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JULY, 1969

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Special for This Issue

Regular Features

The Cover

High costs of maintenance are helping push the trend in cemetery design to the memorial park garden type. The cover picture is of Resurrection Cemetery, Lenexa, Kans., maintained by the Wayne Jenicke family and other employees. By clustering design elements and using ground-level markers, bigger power equipment for mowing and applying chemicals can be used. Darrell Huntington, operating an 88-inch Heckendorn rotary, is getting instructions from Wayne Jenicke, superintendent. A story about Jenicke's maintenance practices begins on page 6.

WEEDS TREES AND TURF is published monthly by The Harvest Publishing Company. Executive, editorial: 9800 Detroit Ave., Cleveland, Ohio 44102.

Single Copy Price: 50 cents for current issue; all back issues 75 cents each. Foreign $1.00.

Subscription Rates: WEEDS TREES AND TURF is mailed free, within the U.S. and possessions and Canada, to qualified persons engaged in the vegetation care industry and related fields in controlled circulation categories. Non-qualified subscriptions in the U.S. are $7.00 per year; Canada and other countries, $10.00 per year. Controlled circulation postage paid at Fostoria, Ohio 44830.

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WEEDS TREES and TURF®

Volume 8, No. 7 **July, 1969**

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Price-Fixing Conspiracy on Money?

Let's take a non-banker's view of the recent hike in the prime interest rate to 8½%. Take a dollar bill from your pocket. At the top, it reads: Federal Reserve Note. That's the *brand name* of the product we're going to talk about. That's right, we said *product.*

That brand name denotes that the Federal Reserve System is the organization licensed by Uncle Sam to create, sell, and regulate the supply of this product that's dear to us all.

More often than you would like, no doubt, you have to "buy" money (get a loan, normally speaking), either for your business or for personal reasons.

The price of "buying" money has gone up 70% in the past four years. Since 1965, the prime rate—(that's the rate to banks' biggest and best purchasers; smaller businesses and individuals may pay more) has gone from 5% to 8½%.

We ask you: *What would your customers say if you had raised the price of your product or service 70% in four years?*

"Tight money" is supposed to stop inflation. When has it?

As the price of money goes up, the cost of operating your business goes up. If you want to stay in business, you react the same as when any other costs go up. You increase prices. Spiraling costs; spiraling prices. But isn't that the *cause* of inflation?

If limiting the amount of credit really does slow inflation, then why not put a volume limit and a priority on the amount of money that's available—and leave the price at a reasonable level.

In other words, *why should pricing smaller and poorer businesses and individuals out of the money market be the method of making money tight?*

You notice that even in a "tight money" period when credit is supposed to be limited, if you're still willing to pay that high interest rate, the lenders usually can scrape up enough to sell to you.

Maybe that's why the top 50 commercial banks can expect to make a profit of better than $1.6 billion* this year, a 62% increase over 1965. In

(Continued on Page 7)

Fairfield Chemicals, Niagara Chemical Division, Middleport, N.Y. 14105

Chinch bugs don't stand a chance when you hit them with Ethion. Ounce-for-ounce, no other pesticide can match its Chinch-killing power.

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THE JENICKES — David, George, Marcella, Wayne, Janice, Alberta.

Power Equipment, Chemicals Save Cemeteries from Weeds

PEOPLE have come to accept the irreverent roar of power mowers and the dousing of weed-killing chemicals on grave sites.

Well, almost everyone has, qualifies Wayne Jenicke, who directs the maintenance of five Catholic cemeteries in the Kansas City, Kan., archdiocese.

"Those who seldom visit the cemeteries complain most. Regular visitors understand what work is necessary to keep a cemetery looking nice."

The shortage of qualified labor and the increasing cost of maintenance are bringing about a change in cemetery design, Jenicke said.

The upkeep factor is strong in his mind as he develops the newest of the five, the 80-acre Resurrection Cemetery near Lenexa. Blueprints for a sixth, 123-acre cemetery to be opened this fall also reflect the sensitive compromises a cemetery su-

perintendent has to make. He must please the people he serves, usually under most difficult circumstances, without unduly sacrificing upkeep efficiency.

"People prefer a shady, cool-looking atmosphere," Jenicke said. "That's why you may see an evergreen planted on either side of the monument in many of the older cemeteries."

As relatives move away, however, the upkeep of so many grave sites, particularly ones with the evergreens, becomes a costly burden for the cemetery to bear. "So now we have a regulation against that type of planting." he said.

Natural Look Is Design Trend

Mt. Calvary and St. John's cemeteries in Kansas City, St. John's in Lenexa, and St. Joseph's in Shawnee all are monument cemeteries. Resurrection and the new one will be mostly memorial park garden type with the ground-level markers, but will have monument sections.

To achieve the cool-looking atmosphere, Jenicke plans to develop a "natural look" with random plantings of large shade trees.

There still will be evergreens and ornamentals, but plantings will be clustered in a way that beautifies the grounds yet permits easy management.

Jenicke maintains present cemeteries and develops the design of new ones with the advice of a personal friend who is a professional arborist and nurseryman, Harry Balthasar, owner of Nashua Nurseries, Nashua, Mo.

"If I have a disease problem on shrubs, he'll drop in and take a look at it," Jenicke said. "He takes the landscaper's blueprint for the new cemetery grounds and tells me what trees and shrubs to plant."

Jenicke began working in the cemeteries, in Wyandotte and Johnson Counties, after he returned from the Army in 1958. He began as assistant superintendent to his predecessor, W. J. Anderson. He became superintendent when Anderson retired in 1966.

Family Operation

Maintaining the cemeteries has since become a family operation.

Wayne was laid up several weeks with a hip ailment in 1961. His brother, David, then just out of the Army, took over for him. Then David stayed on as foreman.

His sister, Janice, began working summers during high school, then became the receptionist after graduation. Another sister, Marcella, still in high school, works on the grounds during the summer. His mother, Alberta, began working in 1967 and is in charge of grounds maintenance. Another brother, George, decided a few months ago he preferred to work outdoors rather than in a potato chip plant.

About six other full-time employees round out the staff.

The era of the parish cemetery — when family members assumed the responsibility for caring for the graves of relatives — is over, Jenicke said. St. Joseph's, a parish cemetery until 1960, has monuments dating in the 1860s.

What this means is that in the mobile society of today, more and more graves are being left for fewer cemetery employees to maintain. And there is the constant wage competition from other industries.

Chemicals and power equipment

Price-Fixing Conspiracy On Money?

(Continued from page 4)

four years, a 70% increase in interest rates and a 62% increase in profits . . . interesting coincidence, isn't it?

Treasury Secretary David Kennedy has said wage and price controls are one way to stop inflation. If it comes to that, let's be sure to establish price control for all industries and all products, *including the banking industry and the price of money.*

Isn't the Federal Reserve Board that runs the money show responsible to the President, since he appoints the members? Hardly. The maximum number any one President can appoint is four. Twelve decide the Fed's, and consequently our, money policy.

Not even the U.S. Secretary of the Treasury sits on the Federal Reserve Board. He used to, but was lobbied off in the late 1930s.

On occasion, the Fed actually brags about its independence from the Federal Government. That translates to independence from you and me—John Doe, interest-rate payer.

Repeating an earlier question: What would your customers say if you increased prices 70% in four years? We suggest you say the same thing to your senators and congressmen.

The idea of a banking system that proclaims it's "saving us all" as it uses a method that puts money in its till doesn't ring true. It smacks of the label attached to it by Cong. Wright Patman, chairman of the House Banking Committee. He called it a "conspiracy," and it appears to be a greedy one at that.

* *Based on a continuation of profit performance of the past three years.*

have been the deciding factors in keeping the cemeteries from literally disappearing in weeds.

Jenicke Formula for Neatness

Wayne Jenicke is establishing an enviable reputation in cemetery neatness. His formula is this:

In early spring, he applies Dacthal W-75 pre-emergence crabgrass killer with a 150-gal. Kim Manufacturing Co. P-800 trailer tank sprayer hitched to the PTO of an International Cub tractor.

"We try to get started soon after March 1 and finish before Apr. 15."

At the present time, plots that are for sale get 10 lbs. per 1000 sq. ft. of Armour Vertagreen Turf and Tree Fertilizer (10-6-4). "In the future, we hope to fertilize all areas of the cemeteries," said Jenicke. Application is with a Maumee seeder broadcast-type spreader behind the IH cub.

"No one likes the idea of loved ones being buried in a weed patch," Jenicke said.

So about May 1, Weedone, a granular lawn weed killer made by Amchem Products, Inc., Ambler, Pa., is applied with a Scotts drop-type spreader behind the riding tractor.

"We tried the liquid spray, but had to worry too much about the drift hitting trees and shrubs."

Two men, working eight-hour days, mow the five cemeteries in a five-day period. Since each cemetery is mowed once a week, the job is practically continuous.

"Seven years ago, it was taking 10-12 men to mow just two cemeteries," Jenicke said, "and they weren't trimming. Now we have 100 acres (in the five cemeteries) handled by two men."

The difference is power equipment — 88-inch, 62-inch and 36-inch Heckendorn rotary mowers and three 21-inch Lawnboys.

Chemicals Cut Labor Cost

The thought of trimming around 20,000 monuments every week during the grass-growing season is stag-

Wayne Jenicke and his mother show how simple the task is to apply a soil sterilant that lasts an entire growing season and thus eliminate the need to trim every other week. Using the chemical cut labor costs nearly 70%. That's a significant accomplishment when you're talking about trimming 20,000 monuments. Acme Weed Killer is applied in a three-to four-inch band.

The striking difference in cemetery neatness is evident here. The picture in which markers are nearly covered with grass and weeds is in a cemetery not under Wayne Jenicke's direction. At left, Marcella Jenicke is applying Amchem's granular Weedone to kill the remaining dandelions and other broadleaf weeds. The warehouse and maintenance shop is in the background.

gering. Jenicke used to do it by hiring eight or nine high school students for the summer.

He still hires extra student help in the summer, but he figures that two persons working two to three weeks applying a soil sterilant that lasts all season saves the labor of five students trimming for three months during the summer.

A simple flower-watering can is filled with Acme Weed Killer, made by Acme Quality Paints, Inc., Detriot, Mich., diluted to one part chemical to 32 parts water. A three- to four-inch band is sterilized around each marker.

Jenicke calculates that the use of the soil sterilant has reduced the annual cost of this extra measure of cemetery neatness from about $6,500 to less than $2,000.

The Acme product, said Jenicke, doesn't have an oil base so it doesn't affect the markers. "We're trying Casoron granules, also," he said.

At present, Jenicke's tree-spraying is limited to spraying for disease or insects after discovery. "We're working toward a preventive program," he added.

Grave-digging is now done with an IH backhoe rather than with hand shovels. New graves are covered with sod.

Bermudagrass is one variety that's taboo with Jenicke. Markers flush with the ground are soon covered because of the way Bermudagrass grows, he explained.

"What I need most is a chemical to keep the grass from growing."

But until a retardant comes, Jenicke will continue his search for further efficiencies as new graves to tend are added at the rate of 500 a year.

The Jenicke family conducts its operations from a modern-design office at Mt. Calvary, 38th and State Streets in Kansas City, Kan. The rows upon rows of monuments stretching up the hill behind the office attest to Jenicke's working philosophy that he should take care of the many grave sites as he would want others to take care of the graves of his relatives and friends.

He knows the kind of care he wants. His father and predecessor are both buried at Mt. Calvary.

LETTER TO THE EDITOR

Australian Seeks Aquatometer

Your issue of March, 1969, has an article dealing with the Aquatometer — an appliance to detect underground water streams.

Will you please put us in touch with the manufacturer?

The country wherein we are located, South Australia, is recognized as being the driest state of the driest continent on Earth. But underground water is fairly abundant. Any method or appliance which assists in accurate location of the subterranean streams and reservoirs would be a "Godsend."

We have people who call themselves "water-diviners," here in Australia. Their method of locating underground water is to walk slowly over the surface of the land with a small, forked branch from a tree, arms outstretched in front, and each hand firmly grasping one of the prongs of the wooden fork.

The claim is that when the "diviner" suddenly walks on to land beneath which an underground stream is hidden, the forked stick is just as suddenly pulled down by some unexplained force, so that it points to where the water lies buried.

Some "diviners" use a piece of fencing wire, suitably bent in the shape of a very large wishbone.

Laymen, farmers and scientists have, for a century or so, argued about whether it is "all bull-tripe" or not. Apparently the term "water-divining" is not used in the U.S.A., else it would have been used at least once in the article by Mr. Jamieson.

Anyhow, we are very interested in the Aquatometer.—**L. W. LAWLOR, director, Lawlors Pty, Ltd., Thebarton, South Australia.**

All Nine Lives . . .

How to Kill Cattails

By BERT BORDEWICK
Associate Professor,
Biology Department
Del Mar College, Corpus Christi, Tex.

Cattails cause a number of problems in many ditches and ponds in the Corpus Christi, Tex., area.

They can prevent proper water movement and during heavy, infrequent, rains common to South Texas, often bring about considerable flooding. They are a major nuisance on some golf courses, where their tall growth may interfere with the proper execution of a golf shot.

Various eradication means have been tried, but none with permanent success. Among the weed-killers which had been used are: 2,4-D; 2,4-D in fuel oil; and sodium arsenite. The following experiment was instituted in an effort to find an herbicide which would give long-lasting control.

Four standard, but locally untried, weed-killers were employed: Dalapon, MSMA, Calar, and Amitrole. Two different dilutions of each chemical were tested.

The experiment was set up at the Oso Beach Municipal Golf Course* in Corpus Christi along the edge of a large pond paralleling No. 10 fairway.

Each experimental plot was 6 feet wide, about 5 feet deep, and contained between 100 and 200 plants. The plants in each plot were sprayed to run-off. No wilting agents were used. Two applications of each chemical were made 14 days apart in late June and early July of 1968 and results were read in late September (3 months following the first application).

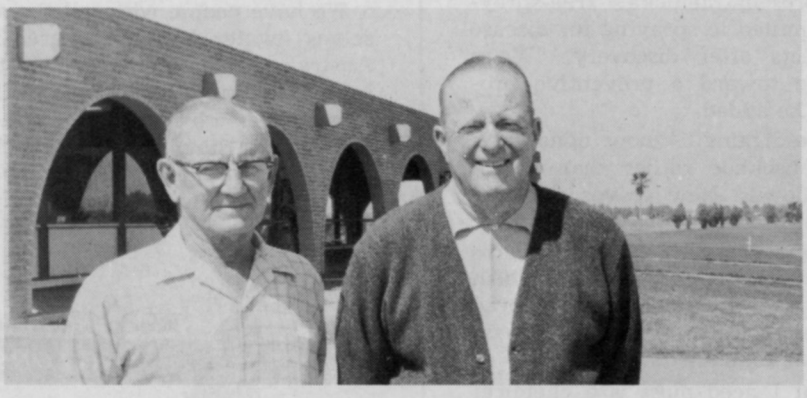
Each day of treatment was sunny and warm (air temperature about 85° F) with a moderate wind from the southeast. Time of treatment was between 4:30 and 6:30 p.m. There were three replications of each treatment and six untreated control plots.

