

How Cal-Turf
Grows, Plants
Stolons
Page 22

WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

February 1966

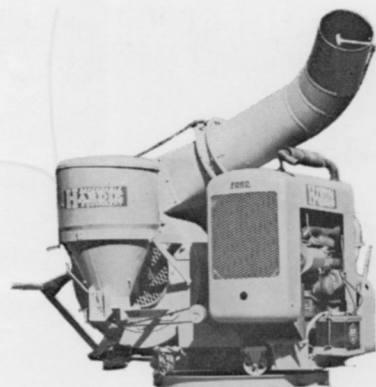
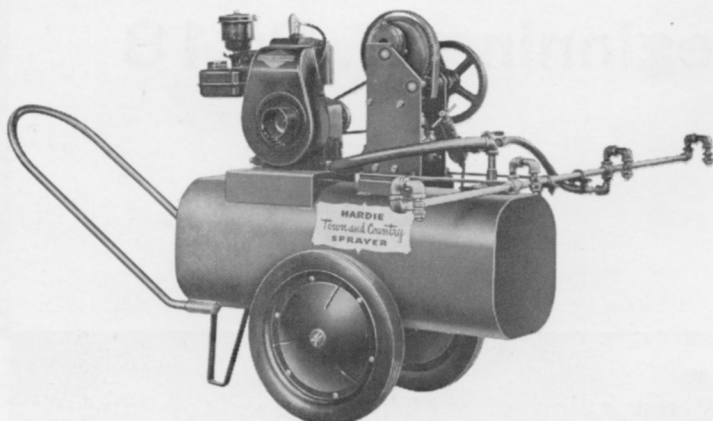
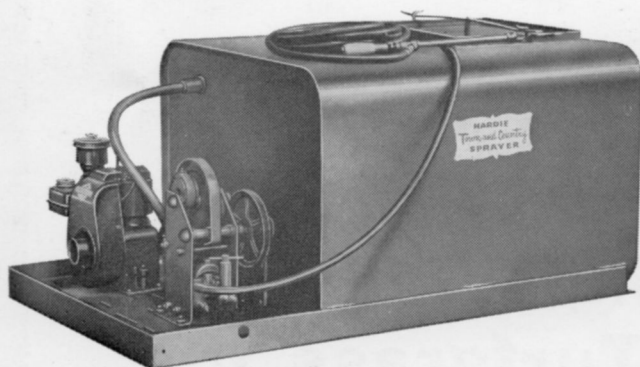
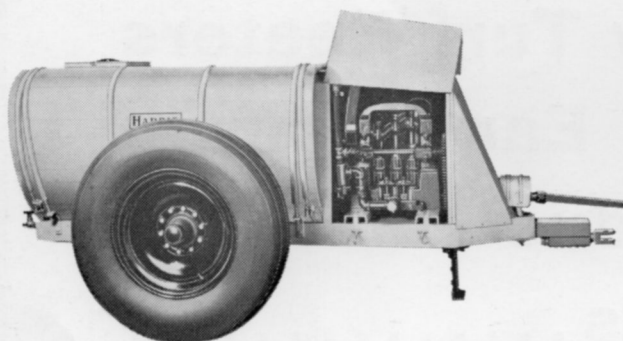
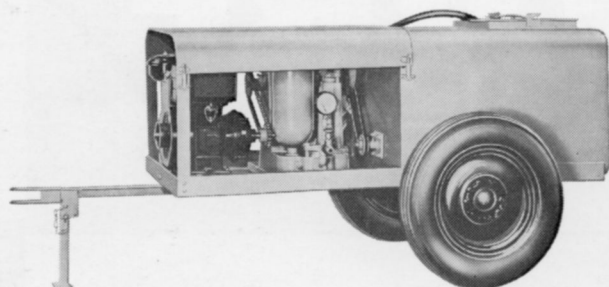
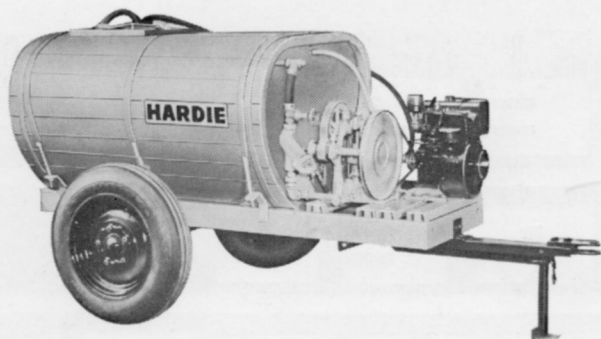
Horace Bryan
Shares Tricks
Of The Tree
Trade 8

**New Turf Heaters
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Detailed Story
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Meet 28

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Monthly magazine of methods, chemicals and
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"Now that we're using Copper Sulfate, our water problems are very few"

reports Mr. John Courchene,
Director of Water Quality for the Seattle Water Department



Constant sampling is one of the safeguards insisted upon by Mr. John Courchene, Director of Water Quality for the Seattle Water Department.

Seattle uses copper sulfate to treat not only the 725 acres but also the 7 mile shoreline of its primary storage and sedimentation reservoir. "Our primary objection to using other algae control chemicals is the difficulty of application," Mr. Courchene says. "When you total the cost of chemical purchase and application, copper sulfate is less expensive."

Seattle has been using copper sulfate for water treatment since 1940. At that time, they used approximately 20,000 pounds per year; in 1963, they used 70,000 pounds; in 1964—92,000 pounds. Mr Courchene says, "We usually treat the entire lake in fall, winter and spring. During the other months we generally make shoreline applications. At one time we had a problem with Isoetes, an aquatic

rooted plant which rises to the surface and drifts over the lake. Before using copper sulfate we had to rake the shoreline, which proved expensive. Now that we apply copper sulfate from winter through spring, this problem is virtually eliminated."

While water can be treated by simply dragging a burlap sack of copper sulfate crystals behind a rowboat, labor costs frequently suggest more efficient procedures. The Seattle Water Department has designed and built two specialized pieces of distributing equipment. For the treatment of the lake itself, a large, bronze, mesh-screened hopper was constructed. Copper sulfate is fed into the submerged screen hopper which is mounted on the stern of a power launch. The boat is steered over parallel courses approximately 100 feet apart. Prop wash spreads the copper solution out over an area ap-

proximately 100 feet wide. For shoreline application, a portable blower is mounted on a truck and a belt of copper sulfate 30 to 50 feet wide is blown out over the shoreline from the truck as it is slowly driven along the top of a dike that encircles the lake.

The Seattle reservoir, when full, holds about 11 billion gallons of water, of which about 4.6 billion gallons are available to intake. "We use the available water figure when determining how much water we wish to treat. The amount of copper sulfate is determined by the quantity of water, water temperature and number and types of algae present. Both shallow and deep samples are collected each week from six sampling stations, as well as from the reservoir's source of supply and its distribution system. There is no industrial contamination and, now that we're using copper sulfate our water problems are very few."

For assistance on your water problems, Phelps Dodge Refining Corporation—one of the world's major producers of copper sulfate—can supply the following: Information on systems and equipment developed and used by water works and commercial applicators; literature, containing data and chemical formulas; technical assistance in algae and water weed control. Write: Phelps Dodge Refining Corporation Information Service, 300 Park Avenue, New York, N. Y. 10022.



Seattle designed and built simple, efficient equipment for distributing copper sulfate by power launch.

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Apply Azak® pre-emergence herbicide to established turf while crabgrass seeds still are sleeping, and not even Paul Revere could arouse them. Azak penetrates the seeds when germination begins, and stops initial growth. Nonleaching, one application lasts through the germination period.

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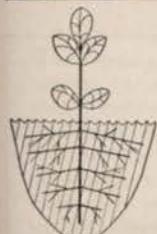
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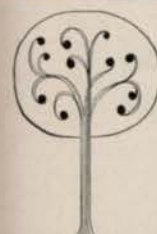
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WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

February 1966
Volume 5, No. 2

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WEEDS TREES AND TURF is published monthly by Trade Magazines, Inc. Executive, editorial, and advertising offices: 1900 Euclid Ave., Cleveland, Ohio 44115. Publication office: Corner of East North St. and Cadwallader St., Fostoria, Ohio. Send all correspondence to WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.

Single Copy Price: 50 cents for current issue; all back issues 75 cents each. Foreign \$1.00. Subscription Rates: U.S. and possessions, 1 year \$3.00; 2 years \$5.00. All other foreign subscriptions, 1 year \$4.00; 2 years \$7.00. Change of Address: Three weeks advance notice is necessary for change of address. Both old and new address must be given. Post Office will not forward copies. Third Class postage is paid at Fostoria, Ohio.

Contents of this Issue © Trade Magazines, Inc., 1966

Minimum Prices, Too?

Legislation recently passed by Congress, which became effective January 20th, will have its effect on contract applicators. Under the new law, contractors must also abide by minimum wage, fringe benefit, and working conditions rules set by the Secretary of Labor.

Any CA now servicing federal property, or contracting to do vegetation maintenance and control work at new federal building sites, will fall into this category. This is true, however, only for contracts in excess of \$2,500.

Wage scales will likely be determined by the highest union rate in the area, or lacking that, by the Federal Minimum Wage Law.

Fringe benefits will be set by the Secretary of Labor. Working conditions cannot be dangerous to either the health or safety of employees.

This law also states that contractors must post a notice of compensation required under the law at work sites.

Failure to abide by the wage or fringe benefit laws will make a contractor liable for all payments to employees. Contracting agencies will have the power to either withhold funds due the CA for payment to the employee, or be able to cancel any contract. The government will also be able to bring suit against contractors to recover remaining amounts of underpayment.

The National Labor Relations Board and the

Secretary of Labor will establish provisions which the new Service Contract Act requires. These requirements must be followed and clearly outlined in all new contracts.

Many contract applicators fall under the jurisdiction of the NLRB, and are already required to pay the Federal Minimum Wage. Generally, the NLRB will cover you if you buy or sell goods in excess of \$50,000 per year out of state.

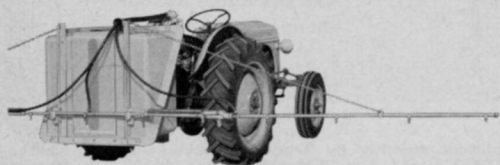
Add these newest requirements for doing business to the higher Social Security taxes, as a result of Medicare, which became effective last month, to the detail required by increased federal and state pesticide use and licensing regulations, and you may wonder when you'll have any time and money to actually get out to do any of the vegetation work all these laws apply to. In addition, of course, the added expense of doing business is either going to come out of profits (if there are any left), or prices must be raised. And yet price cutting still prevails. Wonder if they'll ever get around to establishing minimum prices? But . . . that's against the law, too!

WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled. While the editors welcome contributions by qualified freelance writers, unsolicited manuscripts, unaccompanied by stamped, self-addressed envelopes, cannot be returned.

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THE FACTS that follow quickly explain the essential value of controlling soil pests with Nemagon and dieldrin; their flexibility and ease of use; why the root protection they provide far outweighs the cost of treatment.

Nematode control with Nemagon

Nemagon works as a pre-planting application or on established turf. It fumigates the root zone to kill the nematodes (microscopic worms, not insects) that can infest soil in fantastic numbers. All damaging species are controlled and reinfestation will normally not occur for a year or more.

Without the root knots and lesions caused by nematodes, water and soil



A Nemagon spray knocks out nematodes fast, and thoroughly. Turf isn't disturbed. And nearby plants won't be injured.

nutrients can pass freely through roots. Turf can respond fully to fertilizer and irrigation. Risk of stunting, poor appearance and dead patches is eliminated. So is the risk of a reseeding or



Protecting a golf green with Nemagon eliminates any chance of unsuspected nematode infestation causing costly damage and disrupting play.

resodding.

Nemagon is easily drenched into soil following a spray application. There's no need for special equipment and grass isn't disturbed. Easy-to-follow directions are printed on every package.

Soil insect control with dieldrin

Dieldrin controls all species of grubs, including the larvae of Japanese and June beetles. It can be used ahead of time to prevent damage from ever starting. Or you can apply dieldrin to stop an infestation when discolored turf indicates that soil insects are pruning roots and limiting the crop's access to fertilizer and water.

Dieldrin can be applied any time after soil warms up. Effectiveness usually lasts 3 to 5 years. Control is so thorough that grub-eating moles and rodents can't find food in the treated area and leave.

Dieldrin can be put on in fertilizer, or in granular form. Liquid concentrates and wettable powders are available for spray use and drenching.

Full details on using dieldrin for



This root-chewing white grub can kill turf or make it look sick. So can a host of other grubs and soil insects. Dieldrin stops them all.

control of soil or surface insects are on every package label.

Nemagon and dieldrin are both available as branded products of well-known manufacturers and sold where you normally buy insecticides, and other turf maintenance products.

For more information, write Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st St., New York, New York 10020.

Follow label directions carefully when using any pesticide.

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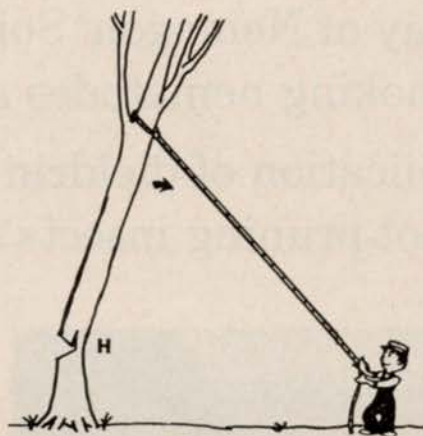
Tricks of the Tree Trade

THE TREE TRADE has more than its share of "tricks." By tricks we refer to things more of a physical nature than to the scientific knowledge which every man engaged in tree care should have.

Country Boys: Instinctive Climbers

We prefer country boys, though the breed has about run out. They climb as if it were instinct. It is said that a veteran woodsman is recognized by the way he uses his feet. He never puts a foot down without knowing where he is putting it. He is not conscious of watching his feet; it's instinctive. So these good climbers use both their hands and feet.

Secondly, country boys know how to use a saw and fell a tree. The same sure-footed principles are applied to removal of a limb or treetop. And, of greater importance, good country climbers know trees and the qualities of



Hinge cuts (H) allow workmen to guide a tree's fall by pulling the treetop with a rope. Cut is made opposite the fell side of the tree which stands upright until the surgeon gives it a jerk in the right direction.

their wood in all stages of growth from sapling to giant when they are green or dead.

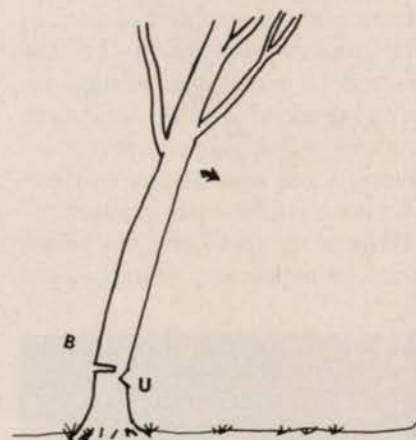
Use Tree Virtues

Quality of wood, as it relates to strength characteristics, is of prime importance in tree operations and safety maintenance.

For example, never trust a dead pecan limb as a foothold when climbing, regardless of its size. Even though pecan limbs are very strong when alive and green, dead pecan limbs snap and break easily and offer very little, if any, support. Galls and hollows, and other faults affect the strength of wood in many trees. The criterion then, is: know your tree before you climb it; use its virtues; avoid its hazards.

Tree Hinge Cushions Fall

The "hinge cut" is the most useful trick available to tree workers. Though widely used, there are still many good operators who do not understand and



Fall cuts are made where a swift and hard impact on the ground is allowed. A back cut (B) is made first nearly through the tree's trunk. Then a smaller undercut (U) is chopped just below the back cut on the fell side of the tree.

use it fully. A tree worker's "hinge" is the bark and sapwood of the tree, and its strength varies with every tree as well as with its size and age.

Use of the hinge begins with tree felling. A tree or limb will swing on a hinge just as a gate swings on a hinge, the only difference being that a gate swings horizontally and a tree swings vertically when cut. A hinge is

Trees hinge during a fall after cut is made partially through their trunks. A thick sapwood and bark strip left intact by the tree surgeon restrains tree's fall for an easy landing on lawns, driveways, or other protected areas. Cut is not made so deep that trees fall by themselves; the hinge is thick enough so worker must pull the tree over.



