waters, such as sewage and industrial effluents, storm drainage, runoff from fertilized areas, etc., have one factor in common. Each type of waste or runoff contains plant food elements such as nitrogen, phosphorus, potassium and others. These nutrients add fertility to inland waters—a process called Eutrophication.

Besides enhancing the production of native plants which create weed problems, runoff also fertilizes major pest plants which have been introduced from other parts of the world. These as well as native plants grow at fantastic rates in well-fertilized water, Wilson pointed out, and thus constitute major aquatic weed problems.

More Regulation Coming

As to the direction of aquatic weed control, Wilson told Society members that they could be sure of only one thing—that of change. Op-

erations, Wilson said, cannot remain static. In fact Wilson predicted that 20 years hence, the group will likely look back to the relatively simple control problems of the '60s. He expects far more technical and complex problems in the '70s and '80s.

One change, Wilson pointed to, is that weed control operators can look forward to a much greater degree of supervision by regulatory agencies. Operations and methods, Wilson believes, will be closely supervised and all commercial applicators will be licensed. Because solving weed control problems may create problems for others, a director of any type weed control can plan on spending more time in liaison with the various agencies and groups which may be involved.

Wilson pointed out that for many years conservation has taken a back seat. As a nation, the dollar has taken precedence. In some cases, wildlife and natural resources have suffered. The country, Wilson said, is entering a period when emphasis is being shifted to conservation. With this shift will come an increase in interest aimed at biological controls. Stringent regulations will be de-

veloped further concerning use of pesticides in water. Research will point more toward chemicals and methods which are highly selective. The use of broad spectrum herbicides will be discouraged.

Even so, Wilson believes, aquatic weed control will become even more important in the economy. Water-front real estate values will depend more and more on the degree of infestation present of submerged aquatic weeds.

Wilson also feels that labor problems will further beset the industry. He believes operators will use more, better, and possibly bigger equipment. Use of aircraft will increase. Wilson said that use of the helicopter in aquatic weed control operations will become commonplace.

Methods and Costs Discussed

During the 4-day program, numerous types of chemical and mechanical control methods and costs were discussed. Typical of reports was that of Robert J. Gates, superintendent of maintenance at the Southwest Florida Water Management District at Brooksville.

Gates revealed costs and chemi-

Andy Price, at the controls, demonstrates the Pennwalt weed control service during the field demonstrations.





Officers and directors elected for the coming year, from the left, are: Paul R. Cohee, Hercules, Inc., Birmingham, Ala., president; Frank Wilson, Polk County Mosquito Control, Eaton Park, Fla., outgoing president and director; Stanley C. Abramson, Southern Mill Creek Products, Tampa, Fla.,

secretary; Robert Blackburn, ARS, USDA, Fort Lauderdale, Fla., editor; Dr. Lyle Weldon, ARS, USDA, Fort Lauderdale, Fla., vice-president; Andy Price, Pennwalt, Orlando, Fla., director; and Jay L. Blanchard, Winter Park, Fla., director.

cals on control of hydrilla, elodea and Eurasian watermilfoil on local rivers in the areas of his district. These weeds are often rapidly spread, he said, by motor boat movements, waterfowl flights, and hurricanes. Cleanup on three local rivers in mid-April, 1969, was handled in five days.

Because of many climatology variables that had to be considered as well as manpower, herbicides had to be carefully selected, Gates said. This responsibility had to be given to staff people of two agencies working on this operation. Because of heavy spring flows in the Crystal and the Homosassa rivers, plus tidal fluctuations, ranging from 1 to 3½ feet, four herbicides were selected. Use was based entirely on position of the tide, and location of the area

to be treated; and the amount needed for the depth and flow of water.

Herbicides selected were: (1) Copper Sulfate — medium course crystals, a product of Copper Hill Tennessee Corp. This material was applied by spin disk applicator and air-boat. It had enough density to carry the herbicide to the bottom of the rivers and canals, having a high flow of water; (2) 20% of 2-4-D Granules, a product of Amchem Corp; (3) Aquathol-Plus, a Pennwalt Corp. product, both of these materials being systemic type herbicides; and (4) Hydrothol-191 was used in three small canals, also a Pennwalt Corporation product. These canals were completely clogged with "hydrilla" growth, which, Gates said, adversely affected values of the water front prop-

erty. A small fish kill was experienced, he stated, because of dense weed growth, in this case attributed to the oxygen sag caused by rapid decomposition of the elodea plant.

Cost of treatment with the combination of herbicides used based on surface acre cost, are as follows:

Crystal River—Treated 172 acres. Cost per surface acre: \$38.21.

Homosassa River — Treated 115 acres. Cost per surface acre: \$44.85.

Chassahowitzka River — Treated 30 acres. Cost per surface acre: \$26.80.