Results (see accompanying table) show that both Dalapon and MSMA gave good control. After the applications, all plants in the Dalapon tests at both dilutions were dead, brown and fallen over. In the MSMA tests, nearly all plants were dead and brown and most of them were fallen over.

Several healthy plants remained in three MSMA plots but it was assumed that these were missed accidentally by the spray material.

Calar and Amitrole at both dilutions caused considerable brown flecking of the leaf and stem with the edges of the leaves turning brown. However, all plants remained alive. Control plants stayed healthy and vigorous.

It would appear from these tests that both Dalapon and MSMA will give adequate control of cattails in this area in the summer. Moreover, the author noted that one treatment with these chemicals seemed sufficient although in this experiment



Tom Lawrence, right, manager and club professional and Frank Knesek, superintendent, are standing in front of the new club house at Oso Beach Municipal Golf Course.

two treatments were used. After the first treatment plants died quickly and the second treatment was applied to dying and dead plants.

In early October, following gathering of data, the entire area was treated with Dalapon at the rate of 8 tbsp/gal. All plants were killed and no regrowth has been noted up to the present time (nearly 6 months later).

* Thanks to Frank Knesek, golf course superintendent, and Tom Lawrence, manager and club professional, for their cooperation and encouragement.

Results of herbicide tests on cattails at Oso Beach Municipal Golf Course, Corpus Christi, Texas, in the summer of 1968

Chemical	Dilution	Rep.	Appearance of plants 3 months following treatment
Dalapon* (powder)	8 tbsp/gal	1	All plants dead, brown, and fallen over
		2	" " " " " " "
		3	" " " " " " "
	16 tbsp/gal	1	" " " " " " "
		2	" " " " " " "
		3	" " " " " " "
MSMA** (liquid)	2 oz/gal	1	All plants dead, brown, but not fallen over
		2	" " " " " " " "
		3	All plants dead, brown, and fallen over
	4 oz/gal	1	" " " " " " " ***
		2	" " " " " " " ***
		3	" " " " " " " ***
Amitrole (powder)	6 tbsp/gal	1	Edges of leaf brown, many brown flecks on leaf and stem, plants alive
		2	" " " " " " " "
		3	" " " " " " " "
	12 tbsp/gal	1	" " " " " " " "
		2	" " " " " " " "
		3	" " " " " " " "
Calar** (liquid)	2 oz/gal	1	" " " " " " " "
		2	" " " " " " " "
		3	" " " " " " " "
	4 oz/gal	1	" " " " " " " "
		2	" " " " " " " "
		3	" " " " " " " "
Control (no treatment)		1-6	All plants healthy

* furnished by Eastern Seed Co., Corpus Christi, Texas
** furnished by Vineland Chemical Co., Vineland, New Jersey
*** several healthy plants remain

"Where's the fairway?" Frank Knesek (we think that's who it is) shows the view golfers used to have of the fairway from the 15th tee at Oso Beach.

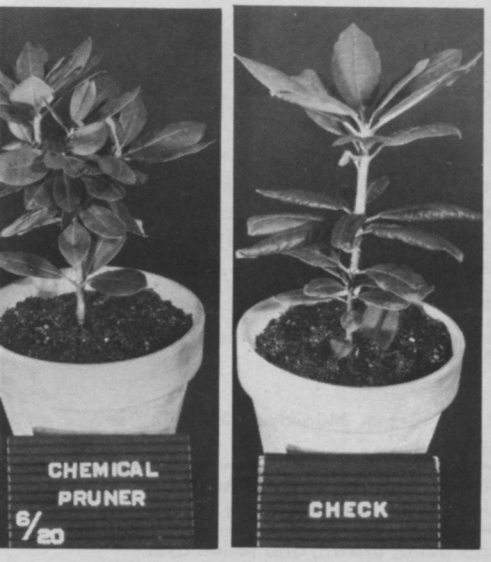


Fig. 1—Increased branching of rhododendron was achieved with a spring treatment of a chemical pruner (8%).

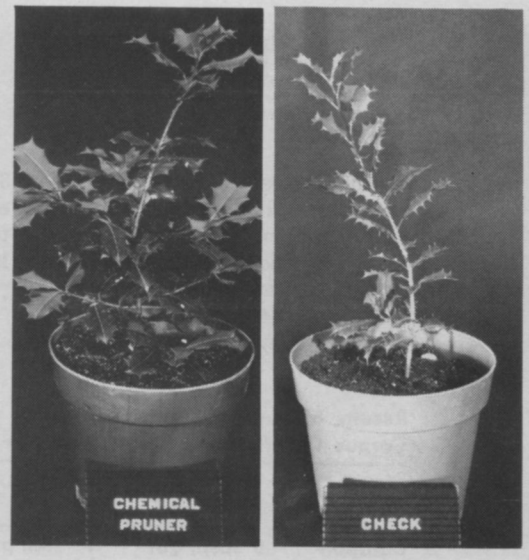


Fig. 2—A spring treatment with a 15% chemical pruner produced increased branching in American Holly.

Fig. 3—A spring application of 100 ppm of Morphactin resulted in increased branching of American Holly.

Ohio Research Report

Chemical Pruning Shows Promise

By DR. P. C. KOZEL, horticulturist, Ohio State University

CHEMICAL regulation of plant growth may be one answer to a nurseryman's labor problem, believes horticulturist Dr. P. C. Kozel of Ohio State University.

In the current issue of Ohio Report, publication of the Ohio Agricultural Research and Development Center at Wooster, Kozel writes about research begun in 1968.

Scarcity of skilled hand labor has forged a two-edged sword that is an increasing menace to nurserymen, he said. Lack of such labor makes it difficult for the nurseryman to adequately prune and weed, with the effect that plant quality and profits are often lowered.

Chemicals have brought efficiencies of operation and reduction of labor cost in other industries, he explained, so studies were initiated to "regulate plant growth with chemicals to fit the current needs of the nursery industry:

"Chemicals are available today that can accelerate or retard plant growth, induce flowering and fruiting, increase lateral branching, and cause other desired effects.

"A great number of substances have been studied and three plant growth regulators have shown outstanding promise for adoption for commercial use."

Of particular significance are the chemicals that can substitute for manual pruning or pinching. These products selectively kill the young shoot apex, resulting in well-branched, high-quality nursery plants with minimum manual labor.

A foliar spray of a chemical pinching agent, Off-Shoot-O, was tried

Beautification Test Plot

Have you considered a "beautification test plot" as a stimulus to bring business your way?

People must have a desire for beauty before they'll plant grass, buy mowers and fertilizer, get their trees and shrubbery sprayed, and so on.

Here's what a Cleveland minister got started.

In a section of town where rutted and barren tree lawns were the rule, the Rev. Sanford Pierce of Holy Gospel Church of God and Mrs. Willie Aetner and her eight children put in some grass to show how it improved the neighborhood.

Extension agent Francis Calderwood was called in to give a grass-planting demonstration. He persuaded the Lakeshore Equipment and Supply Company to donate some grass seed and fertilizer.

Calderwood is thinking now of setting up a lending library of tools, since many of the people at the moment can't afford to buy the tools.

Projects need names and this one is called the Cuyahoga County Beautification Program.

The same kind of a project might work in an area where folks can afford to buy the tools. Whether the project is successful in spreading the desire for beautification isn't yet known. But the "keeping up with the Joneses" psychology has worked wonders in other endeavors.

Fig. 4—A foliar spray of 500 ppm of gibberelic acid (GA_3) increased growth on the viburnum plant at left.

on American holly plants and rhododendron when new growth was about a half-inch long. Young shoot tips were killed within 12 hours with a concentration of 8 to 15 percent of the chemical, Dr. Kozel reported.

A new group of chemicals called "Morphactins" also increased branching, he continued. While these chemicals do not kill the young shoot tip, he explained, they overcome apical dominance and induce lateral branch formation.

"This is an important difference as it is often desirable in the case of shade trees to increase branching without destroying the central leader of the plants."

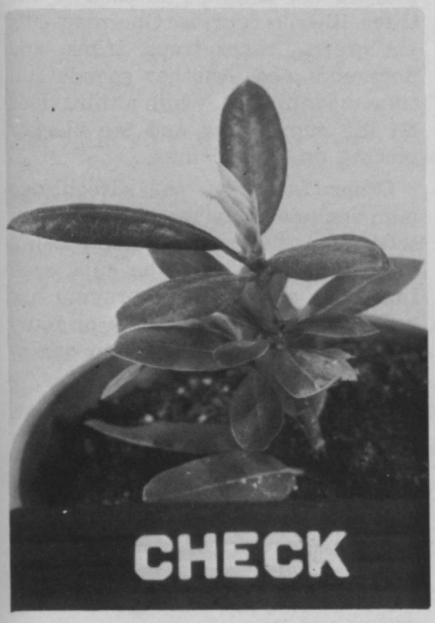
Kozel reported that American holly plants also were created last year with a foliar spray of 100 ppm of Morphactin at the start of vegetative growth. Chemical application, combined with good cultural practices, yielded high-quality plants by the fall of the same year, he reported.

A few plants were treated with 1000 ppm concentrations of the Morphactins. At this high concentration, terminal vegetative growth was severely retarded. Species variation occurred between Forsythia and Honeysuckle.

In both instances, plants treated in early June were severely retarded in their vegetative growth, little being evident event at the beginning of September.

Forsythia, however, exhibited severe leaf distortion whereas Honeysuckle foliage was normal in appearance.

Viburnum plants were treated with 500 ppm foliar spray of gibberellic acid (GA_3) in the spring when the new growth was about one inch long. Treated plants had an accelerated rate of vegetative growth that was of good quality and considerably greater than untreated control plants.



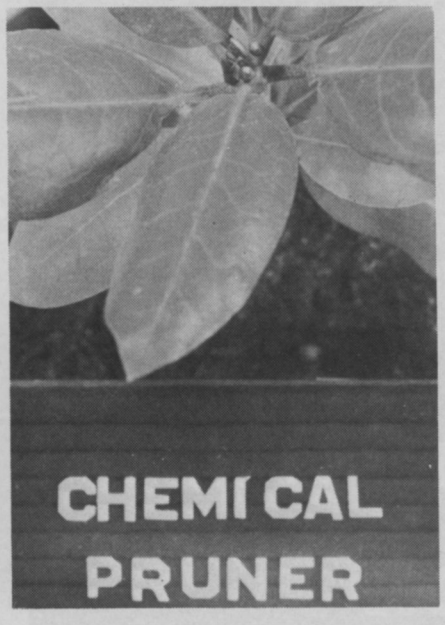
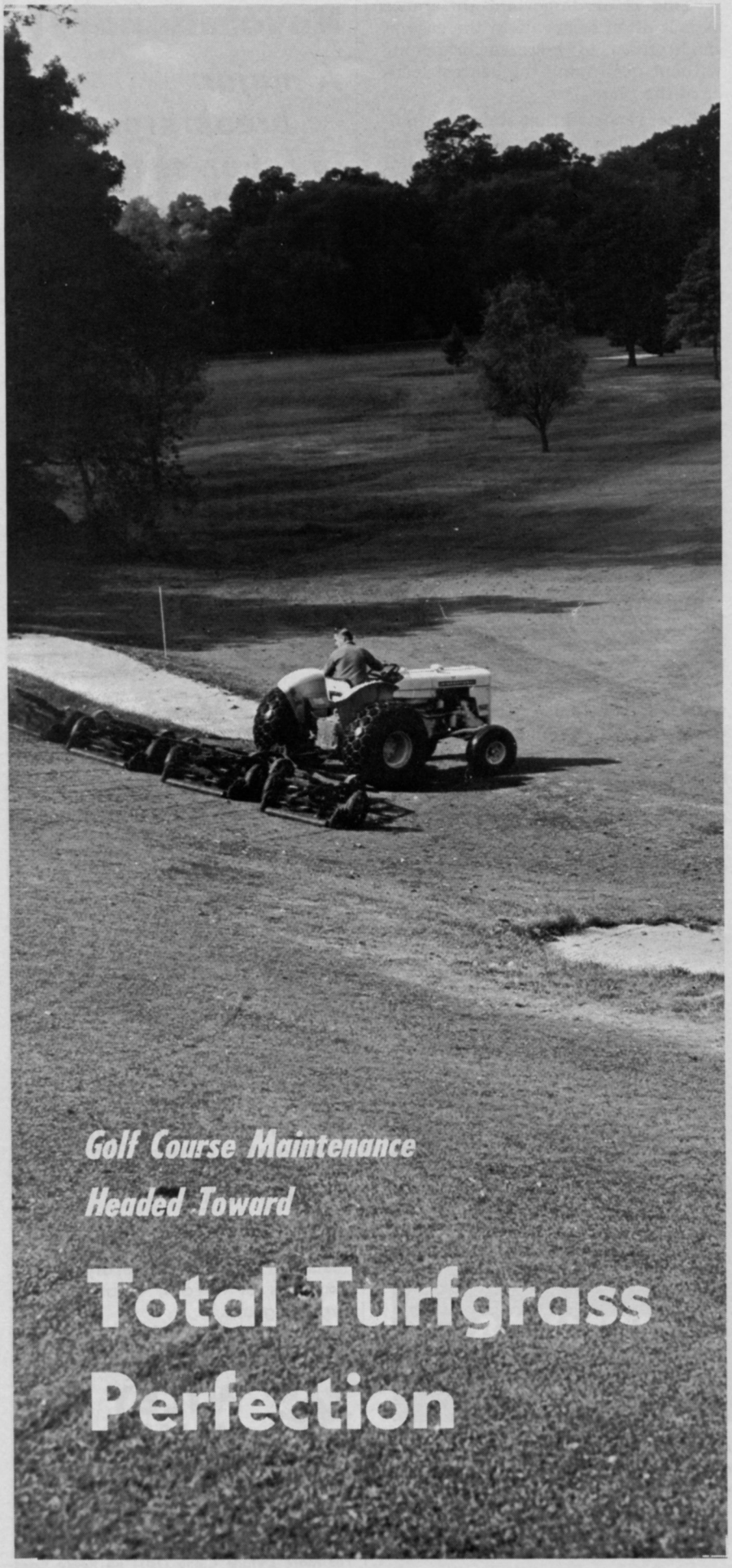


Fig. 5—Continued research has indicated that timing of the growth regulator application is important. For example, last year 8% Off-Shoot-O was necessary to chemically prune rhododendrons, while this year a 3% concentration was effective. The picture at left shows the stage to treat; the other demonstrates the selective killing of the terminal apex and the subsequent enlargement of auxiliary buds.



Golf Course Maintenance Headed Toward

Total Turfgrass Perfection

GOLF COURSE maintenance is headed toward "total turfgrass perfection," says an industry researcher.

Alexander M. Radko, research coordinator for the United States Golf Association, credits the steady improvement in golf course maintenance to a number of factors. Among them, he cites: new technology and the dissemination of it through local, state and national conferences; sufficient capital; and an increasing number of "inquisitive, college-trained personnel" entering the field.