By
HORACE P. BRYAN

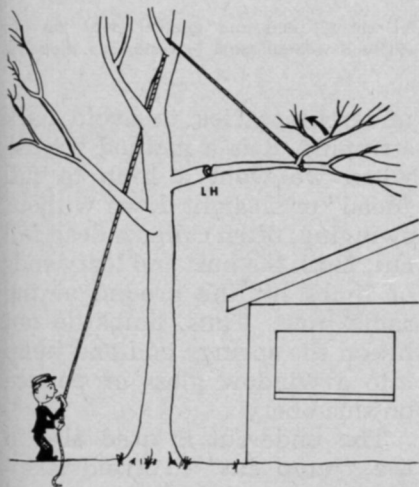
Bryan Tree Service
Dallas, Texas

formed when a single, incomplete cut is made in a tree or limb.

The traditional method of tree felling is a "fall cut"; a cut made on the "fell" side of the tree a little below a cut made on the opposite side. The fall cut helps to throw and direct the tree's fall. When the fall cut is used, a tree falls free with the impact of all its weight. This can be hard on



Tree surgeon, David Barnes, uses a guy rope to swing a limb sideways on its hinge at the cut.



Limbs are hinged (LH) horizontally if their direct downward fall might damage structures, flower beds, driveways, or shrubs. At the cut, a small portion of sapwood remains attached. The tree surgeon swings the branch on a rope either to the right or left until it can be cut free and fall without causing property damage.

the customer's lawn, walk, or driveway.

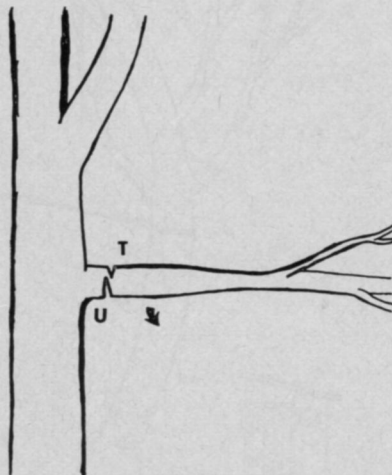
With the hinge, a fairly large tree can be laid down like a lamb. The ease with which a tree or limb may be leveled to the ground by a hinge, depends upon the tree and tensile strength of its wood. Hinge cuts should not be tried on trees which have been dead so long they are rotten or "bone brittle." Green hickory, pecan, American or Chinese elm, hackberry, maple, and oaks, one inch or more in diameter, can be pulled over on a hinge and laid down without damage even to shrubs or flowers. Any

tree, except a brittle dead tree, even a giant tree can be felled on a hinge with only a slight impact if a fall cut is used.

Limbs Hinged And Cut For Pinpoint Landing

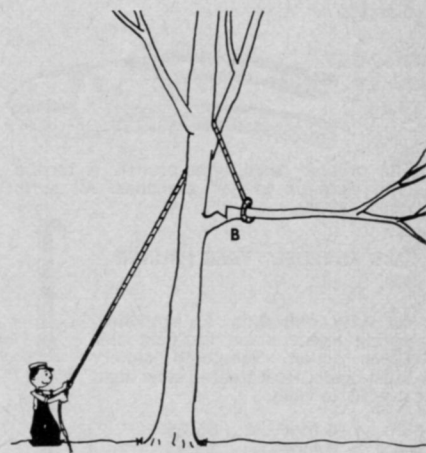
Perhaps the most useful phase of hinging is in the daily job of limb removal over buildings, power lines, and other obstacles. Frequently we have taken down huge limbs piece by piece, or have swung them 45 degrees to the side before they were lowered. We use the hinge if the tree is not too brittle and will hinge.

To rig a limb for hinge cutting, we put a guy rope through a



Undercuts (U) are made about one inch closer to the tree trunk than topcuts (T) to avoid stripping bark from beneath a limb. This method is used when a limb is to fall directly below, butt end first, without hinging.

high crotch in the treetop and tie one end of the rope as far out as possible on the limb to be cut. The other end is anchored to some solid object (stake, tree trunk, or another worker). The



Butt ropes (B) are tied near the hinge cut in a trunk or limb and threaded through a nearby crotch to support the trimmed section and prevent hinge breakage during the fall.

weight of the limb is kept on the rope until we are ready to lower it, and we prevent breaking the hinge until the limb is removed completely. After the "hinge cut" is made and while the limb, still attached by its bark hinge, hangs supported by the guy rope, a snatch rope is used to swing the limb to a position where it can be lowered. Then the limb is lowered with tender guidance and the hinge is finally cut. The whole side of a huge tree often can be cleared by one rigging. Climbers can maneuver limbs

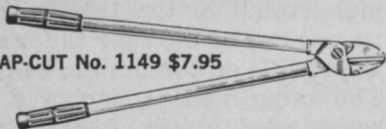
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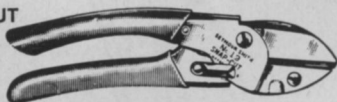
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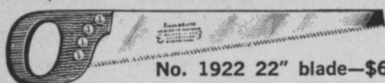


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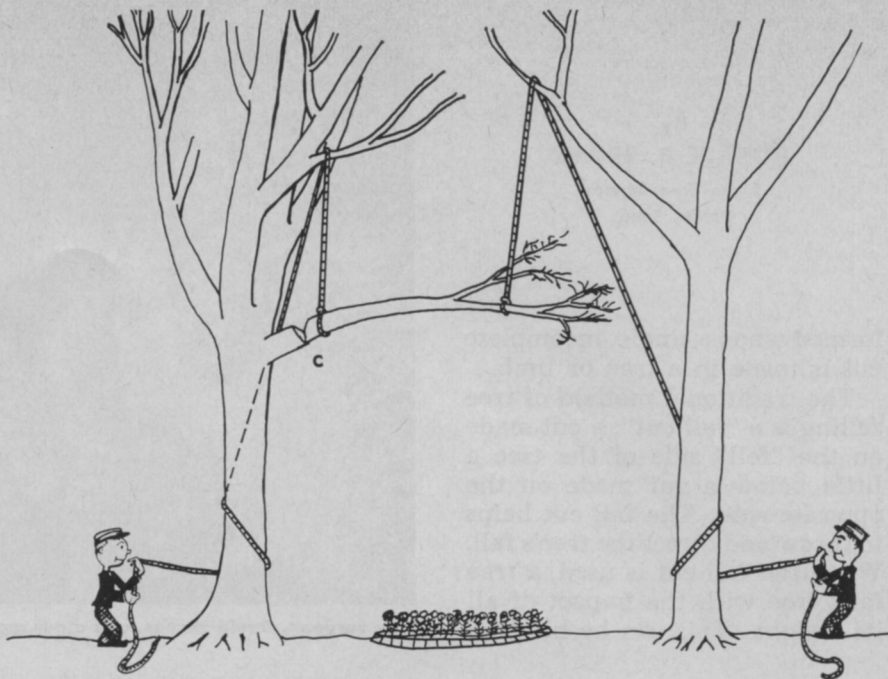
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Oakville, Connecticut



Ropes tied to trimmed branches, one near the cut (C) end and another near the tip, allow tree surgeons to "cradle" a limb's fall so it will land without harm to customer's property, in this case a flower bed.

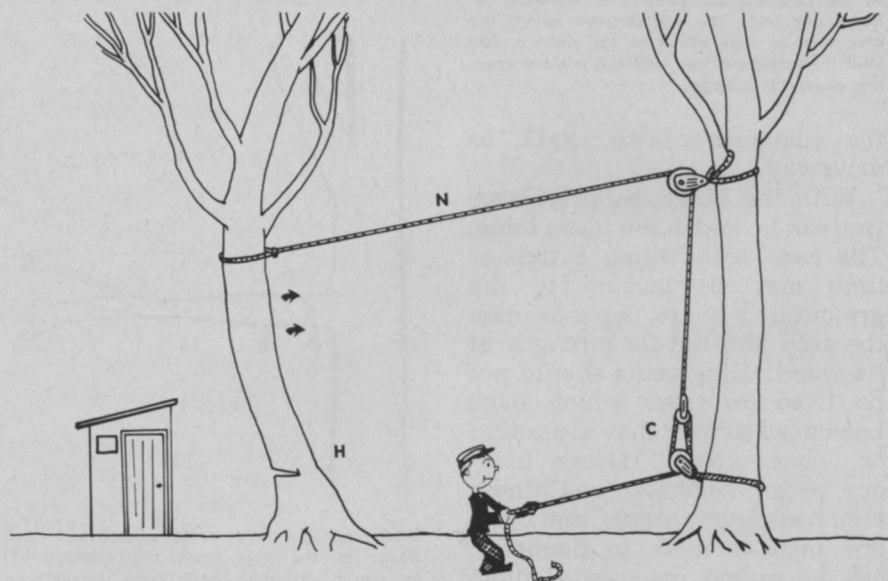
suspended by a rope, with a slight push or tilt, to the most exact landing position. Thus workers and such obstacles as buildings, lines, or flowers are protected.

Undercut To Avoid Bark Strips

Tree surgeons employ the "undercut" to avoid stripping bark from beneath a limb. Hinge cuts always strip and are used where a lower cut is to be made or where stripping does not matter such as when the entire tree is to be removed. Not only is the

undercut a trick to avoid bark stripping, it is a method we use when we want a limb to fall "dead" or straight down without swinging; often called a dead fall cut. Both the butt and leafy ends of limbs hit the ground at the same time. Thus, limbs do not hit on the springy end and jump into a window glass or pounce on shrubbery.

The undercut is used also in the "jump cut" to avoid stripping. An undercut is made as deeply as possible on the underside of a limb about one inch



Nylon rope (N) stretch qualities are used for those big bruisers that lean over structures, fences or lines. A portable pulley system hooked up to a winchlike "come-along" (C) is used by the surgeon to hoist lumbering trees on their hinge (H) in a safe direction away from buildings.

closer to the trunk than the top cut. When jump cuts are used, surgeons must be exact and alert, as always. Just as the limb comes off at the upper and lower cuts, give it an upward push, and the limb will snap free and clear lines and other obstacles on its way down, butt end first.

Butt Rope: Object For Hinge Safety

A "butt rope" is a rope tied to the butt of a limb or trunk near where it is to be sawed. To be effective, the rope is threaded through a nearby crotch and is used to control or guide the big end of a limb or trunk section. The butt rope may be used to support a hinge cut as a safety measure to prevent breaking the hinge. Sections of limbs or trunks guided by a butt rope are controlled so protected objects are not damaged.

Cradle Limbs In Space

Butt ropes are also used as one end of a "cradle." The cradle is formed where a limb, trunk section, or even a whole treetop is swung by two ropes, one fastened to each end of the tree part. When working the cradle, we often use the crotch of a nearby tree for rope support, then we swing a cut tree section into space and carefully lower to avoid damage.

Nylon Stretch: Trick For Big Bruisers

We have one trick which is our own discovery. It's based upon the stretching qualities of the nylon rope. It has served us long and well, and we could not have done many of our difficult removal jobs without it. We use the "nylon stretch" on those old, big trees which lean backwards over buildings, fences, lines, and other protected structures. Big bruiser trees must be lifted or tilted in the opposite direction from their incline before they are felled.

Most firms use a winch or crane for such jobs. Others employ modified- or developed-tricky techniques commonly used. We are a small outfit and our heaviest piece of equipment is a power saw, but we get more

Why the spring-activated feed plate — an exclusive feature of the **FITCHBURG CHIPPER SAVES YOU MONEY!**



Take a good look at the Fitchburg feed plate. It's patented—no other chipper has this feature. Because the feed plate is *spring-activated*, it "gives" and automatically adjusts to size of wood, up to the machine's rated capacity. Result: No sudden shocks to rotor assembly, engine can be run on lower r.p.m., chipping is smoother, quieter and faster.

No hard-to-control fly wheel. The spring-activated feed plate makes a fly wheel unnecessary. No waiting for fly wheel to speed up, no worries about safety, bearing troubles, or clutch strain. Compare the ease and efficiency of a Fitchburg with *any other* chipper!

ALSO COMPARE THESE OTHER FITCHBURG FEATURES:

- **RUGGED CONSTRUCTION, PRECISION-ENGINEERING.** Bearing seats are precision-bored in heavy duty, trouble-free bearing holders.
- **SAFETY STOP SWITCH** (standard equipment). Stops all moving parts within seconds—gives your crews greater protection.
- **LARGE, HINGED, WAIST-HIGH FEED APRON.** Protects operator from cutters, feed apron can be closed when chipper is not in use, saves space in storage.
- **SOLENOID SWITCH** (optional equipment). Motor can be idled between feedings. Saves fuel and engine wear.
- **PATENTED QUICK-OPENING 2-WAY CHUTE.*** Operator directs chip flow, front or side with flick of wrist. Easy access to steel alloy blades.

FREE — Get full facts about Fitchburg Chippers. Write to the Fitchburg Engineering Corporation, Dept. WTT-62, Fitchburg, Mass.

*Optional Equipment

FITCHBURG ENGINEERING CORPORATION

than our share of difficult removals.

We put a nylon rope in the treetop and lead the rope to another tree, or another anchor, using a "come-along" as our power. The "come-along" is a portable pulley system and is worked like a hand hoist. A 12-foot, steel cable with a hook on the end rolls up on a cylinder that is locked and kept from spinning by ratchets. We use it in treetops, mending split trees, and in cabling and bracing.

Come-alongs are made in one- and one-half-ton capacity sizes for lifting different weights.

With the come-along, we tilt the tree away from structures in danger of being crushed by the felled tree. On trees up to two feet in diameter, with an average sized top, one $\frac{3}{8}$ -inch nylon rope is sufficient. This size is adequate for nearly any tree if it has been topped. On extremely huge trees, however, we use two ropes and two come-alongs. Weight of the tree is not as important as the

fact that we tilt heavy trees against a hinge.

Before cutting, we rig our ropes and come-along. As we cut on the back side of the tree, we increase the pressure on the cable by tightening it. Pressure is kept on the treetop as the cut opens. This indicates that our tilt method is working. The tree must be inclined in the right direction, away from the protected structure, before the cut is completed.

Kickback Dangerous Near Building

One danger in the use of a heavy hinge and strong pull on a large tilted tree when its base is near a building is that the trunk may split at the hinge and kickback against the building. This is especially true of ash and red oak, and with other trees depending on how easily they split and how much tilt pressure is applied. To prevent kickback, we sometimes use a fall cut, but a tree cannot be tilted as far when a fall cut is used as it can be with a hinge. Trees that split easily cannot be tilted as far as one with greater internal cohesion and flexibility such as a gum. The kind of tree must always be considered.

Falling trees are often crowd-gathering events in a neighborhood. We have had audiences of 30 to 40 people on adjoining lots and across the street. It does not hurt customer relations one iota to do a job that spectators know only an expert could do!

Marlow Spray Film Available

A film entitled "A Fact of Life" has been produced by Marlow Division of International Telephone and Telegraph Corp. The sound and color movie, which runs 25 minutes, illustrates and demonstrates the advantages and disadvantages of both high concentrate and conventional type spraying.

Marlow, manufacturer of Econ-O-Mist mist blower, offers the film free of charge, except for return postage, to all groups involved in agricultural enterprises. For information write: "Econ-O-Mist," ITT Marlow, P.O. Box 200, Midland Park, N.J.

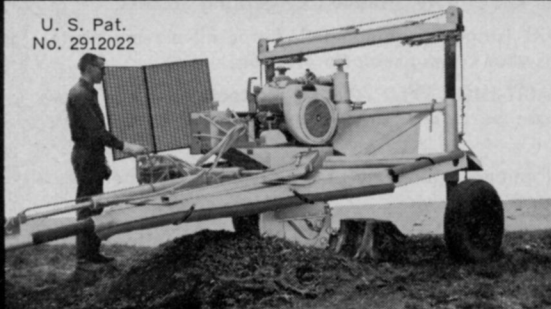
**15
MINUTES
AGO IT
WAS A
STUMP!**



15 minutes or less . . . that's all the time needed to rip the largest stump to chips . . . with the **original, patented Vermeer Pow-R Stump Cutter**. You'll find these ruggedly-built, hydraulically operated machines everywhere—in city parks, cemeteries, golf courses, land clearing projects and residential properties everywhere. Here's a real labor, time and money-saver for municipalities—a proven profit-maker for tree service firms. Available in 5 models to handle every stump removal need—from an occasional stump to hundreds of stumps every week.

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Write for complete information, prices, literature and a Free Demonstration. Thousands in use. Complete sales and service facilities throughout the U. S. and Canada.

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R. F. Lederer New AAN Executive Vice President

Robert F. Lederer, 37, was appointed executive vice president of the American Association of Nurserymen by the organization's board of directors, meeting early last month. He had been serving as acting executive vice president.

After graduation from college in 1953, Lederer joined the staff of the National Cotton Council in Washington, and served that organization as assistant Washington representative until 1958, when he left for a position with the Home Life Insurance Co.