Except for some small spot treating, Gates believes that control will exist until early August, when a conservative rate of application should keep down infestations. Cost ratio benefit for this operation was at least 6 to 1 for dollars spent.



Herbert J. Friedman, president, Southern Mill Creek Products, Inc., Tampa, Fla., and Donald E. Seymour, president, Marine Biochemists, Inc., Waukesha, Wis., discuss technical materials available on aquatic weed control from the Society.

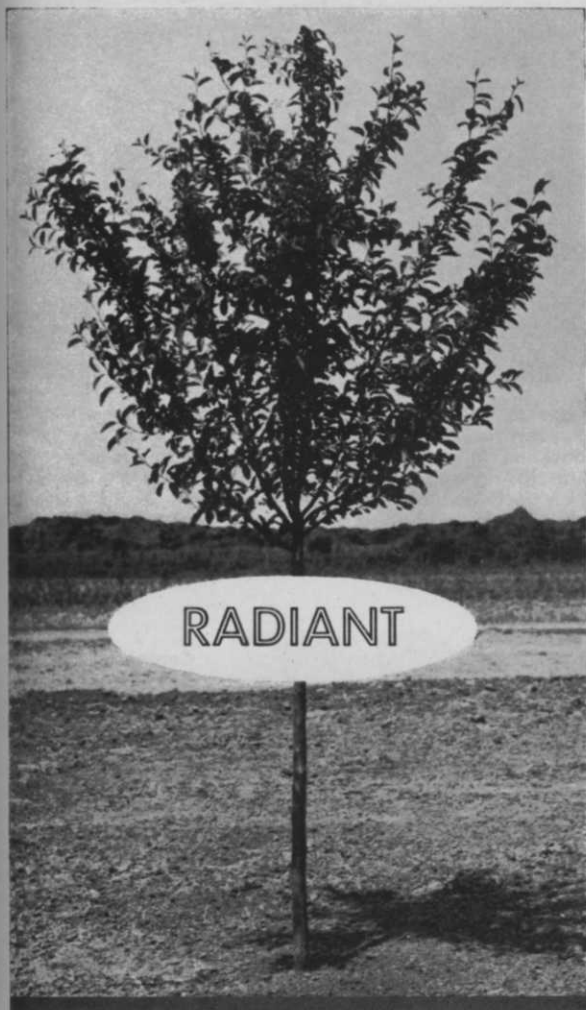


Visiting during break in program of Society are, from the left: John Gallagher, aquatic weed research specialist, Amchem Products, Inc., Ambler, Pa.; Mrs. Robert Blackburn, Fort Lauderdale, Fla.; Robert P. Blakely, Old Plantation Flood District, Plantation, Fla.; and Zeb C. Grant, Florida Flood Control District, West Palm Beach, Fla.

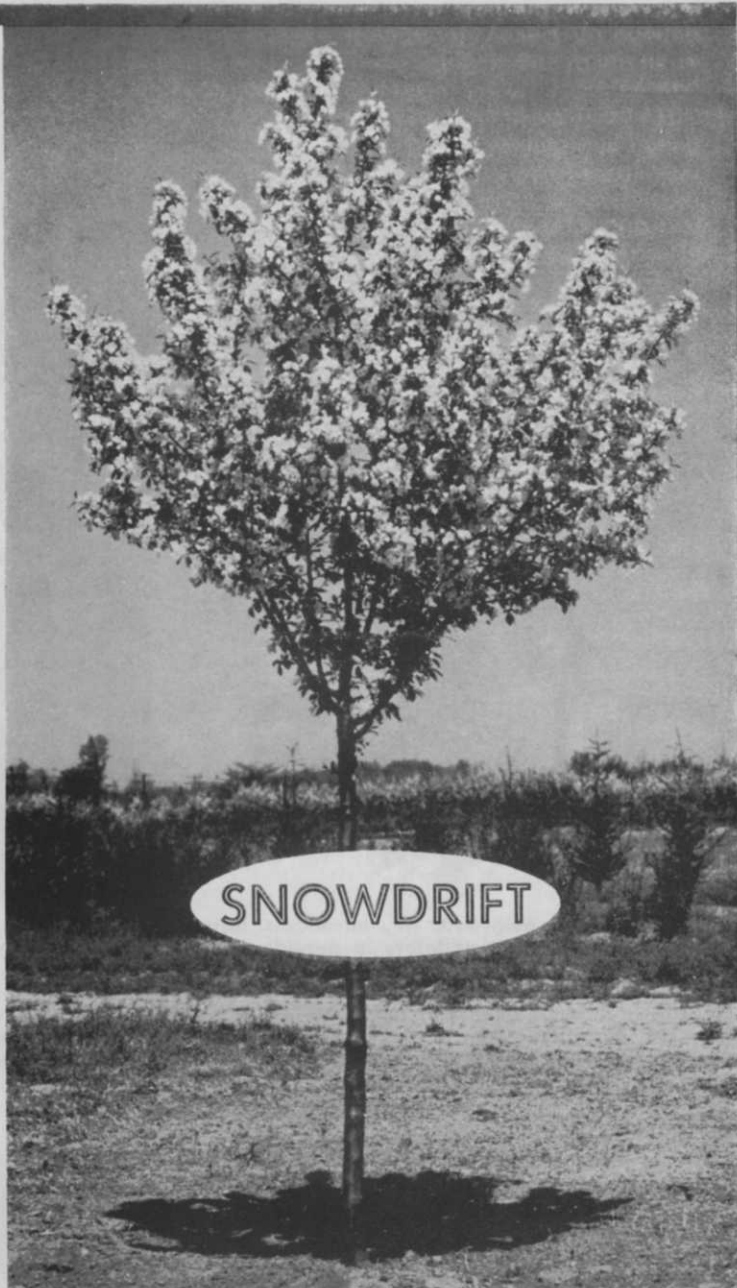
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Colorful new Crabapples developed for modern style and three-season beauty in today's landscape architecture . . .