As industry's wage spiral continues, projections for course maintenance embody fewer—though better paid and informed — ground crews and greater mechanization, Radko predicts.

Emphasis, he says, will be placed on improvements in machinery, irrigation systems, and the installation on new courses of architectural features requiring less hand maintenance.

Greenbrier's Technique

One well-known course that's far along the way toward the maintenance perfection that Radko sees ahead is The Greenbrier, White Sulphur Springs, W. Va.

Superintendent W. D. Haven discussed The Greenbrier's maintenance planning and budgeting at a recent Virginia turfgrass conference.

At present, three Greenbrier employees are assigned to each of the three 18-hole courses. One man cuts six greens, rakes traps, trims, and does odd jobs. Another spends full time mowing tees, while a third does all the cup setting and tee marker placing on each course.

Other facets of the Greenbrier plan include daily mowing and cup setting, with tee markers being moved in relation to the cups each time they are set. The spraying has been changed from a three or four-man operation to a one-man operation on all three courses.

From mid-May to mid-October, the 59 greens are sprayed every seven days, while all 82 tees and the fairways of one course are sprayed every two weeks. To get ahead of the players, spraying is begun at 4 a.m. — with lighted equipment. Two fungicides are used on the greens and tees.

The fairway mowing plan at The Greenbrier calls for mowing four times a week, Haven continued. Installing lights on the equipment and mowing at night has proved advan-

World's Ten Most Hated Weeds

What's the world's worst weed?

Everyone has an opinion. LeRoy Holm, horticulturist at the University of Wisconsin, says the most detested weed is purple nut sedge.

He goes further by listing the 10 most hated weeds, compiled after a study of world weed problems when he was with the United Nations Food and Agriculture Organization.

After purple nut sedge, he lists bermudagrass, barnyard grass, jungle rice, goose grass, johnson grass, guinea grass, water hyacinth, cogon grass and lantana. Eight of these are grasses or sedges and five are perennials. With the exception of guinea grass and cogon grass, these weeds are found on every continent.

"Public enemy weed number one," also called nut grass, nut sedge, coco sedge or coco grass, is common for 2500 miles north and south of the equator and on every continent.

World weed problems do not receive as much attention as more obvious pests, Holm said, such as disease, insects and rats. Yet, he added, weeds are probably taking a greater toll of food that should go to feed hungry people and their livestock.

tageous, since night mowing does not interfere with the players—a primary consideration for any course, Haven maintains. Also, Greenbrier mowing time has been cut in half.

Since the grass is in better condition for mowing after sundown, as it is cooling off, it is less likely to wilt and is under much less strain. Except on particularly hot days, mowing at The Greenbrier begins at 4 p.m. Brushing is done three times a week.

Plans for improved aerification, drainage, fertilization, and top dressing of greens and tees are in the offing at The Greenbrier, according to Haven, who stressed that since fertilization plans are often subject to change, they are projected on a year-to-year basis.

This coming season, for example, the plans call for the use of non-soluble materials which, requiring less frequent application, will consume less labor. Also, Haven reported, the Virginia Polytechnic Institute's heavy-winter-light-summer recommendation is to be implemented nearly 100% at The Greenbrier during the coming season.

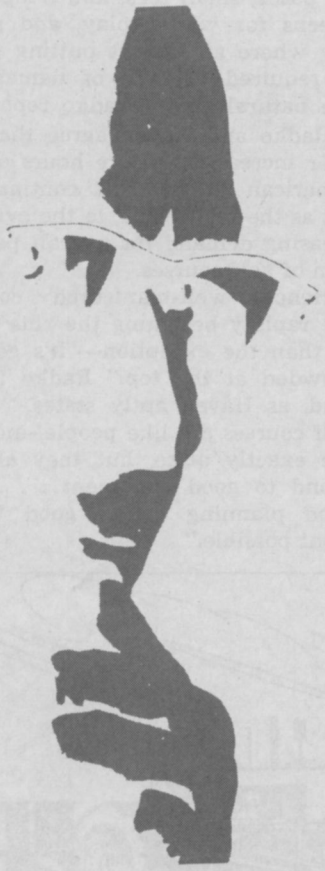
Budget control at The Greenbrier is achieved by comparisons with the preceding season's expenditure projection and its actual cost. Factors weighed in determining a budget include additional costs of materials and equipment, and a detailed breakdown in labor costs incurred in the various operations, Haven said. Inasmuch as about 1,000 man-hours have been consumed during winter months in scraping and brushing equipment for all three courses, Haven reported, Greenbrier officials are considering the purchase of new equipment with a view to decreasing man-hours and increasing maintenance efficiency.

Radko observes that more of today's courses are leaning toward artificial turf. Reasons for this are that the increasing usage of golf carts creates correspondingly more maintenance problems—i.e., harder wear on the turf, plus the necessity for installing more paths.

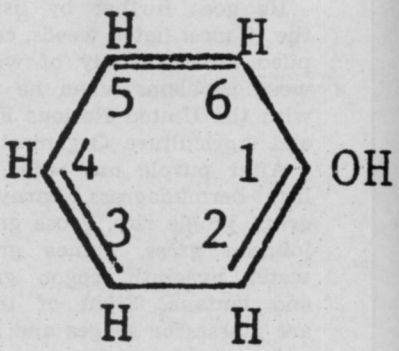
A Tennessee course is currently pioneering the use of artificial turf on paths, small tees, and temporary greens for winter play, and possibly where an instant putting green is required because of damage to the natural green, Radko reports.

Radko and Haven agree that the ever increasing leisure hours of the American public will continue to act as the major spur to the ever increasing demand for overall perfection of golf courses.

Hence, well-manicured courses are rapidly becoming the rule rather than the exception—"it's getting crowded at the top," Radko notes. And, as Haven aptly states, " . . . golf courses are like people—no two are exactly alike, but they all respond to good treatment . . . and good planning makes good treatment possible."



What Type 2,4-D To Use?



By J. S. COARTNEY and A. H. KATES
Extension Specialists, Plant Physiology
Virginia Polytechnic Institute
Blacksburg, Virginia

TO USE 2,4-D or not to use 2,4-D. That is only part of the question. Another consideration is what type of 2,4-D would be best suited for the job.

All kinds of the chemical have the same basic weed-killing ingredient, but are formulated for different purposes. They can be divided into major groups: acids, salts, amines, esters (high and low volatile), and oil-soluble amines.

In addition to 2,4-D, there are several other closely related compounds considered as derivatives of phenol and hence named phenoxy herbicides. These include 2,4,5,-T, silvex MCPA, 2,4-DB, and others.

Comparing the molecular structure of 2,4-D with that of phenol (Fig. 1), you can better visualize how the chemical name is developed.

The phenol ring is numbered for convenience. Each angle of the ring represents a carbon atom. By observing the two molecules you can see the chlorine atoms have been substituted on the ring at the 2 and 4 position and a 2 carbon unit (acetic acid) has been added. 2,4,5-T is identical with 2,4-D with the exception of an additional chlorine atom substituted at the 5 position of the ring.

Growth-regulatory and weed-control potentials of 2,4-D were discovered in the early 1940s. Early information on the use of 2,4-D was classified during the war.

Although a tremendous amount of research has been conducted with 2,4-D, it still is not clear how 2,4-D kills plants or why it is selective for broadleaf plants.

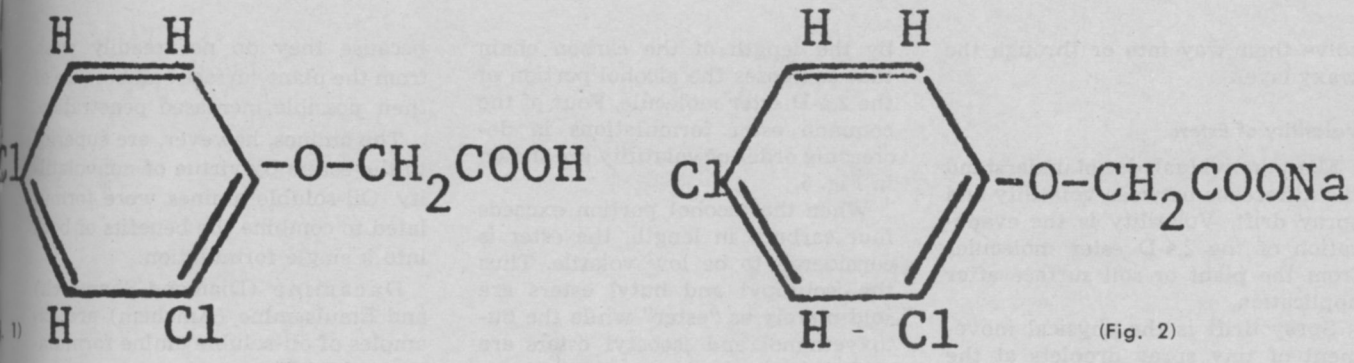
Studies have shown that many plant processes are affected by 2,4-D. Respiration, food utilization, cell division and cell enlargement are all increased after application.

Recent work would indicate that it has a more basic action which is an effect on the nucleic acids of the cells. The nucleic acids contain the information for directing cell processes. Disrupting this system can cause many side effects.

The common expression that 2,4-D causes a plant to grow itself to death may be as near the truth as any present scientific explanation.

The 2,4-D applied to a plant leaf must gain entry to be effective. Once inside, it may be moved through the plant. This movement is called translocation and is responsible for the root kill of many deep-rooted plants.

Movement occurs in the living tissue, which carries food throughout the plant. When excessive rates of 2,4-D are applied or other materials added to give a contact burn, living tissue is destroyed and translocation into the root system is reduced or prevented.



(Fig. 2)

Thus, addition of oil to a foliar spray of 2,4-D and/or 2,4,5-T will hasten top kill but excessive regrowth may occur.

2,4-D also is used as a pre-emergence herbicide. Again its action is primarily selective for broadleaf weeds. Under ideal conditions, some control of emerging grasses may be realized. Duration of 2,4-D in the soil is short and usually does not exceed four weeks. Loss from the soil is primarily by the action of soil microorganisms.

Formulations of 2,4-D

The pure acid of 2,4-D has very low water solubility but may be dissolved in various solvents or suspension agents that can mix with water. Amchem's Weedone 638 is an example of an acid formulation of 2,4-D.

Various salt formulations of 2,4-D are on the market. These appear as white powders that dissolve in water. Fig. 2 is the sodium salt, but others include the potassium, lithium, and ammonium salts.

Amines and esters are by far the more popular formulations. The amines are more accurately known as amine salts, since they combine an amine grouping with one of the above salts.

Amines are ammonia (NH_3) derivatives with hydrogen atoms replaced by alcohol groupings. Methanol (CH_3OH) and ethanol (CH_3CH_3OH) are common substitutions. Fig. 3 is a common commercial formulation, triethanolamine salt of 2,4-D.

Amine salts are quite soluble in water and form true solutions when added to a spray tank. The amine salts as well as the salt formulations dissociate in the spray tank as shown in Fig. 4.

Thus if other salts (calcium and magnesium in hard water, or others in liquid fertilizer) are present, reactions may occur which will result in insoluble precipitates. Such precipitates can clog sprayers and are extremely difficult to remove.

Amine salts and salts are nonvolatile and do not evaporate after reaching the plant or soil surface. Where high temperatures (excess of 80 degrees) are expected or when applications are in close proximity to actively growing sensitive plants, the amines should be used in preference to ester formulations.

A disadvantage of the amines is their water solubility, which allows them to be washed from the plant surface by rain. As a rule, the majority of the applied 2,4-D which is going to enter the plant will have done so in the first six hours. Thus if an amine salt formulation remains on the plant for at least six hours prior to rain, no serious loss of effectiveness should occur.

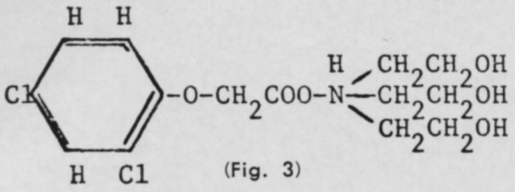
An ester is formed by combining an alcohol with an acid. The resulting ester receives its name from the alcohol used. Thus 2,4-D acid combined with butyl alcohol yields butyl ester of 2,4-D as shown in Fig. 5.

Esters are soluble in organic solvents and nearly insoluble in water. Commercial ester formulations are dissolved in oil carriers with an emulsifier. When added to water in the spray tank, they form emulsions of tiny oil droplets (containing 2,4-D) dispersed in water. Such a dispersion creates a milky appearance rather than the clear (but colored) solution which results when an amine salt is added.

When esters are sprayed on a plant surface, the water evaporates and leaves a thin film of oil containing 2,4-D. As esters are oil soluble rather than water soluble, they do not wash off as readily during rain.

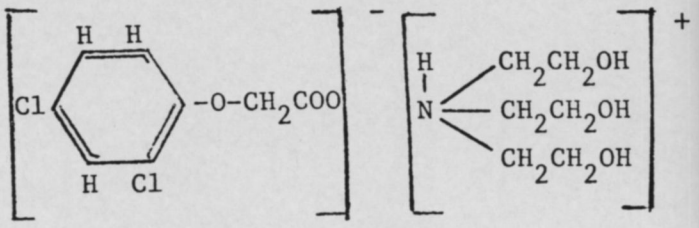
Esters are also considered to have greater killing power than amines on certain plants. (On some woody species, the amines may be superior to esters.) This is thought to be partially due to the presence of the oil carrier, which permits increased penetration of esters.

Leaf surfaces are covered by a waxy substance called cutin. The oils containing 2,4-D can conceivably dis-



(Fig. 3)

(Fig. 4)



solve their way into or through the waxy layer.

Volatility of Esters

Many individuals do not understand the difference between volatility and spray drift. Volatility is the evaporation of the 2,4-D ester molecules from the plant or soil surface after application.

Spray drift is the physical movement of tiny spray droplets at the time of application. Spray drift is dependent upon wind velocity, droplet size, and distance to ground. Droplet size is primarily controlled by pressure, nozzle size and design, and nature of material being applied.

Most cases of injury are from spray drift, and not volatile vapor drift. All formulations can result in spray drift when misused.

Ester formulations vary widely in their degree of volatility. Volatility of 2,4-D esters is primarily controlled by the length of the carbon chain that composes the alcohol portion of the 2,4-D ester molecule. Four of the common ester formulations in decreasing order of volatility are shown in Fig. 6.

When the alcohol portion exceeds four carbons in length, the ester is considered to be low volatile. Thus the isopropyl and butyl esters are sold merely as "ester" while the butoxyethanol and isooctyl esters are sold as low volatile esters.

The high volatile esters have been outlawed in many states. At temperatures in excess of 100 degrees, volatilization of the low volatile formulations becomes significant.

As leaf or soil temperatures exceed air temperatures, we suggest that low volatile esters not be used when air temperatures exceed 80 degrees.

Oil-Soluble Amines

Esters may be superior to amines because they do not readily wash from the plant surface and because of their possible increased penetration.