He returned to association work early in 1959 as AAN administrative assistant, whose executive vice president at that time was Dr. Richard P. White. Lederer later became legislative assistant, and in 1961, when Dr. White retired, became executive associate. In his new post, Lederer succeeds Curtis H. Porterfield, who resigned late last year.

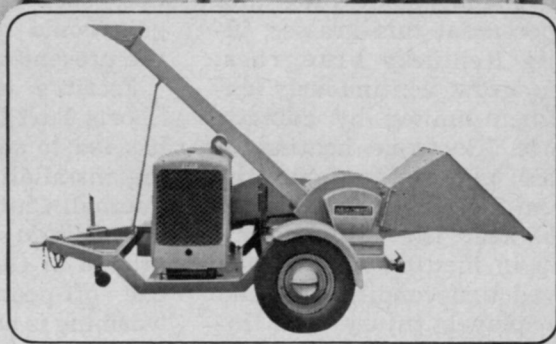
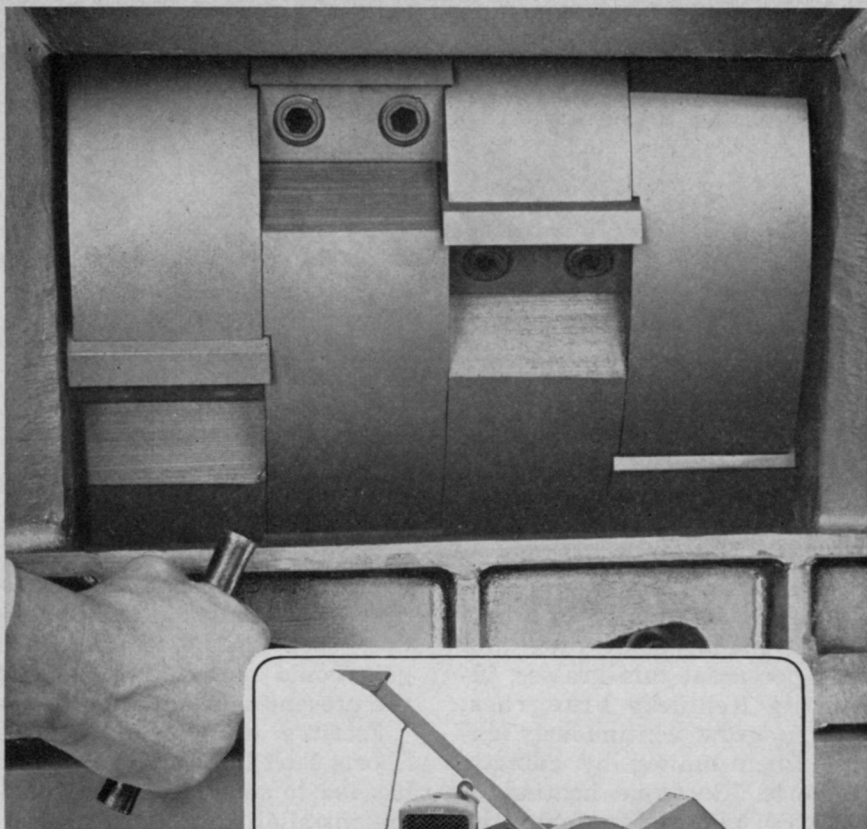
A chartered association executive, Lederer is a member of Directors of the National Council on Business Mail, Inc., Washington Trade Association Executives, National Association Executives Club, National Press Club, Atlantic State Shippers Advisory Board, American Society of Association Executives, National Farm Labor Users Committee, Food Transportation Group, past president of Washington Legislative Luncheon Group, honorary life membership in Delta Kappa Phi Fraternity of America, Inc.

Allis-Chalmers Catalog Out

A complete rundown on the Allis-Chalmers Series II, D-21 turbocharged diesel wheel tractor is contained in a new 20-page illustrated color catalog.

Featured is a series of spreads covering the turbocharged power, construction, and versatility of the tractor. Optional equipment and complete tractor specifications are included.

For a copy of Catalog FE-286 write to the Farm Equipment Division, Allis-Chalmers, Milwaukee, Wis., 53201.



Why do staggered knives chip tree trimmings better?

Why do you get them only on
Mitts and Merrill brush chippers?

Smoother, more economical operation that is easier on the chipper's internal mechanisms are the solid reasons for staggered knife superiority.

Look—most brush chippers use four knives that run the full length of the cutting cylinder. They are spaced around the cylinder at four equal intervals.

M & M, however, divides the same knife length up into 16 smaller knives, spaced only inches apart around the cylinder. Full length knives take only four cuts each time the cylinder revolves. The staggered knives take 16 cuts per revolution.

This faster cutting action draws the log in smoothly and distributes

cutting shock four times more evenly throughout each cylinder revolution. Machine vibration is virtually eliminated; there is less shock per bite; horsepower is used more efficiently; and a lot of fuel is saved.

Knife changing is quicker and easier in M & M design too, because we use a foolproof pin and wedge-lock principle. Knife sharpening is a snap because no angle grinding is required and the double edged knife can be sharpened many times before it needs replacing.

Why can you get staggered knives only on M & M chippers? Because M & M has been the design leader of wood reduction equipment for over 70 years.



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DEPT. WT 70 • SAGINAW, MICHIGAN

Electricity

Warms Soils

for Sport Turf

By DR. WILLIAM H. DANIEL, Turf Specialist, Department of Agronomy, Purdue University,
and JOHN R. BARRETT, JR., Agricultural Engineer, Department of Agricultural Engineering,
Purdue University, and Agricultural Research Service, U. S. Dept. of Agriculture, Lafayette, Indiana

SOIL WARMING is now eligible for acceptance as a part of turf management programs. Most perennial turf grasses, including Kentucky bluegrass, tend to grow continuously except when limited by climatic extremes. Rootzone heating of turfgrass plants can keep the soil from freezing, promote root growth, keep the turf greener, and aid in melting snow. Such improved turf conditions would reduce player injury and in-

crease the precision of games. Also, numerous outdoor activities, such as horseracing and golf, could be extended beyond the present active seasons. Escritt's early work at the Sports Turf Institute in England has led to several electric heating installations there. Everton Football Club was the first to install electric soil warmers in their ground at Goodison Park. Electric, off-peak (low rate) pitch warming is built into the Arsenal

ground at Highbury. Edinburgh, Scotland's Murrayfield rugby football grounds were equipped with electric heating in 1959. At least one stadium in Sweden has electric, and another has water soil warmers.

Turf Heat Tests Started Feb. 1962 at Purdue

Preliminary soil warming studies at Purdue University, Lafayette, Indiana, started on a 20- by 50-foot plot in Feb-

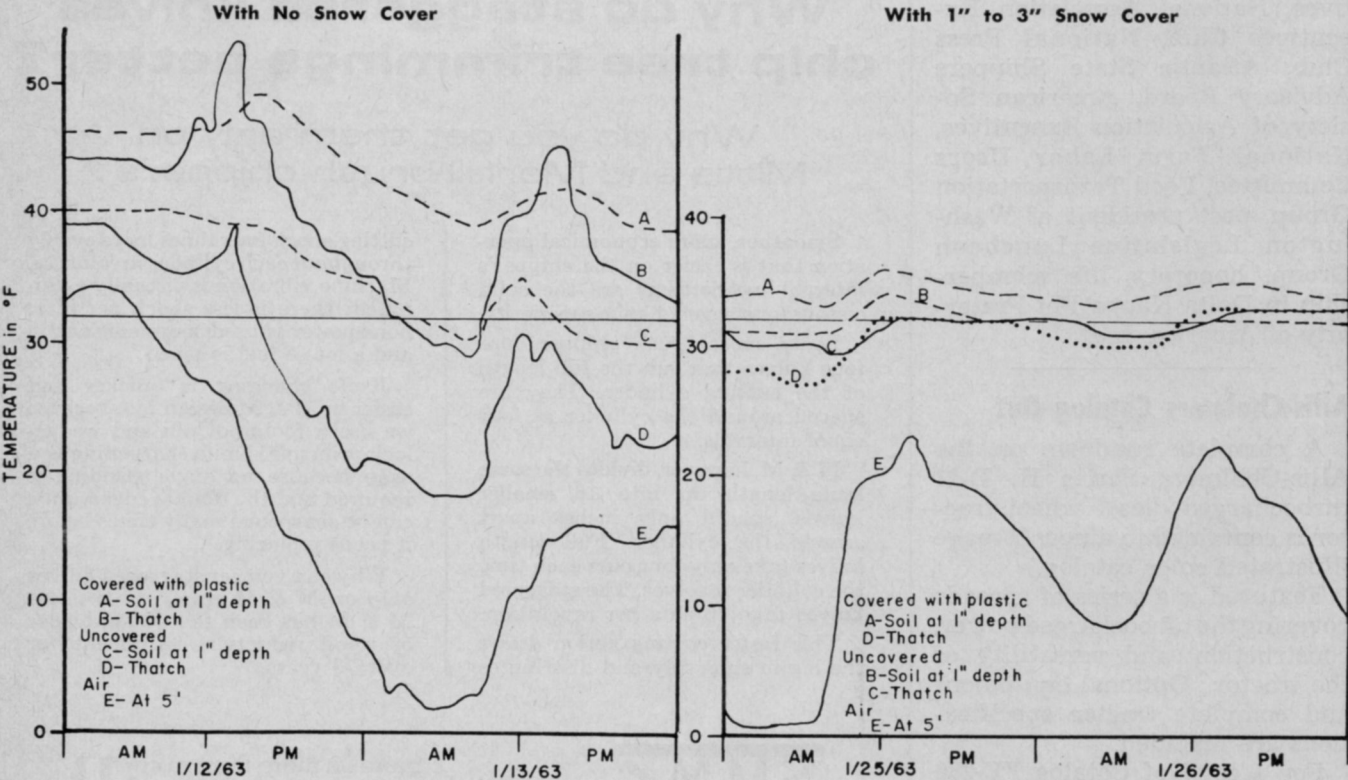


Fig. 1. Temperature fluctuations recorded in thatch, soil 1 inch deep, and in air over electric soil-heating cables that dissipated 1.2 watts per square foot. Right graph shows temperatures recorded when there was a 1- to 3-inch snow cover. Left graph represents temperature changes recorded when plot was not snow covered.

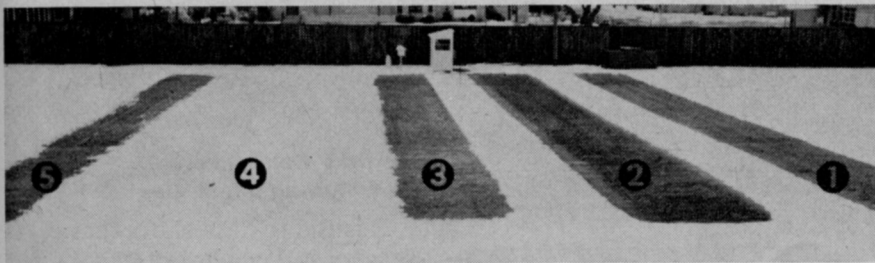


Fig. 2. Snow melting pattern on five electric heated turf plots, installed August 1963, shows that during the 1963-64 winter snow remained on Plot 4. Cables in Plot 4 were spaced 15 inches apart, at least twice as far apart as in the other plots. See Table 1.

An improved experiment was installed in October 1962. Soil was removed from an area 20 by 60 feet, and cables were placed at 4-, 6-, and 8-inch depths with spacings, 6, 12, 18, and 24 inches apart. Different spacing and depths established wattage densities that ranged from 0.8 to 10 watts per square foot. Soil was replaced and firmed over the cables; soil thermostats were buried at 1-inch depths; power cables were laid; then bluegrass sod was placed over the entire area. Energy consumption, soil moisture content, rainfall, relative humidity, and snow-melting data were recorded. To sense abrupt changes in weather, air thermostats were wired in parallel with soil thermostats allowing either to operate the cables.

Plastic covers .004 inch thick utilized solar radiation and warmed the turf by reducing heat loss (Fig. 1). Covers provided both an insulating air layer over the turf and served as a barrier to reduce wind action. Benefits given by plastic covers were:

2. Covering reduced energy

3. Sod roots developed early and were more uniform under plastic covering.

Disadvantages of plastic covers are:

2. Hot, sunny periods may force unwanted, excessive growth.

4. Disease (leafspot) incubation on leaves may be favored by unusually high humidity and warmth under covers.

Little difference was found in soil or turf conditions above cables 4, 6, or 8 inches deep. For better safety and normal protection from mechanical damage,

Rootzones Extend Rapidly When Heated

Temperatures only sufficient enough to keep rootzones thawed and porous produced obvious top growth in early March, three weeks ahead of unwarmed turf. Higher heat inputs that maintained soil temperatures above 45°F, at 1-inch depths favored top growth throughout the winter. Wattage densities of 10 watts per square foot kept the turf thawed at all times. Soil temperatures above 55°F forced some turf growth, even during extended, severely cold weather. However, sharp drops to low temperatures caused some leaf tip damage to rapidly growing grass.

Editor's Note: Practicality of turf heaters was shown last winter when they successfully kept snow off and turf green at a golf course practice green in South Bend, Ind.

never muddy, superwet, or slick from frost action.

Melted Snow Layer Easy To Remove

In plots with heat applied at 10 watts per square foot, snow melted rapidly when air temperatures were above 15°F. At colder air temperatures, melting was slower, although soil remained thawed and turf re-

Table 1. Design and time of actual operation of plots in 1963-64 tests.

Plot	Cable Spacing inches	Watts per sq. ft.	Max. time plots could operate per day hours	Max. time plots operated per season %
1	1.5	4.5	24	74
2	7.5	9.0	24	71
3	7.5	9.0	7	95
4	15.0	4.5	7	97
5	7.5	2.5	24	99

mained green. In cold weather, snow melting from underneath left an air pocket with a crust of snow or ice laced on the grass-blade tips. Heavy snow can be removed quickly by machinery for sport field, turf clearance.

Cables Buried by Knife and Guide Tube

Five plots, 10 by 120 feet, each separated by a 10-foot-wide unheated strip, were installed in the Purdue varsity football practice field (Fig. 2) in August 1963. Poly-vinyl chloride insulated, nylon-jacketed, electric heating cables were laid six inches deep in existing sod. Cables were laid by using a rolling coulter followed by a vertical knife and guide tube for wire burying; all were fastened to the toolbar of a tractor. Cables were spaced either 7½ or 15 inches apart and provided 2.5, 4.5, or 9 watts per square foot. Soil thermostats, air thermostats, and timeclock switches were wired in the control circuits. Turf was smooth enough for football practice immediately after the cable was installed and rolled.

Air Temperature Turns Heat On, Soil Temperature Turns Heat Off

Soil is warmed to prevent it from cooling below root growth temperatures. Air temperature is the best indicator of when heat

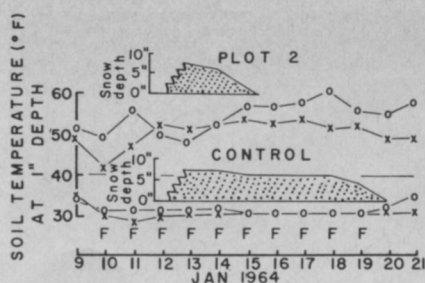


Fig. 3. Temperature changes during a period with snow cover in January 1964. Lines labelled "X" are readings taken at 8 A.M.; lines marked "O" are readings taken at 4 P.M. "F" indicates that the turf was frozen at 8 A.M. Dotted areas in the small graphs show the depth of snow cover and its removal.

should be applied. Temperatures in the soil indicated the heat reserve present and soil thermostats were used as maximum temperature limit-switches to prevent overheating the soil.

Preset timeclocks facilitated using heaters during off-peak

Table 2. Average soil temperature one inch deep at 8 A.M. (F°), 1963-1964.

Plot	Dec.	Jan.	Feb.	Mar.
1	43	40	41	44
2	54	49	52	54
3	42	40	40	46
4	37	35	36	41
5	40	38	38	44
Control	34	32	32	37

Table 3. Number of days turf medium was frozen at 8 A.M., Jan. 1 to March 31, 1964 (91 days).

Plot	Jan.	Feb.	Mar.	Total
1	4	0	0	4
2	0	0	0	0
3	8	1	0	9
4	10	7	2	19
5	11	1	0	12
Control	24	19	7	50

(low rate) periods during early morning hours. Plots 1 and 2 were heated any time the air temperature was less than 40°F, or when soil temperature, 1-inch deep, was less than 45°F, regardless of air temperature. Conversely, heat was not applied when the 1-inch soil temperature was above 60°F, regardless of air temperature. The first test season lasted from November 6, 1963, through April 6, 1964, a period of 152 days (Data are given in Tables 1, 2, 3, and 4).