Cole is headquarters for the widest selection available of the finest varieties of flowering crabapples in wholesale quantities. Many years of careful selection, development and testing, plus the modern, mechanized methods employed in our 1000-acre nurseries make Cole your best source of healthy, strong-rooted trees that will grow and flourish in your planting. Write for our catalog or a special quotation on your needs.



RADIANT is an exceptionally hardy variety introduced by the University of Minnesota. Its deep red buds open to a profusion of deep pink blossoms. Early foliage has a reddish coloring, maturing to a rich green. The small, bright red $\frac{1}{2}$ -inch fruit persists into winter. A perfect tree for locations where a maximum height of 18 feet is desired.



SNOWDRIFT is Cole's first introduction of a new flowering crabapple, now offered for the first time. It is a prolific mass of pink buds and pure white blossoms during a long blooming season. Heavy-textured summer foliage has a clean green color. The tiny $\frac{3}{8}$ -inch fruit matures to a glossy orange-red. Growing to a mature height of 20 to 25 feet, Snowdrift is ideal for colorful street and highway plantings, and for commercial, industrial, park, cemetery, golf course and home landscaping.

THE COLE NURSERY CO.

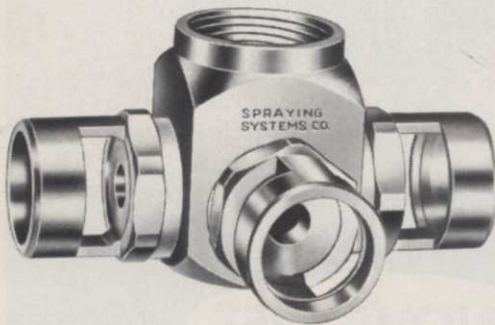
R. D. No. 1, Circleville, Ohio 43113

Phone: A/C 614-474-7531

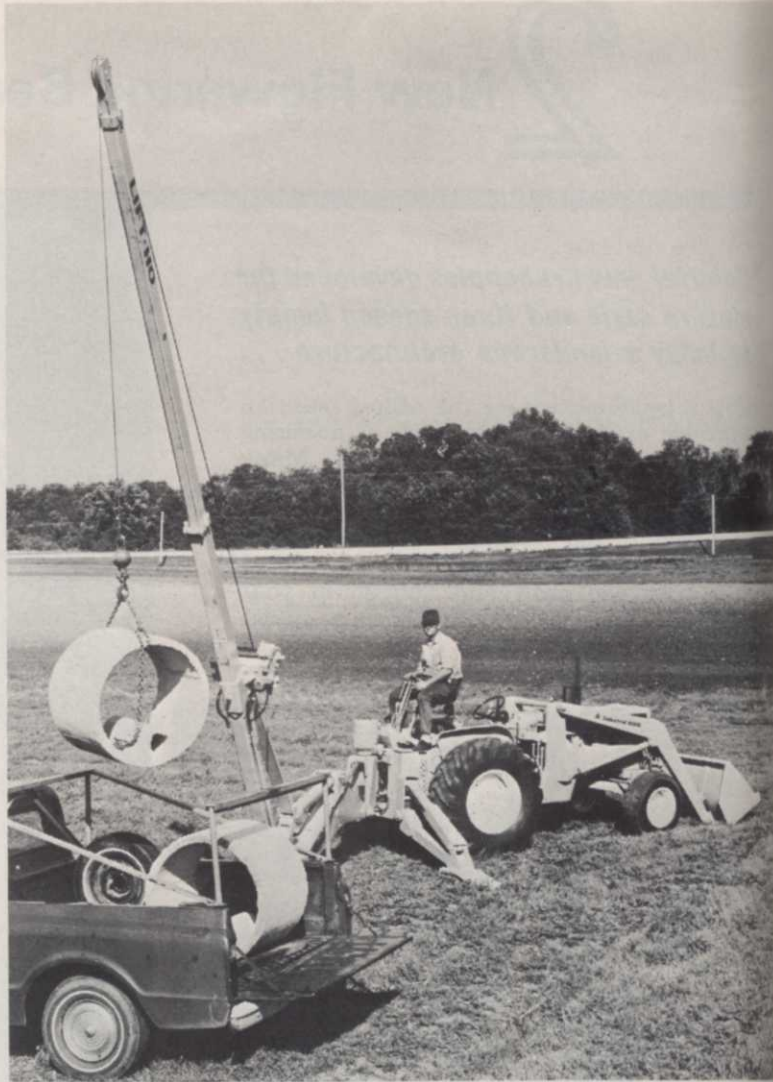
Originators of Plant Specialties Since 1881