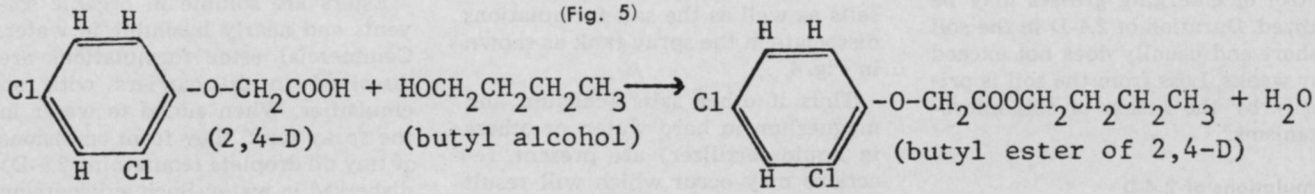
The amines, however, are superior to the esters by virtue of nonvolatility. Oil-soluble amines were formulated to combine the benefits of both into a single formulation.

Dacamine (Diamond-Shamrock) and Emulsamine (Amchem) are examples of oil-soluble amine formulations of 2,4-D.

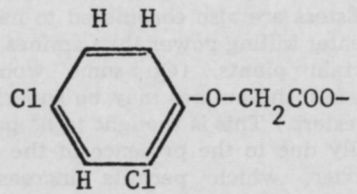
The disadvantages of the oil-soluble amine formulations are their higher cost and syrupy consistency which makes them difficult to pour from containers at cool temperatures.

Data comparing drift potential of oil-soluble amines with that of water soluble amine or ester formulations are not available. However, drift potential is anticipated to be equal to that of other formulations.

(Fig. 5)



(Fig. 6)

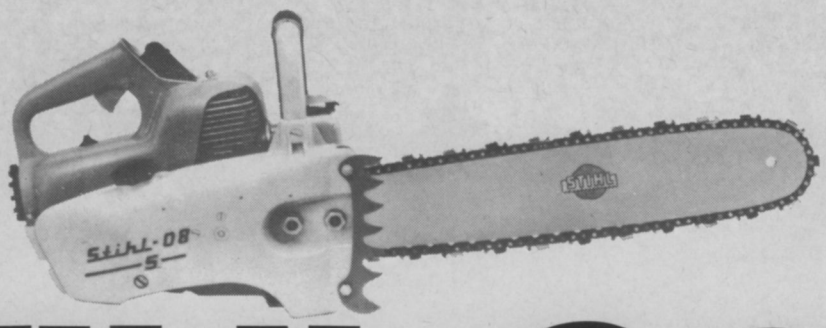


a) $CH(CH_3)_2$ (isopropyl)

b) $CH_2CH_2CH_2CH_3$ (butyl)

c) $CH_2CH_2-O-CH_2CH_2CH_2CH_3$ (butoxyethanol)

d) $CH_2CH_2CH_2CH_2CH_2CH(CH_3)-CH_3$ (isooctyl)



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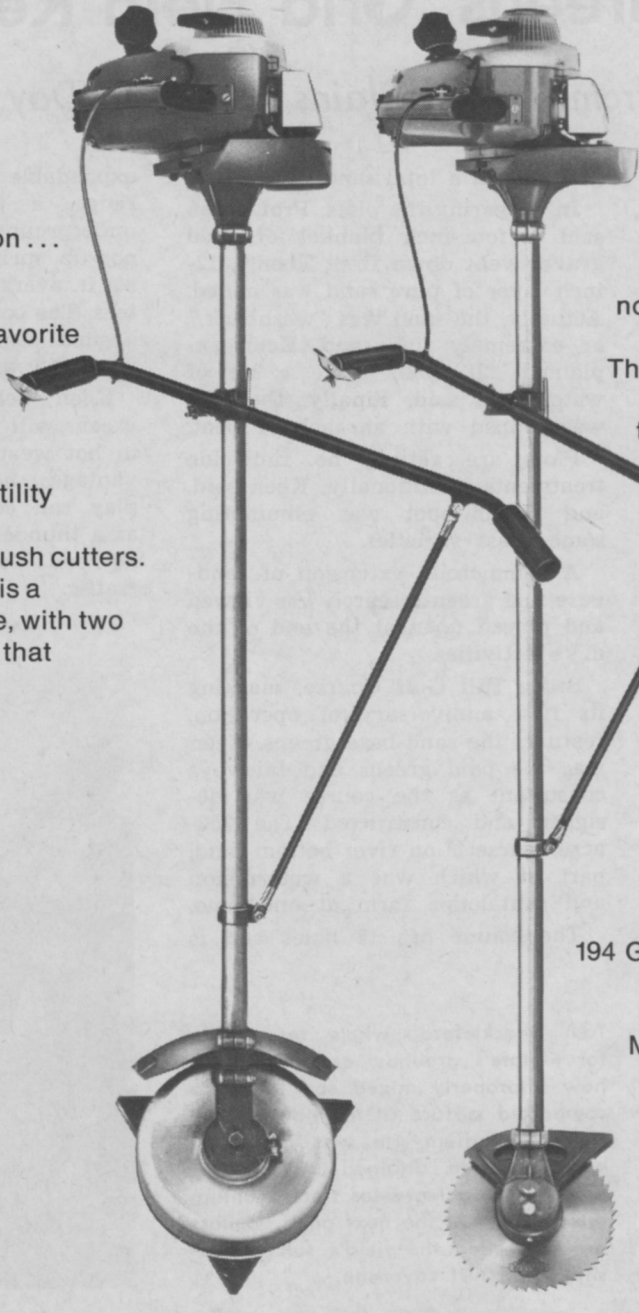

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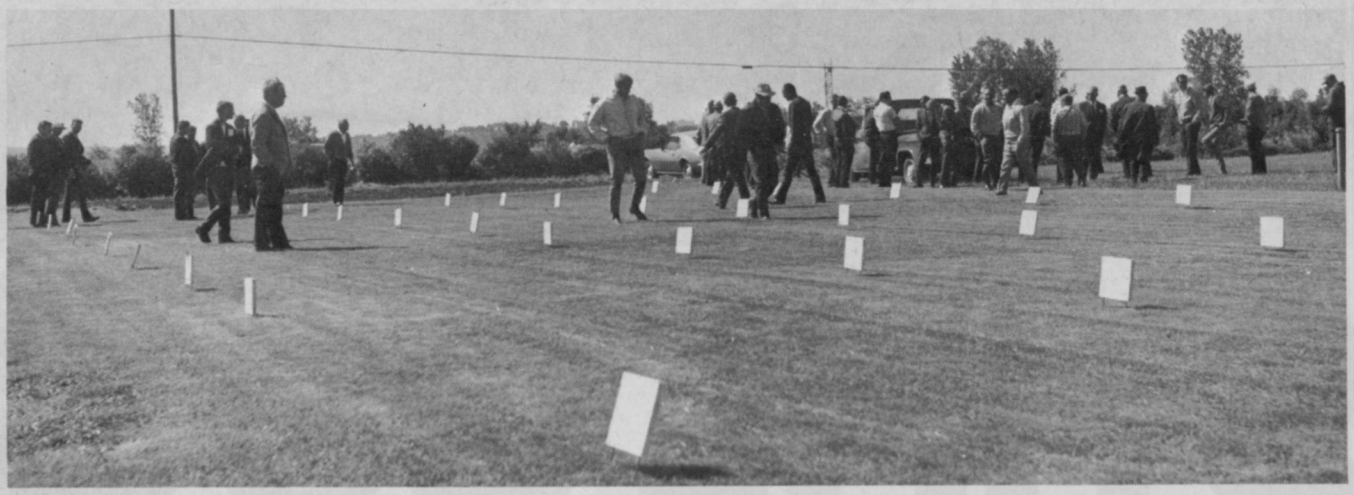


Golf course superintendents, sod producers, nurserymen and garden center owners stroll over grass research plots during the Central Plains Turf Field Day at Kansas State University. These are 55 plots of 26 varieties of bluegrasses and fescues.

Sand-Based Greens, Grid Field Renovation

Report from Central Plains Turf Field Day

WILL A TOTAL sand base support a turf golf green? What's a good way to establish and renovate a football field?

Are nitrogen compounds practical as herbicides?

A little more than 50 turf specialists came to look at these questions and study the answers at the June 2 Central Plains Turf Field Day at Manhattan in the shadow of Kansas State University.

The sun came for looks only. Visitors shivered in early morning temperatures from the mid 30s to mid 40s that equalled or surpassed all-time low records in many parts of the Midwest.

The spring coolness followed one of the more severe winters the region has experienced. "We've had the worst ice crust since '35," reported Ray Keen, professor of horticulture at K-State, shortly after he greeted guests on the grounds of the university's turf research plots.

Bermudagrass varieties, being grown to see which are adaptable to the area, told the story. So severe was the winter that it killed the "sissy Bermudagrasses" to the extent of reducing varieties being considered from 270 to 24.

"That's good," Prof. Keen told the group. "It means those varieties won't be dying on your golf courses later on."

Golf Greens on Sand Base

Interest was intense concerning some 50 varieties of bentgrasses growing on a total sand base.

In preparing the plots, Prof. Keen said a four-inch blanket of road gravel went down first. Then a 12-inch layer of pure sand was added. Actually, the sand was "washback," or extremely fine sand, Keen explained. "It holds quite a bit of water," he said. Finally, the plot was topped with an inch of peat.

Plots are getting no fungicide treatments intentionally, Keen said, and dollar spot was eliminating some grass varieties.

A commercial extension of sand-base turf green research was viewed and played upon at the end of the day's activities.

Stagg Hill Golf Course, marking its first anniversary of operation, features the sand-base greens. Keen was the paid greens and fairways consultant as the course was designed and constructed. The 352-acre course is on river-bottom land, part of which was a watermelon and cantaloupe farm at one time.

The course has 18 holes and is expandable to 27. It has a driving range, a putting clock, and an underground sprinkling system with pop-up sprinklers to tend the 5000 sq. ft. average greens and extra-size tees. The course incorporates a lake, a small lagoon, and most fairways are lined with 50-ft. trees.

Keen believes the sand-base greens will need a little more water in hot weather. But off-setting advantages, he pointed out, are that play can continue almost as soon as a thunderstorm quits and there's no soil compaction from heavy traffic.

Tom Shackleford, who's responsible for K-State's grounds, explains (right) how improperly mixed soil led to a compacted surface at the new K-State football stadium. He was impressed with coverage attained by Windsor and Fylking bluegrasses since planting this spring. On the next page, visitors are inspecting the field's soil composition and turf coverage.

Field day guests hear research observations on 60 varieties of bentgrasses growing on a total sand base. Note in the lower right of the big picture how dollar spot had affected one variety while plots on either side appear to be perfectly healthy. Above, Ray Keen, K-State professor of horticulture and field day chairman, shows Merle Shogren how an inch of peat was used to top off the 'washback' sand.

Football Field Renovation

Compaction and traffic were considerations also, as K-State built its new football field and stadium.

Field composition was specified to be 60% sand, 20% haydite, 15% peat and the rest soil, said Tom Shackleford, who's in charge of the university grounds.

Bermudagrass was sowed for quick cover. When the season opened last fall, it became apparent, Shackleford said, that ingredients weren't mixed enough.

"You'll never find a football coach who says he doesn't want a hard field," Shackleford said, "but this field was so hard that before the first game was played, 75 pairs of soccer shoes were purchased."

Of course, Shackleford continued, every time runners broke loose, they were gone, demonstrating to fans' delight the reason coaches like a hard field. K-State beat Colorado State 21-0, for its first opening-game victory since 1964.

The bermudagrass did not come back this spring, Shackleford said, so the field was planted to Windsor and Fylking bluegrass. "I'm amazed at how quickly the grass has spread," he said. Nevertheless, the plan is to plow up the field again, right after the season ends this year, to thoroughly mix the soil with "everything we can think of."

Good Turf Treated as Crop

As guests paused to allow a barbecued chicken dinner to settle, they listened to Darrell Westervelt, owner of Blueville Nursery in Manhattan, tell how he renovates the football field in Bishop Stadium, part of the city-county park and fairgrounds.

Keeping healthy turf on this field isn't the normal football field maintenance task. This is no normal field, considering its intensive use.

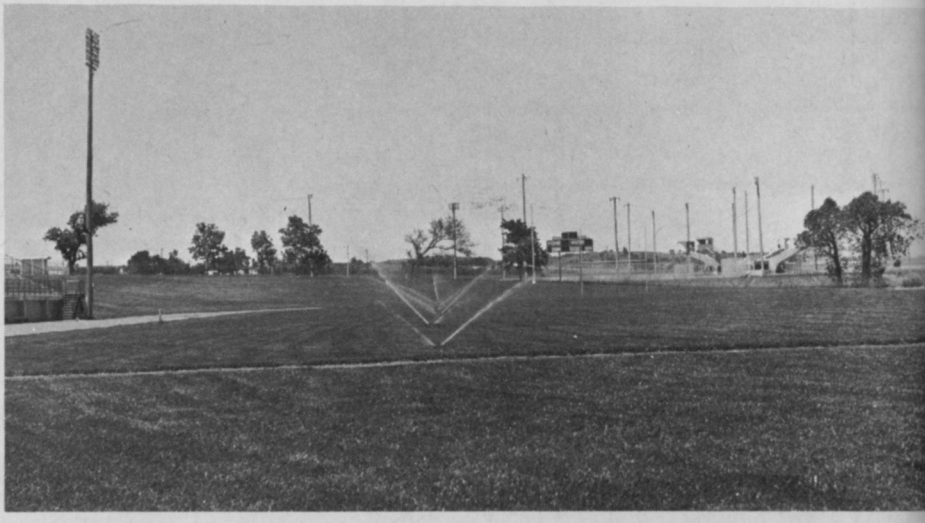
"Last season, 18 games (high school) with three in the rain were played," said Westervelt. Fourteen or 15 is an average season.

"I approach the task of building a good playing turf as though it were a crop, to be grown for harvest during the football season," he said.

Westervelt was given the contract to care for the field after its first season in 1966. It had been seeded to bermudagrass for the quick cover.

After the season, he began the renovation by hauling in 40 tons of sludge from the city disposal plant. Forty to 50 cubic yards of top soil also were added to fill in depressions.

Seeding was done on Feb. 15, 1967; the rate, four lbs. of K31 and one pound of Kentucky bluegrass per 1,000 sq. ft. The same area got one pound of actual nitrogen and



Would you believe this football field withstands 15 to 18 games a season? The Blueville Nursery in Manhattan renovates every year.

two pounds of phosphorus. Another pound of N was added in May, and another pound in September.

After the season, the renovation is repeated; topdress with soil and sludge (applied with a manure spreader), aerate, use harrow and drag mat to break up clods, fertilize, and reseed.

"I reseed at the full rate where the turf is torn up, and at the half rate elsewhere," said Westervelt.

"We mow at three inches during the summer, then lower to 2½, or two inches during the season.

"In high school football, it's not so much of whether you win or lose the game that concerns the coaches, but how to prevent broken arms and legs.