The second test season lasted from October 9, 1964 to April 12, 1965, a 186-day period (See Fig. 3).

Heaters Ready For Turf Management Use

Results to date show that cold-season soil warming can be included in modern turf management programs. It can be used as a tool to improve playing conditions by thawing soil, melting snow, and maintaining more vigorous turf.

Four seasons of research have been completed at Purdue, and new plots are being installed. Demonstration plots are also located at St. Paul, Minnesota; St. Louis, Missouri; Washington, D. C.; and South Bend, Indiana. Some work has been done in Arizona and Texas under bermudagrass and st. augustinegrass. Turf heater installation in several stadiums where both football and baseball are played is now being considered. However, the first one is yet to be installed.

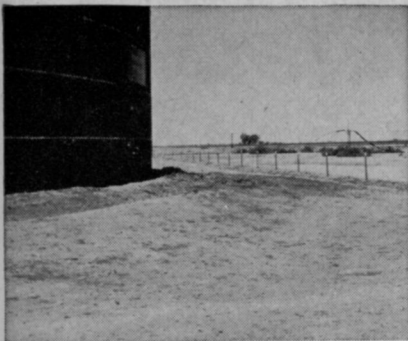
Obviously, the area and use for each turf plot or field, location related to climatic conditions, availability of power, and the grass species used will determine the design of the heating system. An index on which installation requirements may be based is day-degrees (sum of daily average temperature below 65°F for one season). St. Louis, Missouri has approximately 4600; Indianapolis, Indiana has 5500, and St. Paul, Minnesota has 8000.

Specifications for controls and cables, giving 5 watts per square foot, off peak, have been prepared for the new Busch Stadium in St. Louis. Bids are being taken now for installation before sod is laid, and the stadium will be finished by May 1966.

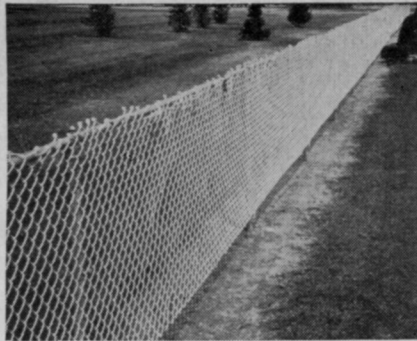
Table 4. Temperatures (F°) at 8 A.M. on January 29, 1964

Soil Depth	Plot 2	Plot 5	Control
Thatch	37	31	29
1 inch	46	34	31
6 inch	61	40	35
1 foot	63	44	37
2 feet	61	45	40
3 feet	60	50	42

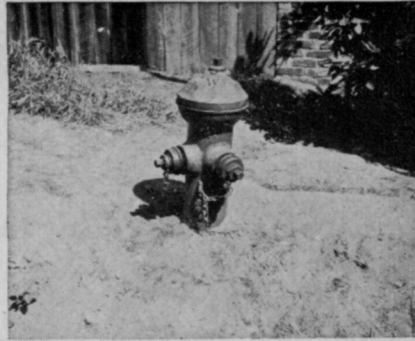
Shaded air temperature was 18 F°



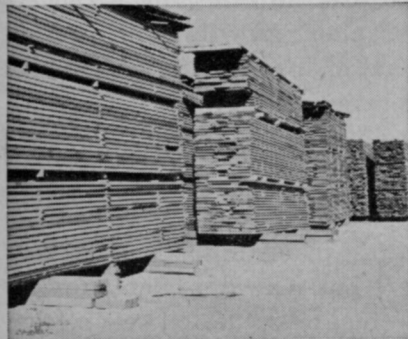
Around this oil pumping station—Hyvar® X bromacil weed killer controlled fire-hazardous vegetation all season. Other products containing bromacil, such as “Hyvar” X-WS, give equally effective control.



Under fence lines—Just one application of “Hyvar” X will control perennial weeds and grasses (such as Johnson, Bermuda, nut, horsetail, plantain, wild carrot, and bouncing bet).



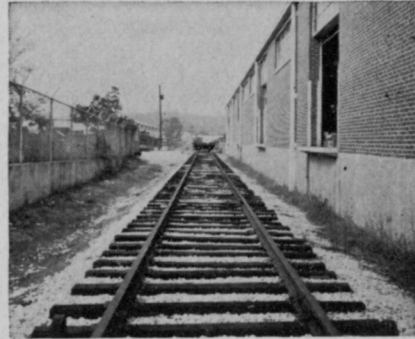
Around fire hydrants—“Hyvar” X is ideal for initial treatment of weeds and grasses because it offers broad-spectrum control and persists in the soil to give long-term, low-cost control.



In lumber yards—Control moisture-holding vegetation that tends to decay lumber. Unwanted vegetation also creates fire hazards during dry periods. Applying “Hyvar” X-WS bromacil prevents these problems.



Around storage warehouses, parking or work areas—Eliminate unsightly weeds that rust equipment, improve the over-all appearance of the sites with “Hyvar” X-WS.



On railroad sidings—Increase the operating efficiency of men and equipment by controlling perennial as well as annual weeds and grasses with “Hyvar” X-WS.

Profit by expanded business— Offer weed control service to your customers based on DuPont Weed Killers

There's profit in weed control—it's a multi-million dollar industry. Du Pont weed killers make custom weed control jobs easy, effective, and profitable for you around industrial sites, lumber yards, storage areas, fence lines, railroad sidings, substations, poyards, tank farms, utilities... wherever unwanted vegetation is a problem.

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New “Hyvar” X-WS bromacil weed killer is a soluble powder designed primarily for situations where agitation in the spray tank is impractical or marginal. Once stirred in solution, “Hyvar” X-WS doesn't require additional mixing or agitation. Time-proven Karmex® diuron weed killer gives versatile, effective, long-term control of a wide range of weeds and grasses.

In addition to weed control, you can offer your customers effective brush control with Du Pont Ammate® X weed

and brush killer and Dybar® fenuron weed and brush killer. You can control brush without injury to nearby vapor-sensitive crops with “Ammate” X because it's non-volatile. On light-to-medium stands of brush or in areas equipment can't reach, easy-to-use pellets of “Dybar”, applied right from the package, do an effective job. Be of additional service to your customers by offering them weed and brush control with dependable Du Pont products.

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Turfgrass Photo Pointers

By TOM MASCARO, President, West Point Products Company

Problems caused by the misuse of turf chemicals and what to do about them



Fuel Oil Damage

Turfgrasses around fuel oil intakes on lawns are often subjected to this type of damage. When fuel oil is spilled on turf, it kills the plant. If enough is spilled to soak into the soil, it renders the soil useless for plant growth. The fuel oil cannot be leached out of the soil, and will remain in it for extremely long periods.

The only solution is to dig the soil out and replace it with new soil. Depth of the soil removed should be well below the layer that is saturated. If this is not done, grass plants in the new soil may germinate and grow but may die later on when the roots reach the fuel-oil-saturated soil below.

Loose stone, sand, or any porous material can be used around the intake pipe to catch drippings from the delivery hose. A circle 8 to 12 inches in diameter is sufficient.

If the problem occurs again, the best solution would be to change fuel oil dealers!

Weed Killer Damage

Although all good weed control chemicals carry detailed instructions regarding rates of application, etc., it still requires the ultimate user to use good judgment and common sense regarding how and when they are applied.

In this case (and one that occurs quite often) the material was carefully applied on the road shoulder between the road and the lawn. It was heavily infested with weeds. Unfortunately, a heavy downpour immediately following application of the chemical washed the materials down into the turf. As advertised the chemical did a good job of eradication on the weeds—and the lawn.



(Two more photo pointers on page 20)



Geigy now offers you five industrial herbicides.

All five Geigy industrial herbicides deliver long-lasting residual control of annual and perennial weeds. With once-a-year application, too. Yet, each one has special features to solve specific problems. As a group, they'll handle just about any weed problem you encounter. On level land, or slopes. In and along paths, drives, lots, and roads. Around buildings, signs, markers, fences, and poles. Everywhere weeds are not wanted.

ATRAZINE 80W. Wettable powder. For spray application before or soon after weeds emerge.

SIMAZINE 80W. Wettable powder. For spray application before weeds emerge.

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ATRA-BOR™ 8P. Pellets. Contains Atrazine. For dry application where sprays are impractical.

PRAMITOL® 5P. Pellets. Combina-

tion of Pramitol and chlorate-borate. Especially effective against deep-rooted perennials.

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Fertilizer Burn

Some fertilizers will severely burn turf under certain conditions. Nitrogenous fertilizer materials can be classified into three groups. They include:

- Inorganic chemical compounds
- Natural organics
- Ureaform compounds

Natural organics and ureaform compounds are relatively safe and do not burn the turf. The Inorganic compounds commonly called chemical fertilizer contain ammonium sulphate and ammonium nitrate, or synthetics such as urea and cyanamid. These materials are highly water soluble and convert quickly into ammonia and nitrates. When any of these materials are applied to turf, they will cause severe burning, unless watered in promptly.



Poor Weed Control Application

This photo shows what can happen when an inexperienced operator applies weed control chemicals. The dark strips are where the operator missed. Accuracy of application is extremely important. The best and most expensive spray equipment is worthless without a trained operator. Calibrations, pressures, width of boom, and speed of travel are all inter-related. Training the operator is as important as selecting the chemical.