New Products

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Spraying Systems Co., Bellwood, Ill., introduces large-capacity No. 1238155-SC jet agitators to provide turbulence to keep wettable powders in uniform suspension. As liquid streams from agitator outlets, surrounding liquid is drawn through open side ports of the siphon caps, causing agitation. The brass or stainless steel units, in four capacities, feature a $\frac{3}{4}$ " NPT female inlet connection. For more details, circle (701) on reply card.



Allis-Chalmers, Topeka, Kan., adds its new Model 631 crane boom for use with its I-600 loader-backhoe industrial tractor. The telescoping boom mounts on the backhoe in place of the bucket and dipper arm. It has a 2000-lb. maximum lifting capacity at a 12-ft. radius from the backhoe center point. When fully extended, the three-position boom has a 31-ft. maximum reach; a 25-ft. mid-point reach and a 19-ft. fully retracted reach. For more details, circle (702) on reply card.



Utility Equipment Co., Inc., Brookfield, Wis., has developed 30" x 30" and 48" x 48" warning signs and matching standards for roadways where maintenance and construction are being done. Holders are available to accommodate both signs. Constructed of welded steel tubing and formed steel channel, both holders fold to a storage size of about 9" x 40". When unfolded, the holders' springloaded legs are automatically pulled to the center staff, where they lock. Various signs are available. For details, circle (703) on reply card.



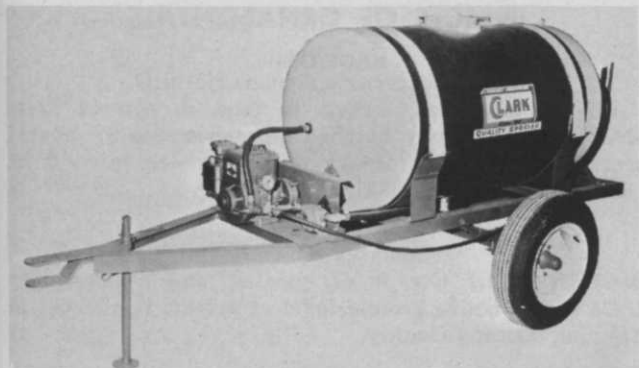
A. J. Gerrard and Company, Des Plaines, Ill., introduces a safety-designed, Model 1775 Beltbinder Unit for limb support. It consists of an adjustable belt which supports a cutter holster, pouch for strap applying tool and seals, and provides a harness to hold strapping material. Manufacturer claims that, when used with Gerrard cartoned-strap coils, product virtually eliminates strap tangle. For more details, circle (704) on reply card.



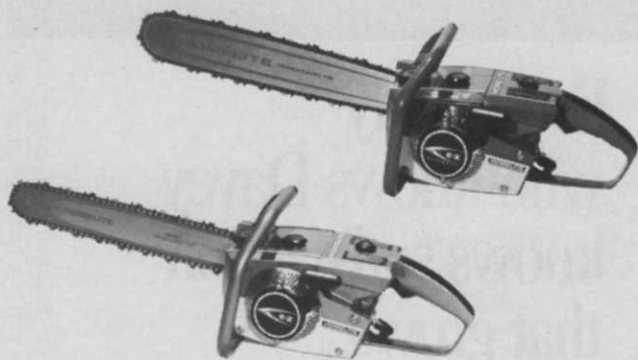
Hermeier Manufacturing Co., Pella, Ia., announces its new Model TS-66T Tree Spade, similar to Models TS-44A and TS-30 tree spades introduced last year. The TS-66T is a truck-mounted machine that digs, transports and transplants trees up to 8" diameter, by using the truck's power take-off. Four hydraulically operated high tensile steel spades penetrate the soil to form a maximum-size tree ball 66" in diameter and 48" deep. Tree and dirt ball are then lifted into transport position. For more details, circle (705) on reply card.