"We cut the grass high and may even water a few days ahead to give the boys a soft place to fall."

The field incorporates a buried Weathermatic watering system with Turbo-jet pop-up sprinklers.

Before the group visited the field, they listened to biology professor Dr. Loran C. Anderson give a scholarly presentation on the anatomy of a grass plant.

It is essential to know the basic make-up of a plant, he said, before you can scientifically breed new varieties, determine how chemicals and diseases affect plant structure, or even to determine which cultural practices are best. New research methods, he added, are revealing there are more classes of grasses than first thought, and that some grasses have been improperly categorized.

Turf Industry Gains Recognition

Dr. Floyd Smith, vice-president for agriculture, officially welcomed the turf specialists, composed of nurserymen, golf course superintendents, garden center owners, and sod producers.

There is "increasing recognition of the contributions of the turf industry in the state," Dr. Smith said. Emphasis is on improving our environment, he continued, and "we can look to the growing of plants as one way of controlling pollution."

Interest among state legislators, said Dr. Smith, has taken the form of a $62,000 horticulture appropriation available beginning this month to deal with the unique climate and soil characteristics around the Wichita area.

Research will be initiated on horticulture problems related to the food crops and the safe use of agricultural chemicals.

"But there will be a very decided interest in research concerning turfgrasses, ornamentals and shrubs," Dr. Smith said.

Nitrogen Compounds as Herbicide

Earlier in the day, Richard Pence showed results of his experimental work with anhydrous ammonia used as a herbicide.

Pence's studies are supported in part by an assistantship from the Central Plains Turfgrass Foundation.

Pence enclosed three turf areas, each about one yard square and 2½ inches deep, then released anhydrous ammonia at the rates of 200 lbs. per acre, 300 lbs. and 400 lbs. An estimated 95% to 100% total vegetation kill was achieved in all three "boxes."

How the grass and broadleaf plants were killed isn't known for sure. Anhydrous ammonia, coming out of the tank as a liquid, is 28 degrees below zero. It immediately vaporizes at higher temperatures. One theory is that vegetation is killed by freezing. Another theory, based on ammonia's great affinity for water, is that, as the liquid ammonia vaporizes, it saps the plant structure of its water content, causing death by dessication.

Whatever the cause of death, the bigger problem, Pence said, is to make the application practical. One method he intends to try is pulling the inverted box device over turf with a tractor as the anhydrous ammonia is released.

Darrell Westervelt, owner of Blueville Nursery, uses a pencil to show the three-inch height the grass is mowed during the growing season. It's mowed either 2½ or 2 inches during the high school playing season. With Westervelt is employee Leroy Hannebaum.

Here Are Program Features For Shade Tree Conference

Programming for the 45th International Shade Tree Conference is a beauty.

That opinion comes in part from the conference theme, "Beautify With Trees." The major basis, however, is the interesting, educational and entertaining agenda that's lined up for every member of the family. There are separate programs for the men, for women, and for the youth.

The date is Aug. 10-14; the place, the Portland Hilton, Portland, Ore.

Sunday is sort of the "business-before-pleasure" day. The board of directors of the National Arborist Association meets in the morning and the ISTC board of governors convenes in the afternoon.

President Keith L. Davey will officially open the conference at 9 a.m. Monday. The topic lineup looks like this:

— Inventory of vegetation resources from air and space, and implications for the arborist;

— Effect of pollution on ornamental plants;

— A banker's opinion of your business today;

— Growth factors in trunk development of young trees; and

— Growth control in trees; physiological and anatomical aspects.

Three sessions run concurrently Tuesday, on commercial, utility and municipal arboriculture.

Commercial topics are:

— What methods are open to those wishing to retire or dispose of their business;

— Encroachment of municipalities into private enterprise and what can be done about it;

— Is arboriculture a trade or profession?; and

— Managing an arboriculture business.

Municipal arboriculture deals with what's happening in this field across the country. Special reports will be given from the cities of New York, Minneapolis, Ottawa, Long Beach, Greenwich, and Lansing.

Session three on utility arboriculture considers:

— Meeting beautification and conservation needs through the off-street planting concept;

— Budgeting tree trimming;

— Helping to maintain a productive line clearance program through a tree cost analysis system;

— The street tree ordinance in support of off-street planting; and

— URD—the answer to service reliability and beautility in new residential areas.

The three groups merge for an evening session on ornamental plants of the Orient adaptable to the Northwest.

Equipment Displays, Demonstrations

Perhaps the most practical and worthwhile feature of the conference is the wide array of equipment, materials and merchandising exhibitors.

A 45-minute "Exhibitors Period" is scheduled for Monday morning and half-hour breaks are scheduled each half-day during other days of the convention.

Field demonstrations are Wednesday morning, 9 to 12 noon. Educational sessions will be at the hotel in the afternoon. Some three dozen exhibit booths are available.

The special educational sessions Wednesday afternoon will be presented in three categories — general arboriculture, utility arboriculture, and municipal arboriculture.

General arborists will learn about cabling and bracing techniques and tools for tree pruning safety.

Utility arborists will hear the same session on safety. In addition, topics are utility engagement in city tree planting programs and a presentation on opportunity for safety on and off the job.

Municipal arborists will spend the afternoon touring and discussing street trees and special city tree-planting and maintenance problems.

Much of Thursday will be devoted to reports and discussions of insects. There will be one session on the use of trees in unusual landscape designs.

At 11 a.m., the conference business session will convene. The agenda includes election of officers and asking recommendations for convention cities for 1974 and 1975.

Bring the Family

If the problem in your house is whether to take a family vacation or attend the Shade Tree Conference, then your troubles are over. Have the family start reading this story from the back.

The entertainment lineup is a family vacation: Monday evening — a visit to J. Frank Schmidt & Son Company nursery and a barbecue at a scenic spot: Wednesday evening — Buses leave for Tillamook and a trip up the scenic coast to Gearhart's, with a salmon barbecue on the beach; and Friday — post convention tours are available to Alaska and the Canadian Rockies.

Special programming for women includes other entertainment. On Monday, they will travel the scenic Columbia Highway, second highest in the U.S., to Multnomah Falls for lunch. They'll visit a beautiful grotto en route.

Tuesday morning is open, except a meeting of the "Shady Ladies." After a luncheon, with a TV personality as speaker, women leave for a tour of the city. The highlight is the world famous international rose garden in Washington Park.

Wednesday and Thursday are open for shopping.

Special features on the teenage and youth program include tours Monday to the Portland zoo and the Oregon Museum of Science & Industry; tour of the Bonneville dam and fish hatchery at Multnomah Falls Tuesday; trip to Janzen Park Wednesday; and a pool party at the hotel Thursday.

Meeting Dates

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

National Fertilizer Solutions Association, Round - Up Program, Ridpath Hotel, Spokane, Wash., July 8-10.

National Fertilizer Solutions Association, Round - Up Program, Hotel Muehlebach, Kansas City, Mo., July 22-23.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The Cissels Employ A Turf Bird

By MARJORIE S. CISSEL
Brookeville, Md.

Photos by Walter Argenbright, Jr., Etchison, Md.
It's not a bird, it's a plane and the boss is in it. Lambert Cissel . . .

WE lifted off from Plymouth, Ind., airport bound for Maryland with clouds hovering gray and windswept at only 2000 feet. Rain was moving in behind.

Promises for better weather turned out to be just promises. In the mountainous terrain of western Pennsylvania, we met the swirling fingers of a squall line.

We had been toying with the idea of climbing over the weather for the past 100 miles. If it meant climbing to 14,000 feet, we would need oxygen, and probably the only thing we didn't have was the oxygen tank.

My husband, Lambert, glanced toward me for a mental reading. Suddenly he decided, pushing the throttle to full power and pulling the nose high.

I began to wonder if we could go high enough, then stopped wondering and started watching the sweeping altimeter hand . . . 5000 feet . . . 7000, 9000, nothing.

Then at 10,500, the highest we had ever been, the plane suddenly popped into the clearest, brightest sunlight we had ever seen.

We rose to 11,500 and settled back for a peaceful trip across the mountains. The engine purred like a sleeping cat.

This was our recent trip home from a Turf Field Day at Shamrock Turf Nurseries at Hanna, Ind. Total hours in the air: 4.5. Total miles traveled: 504. Overnight lodging fees: none.

Such are the stories told by those who run their sod business from a cockpit. Kimberthy Turf Farms is among them.

Kimberthy's "turf bird" is a dependable flying machine called the Cessna 180. Its 230 horses lift it easily from the shortest strips (including sod fields). This particular 180, a four-seater, has a cruise speed of 130 to 160 miles per hour and a cruise range of 700 miles to 800 miles. It is equipped with ADF, a 90-channel Lear (VHF), LF, Omni and a four-hour oxygen supply for five.

Lambert Cissel, president of Kimberthy and owner of the plane, considers the 180 more than a luxury item. It's a very real part of the business.

Sod hunting is its major asset. When the turf supply gets thin, Lambert takes to the air for a quick examination of the countryside.

Spotting a good turf field isn't difficult, and at 140 crow-flying miles per hour, a lot of land can be combed in a short time.

At the same time, he can spot-check his crews. There's nothing like having the boss "drop in" to keep them on their toes.

On occasions, he has air-delivered pay checks.

It is on the long-range trip, however, that the turf bird really proves its worth. Several years ago, Lambert found he would have to wait at least a week for a tractor parts shipment from Richmond, Va. Instead, he took to the air and, despite one stop because of darkness and morning ground fog, got back in mid-afternoon of the next day.

Attending equipment demonstrations and field days are other activities when the plane is handy. Often, he drops in on neighboring turf producers, distant yet within the state, for their field days.

According to a magazine for those with flying interests, we aren't, by a long shot, the only ones floating our way through the business world. Some 1300 large companies and 11,000 small companies own and operate their own aircraft, the article said.

At least 40,000 aircraft are operated mainly for business purposes in the U.S., said the magizine. Business flying is a $2 billion-a-year industry. Airplane costs range from a $2,500 single engine radio equipped plane to a $2 million jet.

If you wonder why we bother to

Next Issue / *D. W. Morrill Tells How To Start a Sod Farm*

. . . lands his Cessna 180 to chat with employee James Austin, on the forklift.

use a plane when a great deal of its uses could be accomplished almost as well without leaving the ground, the first answer would be: To save time.

If you compare using your own plane with using a commercial plane, other good answers are: Independent scheduling, reliability, safety, reaching off-airline cities and airfields.

Our reasons for incorporating a plane into the business, initially, had nothing to do with saving time. We love to fly. With those who love to fly, as with those who hunt, boat or fish, any excuse to get out (or up) is a good one.

And when it's discovered this excuse not only saves time but gives a business-deductible pleasure as well, then why not?

We could find sod, deliver checks and travel without one, but we're sure it could not be done as effectively . . . and certainly not done with as much pleasure.

$1 Buys 16 Publications On Lawns and Landscaping

A 16-page publication "package" on lawns and landscaping is available as a special offer from the Cooperative Extension Service, Michigan State University.

The price is $1.00 for the 16 publications — cash, check or money order — from the Bulletin Office, Box 231, East Lansing, Mich. 48823. The offer will be kept open until Aug. 1.

Subjects include planning a landscape, controlling insects, selection and planting of trees and shrubs, outdoor lighting, pruning, and paving of home grounds.

Grass Use, Crop Forecast Reported at Merion Meeting

Record disappearance, or use, of Merion Kentucky bluegrass — 5,246,004 lbs. — was reported at the recent 16th annual meeting in Spokane, Wash., of the Merion Bluegrass Association.

Unsold grass inventory was listed at 1,925,443 lbs. of quality seed. Crop statistics indicate an acreage decrease in this year. The 10,687-acre production estimate compares with 12,305 acres harvested in 1968. It was concluded that Merion still led the field, due to its built-in promotion program and its good dealer profit margin.

Arden Jacklin of Jacklin Seed Company, Dishman, Wash., was reelected association president. Other officers are Arnie Bonnicksen of Western Farmers Association, Pasco, Wash., vice-president; Dick Bailey of W. R. Grace and Company, Rudy-Patrick Division, Halsay, Ore., treasurer, and James Eveson, La Grande, Ore., secretary.

Directors are George Royes of George Royes Grass Seeds, Imbler, Ore.; Ted Freeman of Madras, Ore.; Bill Rose of Woodburn, Ore.; Elmer Schneidmiller of Liberty Lake, Wash.; A. B. Renz of Veradale, Wash., in addition to Jacklin, Bonnicksen and Bailey.

Michigan Golf Course Damage, Also

As a part of the June issue, we reported the presence of fairy ring on one Michigan sod farm.

In his spring turf report, Dr. James Beard, crop scientist at Michigan State University, has identified *Fusarium* blight as the cause of the dead rings of grass.

"In most cases, spring kill in the circular ring pattern cannot be attributed to the direct activity of *Fusarium* blight," said Beard.

"It appears there is an interaction between the *Fusarium* blight disease and low temperature kill. The turf in these circular rings has been weakened by Fusarium activity the previous summer and fall. Actual kill was caused by direct low temperature injury to the hydrated plants within the weakened region of the ring."

Dr. Beard, also in the spring report, said Michigan golf courses suffered extensive damage last winter from desiccation. He described injury to greens "more severe in 1969 than in the previous ten years."

"The absence of snow cover combined with low temperatures and high winds resulted in severe injury to elevated, exposed slopes and high spots on many golf courses and very extensive injury to greens. Severe injury was most common on greens where an extensive thatch was present or where a late fall aeration was practiced with the holes left open throughout the winter."

Wiley Miner of Princeton Turf Farms, Cranbury, N. J., shows the location of the Aug. 5 sod equipment demonstration to Dr. Henry W. Indyk (next to sign) and William Rapp. Miner and Indyk are president and executive secretary, respectively, of the American Sod Producers Association. Indyk also is Rutgers University turf management extension specialist. Rapp, of Rapp Sod Farm, is president of the New Jersey Cultivated Sod Association. The American Sod Producers Association is sponsoring its third annual sod field days Aug. 4-5.

Dr. C. R. Funk (kneeling, right) demonstrates qualities of a Kentucky bluegrass hybrid he has developed at Rutgers University to Al Neuberger (kneeling, left) and Drs. R. E. Engel (standing, left) and Henry W. Indyk. Turfgrass plots will be featured at the ASPA field days. Neuberger is supervisor of the University's turfgrass research plot maintenance, while Engel is a professor in turfgrass management.

ASPA Field Days Aug. 4-5

Plans for the American Sod Producers third annual summer field days have been completed, according to the group's executive secretary, Dr. Henry W. Indyk.

Events, scheduled for Aug. 4-6, promise to be among the largest and most interesting conducted by the recently formed national organization of sod producers and associated interests, Dr. Indyk said. The Cultivated Sod Association of New Jersey is host.

Activities will begin Aug. 4 at the College of Agriculture and Environmental Science campus of Rutgers University, Route #1, New Brunswick, N.J. A tour of the turfgrass research plots will be conducted by Drs. C. R. Funk and R. E. Engel. Visitors will see results of the first Kentucky bluegrass hybridization program.