Only when all these factors are considered, can one be assured of a good weed control program.

~~~~~  
Over \$75 million is spent annually on chemicals for turfgrass maintenance.

Keep up to date on how to use them properly. Follow label instructions,  
attend regional conferences, and read *Weeds Trees and Turf*.



# Fogbound?

# Use VISTIK\*



## The New Money-Saving Thickener That Reduces Spray Drift

VISTIK, a low-cost cellulose polymer is specially designed to reduce herbicide spray drift. It is an easy-to-handle free-flowing white powder that can be quickly mixed with a herbicide solution. After adding VISTIK, the applicator can begin to spray in 10 minutes or less! No need for special or expensive apparatus. The equipment you are now using can be employed more efficiently than ever!

See for yourself how effective VISTIK is in an actual spray test. The illustration at top left shows unthickened particles drifting wildly. At right, with VISTIK added to the solution, a pattern of tight, heavy drops falls where needed. VISTIK does not affect the potency of the herbicide, but simply thickens the water used as a carrier. Get further information about VISTIK — perhaps the most inexpensive spray

control chemical currently available. Fill out the coupon below, and we will be happy to forward more data. **Cellulose and Protein Products Department, Hercules Powder Company, Wilmington, Delaware 19899.**



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Applications for clearance of Vistik by State and Federal regulatory agencies are currently in progress.

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# How Cal-Turf Plants and Grows Bermuda Stolons

While the turgrass industry in California is very young in comparison to other parts of the country, rapid advancement has been made in stolon handling and planting methods in its few short years of existence.

Introduction of the improved Tifton-developed hybrid bermudagrass has contributed a great deal to the turf industry in the West. These new varieties are filling a very definite need for the buyer who wants a quality recreational turf, which often must serve the heavy demands of multiple recreation uses.

At present, three varieties of hybrid bermudas, Tifway, Tifgreen, and Sunturf, are grown at two locations. Several characteristics differentiate the hybrid bermudas from the common variety. Most noticeable is the finer texture of the hybrids. The fineness of leaf and stem enables them to form a tight, dense turf which resists wear. Weed infestation is minimized by the tightness of the turf. A longer growth period allows the hybrids to begin growing earlier in the spring and continue longer in the fall, thus holding their color longer than the common bermuda. Seedheads of the hybrids are sterile, making confinement to a given area much easier. The rate of

By **DICK MORROW**

Field Representative, Cal-Turf  
Camarillo, California

establishment of these improved bermudas by planting stolons is considerably faster than by seeding, an important fact to consider when time is essential.

The combined factors of large areas, heavy use, and limited maintenance make up the usual problem that schools, parks, and recreational areas must solve. Turf installations are often subjected to abnormally hard and prolonged use. All too often, these large, heavily used grass areas are maintained under a very limited budget. To survive under these conditions, the grass must be especially hardy, disease resistant, wear resistant, and have fast and complete recovery characteristics from wear. The hybrid bermudas are outstanding in all these respects, when planted in their adaptable areas throughout California.

To date, the most common installation for hybrid bermudas has been football fields, but wider use on golf fairways and other athletic facilities is becoming more popular. Two of the first golf courses in California to plant hybrids on all fairways was the La Canada Country Club and the San Marcos Golf Course lo-

cated in those respective cities. The expanding market and new applications include some highway rights-of-way, parks, and industrial sites.

Present company policy is to concentrate solely on the growing and supplying of material and planting equipment to landscape contractors and custom applicators. In some cases where the buyer is doing the installation and no contractor is involved in the work, we offer assistance and make the specialized planters available at the same rental charge as offered contractors.

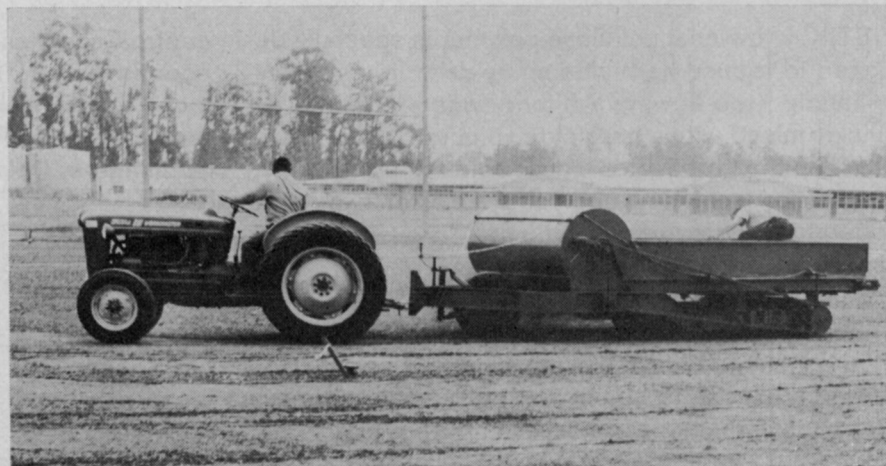
At both of our turfgrass farms, the Camarillo location and the northern growing grounds located at Patterson, California, a constant effort has been made to produce and plant good quality stolons with as little labor and handling as possible.

## Growing

In the production phase of our operation, a modernization program meant the introduction of a system of fumigation that could handle the job of application of fumigant to all growing grounds prior to planting. Initial efforts to attempt this preplant operation of weed, disease, and nematode control on all areas where sod and stolons were to be grown proved costly. A system has been

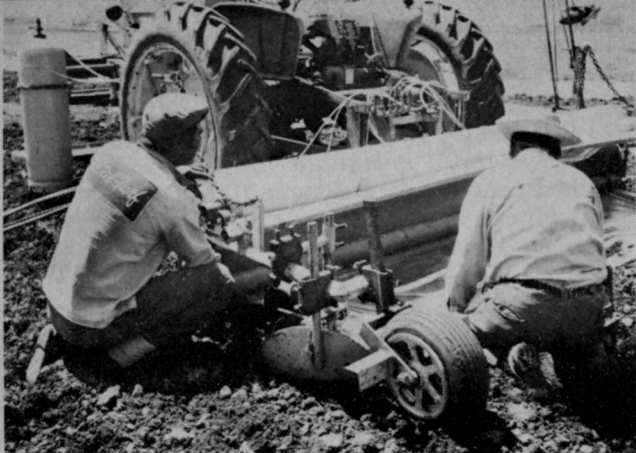


**Small area planter** automatically distributes and presses bermuda stolons into soil and plants half acre per hour. Capacity is 10 bushels.

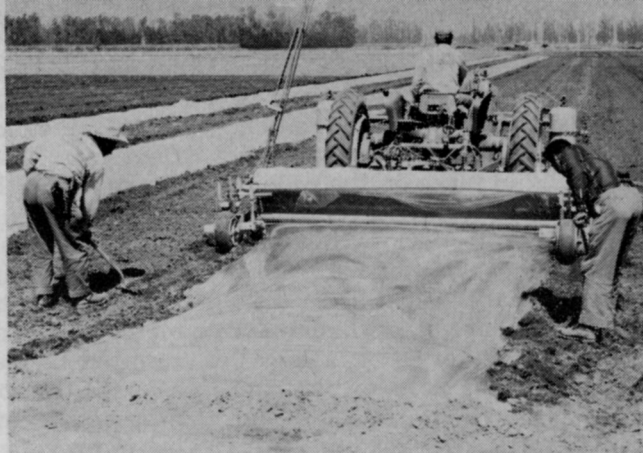


**Large area stolonizer** has sufficient weight to leave new-planted areas smooth. The machine is drawn by a tractor with a three-point hitch. Working capacity of this larger planter is a total of 20 acres per day. Cal-Turf rents this unit to contractors buying its stolons.





**Plastic sheeting** is readied for field fumigation. Disc in foreground tosses soil into plastic; rubber wheels follow to seal edge into soil.



**Three men can fumigate** one to two acres per hour. Direct injection method is used with pressurized fumigant cylinders mounted on tractor.

developed and at the present time costs have been reduced to an average of \$400.00 per acre. A direct line injection method is employed with pressurized cylinders of fumigant mounted on a tractor with control valves within easy reach of the operator. Plastic tarp laying follows immediately from the rolls mounted on the back of the tractor. Three men can fumigate from one to two acres per hour, depending on the length of the field run. Ideal conditions require little to no wind, and adequate soil moisture. Recent development of a machine to remove the plastic sheeting from the fields, by the Tri-Cal Co. of Placentia, Calif., a firm that specializes in fumigation techniques, may further reduce costs.

In a master plan for the growing areas, an attempt to isolate various varieties has been made. Every employee is made aware that purity of strain is of utmost

importance and a necessary requirement for a solid foundation, for future sales and company growth. Special equipment is assigned to each variety and when moved into a different block due to unavoidable conditions, the equipment is thoroughly cleaned with air hoses and then steam cleaned, to avoid any contamination.

Introduction of a certification program by the California Crop Improvement Association, calls for a 50-foot strip between similar species. This restriction has emphasized the need for careful planting of future growing areas to utilize all land to the best advantage. Only basic material of a known origin is used for any planting. The aim of our production crews is to harvest only mature material; experience has proven the best stolons have a large number of nodes and the material has been hardened off to reduce transplanting shock.

All hybrid bermuda stolon growing blocks are kept at approximately two inches high, with minimum water and fertilizer applications. Since it is our desire to harvest material that consists of a majority of heavy rhizome growth that can withstand some possible neglect conditions after planting, only material that is at least one year old is harvested.

### Harvesting

Our harvesting operation begins with the area being cut with a sod cutter slightly below the soil level. The stolon harvester, pulled by a tractor, feeds the cut material onto a conveyor belt that carries it into the machine which cuts, shreds, and screens it. Cutting knives are set to cut the majority of the material two and one half inches long. It is then fed automatically into the bins which are carried on the



**New machine**, developed by Tri-Cal Co., fumigation technique specialists, quickly removes sheeting prior to planting; reduces labor costs.



**Hybrid bermuda harvester** shreds, chops, and screens stolons in one operation; conveys them into bulk bins carried on back of machine.

back platform of the machine. One bin is always in reserve to avoid any delay in the operation. As one bin is filled, the reserve bin is slid in place on the rollers. The new harvester, developed at the Camarillo farms this past winter, is capable of harvesting up to 1200 bushels per hour. Two sizes of bins are used; the largest has a capacity of 90 bushels.

A forklift is used to pick the filled bins out of the field and deliver them to the loading ramp, where they are iced and loaded

for shipment. Most harvesting is scheduled for late afternoon when the stolons have lost their field heat. With this new system of handling bulk packed bermuda stolons, an equal amount of material can be harvested in one hour, that only a year ago took eight hours. This new method of stolon handling has resulted in fresher material because of the speed and thoroughness of the operation, and is a big improvement on older methods. Although only one of these

machines has been built for the southern farms, work has already begun in our shops to build a similar one for the Patterson farms since it has proved satisfactory.

### Planting

In the Southwest, the ideal planting season for hybrid bermudas is short. Because of the wide climate variations, no exact dates can be set, but the most favorable time is considered from the middle of March until the end of September. During the cool season, more planting is being done with an overseeding, usually Creeping Red fescue is specified at 80 to 100 pounds to the acre.

Very little fumigation of the sites to be planted is done, even with the excellent application equipment available. Where fumigation does precede planting, it is very evident that it is an excellent practice and pays dividends in the absence of weeds and getting a fast stand of grass. Much of the planting is done in heavier type soil that has been amended, usually with redwood, sawdust or chips, or in some cases, large quantities of steer manure is used. For ideal planting, the top couple of inches of soil should be loose with some moisture.

### New Stolon Planter

Development of a new stolonizer this year is the result of five years of work with varying methods of planting that started with a four-man row sprigger. The machine automatically distributes stolons evenly on the prepared surface and simultaneously presses them into the soil and rolls the area smooth. The machine is drawn with a tractor and is capable of planting up to 20 acres a day. The rate of planting can be varied according to the amount of plant material placed in the self-feeding hopper. A steel hood was incorporated over the distribution tines, which directs the material downward. This hood is especially useful when planting during high winds to prevent any blowing of stolons.

A set of cup discs can be lowered to break any surface soil

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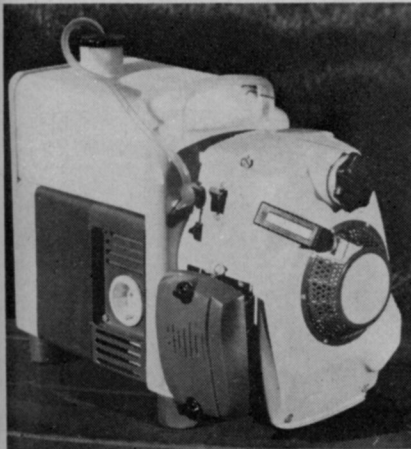


# What Can You Do with One SOLO Engine?



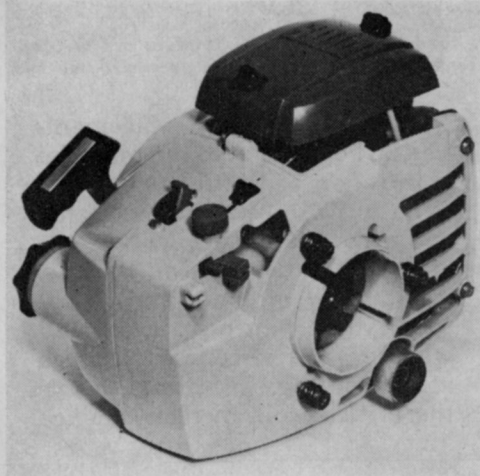
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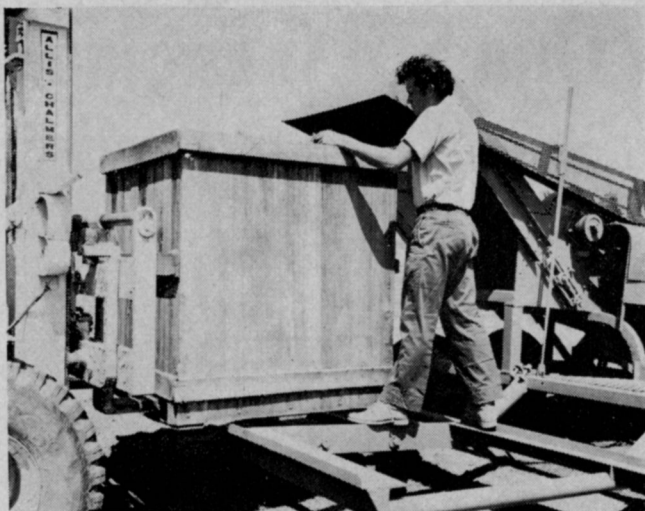
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**Large bins** are easily unloaded from harvester. Loaded, bins weigh 900 lbs. Empty bin is quickly slid in place for continuous harvesting.



**Stolons are bagged** right in the field to assure freshness. Operation is scheduled for late afternoon when stolons have lost field heat.

crust. Two sets of offset straight discs, spaced two inches apart, presses the material into the soil for good contact.

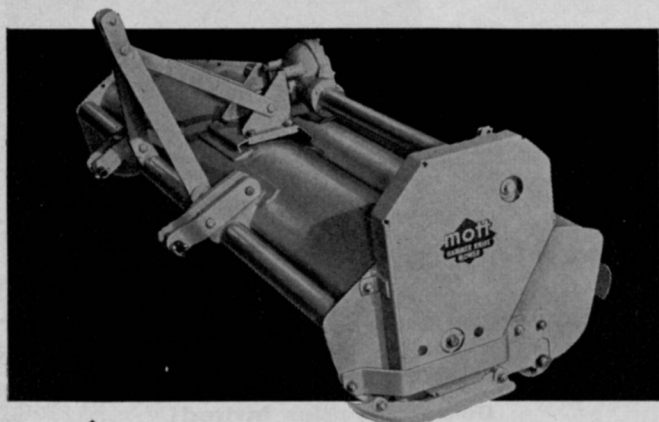
#### Stolon Placement Controlled

The majority of the stolons are placed in the top one-half inch of soil. Incorporated in the new machine is a guide wheel that can be raised or lowered to con-

trol depth of stolon placement. The last operation of the machine is a roller of sufficient weight to pack the soil around the plants and leave the surface level. Rate of coverage depends on amount and quality of the material applied, the temperature and weather, and of course, the care after planting. Water also plays the critical role in maintenance

after planting. Stolonizing is always done with regard to the layout and the sprinkler sequence pattern; care is always taken not to plant too far ahead of watering. A maximum time delay before watering is very dependent on whether it is a bright, hot day or a cool and cloudy day, but never do we exceed this general guide: (100°-15 minutes,

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Bagged stolons, two and a half inches long, are loaded onto huge trailer and then quickly iced to protect quality during transport.

90°-20 minutes, 80°-30 minutes, 70°-1 hour). When possible, all planting is scheduled for early morning or late afternoon, especially during extremely hot weather.

After planting, quick coverage becomes the immediate objective. This means adequate irrigation, fertilization, and early and regular mowing. The results of

the planting will depend, to a great extent, on the willingness of the buyer to provide a good maintenance program.

In an effort to observe new varieties being developed throughout the country, the company has established plots at both growing grounds. The most promising varieties are being observed for possible future plant-

ings after they are proven to have desirable characteristics and will adapt to the varied California soil and climatic conditions. With regard to expansion, options have been taken on new growing grounds, to insure the firm areas to expand, to keep pace with this young, but fast-growing turf industry throughout the state.

## try this simple test...



Take an object weighing twenty pounds into your hands (the vacuum cleaner is just fine) . . . Kneel down with it . . . Now, still crouching . . . move ahead five feet . . . now five more . . . stand up . . . kneel down . . . move ahead another five feet . . .

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# Expanding Overseas Market Competing for Chemicals, Manpower, 20th Northeastern Weed Meet Hears in New York Last Month

"A new demand for trained personnel and product distribution is coming from the foreign weed control market," Dr. William R. Furtick, Oregon State University in Corvallis, told delegates to the 20th Annual Northeastern Weed Control Conference. Almost 700 weed control contractors, highway and utility workers, horticulturists, and researchers attended the three-day conclave at New York City's Hotel Astor, Jan. 5-7, honoring pioneers in the weed control field whose work during the last two decades has made this group's annual sessions one of the country's most educational conferences. The concurrent subway strike, which created massive chaos for New York City, did little to dampen delegates' interest and enthusiasm for this year's fact-filled program. Only minor arrival and departure inconveniences held total attendance slightly under last year's record enrollment.

"Weed control is one of the most rapidly growing fields today in this country," Dr. Furtick continued, "and now international sales have exceeded domestic use. Demand for additional trained personnel in the USA will increase more than ever before. We already have a serious shortage. And now the growth of the foreign market further complicates the problem," he observed during the first session of the combined technical- and use-oriented weed control meet.

Serving needs of conference delegates were reports of test results on weed control methods, chemicals, and equipment, given by contract applicators, researchers, and representatives from industrial, university, and governmental organizations.

## New Products from Industry

Among the new products being offered weed controllers, nine new herbicides were described for potential use in non-agricultural fields. Dr. Robert Metz of Niagara Chemical Corp. chaired the panel of chemical company researchers.

Dr. Mark B. Weed, Agricul-



Dr. Stan N. Fertig, Cornell University, Ithaca, N. Y., discussed preemergence treatments for weed control. He also co-authored a report with Dr. Armin H. Furrer, from Rutgers University, on fall treatments for quackgrass control in clay soils.

tural Research Section of the E. I. duPont de Nemours & Co., Inc., introduced the first new herbicide, Sinbar, formerly known as test chemical 732. "Sinbar," he said, "is a uracil-type compound which has controlled deep-rooted annual weeds and perennials during test trials. Its oral LD<sub>50</sub> to rats is 1,000 mg./kg. Toxicity tests in feeding studies with dogs and rats are in process. Sinbar inhibits photosynthesis and leaves the plant in a chlorotic state with stems and leaves somewhat faded." Weed explained, "It has given good control of quackgrass at 2 to 4 lbs. per acre. Plants pick the chemical up through their roots, and apparently there is no translocation of it downward into the soil."

Hooker Chemical Co. researcher, Dr. L. G. Butler, described their new product, Glytac. "Its technical name is ethylene glycol bis- (trichloroacetate), and has an oral LD<sub>50</sub> to rats of 7,000 mg./kg. Use of Glytac is now restricted to the Delta area, and is not used on crop plants," he said. Tests have shown that Glytac's herbicidal activities are reduced when it is applied as an emulsion. Hooker recommends

its dilution in an oil solvent. Among the weeds controlled, Butler listed johnsongrass, quackgrass, and broadleaf annuals.


Richard Otten, Amchem Products, reported on his firm's new herbicide, Sindone, formerly known as D 263. It is a mixture of 1,1-dimethyl-4,6-di isopropyl 5 indanyl ethyl ketone and 1,1-dimethyl-4,6-di isopropyl 7 indanyl ethyl ketone. "During trials, this herbicide controlled hairy crabgrass, goosegrass, and most seedling grass weeds. It should be applied at 8 to 10 lbs. per acre for weed control in turf. It controlled weeds after preplant soil and preemergence applications."