Howard C. Green Manufacturing Co., Portland, N. Y., announces a platform mountable on any three-point hook-up tractor which operates from the tractor's hydraulic system. Other features include operator's reach of as high as 18 feet from the ground, 8' x 15' lateral coverage, three-minute hook-up time, vertical and horizontal extension and retraction by one conveniently located lever, heavy chain supports to tractor axle, and safety rails on all three work sides. For more details, circle (706) on reply card.



Clark Mfg. Co., Atherton, Mo., introduces a two-wheel Model "GL" trailer sprayer. The 200-gal. fiberglass tank will handle engine-driven roller pumps for low-pressure spraying, or engine-driven piston pumps for high-pressure spraying. The unit comes with trailer, 6" x 14" wheels (less tires), 50-ft. handgun hose, hose reel, 5 HP engine and choice of pumps, saddle, straps, hose and fittings. It's adaptable for spraying with a boomjet nozzle. For more details, circle (707) on reply card.



Homelite, a division of Textron, Inc., introduces two new super lightweight chain saws, the E-Z and E-Z Automatic. Weighing only 8½ and 9½ lbs. (less bar and chain), respectively, they are easy to start because of the exclusive Simplex Starting System and easy to handle. E-Z Automatic offers the most powerful chain saw engine, per pound and per cubic inch, ever developed. Felling, cutting, limbing and pruning are all easily done. For more details, circle (708) on reply card.



The Rinchem Co., Phoenix, Ariz., announces an ultraviolet lamp, Chek-Lite, and a fluorescent dye, Glo-Chek. Made to complement each other, both lamp and dye facilitate the determination of spray coverage and uniformity, droplet size and density, and swath overlap. The lamp weighs 1½ lbs. and includes a recharger which operates on 115V. AC. For more details, circle (709) on reply card.



General Electric Co., Lynchburg, Va., introduces its MASTR Progress Line Personal Series hand-held FM two-way radios with 8¼" high, 3 7/16" wide and 1¾" deep case dimensions. Options can be added without changing case size. UHF models come in 406-420 MHz. and 450-470 MHz. and deliver two watts. The units feature sealed circuitry and are externally constructed of Lexan® and cast aluminum. Each is equipped with one rechargeable 7½-volt, nickel-cadmium battery. For more details, circle (710) on reply card.



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Homeowners know Davey men have the professional touch, the experience, and the equipment, backed up by continuous research, to keep residential trees, shrubs and lawns flourishing in health and beauty.

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For More Details Circle (117) on Reply Card

Insect Report

WTT's compilation of insect problems occurring in turfgrasses, trees, and ornamentals throughout the country.



TURF INSECTS

BLUEGRASS BILLBUG

(*Sphenophorus parvulus*)

UTAH: Heavy in 3 new lawns in Salt Lake and Holladay area of Salt Lake County.

BRONZED CUTWORM

(*Nephelodes emmedonius*)

IOWA: Larvae damaged bluegrass pasture in Decatur County. Ranged 4-5 brown spots per square foot of sod. Also reported at Ottumway, Wapello County.

A DELPHACID PLANTHOPPER

(*Delphacodes nigrifacies* Muir)

FLORIDA: Adults on Bahia grass, *Paspalum notatum*, at Belle Glade, Palm Beach County. This is a new United States record. This neotropical species is recorded from Costa Rica, Guyana, and Martinique.

INSECTS OF ORNAMENTALS

BAGWORM

(*Thyridopteryx ephemeraeformis*)

ILLINOIS: Hatched; begun to feed in central area. MARYLAND: Newly hatched on evergreens in several areas. OKLAHOMA: Heavy on evergreens in most of Oklahoma City area, Oklahoma County.

FIR ENGRAVER

(*Scolytus ventralis*)

WASHINGTON: Completely girdled some mugho pines 18-24 inches above ground level at several residences in Yakima, Yakima County.

TREE INSECTS

AN OLETHREUTID MOTH

(*Pseudexentera improbana*)

PENNSYLVANIA: One of the heaviest outbreaks in Clinton County and western Lycoming County; visible from State Highway 44 north of Haneyville and State Highway 144 south of Renovo. Affected predominantly white oak and chestnut oak at higher elevations. Involved at least 200,000 acres; completely stripped majority of trees. Third year of heavy defoliation in these areas, but much more widespread this year. Some trees died fall of 1968; heavy mortality later this summer. Similar infestations in Districts 7 and 19 collapsed this year. Active in Schuylkill County; 80 percent defoliation on 200+ acres west of Morgantown, Lancaster County.