At the evening dinner meeting, Francis Raymaley, New Jersey Department of Agriculture director of resource development, will speak on "Future Platterns of Land Development in New Jersey."

An all-day demonstration of sod production equipment is scheduled for Aug. 5 at the Princeton Turf Farms home office, Union Valley Rd., Cranbury, N.J. The latest line of sod production equipment and materials will be displayed and demonstrated under actual field conditions. Lunch and refreshments will be served.

These activities have been scheduled to coincide with the biennial USDA field day, Aug. 6 at the Agricultural Research Center, Beltsville, Md. A tour of the Center's facilities and turfgrass research plots is scheduled.

Turfgrass Foundation Gives $10,000 Grant to OSU

A $10,000 turfgrass management study grant has been awarded for the second consecutive year to Ohio State University by the Ohio Turfgrass Foundation.

According to University Associate Professor of Agronomy Dr. Robert W. Miller, who will conduct the study, the grant makes possible additional research in the fields of better turfgrass on golf courses, industrial grounds, cemeteries, parks, and home lawns.

The Ohio Turfgrass Foundation was founded in 1961 as a nonprofit organization incorporated under Ohio laws. Its three basic purposes are to promote research in and disseminate information on turfgrass management, as well as to encourage turfgrass training of students. It offers several scholarships annually and sponsors a turfgrass conference and show each year. Dates for 1969 are Dec. 1-3 in Cleveland.

Soil Test, Not Plant Use Basis for Fertilizer Need

Some exercises in pencil pushing can be misleading when you figure fertilizer needs, warns Curtis Overdahl, extension soils specialist at the University of Minnesota.

Overdahl says plant composition sometimes is mistakenly used as the major basis for a fertility program. This reasoning that "whatever is removed must be replaced" can cause serious miscalculations of plant nutrient needs.

Merely by replacing the plant nutrients that are removed, underestimates can occur, since factors such as leaching and fixation losses and the lack of 100% efficient plant use are ignored.

Overestimates of plant nutrient needs are possible, also. Some soils may have sufficient quantities of an element so that additions won't be necessary in a lifetime.

Knowledge of plant composition is important, but exercise care in how you use it, Overdahl adds. A complete soil testing program is your best bet for determining fertilizer needs.

Phosphorus Is Key To Lake Enrichment

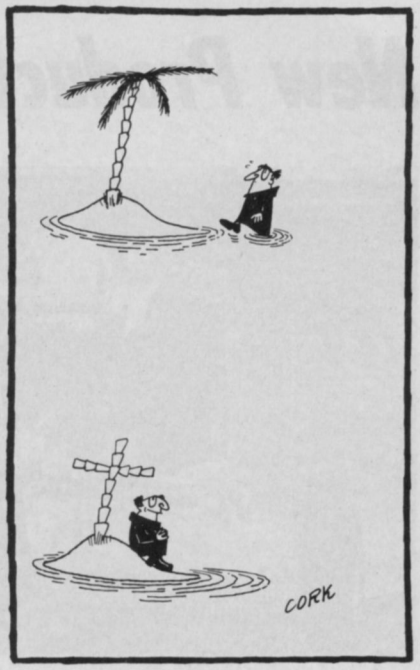
Phosphorus is a key nutrient in the regulation of water plant growth, according to University of Minnesota researchers studying the process of lake enrichment and aging.

University limnologist Robert Megard reports that the amount of phosphorus is often the limiting nutrient of water plant growth.

Even small amounts of phosphorus can cause a great deal of algae growth, he says, estimating that the 3 pounds of phosphorus in the surface layer of an acre of Lake Minnetonka, for example, produces 70 pounds of new organic matter a day.

During a 60-day summer period, more than 2000 pounds per acre of actual algae organic matter can accumulate, according to Megard.

Lowell Hanson, university soils scientist, reports that surface water and sediment are big sources of phosphorus from the land. When soil is able to stay in place and come in contact with soluble or suspended phosphorus compounds, soil particles absorb the phosphorus quite efficiently, he says.



He explains that spray irrigation of sewage or feedlot effluents is a possibility for cleaning up phosphorus-polluted waters. Another method may be the use of inland potholes used as sites for settling and absorbing nutrients before they get into the lakes.

Analysis of tile water samples from fertilized fields in southern Minnesota indicate that water percolated through the soil contains about 20 parts of phosphorus per billion parts water, the researchers report. This would mean that about 1/100 of a pound of phosphorus would be removed from an acre of land if 2 inches of water were collected by the tile lines over a year's time, they explain.

On a township basis of 23,000 acres this would total up to the phosphorus equivalent of 1200 pounds of a 0-45-0 phosphate fertilizer, they add.

Slide Rule 'Errs' on Sod Webworm Control

An error has been found in the 1969 Cornell recommendations for sod webworm control, says Kirk Personius, Monroe County, N.Y., Cooperative Extension Agent.

Recommendations for sod webworm control call for Sevin (carbaryl) at the rate of 2 qts. of 4F; or 4 lbs. of 50W per 5000 sq. ft. This results in more than 17 lbs. per acre, or almost twice that recommended by the producers of Sevin.

The United States Department of Agriculture recommends 4 oz. of Sevin per 1000 sq. ft., or 174.42 oz. per acre. The Cornell recommendations, calculated on a per-acre basis, resulted in 17.42 lbs. per acre. Apparently the person making the calculations, said Personius, made two mistakes — thinking in pounds rather than ounces and misplacing the decimal point.

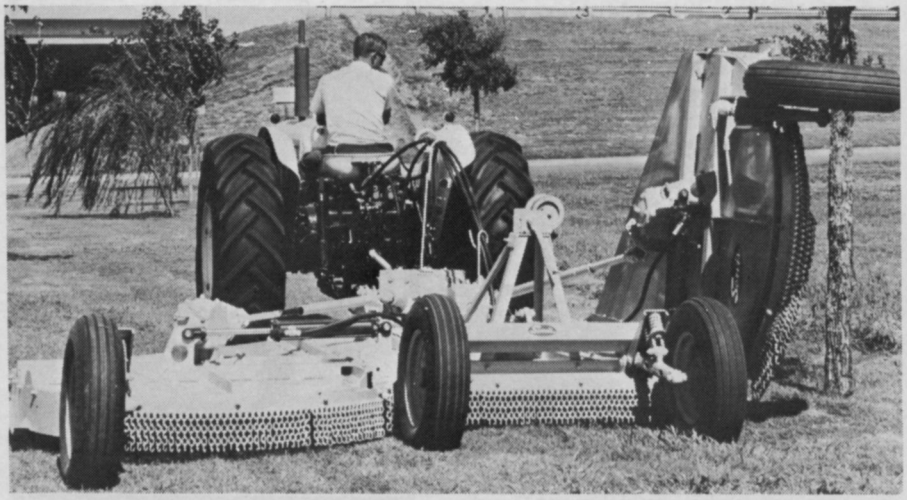
In any event, he added, "we think 17.42 lbs. per acre is too much and suggest this be reduced."

USDA recommendations, when raised to a per-acre figure, came to about 11 pounds.

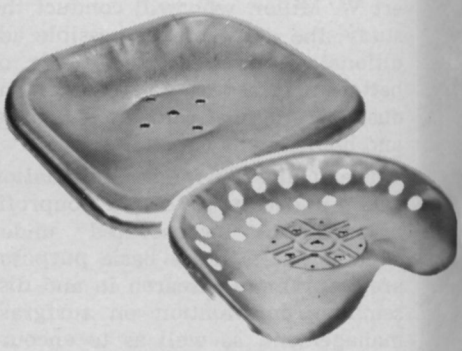
Until more experimental evidence is available, the New York Extension Service advises using carbaryl at the rate of between six and 10 lbs. per acre for control of sod webworms.

Therefore, the 1969 Cornell recommendations should be changed to 1 qt. 4F, or 2 lbs. 50W Sevin per 5000 sq. ft.

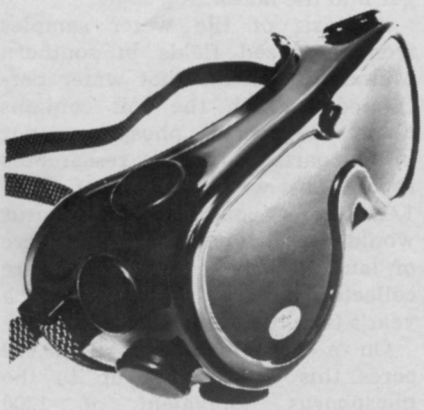
New Products . . . Designed for the Vegetation Care Industry



Servis Equipment Company, Dallas, Tex., has introduced its new FLEX XV Flex- Action Rotary Cutter for contour mowing, brush cutting, and row crop shredding operations. The FLEX XV weighs more than 3,350 lbs. without optional accessories and clean cuts a full 15-ft. wide swath. Wings raise to 90° maximum and lower to 22° minimum heights while the unit is in continuous operation. It is designed to operate behind wheel-type tractors with drawbar ratings from 50 h.p. For more details, circle (701) on reply card.

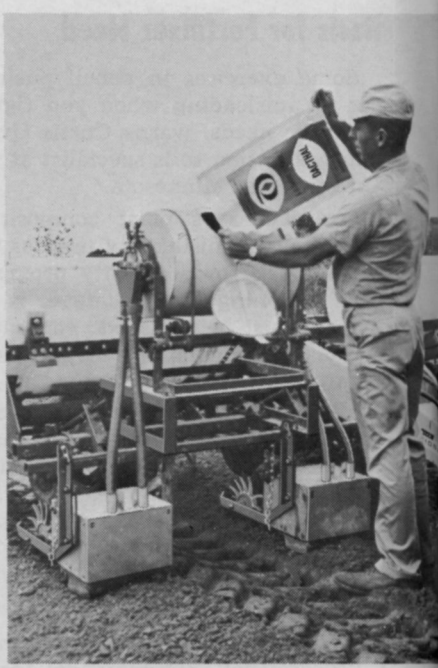


Logan Metal Stampings, Inc., Akron, Ohio announces two new metal seats for ridin mowers and garden tractors. Both mode feature heavy, lock-reinforced backing plate for extra rigidity, are constructed of 1 gauge steel, and are available in rectangu lar and round styles. For more details, circl (702) on reply card.

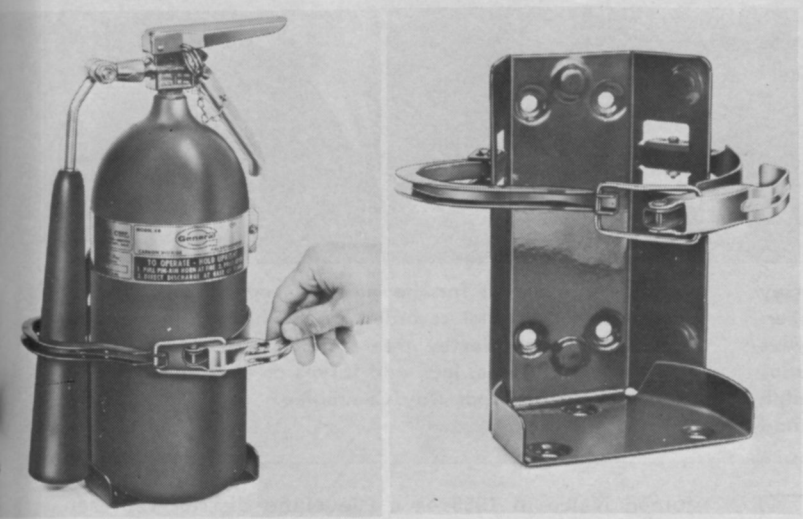


Glendale Optical Company, Inc., Woodbury, N.Y., announces an all-plastic welding goggle with a soft vinyl body and lenses of IRex, an infra-red and ultra-violet absorber developed by American Cyanamid Company. Called the Glengard 715, the goggle features an 0.60 plastic wide view lens available in shades from 3 to 8. Also, lenses are available to fit standard welding goggles in these shades, in 50mm sizes. Glengard plastic filter plates fit welding helmets and come in sizes 2 x 4¼" and 4½ x 5¼", shades 3 to 14. The lenses are in compliance with U.S.A.S.Z87-1-1968. For more details, circle (705) on reply card.

Lakes Supply Company, Inc., Dundee, Ill., introduces a turf weed control unit, available in three models, to curb the "drift" of spray weedicides that kill plant life. Called "The Drip," it operates by dripping liquid weed killer onto a roller, coating it with a film. The damp roller kills the weeds it contacts. Model 101, illustrated, is equipped with a 36" wide roller and a 15⅓-gal. capacity tank. For more details, circle (706) on reply card.



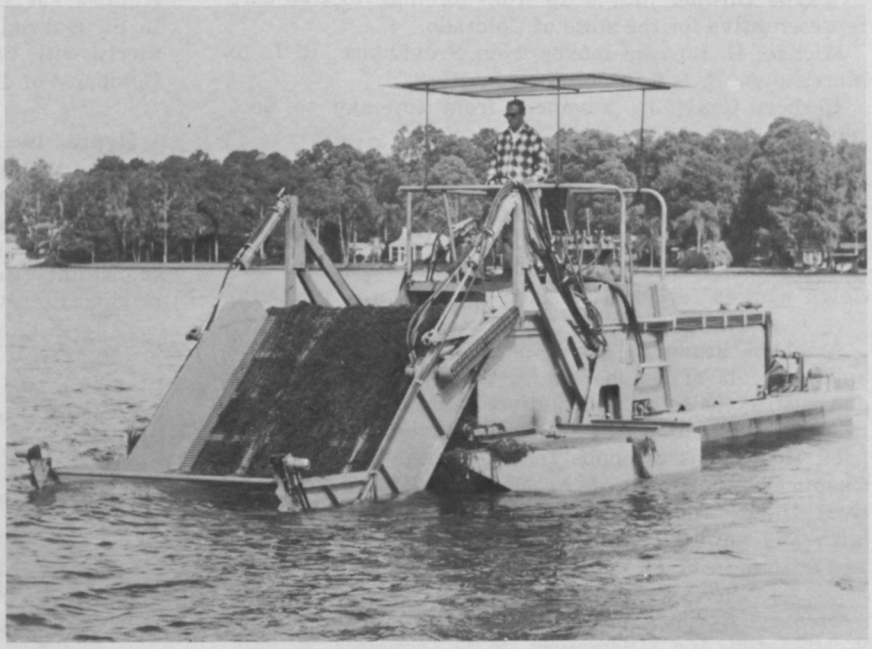
Diamond Shamrock Chemical Co., Clevela Ohio, has developed a dry herbicide ap cator allowing application and planting i single operation. The applicator, which el inates water carrying, mixing and pouri is designed for use with Diamond's Dact W-75 preemergence weedkiller. From a lb. capacity drum, dry herbicide rotates is metered at a preset rate through flexi tubes onto the ground in 12" bands. It ne refilling only once every 15 to 20 ac Flaps on the application tubes minim wind drift. The applicator may be re mounted, tool-bar mounted, or front-mou ed. For more details, circle (707) on re card.