"Application to register Paraquat for nonagriculture use has been made," J. P. Good of Chevron Chemical Co. disclosed. "It will be especially useful in grass seed bed applications, but Paraquat should not be used with anionic wetting agents." The herbicide, insoluble in most organic solvents, is soluble in water. Its oral LD<sub>50</sub> to rats is 115 mg./kg., and has a very short residue period.

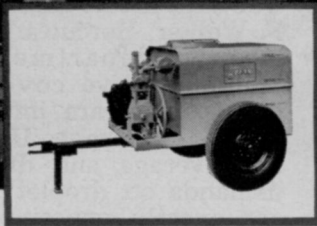
Velcisol's coded herbicide, OCS-21799, was explained by Dr. Warren H. Zick. The chemical name for this new entry is 2-(4-chloro-o-tolyloxy)-N-methoxyacetamide. "The potassium salt of this compound is formulated in water as the herbicide, and its oral LD<sub>50</sub> to rats is 175 mg./kg. Results from two test seasons have shown high general herbicidal activity when applied both preemergence or postemergence. Currently, combinations of Banvel-D and OCS-21799 are being tested, and 1:2, 1:3, and 1:4 ratio formulations will be available," Zick concluded.

"Now formulated as a 75% wettable powder, Planavin (SD 11831) is used primarily for weed control in cotton but does look promising on turf. However, it is not yet registered for such use," Dr. R. H. Schieferstein, Shell Development Co., said. "As a preemergence herbicide, Planavin is very active, and

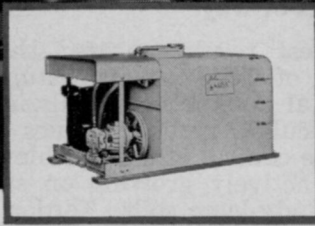


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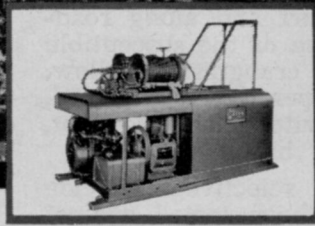
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## JOHN BEAN DIVISION

Lansing, Mich. - Orlando, Fla. - San Jose, Calif.

has a low oral LD<sub>50</sub> to rats of 2000 mg./kg.

"Niagara Chemical Division of FMC Corp. is developing a new herbicide, NIA 11092, for low-rate nonagriculture use," Dr. Richard W. Bushing, from Niagara's Middleport, N. Y., headquarters, told delegates. "It is now formulated as granules, a wettable powder, or 1 lb./gal. emulsifiable concentrate. It has a low LD<sub>50</sub> rating orally to rats at 3,000 mg./kg." Bushing said that 3 to 5 lbs./A. should be used for annual weeds and up to 6 lbs./A. for woody-rooted perennials. Applied at 2 lbs. per 100 gals., NIA 11092 will defoliate conifers and maples within 6 weeks.

Rohm & Haas Co. researcher, Dr. V. H. Unger, described two experimental herbicides BV-201 and BV-207. Both are formulated as either a 40% wettable powder or an emulsifiable concentrate at 1.5 lbs./gal. Each is soluble in organic solvents and only slightly soluble in water. "To date, most tests have been made on weed control in agronomic crops," Unger explained, "but these compounds applied at from 2 to 6 lbs./A. were effective on some 30 weeds species found in turf and along roadsides." Some of the susceptible species are crabgrass, mallow, chickweed, pennycress, pigweed, purslane, witchgrass, crowfoot, and annual bluegrass.

"Another selective herbicide which has been tested against many annual weeds is Patoran, a product of CIBA Corp., available in technical form or as a 50% wettable powder. It has been tested against 29 weed spe-

cies and gave control at from 1 to 4 lbs./A. During standard sensitivity tests, beets, most cucurbits, most cole crops, and tomatoes were found to be susceptible to it," Dr. R. B. Seely of CIBA, summarized at the close of the new products session.

#### Drift Control Additives Tested

"Our research in a small wind tunnel revealed that particulated sprays reduced drift potential to less than 1% compared with unmodified water-solution sprays," B. C. Byrd, Technical Specialist for The Dow Chemical Co. explained during a session on utility and railroad weed control. Particulated sprays are formed by adding special chemicals to mixtures of water and herbicide. Uniform and larger particles are formed from herbicide droplets so the spray is less subject to air currents. "Field tests tend to substantiate wind tunnel results. In nine different states, Norbak (a particulating agent) prevented off-right-of-way damage by confining the herbicide, Tordon, to intended targets when sprayed from helicopters. There was little effect on plants off the rights-of-way.

"Test results showed that 2 gals. of Tordon 101 mixture in a total volume of 10 gals./A. of particulate spray provides adequate control of susceptible species actively growing on sandy or sandy-loam soils. Tordon 101 mixture is .54 lb./gal. of 4-amino-3,5,6-trichloropicolinic acid and 2 lb./gal. of 2,4-D as the triisopropanolamine salt. On rocky areas, clay soils, or where brush



Graduate assistant, A. B. Rogerson from Virginia Polytechnic Institute, reported on the effectiveness of soil sterilants under highway guardrails. His research was planned with Doctors T. O. Evrard and W. E. Chappell, both staffers at V.P.I.

is covered with dense vines, 3 gals. in 15, or 4 gals. in 20, may be needed to control less susceptible species. Double applications at 1/2 rate per swath, and during periods of active plant growth, have given consistent and most effective results," Byrd told the weedmen.

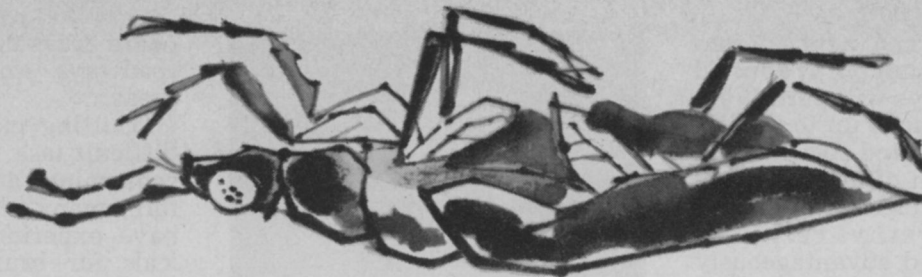
On the subject of drift control with invert emulsions, John F. Walker, Hercules Powder Co. research department, added, "Both effective coverage and drift control are influenced by droplet size range. Unfortunately, coverage and drift control demands on droplet size range are exactly opposite. Right-of-way spraying, usually done by aircraft at a substantial altitude, calls for strict drift control. Here, a large droplet size is necessary so that herbicide will hit only the weedy targets." Walker explained that, on the other hand, spraying very large areas at low altitudes, or from the ground, necessitates small droplet size to get good coverage. Drift in this case would be held to a minimum since the spray is applied near the ground. "We now know that properties of invert emulsions are variable and in any piece of equipment, aerial or ground rig, requirements of invert applications can be met by adjusting characteristics of the invert emulsion, either in the field or lab."

J. W. Suggitt, research chemist for the Hydro-Electric Power Commission of Ontario, Canada, pointed out, "Where herbicides must be applied to right-of-way



Registration was nearly 700 at the 20th Annual Northeastern Weed Control Conference at the Hotel Astor in New York City. Weed controllers, suppliers, and researchers were processed rapidly under the supervision of Dr. and Mrs. John A. Meade. Dr. Meade, 1965 Secretary-Treasurer, organized the check-in process and helped maintain its steady flow.





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or roadside brush next to sensitive crops, simply prepared thickened sprays will permit applications in winds up to 8 miles per hour. This wind speed would halt application of normal spray mixtures. Herbicides thickened with hydroxyethyl cellulose (HEC) are used advantageously where slower drying and greater leaf retention are needed. Such mixtures minimize the number of very small droplets and reduce the risk of damage to adjacent sensitive plants by wind drift."

#### Plants Affect Public Waters

"Vegetation that grows next to public water supply reservoirs, and next to the streams that supply these reservoirs, directly influence both the quality and quantity of stored water," William I. Boyd, E. I. duPont de Nemours & Co., explained during the utilities weed control session. "In supply streams, leaves hamper the flow of water. They clog screens, plugs, and valves, as well as affect the taste, color, and quality of water.

"There are two approaches to



William I. Boyd, from E. I. duPont, told weedmen about factors that should be considered when controlling weeds near public water supplies. "DuPont has conducted large-scale field tests during the summers of 1962, 1963, and 1964 to see whether residues could result from typical applications," he said.

vegetation control in areas bordering public water supplies," Boyd added. "One is to prevent or remove growth of troublesome broadleaved brush; the other is to establish conifers to prevent the accumulation of leaves in the water and, at the same time to prevent erosion. However, even in a conifer program with pines or spruce, leafy plants cause problems in free-

board areas next to water, along roadways, and other service areas.

"Cutting plants is not only a difficult task, but it can be time consuming and costly. Therefore, many chemical companies have experimented with chemicals for brush control," Boyd explained. He outlined that, by law, such chemicals shall not reside in drinking waters beyond the limits set forth by the U. S. Public Health Service. He told the delegates that for three years DuPont has tested Ammate herbicide applied with a mistblower for vegetation control around water reservoirs. Concentrations of up to 4 lbs. of Ammate per gallon of water gave good results, he said.

#### Fenac Tested in Ponds

Madalene E. Pierce, Vassar College at Poughkeepsie, N. Y., reported results from treating four ponds with a 10% concentrate of Fenac. "The ponds were on the Vassar Campus, each less than one acre and with no appreciable inlet or outlet. Two received enough chemical to give a 1-part-per-million dosage

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concentration, one pond had 2 ppm, and the fourth 3 ppm.

"Applications of granular Fenac were made on June 8, 1965. Their effects on pond plant and animal life were tabulated six times between June 11 and September 23, 1965.

"*Potamogeton pusillus*, a submergent weed, was eradicated at 2 ppm, and the same concentration greatly reduced *Lemna minor*, a surface weed. *Wolffia columbiana*, another surface weed, was resistant to all concentrations; however it was

slightly reduced in an open pond treated at 2 ppm. *Potamogeton crispus*, a submergent weed, was eradicated by a dosage of only 1 ppm, but winter buds were produced later.

"Water temperature remained for the most part between 64°F and 68°F and never exceeded 70°F.

The aquatic biologist added that plankton organisms, small invertebrates, frogs, turtles, and adult and young fishes seemed unaffected by the Fenac treatments. The chemical name of

Fenac is 2,3,6-trichlorophenyl acetic acid.

#### **Simazine Controlled Aquatic Weeds**

"The effects of simazine on aquatic plants seem to depend on the amount of the chemical applied," David L. Sutton, Virginia Agricultural Experiment Station, Blacksburg, divulged during the aquatic weed control session. "Higher concentrations usually control a wider range of plants. During our tests, using eight applications ranging from 2 to 4 ppm in water, nearly 65% of the simazine remained after one week. Of three applications from 0.6 to 1.5 ppm, about 30% of the simazine was still present one week after treatment.

"In greenhouse tests, we found there are at least three ways that simazine may be removed from the water: (1) adsorption to the soil or glass, (2) volatilization, or (3) removal by a plant species, namely *Oedogonium* sp. used in our tests.

"In subsequent tests conducted in seven ponds, it was found that repeated applications with simazine seemed more effective for control of filamentous algae than for *Chara* spp. or higher plants. *Eleocharis* spp. did not seem to be effected by simazine treatments; however, there was some damage done to this species along a pond bank. In all pond treatments, there was no control of any aquatic plants with five applications of 0.1 ppm," Sutton concluded.

#### **Chemicals and Management Control Turf Weeds**

Weed control in turfgrass was featured in sessions all day Thursday. More than 15 speakers from university research departments and agricultural experiment stations reported on results from their current weed control tests.

"To adequately suppress broadleaf weeds in Kentucky bluegrass varieties," Dr. C. R. Funk, Associate Research Professor at Rutgers University, said, "our tests show that good fertility is needed. At closer cutting heights,  $\frac{3}{4}$  inch and  $1\frac{1}{2}$  inch, competition was most severe from broadleaf weeds when compared with plots of grass cut to  $2\frac{1}{2}$  inches.

"Fertilizer levels in Kentucky bluegrasses influence their sus-

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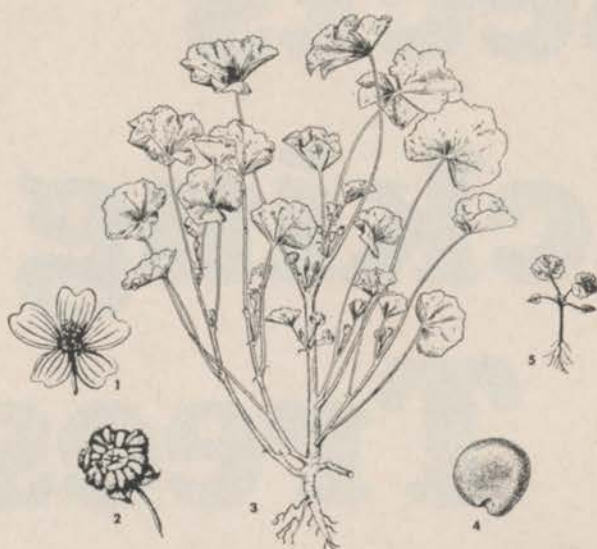


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## Common Mallow

(*Malva neglecta*)



Introduced from Eurasia, common mallow is widespread throughout North America. It inhabits moist, loamy soil types and grows in yards, gardens, and cultivated fields.

Other common names for this species are round-leaf mallow, running mallow, cheeses, buttonweed, and low mallow. It is annual or a short-lived perennial species, sometimes called biennial and reproduces only by seeds.

Growth habit is semiprostrate; stems extend upward or they grow laterally from the crown at ground level. Seedlings (5) may grow, for a short time, both upward and laterally. Stems are hairy and may be 3 feet long. A deep, fibrous taproot (3) supports the plant.

Leaves are bright green and nearly round. Their edges are irregularly scalloped or have shallow lobes, and are from 1 to 3 inches in diameter. Leaves are alternate on the stems.

Flowers are produced singly or clustered in a leaf axil. They are small, bell shaped, and bluish white. Each flower (1) has five petals, each from 1/3 to 2/3 inch long.

Seeds (4) are produced within a cup (calyx bracts) formed by the flower head. They are attached together in a circle in the cup or pod (2) which is round, flat, and buttonlike. The button-shaped pod resembles a round cheese divided into 10 or 20 seed sections, thus the common name "cheeses." Seeds are dark gray, flattened, and nearly circular with a deep notch in one side. Often they contaminate flower, clover, and grass seed. A single plant may produce over 40,000 of these tiny (1/16 in. dia.) seeds each year.

During the period of rapid leaf and stem growth, this weed is eliminated by 2,4-D, 2,4,5-T, or silvex treatments at the rate of 1 lb. per acre. During periods of slower growth, repeated treatments are necessary. In lawns and yards its spread can be halted by cutting before seed is produced.

Prepared in cooperation with Crops Research Division, Agricultural Research Service, United States Department of Agriculture, Beltsville, Maryland.

(DRAWING FROM NORTH CENTRAL REGIONAL PUBLICATION NO. 36, USDA EXTENSION SERVICE)



Dr. C. R. Funk, Rutgers University, New Brunswick, and Dr. Joseph M. Duich of Penn. State University, chatted during a pre-session break. Dr. Funk told weed control delegates about the influence of grass variety, fertility level, and cutting height on weed invasion in Kentucky bluegrass. Dr. Duich discussed control of broadleaf weeds in turf.

ceptibility to invasion by crabgrass," Funk asserted. "Crabgrass was most serious in our test plots at high fertility, but broadleaf weeds were more serious at low fertility. During establishment, grasses with rapid germination and vigorous seedlings were less effected by weed competition than were slower starting varieties. Use of rapid starting grasses as companion species with bluegrass varieties is one method of reducing weed competition," Dr. Funk advised.

### Knotweed Control Tested

University of Rhode Island researcher, Dr. Richard Skogley, reported on "Early and Mid-Season Chemical Control of Knotweed in Turfgrass." Effectiveness of about 30 herbicides or their combinations were tested for selective knotweed control in 1965 during one early season and one midseason trial.

"When treatment was made to young plants, knotweed control was achieved with more chemicals applied at lower rates," Skogley announced. "Good control of seedling knotweed resulted from treatments of liquid DMPA at 15 lbs./A., and with dicamba as low as 0.25 lb./A. A combination of 0.1 lb. dicamba with 1 lb. of 2,4-D per acre gave knotweed control, and mecoprop-2,4-D combinations gave control at dosages as low as 0.5 mecoprop with 1 lb. 2,4-D per acre.

"At both early and midseason stages of growth, good knotweed control was obtained only with dicamba at 1 lb./A. Dicamba-



2,4-D combinations gave good control at the rates: 0.2 plus 1 lbs., 0.25 plus 1 lb., and 0.5 plus 1 lb. per acre."

Mecoprop, uncombined, failed to control knotweed at either stage of growth as did 2,4-D and silvex. Combinations of 2,4-D, one with silvex and one with 2,4,5-T, applied only to mature knotweed, failed to control it. Dry formulations of dicamba and mecoprop were tested against mature knotweed, and neither gave satisfactory control, Skogley said.

#### Broadleaf Weed Control Explored

"From our tests on two separate country club fairways, the value of MCPP for safe clover control, and dicamba for knotweed, was reconfirmed," Dr. Joseph M. Duich of the Penn. State University department of



Dr. Robert W. Metz (left), chairman of the "New Products from Industry" session, discussed potential weed control materials and plans for the coming year with his associate Don Moore. Both are from Niagara Chemical Div., Middleport, N. Y.

agronomy disclosed. His talk was presented to those interested in weed control in turf-grasses and revealed results from rather large-scale field trials. Nine herbicides or their combinations were tested, and control of weeds such as knotweed, clover, dandelion, ox-eye daisy, thyme-leaved veronica, and other broadleaf weeds was reported.

Duich said that, "MCPP potassium salt was more effective than an ester formulation, and to provide broad-spectrum control for weeds such as dandelion and plaintain, 2,4-D must be combined with dicamba and MCPP. Alone or in combinations, 2,4-D," he said, "may be harmful to both bentgrass and



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*Poa annua* if applied above 1 lb./A."

Herbicides were applied with a four-nozzle plot boom sprayer at 45 gal./A. with pressure at 35 lbs. per square inch. The single pass technique used was assumed the best to approximate a tractor-drawn spray rig. All treatments were applied on April 28 and 29 when clover and *Poa annua* were actively growing and knotweed was in the post-cotyledon stage. One golf course area was irrigated and supported 80% *Poa annua* and 20% bentgrass; the other, irrigated only during the test period, was composed of 50% bluegrass and 50% weeds rather uniformly distributed, Duich outlined.

#### Control in Established and Putting Turf Studied

Continuing with the Thursday afternoon session on weed control in turfgrass, Dr. Elwyn E. Deal, from the University of Maryland agronomy department, discussed control of crabgrass, goosegrass, and annual bluegrass with preemergence herbicides. Connecticut Agriculture Experiment Station researcher, Dr. John F. Ahrens described studies on chemical control of *Poa annua* in putting green turf.