GEOMETRID MOTHS

PENNSYLVANIA: First *Erannis tiliaria* infestations in state since 1962 at several locations. Defoliated several thousand acres of oaks near Cornwall on Lebanon and Lancaster County line; many completely stripped. Defoliation 50-90 percent of several hundred acres near Pine Grove Furnace, Cumberland County.

PINK-STRIPED OAKWORM

(*Anisota virginiensis*)

WISCONSIN: Adults numerous on 500 acres of northern pin oaks June 12 in Douglas County; eggs plentiful on undersides of leaves. Spent and mating moths present. Trees defoliated in 1968 less vigorous than trees not defoliated in 1968.

Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

Rates: "Position Wanted" 10¢ per word, minimum \$3.00. All other classifications 20¢ per word, minimum \$4.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. Bold-face rule box: \$25.00 per column inch.

FOR SALE

40 ft. Skyworker and Chipper on 1957 G.M.C. Excellent condition.

Write or Call

Valley Chemical and Tree Service
1416 East 11th Street
Pueblo, Colorado 81001
Phone 545-4791

AUSTRALIAN BUSINESS — Agricultural Chemicals — Custom Applicators. This firm specializes in Agricultural and Industrial Weed Control. It is firmly established in three eastern States and there is potential for expansion to the remaining States and New Zealand. Opportunities in allied fields are excellent. An ideal proposition for a chemical or pest control company seeking a comprehensive introduction to the Australian Market. Any reasonable proposition will be confidentially considered by the Founder-Manager who is anxious to ensure the future of this unique organization before retiring. Address all inquiries to: "Chemicals," P.O. Box 767 G, G.P.O. Melbourne, 3001, Vic. Australia.

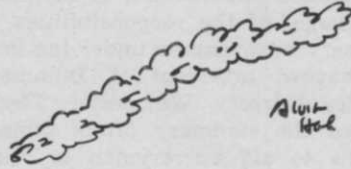
FOR SALE — Sod Farm — 160-acre sod farm, 100 acres muck in sod, rest is mineral soil. In Ingham County, Mich. Phone 313 662-9398.

USED EQUIPMENT

SPRAYERS, chippers, log splitters and other equipment at large savings. Let us know your needs. Equipment Sales Company, 4744 Sunrise Highway, Massapequa Park, N. Y. 11762.



A complete mechanical water weed removal system is offered by the Aquamarine Corporation of Waukesha, Wis. The key unit of the Aqua-Trio, as the system is called, is the H-650 harvester shown above. The other two units are a weed transporter and a shore conveyor. Weeds are cut, transported to shore, and loaded into trucks without being handled manually. The harvester cuts an 8-ft. wide swath to a depth of 5 ft. For details, circle (711) on reply card.



"Yep, another helicopter pilot has found out what 'High Voltage' means."

SEED

SOD QUALITY MERION SEED for discriminating growers. Also Fyking, Delta, Park, Newport and Prato bluegrasses as well as fine fescues. We will custom mix to your specifications. Michigan State Seed Company, Grand Ledge, Michigan 48837. Phone 517 627-2164.

Helicopter Association Elects Rockefeller and McPherson

Godfrey A. Rockefeller is the board chairman and Glenn W. McPherson is president of the Helicopter Association of America.

They and seven other officers were selected by a full-membership mail-balloting system adopted as part of the association's reorganization at its spring annual meeting.

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Rockefeller, who'll serve as chairman until January, 1971, is with Chesapeake and Potomac Airways. McPherson, Okanagan Helicopters, Ltd., Vancouver, B.C., was elected to a three-year directorship.

Other officers and their terms on the board are: First vice-president—Richard U. Temple of Inland Air Lines, Inc., Myrtle Beach, S.C., two years; vice-presidents—J. Arlo Livingston of Livingston Copters, Inc., Juneau, Alaska, 1½ years, and Alec H. B. Ferguson of Western Helicopters, Inc., Rialto, Calif., three years; secretary—Robert G. McLellan of InterMountain Helicopters, Inc., Boise, Idaho, 1½ years; treasurer—Frank Lee of Petroleum Helicopters, Inc., Lafayette, La., three years; assistant secretary—Robert S. Angstadt of Chicago Helicopter Airways, Inc., two years; and assistant treasurer—George L. Reno of Helicopter Patrol, Inc., Farmington, Pa., two years.

As provided for in the revised by-laws, two ex officio directors join the board. They are James F. Atkins, executive vice-president of Bell Helicopter Co., and John E. Ryan, HAA executive director, who continues on a renewed contract. Ryan also serves on all committees.