Harman Division of Aeroquip Corporation, Los Angeles, Calif., introduces a new fire extinguisher mounting bracket, Part MBS9001, designed to fit 5 lb. CO_2 bottles, or dry chemical bottles with a diameter range of 5—5½". It can be released both in the back plate and bracket base for either wall or case mounting. Removable bolts and nuts facilitate changing the bracket catch for either right- or left-hand release. The bracket is covered with a red plastic coating for corrosion protection and shock cushioning. The handle, bail and bolts are of stainless steel. For more details, circle (703) on reply card.

Bridgeport Implement Works, Inc., Stratford, Conn., announces a compact stonepicker, the Pixtone Junior, designed for use with compact tractors for stone removal in seedbed preparation on small landscaping jobs. The rake can be raised or lowered for surface raking or working to a 2" depth in previously loosened soil. It picks stones or debris ¾ to 4" in diameter from a 28"-wide swath. The material is then deposited in a 600-lb. capacity box for transporting to a disposing area. The steel-constructed Pixtone Junior measures 3 ft. wide, 6 ft. long and 30 in. high, and weighs 500 lbs. For more details, circle (704) on reply card.

Spraying Systems Company, Bellwood, Ill., introduces its No. 12150 Directo-Valve control valve for controlling large capacity spray booms. The valve has a 1½" NPT inlet connection and a 1¼" NPT outlet, conveniently positioned at 90° for connection to the boom line. A second 1½" NPT connection in line with the inlet is used as a continual bypass for excess flow. With the valve in "shut-off" position, all liquid bypasses through the valve; in "open" position, liquid is directed to the spray line with excess liquid being bypassed. Of ball-type design, the valves may be operated at pressures up to 150 psi. For more details, circle (708) on reply card.



Aquatic Controls Corporation, Waukesha, Wis., has announced an aquatic vegetation control machine, the Marine Scavenger, Model 258-II. It cuts, removes and loads up to 2,000 lbs. of rooted or surface aquatic plants per minute; takes to shore and unloads at the rate of 4,000 lbs. per minute in an automatic, one-man operation. The Marine Scavenger clears floating aquatic debris, including dead fish, and can be used as a work boat, an auxiliary fire boat, and as a water pump power source. It is available in a range of models from small lake to ocean sizes. For more details, circle (709) on reply card.

Newly elected officers for 1969-1970 of the New Jersey Arborists Association are, left to right, Harry P. Banker, president; Emid Cardell, recording secretary; C. Wyllys Cass, financial secretary; Del. St. Louis, trustee; Sylvanus Shaw, trustee; Wayne Warner, vice-president, and Ralph Morton, treasurer. Banker succeeded his father who had served as president for the past 20 years. The father-son succession is the first recorded in the history of the three professional New Jersey tree societies. The senior Banker is president of Trees, Inc., and serves as executive secretary of the National Arbor Day Committee.

Industry People On the Move

Davey Tree Expert Company, Kent, Ohio, announces a half-dozen promotions. Howard L. Eckel becomes regional manager of utilities service for the southeast U. S. He'll move to the main office in Kent from Boston, where he was area sales representative.

Edgar A. Dahlgren is the new division manager for upper New York State, moving to Syracuse from Albany, where he had been district manager.

Richard Johnson succeeds Dahlgren as Albany district manager.

Wayne Dittmer moves up from foreman to tree care representative for the state of Colorado.

Michael C. Rosicke moves from Providence, R. I., to Morristown, R. I., as area representative.

Herbert Gray, Jr. advances from foreman to area representative at Providence.

* * *

Thompson-Hayward Chemical Company, Kansas City, Kans., announces the appointment of Charles Ray McCown as sales representative at its Baton Rouge, La., branch office. Prior to joining the company, McCown worked for the Louisiana State Board of Health.

* * *

Amchem Products, Inc., Ambler, Pa. announces the appointments of Ralph Donald Heath, Jr. as a Louisiana district sales representative and Robert H. Uhler to its mid-Atlantic lawn and garden products sales district. Heath was previously the manager of the Farm Chemical Department of the Mississippi Farm Cooperatives. Uhler, who recently owned and operated his own lawn and garden supply business, will call on jobbers and dealers in Pennsylvania, New Jersey and Maryland.

* * *

Gravely Corporation, a subsidiary of Studebaker-Worthington, Inc., Clemmons, N. C., appoints William S. Howard director of planning. Howard was formerly marketing analysis director for Studebaker Corporation at South Bend, Ind.

* * *

Nalco Chemical Company, Chicago, announces three promotions in its industrial division. Jack E. Phelan becomes area manager of the Pittsburgh district. He joined Nalco in 1955 as a Cleveland district representative.

Joe W. Cagle, now area manager of the Kansas City district, began his Nalco career in 1963 as a district representative.

Manuel W. Wilkinson becomes area manager of the Texas district. Wilkinson joined the firm in 1964 as a Corpus Christi district representative.

* * *

Geigy Chemical Corporation, Ardsley, N. Y., welcomes Claude G. Bradley and James N. Cairns, both of Mobile, Ala., to its Baton Rouge plant now under construction. Before joining the staff there, however, both men will participate in a six-month orientation period at Geigy's chemical complex in McIntosh, Ala.

David Lamprecht has joined Geigy as a mechanical engineer at their new plant, also under construction, in St. Gabriel, near Baton Rouge. Lamprecht was formerly with the Westinghouse Engineered Maintenance Company of Luling, La.

* * *

Hypro, Inc., a subsidiary of Lear Siegler, Inc., announces the appointment of Alfred G. Henjum as advertising manager. Henjum, who joined Hypro in 1959, will direct the company's publication advertising program to various farm and industrial markets, and will have responsibility for the preparation and distribution of product literature.

421-Page Book Published On North American Nut Trees

"Handbook of North American Nut Trees" is the title of a new, 421-page book published by the Northern Nut Growers Association.

Editor and contributing author is Dr. Richard A. Jaynes, Connecticut Agricultural Experiment Station associate geneticist in charge of chestnut breeding research. Other contributors include two station specialists and various authorities across the country.

Jaynes is in charge of the chestnut-breeding research program centered at the Hamden, Conn., Sleeping Giant chestnut plantation. This research has yielded blight-resistant hybrid chestnuts which show promise as forest trees, nut-producers or ornamentals, a station spokesman claimed.

Copies may be obtained from the Connecticut Agricultural Experimental Station, P.O. Box 1106, New Haven, Conn. 06504.

Biological Herbicides Rated 'Safe, Effective,' by USDA

One more step toward safe and effective biological weed killers may have been taken when U.S. Department of Agriculture scientists discovered rhizobitoxine, according to a recent announcement.

Rhizobitoxine is a plant toxin found in some plants, and is produced by certain strains of the bacterium *Rhizobium japonicum*. It was reported that scientists of the Department's Agricultural Research Service have now produced small amounts of the substance in the laboratory.

Rhizobitoxine is a broad-spectrum herbicide toxic to many weed and crop species. Because it attacks young growth and new leaves, but has little effect on older growth, it appears promising for use after weed emergence but before crop emergence, and might also be used as a directed-spray application to reach weeds under the leaves of established crops without damaging the crops, it is claimed.

Preliminary tests were conducted by Dr. Lowell D. Owens, ARS soil scientist at Beltsville, Md.; Dr. John F. Thompson, ARS plant pathologist at Ithaca, N.Y.; and Dr. S. Guggenheim, National Heart Institute at Bethesda, Md.

Dr. Owens says rhizobitoxine works like this:

"When a plant is in the process of building protein, the molecule cystathionine must be cleaved by an enzyme to allow the building process to run its course. Rhizobitoxine 'looks' like cystathionine to the enzyme that does the cleaving and causes it to cling to the toxin rather than to the molecule. In fact, it seems to prefer the toxin. Growth is stopped at that point."

Dr. Owens explains that the breaking down of protein in animal digestion does not involve the cystathionine-cleaving enzyme, and therefore the herbicide should not affect animals or even the smallest birds. It also has the advantage over many other post-emergent herbicides of breaking down by microorganisms in the soil after two or three days, he maintains.

So far, experiments indicate that rhizobitoxine is effective as a herbicide only when dissolved in a 50:50:1 solution of ethanol, water, and glycerol, to aid in leaf penetration. Rates of rhizobitoxine as low as 0.2 pound per acre have been found effective in the tests, it was stated.

The report concluded that if further studies are equally promising, eventual use of the herbicide will depend on whether it can be manufactured easily and cheaply.

AAN Landscaping Film Among 10 Most Popular

"New Guidelines for the Well-Landscaped Home," a sales promotion film produced by the American Association of Nurserymen, has been named by the U.S. Department of Agriculture as one of its top 10 most popular films for the second consecutive year.

The 16mm, color/sound film describing the proper steps in landscaping a home also has been awarded citations from the International Film and TV Festival of New York, and the American Horticultural Society. Produced two years ago, it has been shown numerous times by USDA and cooperating film libraries, on television and by various civic organizations.

According to an Association spokesman, "this valuable film has proved to be one of the best promotion vehicles the Association has produced."

Trial treatments of Tandex®, a new herbicide from FMC Corporation's Niagara Chemicals Division, show effective weed control on non-crop California terrain. Most weed vegetation was eliminated after application on an 8-ft. highway swath (left.) Barren plots adjacent to an industrial fence (right) were covered with annual broadleaf weeds and grasses.

FMC Non-Crop Herbicide Given Federal Registration

A urea-carbamate type herbicide and soil sterilant has been granted federal registration for general use in certain areas, according to the FMC Corporation, Niagara Chemicals Division.

Called Tandex™, it can now be used on railroad, highway and utility rights-of-way, industrial sites, and non-crop farm areas, it was reported.

Available in 80% wettable powder (80WP) and 4% granular (4G) formulations, Tandex™ can be applied either as a pre-emergence or post-emergence treatment to combat annual and perennial broadleaved weeds, grasses, and woody species, FMC officials claim.

It features a low toxicity, and can be used also as a soil sterilant along runways, on parking lots within military installations, tank farms, and under asphalt or cement roads.

Label directions specify different dosages for control of different weeds species, as follows:

Three to 6 lbs. Tandex 80WP, or 60 to 120 lbs. Tandex 4G per acre for barnyardgrass, bromegrass, bluegrass, buckhorn plantain, cheatgrass, crabgrass, clovers, fiddleneck, foxtail, lambsquarters, pigweed, puncture vine, and thistles.

Seven to 12 lbs. Tandex 80WP, or 140 to 240 lbs. Tandex 4G per acre for bindweed, brambles, docks, milkweed, and quackgrass.

Fifteen to 30 lbs. Tandex 80WP, or 300 to 600 lbs. Tandex 4G for sumac, bermudagrass, dallisgrass, nutgrass, vaseygrass, and poison ivy. Saltgrass control by 80WP treatment is restricted to soils low in organic or clay content.

It is suggested that application either of the wettable powder or granular material should be made just before, or during, the active growth period of the weeds to be controlled. For best results, sufficient moisture after treatment is recommended to carry the chemical into the root zones. Although the herbicide is absorbed primarily through roots, it also may be slowly absorbed by the foliage, it was learned.

Wettable powder can be sprayed in either water or herbicidal oil. Mixtures of oil, or oil-water, are preferred where rapid contact kill of vegetation is desired. It is further claimed that the addition of a wetting agent at levels up to 1% also increases contact activity.

VPI Revises Turf Circular

A revised edition of "Guide for the Chemical Control of Turfgrass Diseases and Turfgrass Weeds," published by the Cooperative Extension Service of Virginia Polytechnic Institute, is now available, according to an Institute spokesman. The publication, previously printed as Circular 1034, is now designated Control Series 76, and may be obtained from J. S. Coartney, Extension Specialist of Plant Physiology, at the Institute's Extension Division, Blacksburg, Va. 24061.

Texas A&M Scientists Testing New Brush Control Method

A new method of range brush control is being tested by a trio of Texas A&M University scientists.

It consists of deliberately forcing growth of underground buds before applying herbicide. After the growth, the herbicide is sprayed on, catching both the upper part of the tree and the sprouts. This results in a dead tree from top to bottom.

In laboratory experiments, the researchers — Page W. Morgan of the Plant Sciences Department, Robert E. Meyer, U.S. Department of Agriculture plant physiologist at the University, and Morris G. Merkle of the Soil and Crop Sciences Department — sprayed mesquite and huisache seedlings with a hormonal growth regulator known as 2-chloroethanephosphonic acid. Called Ethrel for short, the chemical is still experimental.

The first effect, they learned, was defoliation. Then, the tops of the plants showed a big increase in the number of branches and leaves per node. At the same time, there was considerable sprouting from basal and lateral buds at the bottom of the seedlings. When these plants were sprayed with a herbicide, they died without resprouting.

Morgan emphasized that the system is simply a new principle—one he hopes will work in the field. There is no guarantee that this approach will revolutionize brush control, he concluded.

Pine Sawfly Bite Not Fatal; How to Spray If You Wish

Tree damage from the Virginia pine sawfly isn't as serious as it may appear, say North Carolina State University foresters.

The sawfly, on the rampage in sections of North Carolina, causes trees to look poorly, but Fred Whitfield, extension forestry specialist, maintains that, to his knowledge, no pine trees of any size have been lost to the insect.

"Small pines of seedling size are seriously weakened by the sawfly attack, and," he continued, "in some cases, they will die. But trees of pulpwood size or larger recover from the damage."

Although sawflies feed on needles, new needles begin to come back on new shoots, and by mid-summer the trees should be green again, Whitfield contends.

"The tree won't look like it's 100% recovered," he explains, "because it will only have one year's growth of needles. But it will recover in practically all cases."

Fortunately, the sawfly has at least 50 enemies such as parasites and predators, Whitfield stated. Also, many fly larvae die from prolonged hot or cold weather, and from wet snowstorms in early fall.

"I don't think the use of chemicals is necessary in most cases," Whitfield said. "But if someone feels they must spray, two effective materials are sevin and malathion."

Sevin is recommended at the rate of 1¼ lbs. of 80% wettable powder per 100 gal. water; malathion at the rate of two lbs. of 25% wettable powder per 100 gal. water. Follow label directions, advises Whitfield.

He claims that the best procedure for a few colonies feeding on small trees is to pick or shake them off and destroy them.

Generally, only the larvae — worms — are seen. The adult sawfly, akin to wasps and bees but more nearly resembling the fly, is seldom seen, Whitfield said.

USDA Extends Quarantine Of Beetle-Infested Areas

Two cities and parts of 14 previously nonregulated counties and parishes in six states are now included in the recent extension of the federal white-fringed beetle quarantine, according to the U.S. Department of Agriculture.

Revisions to quarantine regulations became effective May 14 on publication in the *Federal Register*.

Designed to protect noninfested areas from the pest, according to officials of the Department's Agricultural Research Service, the extension includes the cities of Hampton and Newport News, Va., as well as the following counties and parishes: Crittenden and Monroe counties in Arkansas; Brooks, De Kalb, and Early counties in Georgia; Evangeline, Rapides, and Terrebonne parishes in Louisiana; Bolivar, Clay, and Lowndes counties in Mississippi; Stanly County in North Carolina, and Greene and Marshall counties in Tennessee. The revised regulation also extends the regulated areas in some previously regulated counties.