"DMPA granules and bensulide granules provided 90% to 100% late-season crabgrass control at rates recommended by manufacturers. Granular siduron, test material D-263, Bandane, and wettable powder DCPA gave 80% to 90% control," Deal announced.

"Goosegrass," Deal added, "was particularly controlled by recommended rates of granular D-263, H-9573, FW-925, and wet-

table powder siduron. Higher rates of these and DCPA, Bandane, DMPA, and bensulide gave best goosegrass control. Annual bluegrass plants were injured by all DMPA and FW-925 treatments. High rates of benefin, DCPA, siduron, and bensulide also injured bluegrass plants. None of the herbicides tested affected fall germination of annual bluegrass when applied at rates recommended by manufacturers."

Reporting results of his tests on *Poa annua* control in putting green turf, John Ahrens said, "DMPA applied at 15 to 20 lbs./A. in September, or in April and September, greatly reduced *Poa annua* infestations in putting green turf. Slight injury to bentgrass turf resulted from the second application of DMPA at 15 lb./A. one year after initial treatment.

"Bensulide, applied at 16 and 32 lbs./A. in October, 1964, provided fair control of *Poa annua* in May, 1965. Reapplication at 15 and 20 lbs./A. in September, 1965, on the same plots caused no turf injury," Ahrens cited.

#### Ilnicki: 1966 President

Dr. Richard D. Ilnicki, Rutgers State University, New Brunswick, New Jersey, was elected 1966 President of the Northeastern Weed Control Conference. Dr. Gideon D. Hill, of duPont, 1965 President, announced that other new officers will be Cornell's Arthur Bing, Secretary-Treasurer, and John Gallagher, of Amchem, is Vice President.

A conference wide vote elected Homer LeBaron of Geigy Chemical Co., Ardsley, N. Y.,



Raymond P. Atherton, Kerr-McGee Corp. (left), Robert A. Peters, University of Connecticut, and Andrew Watson, Dow Chemical Co., correlated industrial progress with research as they took a midmorning break during the Agronomic Crops session.

representative to the Weed Society of America. Mr. LeBaron will act as liaison between the NEWCC and WSA and will attend their committee and business meetings during his four-year term.

Next year's Northeastern Weed Control Conference meeting place and date was not announced, but will appear in a coming issue of *Weeds Trees and Turf*.

#### Iowa Park Personnel Meet

Park and recreation personnel from Iowa and bordering states meet at the University of Iowa March 18-19 for a Conference on Community Development for Parks and Recreation. The expansion-directed conclave features a session on "Grass, Turf, and Groundcover for Park and Recreation Areas." Edward Cott, Iowa State University extension horticulturist and turfgrass specialist, will explore this problem.

Registration fee of \$10 includes a banquet and a luncheon. Additional information and reservations for the two-day meeting are available from Prof. E. A. Scholer, The University of Iowa, Department of Physical Education for Men, Iowa City, Iowa 52241.

#### Connelley Advances at NMSU

Hoy C. Connelley, former soil conservationist with the Cooperative Extension Service, New Mexico State University, was recently appointed research technician in the university's Agronomy Department, Agricultural Experiment Station.

Officers of the Northeastern Weed Control Conference are (from left) 1965 President, G. D. Hill, E. I. duPont de Nemours & Co.; 1966 President Richard D. Ilnicki, Rutgers University, New Brunswick, N. J.; Vice President John Gallagher, Amchem Products, Inc., Ambler, Pa.; and Arthur Bing, Secretary-Treasurer from the Cornell Ornamental Horticulture Research Laboratory, Farmingdale, N. Y.





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## Meeting Dates



- 2nd Annual Colorado Agriculture Chemical Exposition**, Community Bldg., Greeley, Feb. 15-16.
- Northwest Turfgrass Assn., Golf Course Management Workshop**, Puyallup Experiment Station, Puyallup, Wash., Feb. 16-17.
- International Shade Tree Conference, Southern Chapter, Annual Meeting**, Andrew Jackson Hotel, Nashville, Tenn., Feb. 20-22.
- Pennsylvania State University Turfgrass Conference**, on campus, University Park, Feb. 21-24.
- Annual Nursery, Landscape Tree, and Turf Conference**, University of California, Davis, Feb. 23-25.
- Southern Turfgrass Conference**, Hotel Peabody, Memphis, Tenn., Feb. 28-Mar. 1.
- Massachusetts Nurserymen's Assn. Short Course**, Waltham Field Station, Waltham, March 1-2.
- Sod Producers Conference**, University of Maryland, College Park, March 2.
- Texas Weed Control Assn., Annual Weed Conference**, Holiday Inn West, Amarillo, March 3.
- Midwest Regional Turf Conference**, Purdue University, West Lafayette, Indiana, March 7-9.
- 36th Annual Michigan Turfgrass Conference**, Kellogg Center, Michigan State University, East Lansing, Mar. 16-17.
- Conference on Community Development**, on campus, University of Iowa, Ames, Mar. 18-19.
- Wisconsin Turfgrass Conference**, Wisconsin Center, Madison, March 22-23.
- Wisconsin Park & Recreation Assn. Annual Meeting**, Hotel Eau Claire, Eau Claire, March 23-25.
- 5th Annual Florida Turf-Grass Trade Show**, Plantation Field Research Laboratory, Ft. Lauderdale, April 28-29.
- Florida Nurserymen and Growers Assn., Convention**, Sheraton's British Colonial Hotel, Nassau, May 12-14.
- Texas Assn. of Nurserymen, Annual Convention, Nursery and Garden Supply Show**, Dallas Memorial Auditorium, Dallas, Aug. 21-24.
- Florida Nurserymen and Growers Assn. Trade Meet**, George Washington Hotel, Jacksonville, Oct. 14-16.

## Municipal Pest Control Problems Subject of New England Agricultural Chemical Conference

By T. R. FLANAGAN

Extension Weed Specialist, University of Vermont, Burlington, Vt.

"We now need to take a good look at pest control programs to see where we failed to capture wholehearted public support which we shall need in the future," Leo G. K. Iverson, assistant director, Plant Pest Control Division, ARS, US Dept. of Agriculture, stated in his talk, "The Necessity of Good Relations with the Public," at the New England Agricultural Chemical Conference, Dec. 15 and 16. He went on to add, "It will be more important than ever that the public be fully informed and have confidence in our profession."

The New England program drew delegates from all six states to the New Hampshire Highway Hotel in Concord for this annual pesticide meeting.

Over 250 town and county officials, park superintendents, tree wardens and arborists, utilities and public works people, road and cemetery commissioners, representatives from county, state and federal parks and forests, military base personnel, pesticide industry and others attended.

Iverson continued, in his keynote address, that without the support of a sizeable portion of the general public, control programs are in trouble. But when the people are fully informed, most are pleased that their public officials are taking action to pro-

tect them from a destructive or harmful pest.

This two-day program, an outgrowth of earlier but separate conferences on weeds and plant pests, was geared to provide information useful in solving problems for those people specifically concerned with the supervision and direction of pest control programs in municipal and other public land situations.

T. R. Flanagan, chairman of the 1965 conference, welcomed the delegates and emphasized that the conference goal was to provide new information on the wise and safe use of pesticides to groups and individuals in direct contact with the ultimate consumer.

In addition to a discussion on the necessity of good public relations, delegates heard several talks on legal aspects of pest control programs. Hyland R. Johns, vice president of the Asplundh Tree Expert Co., showed a series of slides depicting various aspects and pitfalls related to contractor liability. He concluded that for a pest control program "good planning, organization, and supervision will prevent problems before liability is incurred."

"Laws dealing with pesticides are of interest to those who supply and use pesticides because they are the 'ground rules' under



New executive board members are included in this group attending the New England Agricultural Chemical Conference. They are (l. to r.): J. Lincoln Pearson, chairman, extension pesticide coordinator, University of Rhode Island; Edward J. Cooper, past vice chairman, Allied Chemical Corp.; Raymond P. Atherton, vice chairman, Hubbard-Hall Chemical Co.; C. A. Langer, secretary-treasurer, extension horticulturist, University of New Hampshire; and T. R. Flanagan, past chairman, extension weed specialist, University of Vermont.



which we must operate," stated Lewis P. Wells, Jr. In his comprehensive review of the laws of the New England states relating to pesticides and the control of pests, Wells went on to say that these laws vary from state to state and that it is vitally important for those managing pest control programs to know legislation in their area of operation. Wells, pesticide program supervisor with the Massachusetts Department of Public Health, concluded that "Our present laws provide a set of guidelines which tend to minimize damage and discourage the use of pesticides without full knowledge of the effects of improper use."

The first day's program included a full afternoon session on shade tree problems. Gordon Nielsen, Pesticide Coordinator from Vermont, led off a double-barreled attack on municipal tree programs explaining that often alternate non-chemical programs were as important as spraying.

The importance of replace-

ment, management, and sanitation in city tree planning was discussed by Ed Duda from the University of Connecticut, R. B. Pike from the University of New Hampshire, and J. A. Dietrick, Superintendent of Parks and Trees from Greenwich, Conn. Joe Dietrick emphasized that "The planning and management of a municipal tree program will determine its success or failure." He went on to point out that success was often achieved by ingenuity and good public relations alone.

The proper organization of a successful Dutch Elm disease control program involves sanitation as well as spraying, concluded the next panel of Robley W. Nash, Maine State Entomologist, W. B. Becker, University of Massachusetts, and D. J. Reid, Shell Chemical Co. Nash commented on Maine's emphasis on local management of sanitation programs. He concluded that a successful sanitation program involved "A good understanding of the biology of the fungus and its vectors."



George Cavin gave keynote address for L. G. K. Iverson, who was unexpectedly and unavoidably absent at the last moment.

The first day's program ended with a discussion on other shade tree problems and their controls, a description of the pesticides recommended in the several New England states, and a delineation by E. H. Wheeler, University of Massachusetts, of the role a State Pesticide Coordinator can play in offering aid and advice to those engaged in municipal programs.

Clif Chater, in discussing the control of important insect pests of New England trees, pointed out the need to avoid overspray-

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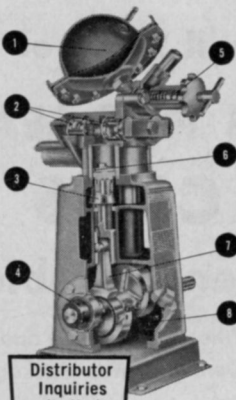
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**J. A. Dietrick**, superintendent of parks and trees, Greenwich, Conn., emphasized that planning and management of a tree program will determine its success or failure.

ing or overdosing, one danger of which is the inadvertent elimination of useful parasites or even wildlife. "Spraying, when properly done," he concluded, "may be therefore thought of as a form of conservation."

The second day at Concord brought to the group's attention a series of helps toward solving

insects, weed, and vermin problems. Ray P. Atherton, Hubbard-Hall Chemical Co. moderated a series of talks on solving insect problems of a public nature. R. L. Armstrong and R. W. Spencer, both superintendents of New England community mosquito control projects, and E. H. Wheeler and H. E. Wave, from the University of Massachusetts, covered the good and bad points of mosquito, blackfly, and other insect controls. A panel of experts from industry and the several New England Extension Services covered weed problem solutions. Dr. Richard Skogley, turf specialist from Rhode Island, spoke of the importance of weed elimination from public turfed areas, even if only for esthetic reasons, as a good public relations tool. Mario Boschetti, Massachusetts Department of Public Health, echoed this sentiment in regard to aquatic nuisances although some water weed infestations may cause other more serious problems. Boschetti was quick to point out the need for very careful calculations in figuring herbi-

cide dosages when planning for algae and weed control.

The afternoon saw new officers elected to govern this annual conference. Chairman for 1966 is J. Lincoln Pearson, University of Rhode Island Extension Specialist; vice chairman, R. P. Atherton, Hubbard-Hall Chemical Co.; and secretary-treasurer, C. A. "Kelly" Langer, University of New Hampshire. This conference is jointly sponsored by representatives of the region's Extension Services with representatives from industry and each New England Land Grant College as advisors.

The final panel, headed up by J. L. Pearson, pesticide coordinator from the University of Rhode Island, presented information on the latest on vermin control. J. Peterson and R. Bollengier of the U.S. Fish and Wildlife Service covered control solutions for rodents and pest birds including gulls and pigeons. C. Houghton of the Safety Fumigant Co., Boston, discussed various other aspects of household vermin control. Houghton concluded with a summary of the National Pest Control Association's official statement of policy on safe pesticide use. He pointed out that these rules emphasize "In all pest control procedures, safety must come foremost."

### **Diamond Alkali Expands**

Construction of a new agricultural chemicals plant for the manufacture of synthetic granular pesticides has been announced by Diamond Alkali Co. The plant scheduled to be in operation in Des Moines, Iowa, late next Spring will be adjacent to the company's present facilities there.

Diamond's new process produce homogeneous particles with the toxicant added during formation of the granule. According to John S. Cort, Jr., of Diamond's agricultural chemicals division, release of the toxicant can be controlled and it is possible to combine pre-emergence and post-emergence treatment in one application by mixing granules which will disintegrate at different rates.

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## Business Administration Dominates Arborist's

### Program for Mid-Winter Meeting Feb. 13-16

Five topics, each presented by a man who has acquired his administrative experience in the tree-care industry, will dominate the program when the National Arborist Assn., meets at the International Inn, Tampa, Fla., Feb. 13-16.

Of the eight subjects listed on the program, "Cost Studies on Some Tree-Care Operations," by George W. Goodall, Jr., Goodall Tree Expert Co., Portland, Maine, and "Bookkeeping Methods and Office Management," by Jan Smith, of Smith Tree and Landscape Service, Inc., Lansing, Mich., will be presented the first day.

Other topics to aid administrativemen are "Business Machines as Aids in the Tree Company Office," by John Z. Duling, of Duling Tree Expert Co., Muncie, Ind.; "Wage and Hour Law, Its Application to the Tree-Care Industry," by Henry A. Huettner, regional director,

Wage and Hour and Public Contracts Divisions, U.S. Dept. of Labor, Atlanta, Ga.; and "Recruiting Men and Good Employee Practices," by Dr. Melvin P. Reid, industrial psychologist associated with Byron Harless & Associates, Inc., Tampa.

Each day's session will present two of the administrative subjects with one other applying to a field subject such as "Making Water Wetter for Better Soil Penetration," which will be presented by Robert A. Moore, of Aquatrols Corp. of America, Camden, N. J.

"Labor Saving Tools and Equipment for the Arborist," by Fred C. Galle, director of horticulture, Callaway Gardens, Pine Mountain, Ga.; and another "Large Tree Moving and Tree Moving Equipment," by H. M. Van Wormer, of Van Wormer Tree Service, Inc., Richmond, Va., will be the final discussions.



Kevin Kelly, AAN's administrative assistant.

### Kelly Joins AAN Staff

Kevin Kelly has been named American Association of Nurserymen Administrative Assistant, one of the three top staff positions of the Washington, D. C.-based organization. A native of Washington, he graduated from George Washington University in 1963.

Kelly worked part-time in the AAN office throughout his college career. He taught history and English in the Washington area after graduation. In December he returned to AAN headquarters to handle business and administrative matters.

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# California Turf, Tree and Nursery Men Meet Feb. 23-25

Probing into every segment of the turf, landscape tree, and nursery industry, the University of California Agricultural Extension Service and Department of Landscape Horticulture intends to solve problems, suggest new methods, and inspire new thinking when industry men meet at Davis Feb. 23-25.

First day's sessions will deal with turf, soils, water movement, and sprinkler systems. Also included are discussions on salinity tolerance as they relate to turfgrasses and some revealing facts and opinions about California's expanding sod industry.

A symposium, "Analyzing My Turf Costs," will have William H. Bengeyfield, Western Director, USGA, Greens Section, as moderator. Also participating are Walter Boysen (fairways and roughs), superintendent, Sequoyah Golf & Country Club, Los Angeles; Fred Bove, (greens and tees), superintendent, Brentwood Golf & Country Club, Los Angeles; and Clifford A. Waggoner (renovating greens), superintendent, Del Rio Golf and Country Club, Modesto, Calif.

Chairman for the day's turf sessions will be Robert Lateer, Loamite Div., Pope & Talbot, Inc., San Francisco, Northern California Turfgrass Council.

Gene Robinson, assistant superintendent of parks for the city of Sacramento, Cal., will be chairman of the second day's landscape tree program.

Arborists will hear tree specialist Austin B. Carroll, Sacramento, relate his experiences in "Trouble Shooting Shade Tree Problems." Of particular interest is a review of systemic insecticides for control of tree insects to be given by Carlton S. Koehler, U. of Calif. Berkeley assistant entomologist.