SAVE TIME AND TREES

WITH BESELER TREE SLINGS

- Less digging, adjustable
- For any soil condition
- No skill required
- Quickly on or off
- Controllable tilt

Patented

BESELER EQUIPMENT CO. 5417 Oak Lawn Ave.,
MINNEAPOLIS, MINNESOTA 55424

For More Details Circle (113) on Reply Card



**SPLENDOR
IN GRASS**
is 0217[®] brand
**Fylking
Kentucky
bluegrass**

Jewel among lawngrasses, Fylking has an entire complement of splendid features. Unusual density due to abundance of sideshoots creates a weed-free lawn. A ground-hugging carpet of green splendor, its outstanding color continues all season because it's so disease-resistant. Winter hardy and drought tolerant, Fylking grows thicker in summer. Doesn't produce ugly seed-heads, mixes well with other varieties, gradually dominating. Fine, thick texture can be cut as low as 1/2 inch for home putting greens, or 3/4 inch for beautiful home lawns. Specify 0217[®] Brand Fylking Kentucky bluegrass lawn seed—at your seed distributor.



**FYLKING
KENTUCKY
BLUEGRASS**

For More Details Circle (107) on Reply Card

AAN Publishes Guide On 'Truth-in-Lending'

The American Association of Nurserymen has published a special summary to assist nurserymen in complying with the new "Truth-in-Lending" Act which became law July 1.

Hoskins A. Shadow, AAN president, said that the summary, **Truth-in-Lending and Nurserymen**, gives a detailed explanation, in laymen's language, of the responsibilities of nursery businessmen under the law.

Shadow, president of Tennessee Valley Nursery, Winchester, Tenn., stated the summary offers sample forms to aid nurserymen in complying with the law, as well as examples of situations and language the law forbids. It also covers the type of credit allowed by the law, guidelines for proper financing, telephone and mail orders, ways to prove compliance with the law, and a complete explanation of its effect on consumer advertising.

Copies of **Truth-in-Lending and Nurserymen** have been mailed free of charge to AAN members, and the Association is offering it to non-members at \$2.00 per copy. To obtain copies, write to **Truth-in-Lending and Nurserymen**, 835 Southern Building, Washington, D. C. 20005.

LETTER TO THE EDITOR

Has WTT Issues From the First

Your magazine is read from cover to cover here and is at the present time kept as a source of information and referral. I have your copies way back from the very first publications, which I believe were the ones included in the Pest Control magazine.

Though most of your articles are from experiences up North, they are still extremely useful down here in South Florida, with minor adjustments and compensations taken into consideration.

Therefore, I wish to take this time to thank you, and may you continue on to even greater success than at present.—
ROBERT B. SHANKWITZ,
Dade County Parks Nursery,
Miami, Fla.

Trimmings

WHAT DID FOLKS use to fight off mosquitoes before the advent of man-made stick and aerosol repellents? We were reminded recently. It came in a letter—a well-pressed and dried sprig of American Pennyroyal (*Hedeoma pulegioides*). It still carried enough of its mosquito repellent "quality" to also remind us of its alias: stink weed.

The switch to chemical repellents leaves us wondering if one reason was the discovery that stink weed brought a disproportionate drop in friends in relation to the decrease in mosquito bites.

* * *

"OUR BRANCH HAS TREES. We think everyone should have a Money Tree." This is the headline for a promotion by Financial Federation of Los Angeles. The firm's 11 savings and loan companies backed up the headline by giving away 200,000 "money trees." The trees were silver mountain eucalyptus, with silver-dollar-shaped leaves that look as though they're powdered with silver dust.

* * *

DUTCH ELM DISEASE has felled what is believed to be a Canadian city's largest tree. The 110-foot elm had been growing in the city of Metro for an estimated 140 years. The Toronto Daily Star reported that four men worked eight hours removing the branches. Then seven men worked 3 1/2 more hours to remove the 20-ton tree. They used a 35-ton crane to hoist the trunk from its 11-foot-wide stump, the paper said.

* * *

TO REDUCE WEED PROBLEMS in farm ponds, deepen water edges to three feet, says a Purdue specialist. That way, we suppose, a weed has to grow higher than three feet before you notice you have a problem.

* * *

WALNUT LOG PRICES are at an all-time high, reports the Wall Street Journal, with the government price for a 24- to 28-inch diameter log at \$1,367 per 1,000 board feet.

Competition has stiffened, and the competitors for logs include an increasing number of tree rustlers. They've become bold enough, for example, to swipe a tree just 30 miles west of Chicago from a banker. Walnut owners are in a quandary over what to do to protect their trees. One owner, reported the Journal, dug large trenches around his trees to prevent thieves from driving too close to them.



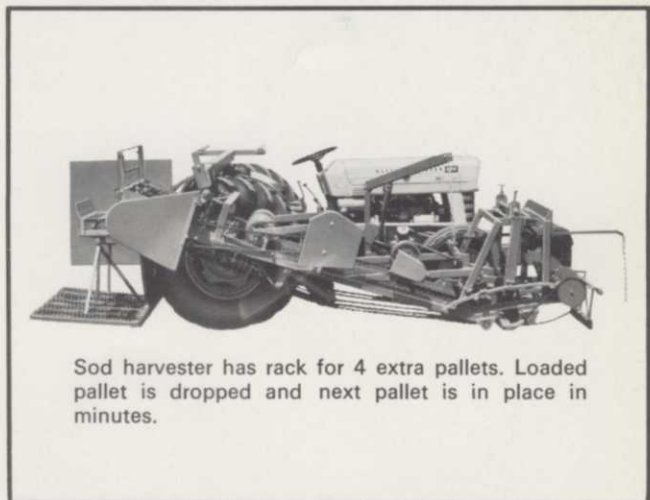
Trying to find a way to cut sod harvesting production costs? This is it!

... the Ryan Sod Harvester. This is the one that virtually automates sod harvesting. It cuts sod. Cuts it off. Conveys it. Rolls it. All your crew does is stack it on the pallet.

Figure it out! You don't need 8, 10 or 12 men. You need only 3... 2 if they are top-notch. Production? 600 yards. 1000 yards. 1200 yards per hour. Or more. Depends on your crew and the condition of the sod. With this mechanical marvel you will produce all the tightly rolled sod your crew can handle. And best of all, your sod is palletized ready for fast fork lift loading onto trucks. Cuts truck waiting time.

Then, when sod is cut, isn't it easier—and less expensive—to find work for a small 2 or 3 man crew rather than 8 to 12 people? You bet!

Mount a Ryan Sod Harvester on a Massey Ferguson MF20 Utility. Hook it up to the 3-point hitch and PTO and you're ready to harvest the biggest payloads ever. It's available for cutting sod from 15" to 24" wide and in lengths from 24" to 81". Cut-off blade in front of unit cuts sod to required length. Sod cutting blade cuts sod to the required depth (this is adjustable).



Sod harvester has rack for 4 extra pallets. Loaded pallet is dropped and next pallet is in place in minutes.

Sod farms and sod producers throughout the country are using the Ryan Sod Harvester to reduce manpower needs, to cut operational costs... and to increase production. Let the Sod Harvester do the same for you. Make your operation more efficient, more productive, more profitable.

For information about the Sod Harvester and other fine Ryan Sod Farm products, write for the new "Turf Equipment catalog."



TURF EQUIPMENT

2055 White Bear Avenue
St. Paul, Minnesota 55109
SUBSIDIARY OF OUTBOARD MARINE CORP.

For More Details Circle (118) on Reply Card



Why is Golf Brand Sod the color of new dollar bills?

We're trying to tell you something.

Like how you can make money with Golf Brand seed in two ways. Don't believe us? Believe John White, manager of the Iowa Nursery Corporation, Des Moines, Iowa.

John tells us that they went from 20 acres of Golf Brand sod in 1965 to 110 acres today because they found that Golf Brand was making money for them in two ways. First, it's a great sod, so it sells well. Second, it's lots easier, and therefore cheaper, to raise.

Iowa Nursery found that Golf Brand produces a tougher sod, produces a lot of rhizomes faster with excellent rhizome production during the hot summer months. And it stays greener and keeps color better year long . . . even when they don't irrigate. By the second year, John says, Golf Brand sod was dense enough to crowd out the weeds and the establishment of turf or sod harvest is 50% faster than the time for other grasses.

Easier to raise? John says Golf Brand requires 50% less fertilizer than Merion Kentucky bluegrass for equal response. During stress periods, the peak level of fertility is not as essential as with a Merion type bluegrass. Irrigation at Iowa Nursery is done with a Side Roll Irrigation system and done only when the grasses show wilt. With Golf Brand, John averages 1/2 inch of water per week.

Why are we telling you all this? We're trying to sell you something. Golf Brand Seed . . . a mixture of grass seeds for sod like a living room carpet. And to give you something. A new, FREE technical bulletin that's a complete guide to grass seeds. Just fill in the coupon below.



NORTHRUP, KING & CO.
1500 JACKSON ST., N. E., MINNEAPOLIS, MINN. 55413

NORTHRUP KING & COMPANY

Attn. Lawn Products Dept., 1500 Jackson Street N.E., WTT-8, Minneapolis, Minn. 55413

Please send me the following:

- Technical Bulletin #1
Basics for Turf Grass
Blends and Formulas
- Technical Bulletin #2
Complete Reference Guide
to Grass Seed Varieties
and Blends
- Have NK man contact me.

Name _____

Address _____

City _____

State _____

Zip _____

For More Details Circle (119) on Reply Card