A symposium on "If There Were Only Three Trees," will be moderated by Douglas Hamilton, horticulture advisor, U. of Calif., Alameda County. Others on this panel are Ernest A. Wertheim, landscape architect, Wer-

theim & Van Der Ploeg, San Francisco; James Poindexter, line clearance foreman with Sacramento (Calif.) Municipal Utility District; Brian Fewer, superintendent, tree division, San Francisco; Robert Belcher, assistant parks superintendent, Fresno; and Millar F. Blair, arborist, Mountain View.

The final day will find the nurseryman and his problems the center of attention. Walter Tecklenburg, of Teck's Nursery, Lodi, is the chairman. Tokuji Furuta, extension ornamental horticulturist, U. of Calif., Riverside, will explain systems for ornamental plant production. From UCLA comes R. Bruce Ricks, assistant professor, graduate school of business, to offer

his "Locational decision for the nursery industry."

Two subjects related to the use of steam for sterilization are scheduled, along with a talk on the economics of production. This day features a period for open discussion and also information about equipment for metering liquid fertilizers.

General chairman of the conference is William B. Davis, extension turf and landscape horticulturist, U. of Calif., Davis; and Tokuji Furuta, extension ornamental horticulturist, U. of C. Riverside, is co-chairman.

Cooperating with the university in presenting this annual event are the Northern California Turfgrass Council, International Shade Tree Conference, Western Chapter, and the California Association of Nurserymen.

## Forest Growth, Objective Turf Management, Major Points at Oregon Weed Conference

Successful tree growth through better brush control, reports on nursery test plots, and a call for objective approach to turf problems were important topics heard at the annual meeting of the Oregon Weed Conference, held recently in Salem.

Mike Newton, of Oregon State University Forestry Department, reminded the many in attendance that Oregon's forests are a major industry and that good husbandry is essential to the state's future growth. He pointed out that setting larger seedlings will assure a better start over regrowth of brush. Newton reported that dormant aerial treatment by helicopter, using low volatile esters of 2,4-D and 2,4,5-T, is the most effective treatment for brush control.

Robert L. Tichnor, research scientist at the North Willamette branch of OSU's agricultural experiment station, told the group that each year since 1960 a new planting of ornamental plants has been established to evaluate herbicides for nursery stock. Latest successful treatments, and most effective, are Caseron at 3 and 4 lb/A, applied as a wettable

powder and incorporated; granular Caseron at 5 lbs./A, unincorporated; CIBA 2059 at 4 lbs./A, and simazine at 2 lbs./A.

Industrial weed and brush control views were presented by R. Larry Rowse, of the Portland General Electric Co., and Fred Gross, Bonneville Power Administration. A panel made up of Rex Warren; Ray Hubbell, Jackson County Weed Supervisor; J. D. Vertrees and Paulen Kaseberg, interpreted the new Proposed Uniform National Weed District Law.

In elections held during the meeting Paulen Kaseberg, Wasco, was elected president; J. D. Vertrees, county extension agent from Roseburg, is vice president. New director for Eastern Oregon is Martin Zimmerman, Sherman County extension agent; and elected to serve as Western Oregon director is Ken Gray, Portland. John Couch, Hood River, and Paul Willard, Salem, were appointed ex-officio directors. Rex Warren, OSU extension specialist, continues as conference secretary, and Clark Amen, Corvallis, remains as treasurer.



Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 1900 Euclid Avenue, Cleveland, Ohio 44115.

Rates: "Position Wanted" 5c per word, minimum \$2.00. All other classifications, 10c per word, minimum \$2.00. 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.

HELP WANTED

**LANDSCAPE MANAGER.** For large, 35-year-old landscape firm in southern New England. Applicant should not be over 45 years of age and have the qualifications, experience and, above all, managerial ability to assume over-all responsibility of landscape department. College degree in landscape design, horticulture or civil engineering is desirable, and at least 5 years of successful managerial and supervisory field experience in landscape construction and planting is a must. Ability to efficiently handle men and equipment and accurately estimate all phases of landscape work are most important qualifications. Other qualifications are average design and sales ability. If you now have a similar position, it could be worth your while to answer this ad, as this position has outstanding possibilities to the right person, not only in salary, but in profit sharing and opportunity to purchase a share in business when owner retires. Send complete résumé, references, and photograph in first letter. Write Box 16, Weeds Trees and Turf magazine.

**LAWN SERVICE FOREMAN NEEDED.** Fast growing lawn service company needs ambitious man with supervisory experience to learn and supervise lawn service work. Opportunity for advancement. Send brief résumé including background, education, and desired salary to Mr. Waltz, Tech-Turf, Inc., 79 Dunnell Rd., Maplewood, N. J.

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**LANDSCAPING and tree expert business** in highest income area in northeast. Annual volume \$400,000, been in business 37 years, and enjoy high reputation for quality work. Owns equipment to handle any type of landscape or tree work. Office, warehouse and nursery may be purchased at buyer's option. Owner wishes to retire but will stay on for a limited time in a consultant capacity. Write Box 17, Weeds Trees and Turf magazine.

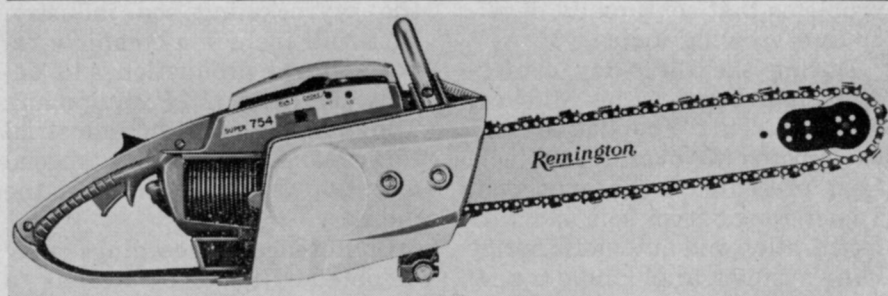


Liquid weed killer drips onto a roller of this Model 101 Commercial 36 inch Pull-Type Drip Roller Unit from Lakes Supply Co. Liquid transfers to ground as the applicator travels. This process eliminates spray drift and allows closer approach to flowers and shrubs, the manufacturer claims. Three models all have adjustable drip rate, filters, and pump gear. Lakes Supply Co., Inc., Dundee, Ill. is the distributor.

Calo-Gran Introduced

A snow mold turf fungicide is now available in a dry granular form reports the Mallinckrodt Chemical Works. The free-flowing granules require no mixing and can be applied to turf with a conventional spreader the company says.

Calo-Gran is based on the Mallinckrodt Calo-Clor formula which has been used in snow mold control for many years. The new material is applied late in the fall although a mid-winter application is necessary in areas of severe snow mold conditions. It is packed in 30-lb. bags said to be sufficient to treat 5,000 sq. ft. More details will be sent those who write the company at Second and Mallinckrodt Streets, St. Louis, Mo. 63160.



The Super 754, a new, compact, economical chain saw, has a 5.4 cu. in. engine with all roller bearing design and a high power per pound ratio, Remington Arms Co., Inc., says. This model, equipped with a power booster nose-guide bar, has a cutting capacity from 13 to 31 inches. A feature of its compact design is said to permit stump cutting to within 3/4 inches of the ground. Literature and complete specifications are available from the company's Power Tool Dept., Park Forest, Ill.

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Suppliers Personnel Changes

Amchem Products, Inc., Ambler, Pa., recently named Gerald D. Ames to its agricultural research staff, according to an announcement by M. B. Turner, vice president, director of marketing. Ames is headquartered at the firm's 60-acre experimental farm where he will conduct secondary screening of new herbicides.

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## More Beautification Is Big Item as ISTC's

### Southern Chapter Meets in Memphis, Feb. 20-22

More beautification of the nation's countryside, particularly along highways that are changing the face of America, will set the theme for the Southern Chapter, International Shade Tree Conference when it meets at the Andrew Jackson Hotel, Memphis, Tenn., Feb. 20-22.

Bert Elmore, director of metropolitan parks and recreation at Memphis, will welcome the group. President Frank Graham will respond for the Southern Chapter.

A keynote speech, "Beautification," will be made by Paul T. Tysinger, of Duke Power Co., Charlotte, N. C.

"Developing New Plant Varieties with Ionizing Radiation," by Dr. John Love, University of Tennessee, Oak Ridge, will provide new light on possible future trends. Charles O. Bell, University of North Carolina, Greens-

boro, will offer "One of My Weaknesses," and Ray Gustin, Jr., of Gustin Gardens, Gaithersburg, Md., will amplify a recognized trend with his talk, "The Leisure World Community."

Two subjects dedicated to greater improvement of highway landscaping are scheduled with "Survival and Growth of Woody Ornamentals in Roadside Plantings," by Dr. Henry Orr, Auburn University, Auburn, Ala., and "Production of Nursery Stock for Roadside Development," by Hubert Nicholson, of Commercial Nursery Co., Dechard, Tenn.

Clifford M. Storey, Carolina Power & Light Co., Raleigh, N.C., will discuss growth inhibitors and whether they produce the desired results. A business meeting, annual banquet, entertainment and visits to historical sites are included in the program.

## Midwest Regional Turf Foundation to

### Meet at Purdue University, March 7-9

"Turf Management Tricks for '66," is the theme coined for the Midwest Regional Turf Conference meeting at Purdue University, Lafayette, Ind., March 7-9.

About 600 representatives from a seven-state area, specialists in golf courses, general turf production and care, and industrial turf management, will participate in a program that is planned to provide up-to-date information and answers for scores of problems that continually develop in a growing industry.

During the three-day conference, members of the Midwest Regional Turf Foundation will be exposed to over 30 subjects each presented by a specialist. Topics range from soil and turf fertilization and automatic sprinkling systems to planning a new turf for the St. Louis stadium and preparing a golf course for a national tournament.

Each of the three days is programmed to focus attention on a

special phase of the turf industry. Monday, March 7, presents general subjects pertaining to diseases, plant anatomy, plant metabolism, a greenhouse tour, a film and other items of import.

Heaviest schedule will be faced March 8 with about half the day concentrated on general turf information and the other half devoted to golf course maintenance and development. Included, too, are several subjects dealing with the skyrocketing sod industry. This will include a complete report on sod production and details on desirable equipment. The final day will find industrial turf managers getting special attention on their phase of the industry.

Conference proceedings may be obtained for \$1 by writing to William H. Daniel, Executive Secretary, Midwest Regional Turf Foundation, Room 2-303, Lilly Hall, Purdue University, Lafayette, Ind.

## Trimmings

**No Place to Sleep.** *It wasn't quite that bad at last month's Northeastern Weed Control Conference, but several dozen delegates with confirmed reservations at the Astor Hotel in New York City were turned away because of the subway strike. Really no one is to blame, for intown guests who had been staying at the hotel before Mike Quill pulled his union off Manhattan's subway and bus lines had little choice but to keep their rooms to be sure of getting to work. Hotel employees were bedded down on cots in some of the unused ballrooms so weedmen could be serviced with clean sheets and food. Any large city, any large hotel (and it takes one to house over 700 delegates) is subject to an unforeseen strike. Even hotel elevator operators are known to walk out. We know. We experienced this during a convention in Philadelphia!*

\* \* \*

**Sound Advice.** Recently, Bob Lederer, new executive V-P of the American Assn. of Nurserymen, spoke before the Arizona Nurserymen's Assn., on the importance of industry taking full advantage of President Johnson's Beautification Program by giving the best kind of service to the public. He said, "You are in a big and important business and if you can't handle it, someone else will. You must grow the right stock in the highest quality and in the proper quantity. You must be an economist, a businessman, a scientist, a salesman . . . You have no choice if you want to be successful in this day and age." Applies to all phases of the vegetation maintenance and control field, doesn't it?

\* \* \*

**Moving Ahead.** Bill Owen, who runs General Spray Service in the greater Portland, Ore., area, telephoned us recently that the Pacific Northwest Spraymen's Association is legally incorporated, and at its January 15th board meeting in Seattle, set up liaison with legislative bodies in both Oregon and Washington. The PNSA includes Idaho and British Columbia as well, and its plan is to get some kind of uniformity for urban sprayers, better rates on insurance coverage, and an effective educational program. Bill's anxious to foster similar program objectives for the National Spraymen's Association.

\* \* \*

**New faces** are taking positions of leadership in a number of industry trade associations. Last month we announced that Clarke W. Davis had been appointed executive secretary of the National Arborist Assn. and this month there's news that L. Kevin K. Kelly has been made administrative assistant on the American Assn. of Nurserymen staff. Art C. Drysdale is executive secretary of the Parks and Recreation Assn. of Canada. The future of the total vegetation field depends upon the enlightened aggressiveness of such young men to whom we can look for effective innovations in keeping with our increasingly scientific environment.



# Bidrin® proved tremendously successful in protecting elms against Dutch elm disease last season.

More than 100,000 trees were injected with the systemic insecticide. Bidrin controlled blight-carrying bark beetles, and held disease-spread to new, low levels.

BIDRIN® Insecticide, and the new injection technique, give professional arborists another important weapon in the fight against Dutch elm disease. But Bidrin must be viewed realistically. It cannot perform miracles. It should be used as part of a planned program that includes sanitation, and prevention of infection by root graft.

## What Bidrin did

Bidrin held the breakthrough of disease in uninfected trees to 1.4 percent. Where trees that may have been infected prior to 1965 were included, the figure was still only 2.8 percent. Data is based on reports of Bidrin application to over 60,000 elm trees. Losses on untreated trees in adjacent areas averaged 10-15 percent.

## How Bidrin works

Injected into an elm prior to the period when the tree is susceptible to Dutch elm disease, Bidrin is translocated throughout the living tissue. When disease-carrying elm bark beetles attempt to feed on tender young twigs they are killed by the insecticide before they can penetrate far enough to infect the tree.

Important: The Bidrin injection technique may only be practiced by an operator certified by Shell Chemical Company, after passing a written test given in conjunction with the official training course.



A large elm, or a small one, can be protected against Dutch elm disease by a Bidrin injection treatment based on individual factors like height, crown class and foliage density.

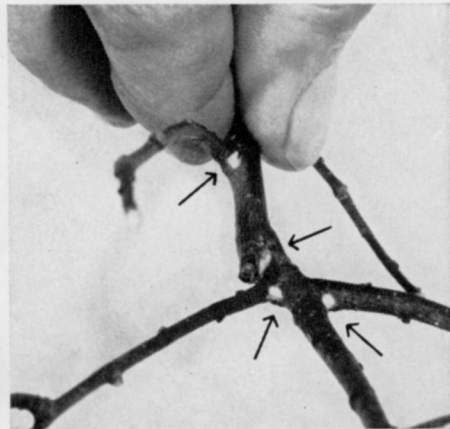
## What Bidrin cannot do

Bidrin Insecticide cannot kill the organisms that cause Dutch elm disease. It cannot save a tree already infected. In cases where Bidrin has been injected into previously infected trees, the trees have predictably failed to survive. There is no way of knowing exactly how many of the so-called "Bidrin failures" were inevitable because of hidden disease.

Another point: Bidrin cannot protect a tree that is (or becomes) root grafted to an infected elm.

## Controversy about Bidrin

Bidrin was reported to have failed to prevent Dutch elm disease in certain uncontrolled short-range experiments last year. There's a logical explanation. The tests were conducted in epidemic areas and under abnormally heavy insect pressure. Bidrin could not stem the tide of disease that was out of control. Nothing could. Under the condi-



Arrows show feeding scars made by elm bark beetles—the insects that spread Dutch elm disease. Bidrin, working inside the tree, kills beetles before they can penetrate and infect an elm.

tions it was virtually impossible to prevent breakthrough.

## Many advantages

The Bidrin injection method is endorsed by leading tree authorities. It offers better insecticide distribution in trees; can be applied in any weather; leaves no harmful, long-term residues; reduces hazard to people and animals; eliminates spraying and spray drift problems. *Get all the facts on Dutch elm disease prevention with Bidrin Insecticide by writing Shell Chemical Company, Agricultural Chemicals Division, 110 West 51st Street, New York, New York 10020.*



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This entire area was seeded with bluegrass and crabgrass. Left-hand side was sprayed with "Tupersan" the same day it was seeded. Note absence of crabgrass in treated area seven days after treating.



The same area twenty-one days after seeding and treating. "Tupersan" made the difference. Note crabgrass growth in the untreated area at right, and how "Tupersan" controlled crabgrass in treated area at left.

## New Tupersan<sup>®</sup> is the only SIDURON WEED KILLER crabgrass killer which permits seeding and treating the same day (COOL SEASON GRASSES)

Highly effective, new Du Pont "Tupersan" is a pre-emergence weed killer which controls crabgrass (smooth and hairy) and certain other annual weed grasses in turf areas such as golf course fairways, lawns, parks, roadsides and turf grown for grass seed or sod production.

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To supply turf with long-feeding, slow-release nitrogen, use Du Pont Uramite<sup>®</sup> ureaform fertilizer...38% nitrogen that's free-flowing and highly resistant to leaching. New "Uramite" sprayable ureaform has all the advantages of granular "Uramite" and is easier to apply on closely-cut turf.

For more information on "Tupersan" and "Uramite" and Du Pont turf fungicides, see your local Du Pont supplier, or mail the coupon.

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