Articles regulated under the quarantine are soil, grass sod, uncleaned grass seed, soil-moving equipment, rooted plants, logs, lumber, Irish potatoes, raw peanuts, seed cotton, hay, straw, brick, stone, drainage pipes, scrap metal and junk.

Both federal and state quarantines are designed to prevent the "artificial" spread of the beetle by requiring inspection, necessary treatment, and certification of articles that might harbor the pest prior to shipment from infested areas.

Restrictions apply only to items moving from infested areas. However, persons moving regulated articles from nonregulated areas of quarantined states must be able to furnish proof of origin, Department officials claim.

'69 Ford Booklet Lists Industrial Tractor Line

The 76-page, 1969 edition of Ford Tractor Operations' Industrial Tractor Specifications booklet is now available from Ford Tractor Operations, 2500 E. Maple Rd., Birmingham, Mich. 48012.

The publication covers specifications for Ford's complete line of industrial tractors offering 34.0 to 70.0 net engine HP; tractor-loader combinations with 2,200 to 5,400 lbs. rated lift as well as LCG and all-purpose tractor models; 10-to-17 ft. backhoes; lawn and garden tractors and attachments, and other industrial equipment.

It also provides specifications for Ford flail, cutter bar and rotary mowers, blades, scoops, augers and allied equipment sold by Ford dealers, such as the Hughes Impactor.

Insect Report

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

TURF INSECTS

WESTERN TUSSOCK MOTH

(Hemerocampa vetusta)

NEVADA: First-instar to half-grown larvae medium on desert peach *(Prunus andersoni)* and bitterbrush *(Purshia tridentata)* in Jacks Valley, Douglas County.

MEADOW SPITTLEBUG

(Philaenus spumarius)

WISCONSIN: Spittle masses ranged about 3 per 10 stems in southwest to 13 per 10 stems in some fields in central sands area.

A WEEVIL

(Mecinus pyraster)

MARYLAND: Adults swept from grass and weeds along a field near Easton, Talbot County. This is a new county record.

INSECTS OF ORNAMENTALS

TWO-SPOTTED SPIDER MITE

(Tetranychus urticae)

FLORIDA: All stages general and moderate to severe on all 125 plants and all 600 rose plants in 2 nurseries at Tampa, Hillsborough County.

ARMORED SCALES

(Lepidosaphes ulmi)

NEVADA: (Oystershell scale), heavy on liliac at Elko, Elko County.

(Diaspis carueli)

IDAHO: (Juniper scale), severe on ornamental junipers at Twin Falls, Twin Falls County.

TREE INSECTS

BARK BEETLES

WISCONSIN: Mating pairs of *Hylurgopinus rufipes* (native elm bark beetle) in nuptial chambers May 5 in standing elms which died in 1968 in Menominee County. Egg laying under way. Few still hibernating. Noted May 15 in bark of living elms in Winnebago County. Heavy in elms May 6 at Green Bay, Brown County. IOWA: *Scolytus multistriatus* (smaller European elm bark beetle) adult flight imminent.

ELM LEAF BEETLE

(Pyrrhalta luteola)

ALABAMA: Light first emergence on elm leaves in Lee and Tallapoosa Counties. MISSOURI: Eggs on American and Chinese elms in southern and central areas. KANSAS: Overwintered adults beginning to feed; no eggs yet. NEVADA: Adults and larvae at Henderson, Clark County. IDAHO: First eggs of season May 6 at Parma, Canyon County.

GEOMETRID MOTHS

MINNESOTA: *Paleacrita vernata* (spring cankerworm) probably in third and fourth instar. St. Paul municipal crews started spraying for cankerworm May 14. To date, several hundred boulevard trees treated in Randolph to Jefferson and Snelling to Mississippi River area. PENNSYLVANIA: *Physostegania pustularia* larvae heavy on Perry County red maples for third year of heavy defoliation. Expected to be abundant in many central and eastern counties. Some tree mortality and extensive dieback to red maple expected this year. NEW JERSEY: Cankerworms very destructive in section of Medford Lakes, Burlington County. Completely defoliated oaks and severely injured many other plants, including valued ornamentals. Extremely heavy along Tuckerton Road bordering Medford Lakes and Medford Township for about 2.2 miles. At least 500 acres in defoliated areas.

Classifieds

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

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

FOR SALE

IN NEW YORK STATE. Prime Tree Spraying Business located in Westchester County, New York, established 20 years ago. Gross volume of approximately $50,000 to $60,000 (with a potential of many times this amount) is done in less than a seven month period, with a payroll of only $10,500, plus considerable tree surgery work that is referred to other companies. There is more than $40,000 in equipment which ranges from office machines to 600 gal. hydraulic sprayers. Also included is a modern 2-way radio network. This operation nets into five figures, plus other valuable considerations for its owner, who is selling because of other business activities. Priced for a quick sale at $35,000 or would consider selling the business and equipment separately. Terms arranged. List of inventory mailed on request. Mail inquiry to Mr. H. G. Widmark, Pres., Widmark Scientific Control, Inc., Drawer 151, Harrison, New York 10528.

PORTLAND, OREGON—Well established pruning and spraying businesses, (3 in all). 4500 square foot warehouse, office and equipment. "OR" sprayman to run this business on percentage with investment fringe benefits. Box 41, Weeds, Trees, & Turf, 9800 Detroit Avenue, Cleveland, Ohio 44102.

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

USED EQUIPMENT

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

HELP WANTED

CITY FORESTER—City of Adrian, Michigan, population 22,000. Bachelor of Science Degree in agriculture, horticulture, forestry, or related fields, or two years of college and experience in the field equivalent to added education. Must be able to direct work crews in the field. Must have knowledge of construction and complete care of park facilities. Salary to $10,900. Send resume to personnel office, City Hall, Adrian, Michigan 49221.

EXCELLENT opportunity for experienced landscape foreman to supervise landscape crew in execution of planting from plans and sketches. Salary plus incentive pay, hospitalization, profit sharing, insurance and retirement plan. Reply to: The Siebenthaler Company, 3001 Catalpa Drive, Dayton, Ohio 45405.

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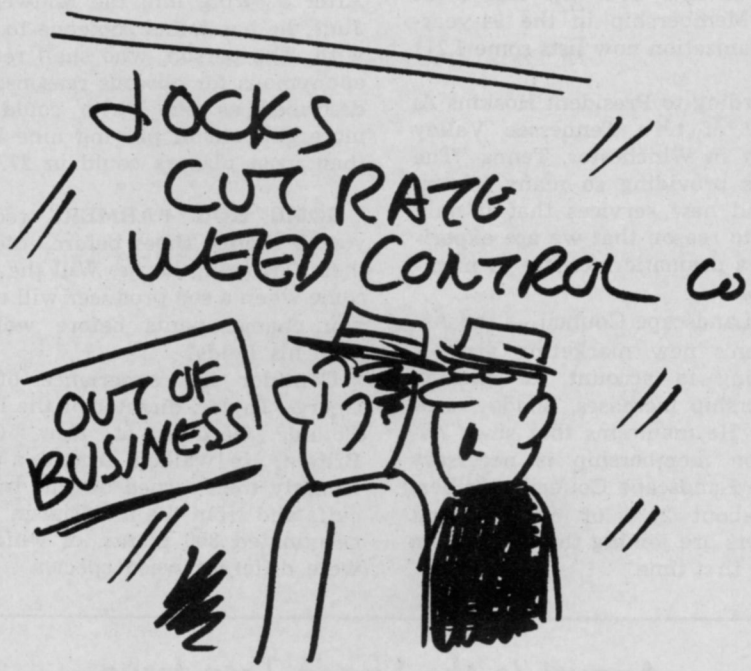
SOD QUALITY MERION SEED for discriminating growers. Also Fylking, Delta, Park, Newport and Prato bluegrasses as well as fine fescues. We will custom mix to your specifications. Michigan State Seed Company, Grand Ledge, Michigan 48837. Phone 517 627-2164.



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Advertisers

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Heath Goes International; Acquires CMW Sales

Heath, Inc., a utilities service contractor headquartered at Richmond, Mich., has been reincorporated as Heath International, according to President Charles A. Heath.

The company also announced the acquisition of CMW Sales and Service, Inc. CMW, to be operated as a wholly owned subsidiary, is a Bombardier distributor of off-road track equipment and of water craft in Kentucky, Tennessee and West Virginia.

Officials said that Heath is now the third largest Bombardier distributorship in the country. The Bombardier line and the Ski-Doo snowmobile are made in Valcourt, Quebec, Canada.

Also included in the corporation's foreign interests is the manufacture of the Heath De-K-Tector, an instrument to detect decay in any type wood by means of electronic frequencies.

Other Heath operations include tree trimming and right-of-way clearance; land and air spraying; sonic and x-ray; a two-stage pole-testing program for electrical and telephone utility service industries; and cathodic protection of pipe lines for corrosion prevention.

The organization was founded in 1939 at Wellesley, Mass., as Heath Tree Service, Inc., by the president's brother, Milton W. Heath.

In 1963, the firm name was changed to Heath, Inc., and its operations expanded to include Heath utility services, Heath tree service, and Heath sales.

Vincennes University Adds Aerial Applicator Training

Agricultural Aviation Technology is the name of a new course being added to the Career Division Program at Vincennes University in Indiana.

It requires five semesters of classes and two summers of on-the-job training. The program is being offered in cooperation with the National Aerial Applicators Association.

At the present time, admissions will be limited to 12 students.

Applications are now being taken for the fall 1969 term. The University's Advisory Committee plans final screening of all applicants July 18.

Before a student will begin his applicating training, he will be required to earn a commercial pilot's license. Training during this phase will be given in Cessna 180s.

It is estimated that this highly skilled profession probably will pay the highest beginning salary of any of the technology programs offered at Vincennes University.

Elm 'Odor Code' Can Be Altered to Repel Beetles

University of Wisconsin researchers under the direction of Dale M. Norris are studying chemical codes in trees in order to break and alter the codes to repel insect pests.

Plants possess certain chemical combinations that give off "odor signals" to insects, Norris reveals. Certain signals attract pests, while others repel them.

If these chemical "odor codes" can be disrupted, the researchers reason, insect pests can be confused and repelled from feeding on valuable ornamentals and other economically important plants.

In experiments with American elms, Norris and his colleagues injected safrole or isosafrole into the basal trunk of 30-foot elms to change their odor codes. When elm bark beetles were given the choice of feeding on twigs from treated trees or starving, they consumed 52 percent less than when feeding on untreated twigs, Norris reports.

In natural conditions where beetles would be free to fly to untreated trees, the reduction of feeding on treated elms should be even higher, he contends.

Norris is also studying insect feeding responses to chemical stimuli. Test results show that bark beetles are generally stimulated to feed by plant sugars, phenols and alcohols, many of which also stimulate man to eat, Norris reports.

Such studies of insect feeding responses are of value not only in saving trees from insect attack but in increasing man's knowledge of such mechanics in himself, Norris says.

Malathion Looks Good As Lake Fly Control

Low-volume spraying of malathion has a lot of potential for controlling adult lake flies, reports University of Wisconsin entomologist W. L. Hilsenhoff.

Tests show that application of malathion at 2 ounces per acre in shoreline areas produces good control for 48 hours or more, he said. The insecticide is also safe for controlling lake fly larvae, he added.

Drawbacks for using malathion, however, include a prohibitive cost for big lakes and the fact that it may spot the finish of some cars, Hilsenhoff revealed. Treating an area such as Lake Winnebago, for example, would require about $250,000, he said.

The use of certain viruses or natural predators to control lake flies also is being studied, the entomologist reported.

Record AAN Membership

American Association of Nurserymen reports a net membership increase of 25% over the last three years. Membership in the 94-year-old organization now lists some 1,711 firms.

According to President Hoskins A. Shadow of the Tennessee Valley Nursery in Winchester, Tenn., "The AAN is providing so many important and new services that it only stands to reason that we are experiencing a dramatic increase in membership."

The Landscape Council — the Association's new marketing arm—is beginning to account for healthy membership increases, Shadow continued. He maintains that since Association membership is necessary for the Landscape Council membership, about 20% of new Council members are joining the Association for the first time.

Trimmings

DICK BEELER, editor of Agrichemical West, gets our vote for a Nobel prize for touches. Says Beeler: "A conservationist is a guy who wants to make sure the 40 billion gallons of raw sewage going into Lake Erie each year contains no DDT.

* * *

TREE CONSERVATION and preservation is serious business, though. Ask three men in the Ohio Penitentiary who were sentenced recently to one to seven years for stealing six walnut trees valued at $5000.

* * *

EGYPTIAN SOLDIERS certainly are taking trees more seriously, especially palm trees. They now count the number of palms on the Israeli-held east bank of the Suez Canal each day. They discovered the Israelis are using movable palm trees as spy towers.

* * *

SPEAKING OF MOVING TREES, the Davey Tree Expert Company, Kent, Ohio, claimed recently in its company publication to have moved the largest tree. The record, the article stated, was a copper beach moved in 1930 for the Toledo, Ohio, Museum of Art. The tree was 31 inches in diameter, about 60 feet high, and had a spread of 40 feet. By the Davey formula, the ball should have weighed 107 tons. Can anybody beat that?

* * *

THIS WRITER has the unusual knack of training a golf ball to find nearly every tree on a golf course. After a swing into the Midwest in June, he has found someone to play with. The person, who shall remain anonymous for obvious reasons, was described as one "who could get more golf out of playing nine holes than most players could in 27."

* * *

SOME HOG FARMERS require you to change shoes before entering their farrowing house. Will the time come when a sod producer will make you change pants before walking onto his fields?

Consider the experience of Sir George Taylor, director of the Royal Botanic Gardens at Kew, Great Britain. He walked around a farm recently then turned out his trouser cuffs and from the material in them germinated 300 plants, of which 20 were different weed species.

August Is the Shade Tree Issue

This man just cut and rolled over 10,000 yards of sod and didn't even get his hands dirty.

Dirty hands and aching backs are obsolete with the Ryan Sulky Roller. This rugged unit attaches to a Ryan Heavy Duty Sod Cutter, enabling *one man* to cut and roll up to 15,000 yards of perfect sod per day.

The Sulky Roller operator rides while cutting sod to any length. At the same time it rolls sod up to 24″ wide and gently pushes each roll from the cutting path.

If you own a Ryan Heavy Duty Sod Cutter, all you do is order the Sulky Roller with a conversion kit. It attaches quickly and easily with six bolts into existing holes. In minutes you've got a "sod harvester", ready to cut your labor costs and cut big payloads of quality sod.

If you're in the market for a Ryan HD Sod Cutter and want the Sulky Roller, it comes as a complete unit from the factory. The HD Sod Cutters will be equipped with a powerful 12 HP Briggs & Stratton engine.

For information about the Sulky Roller and other fine Ryan sod farm products, write for the NEW Turf Equipment Catalog.

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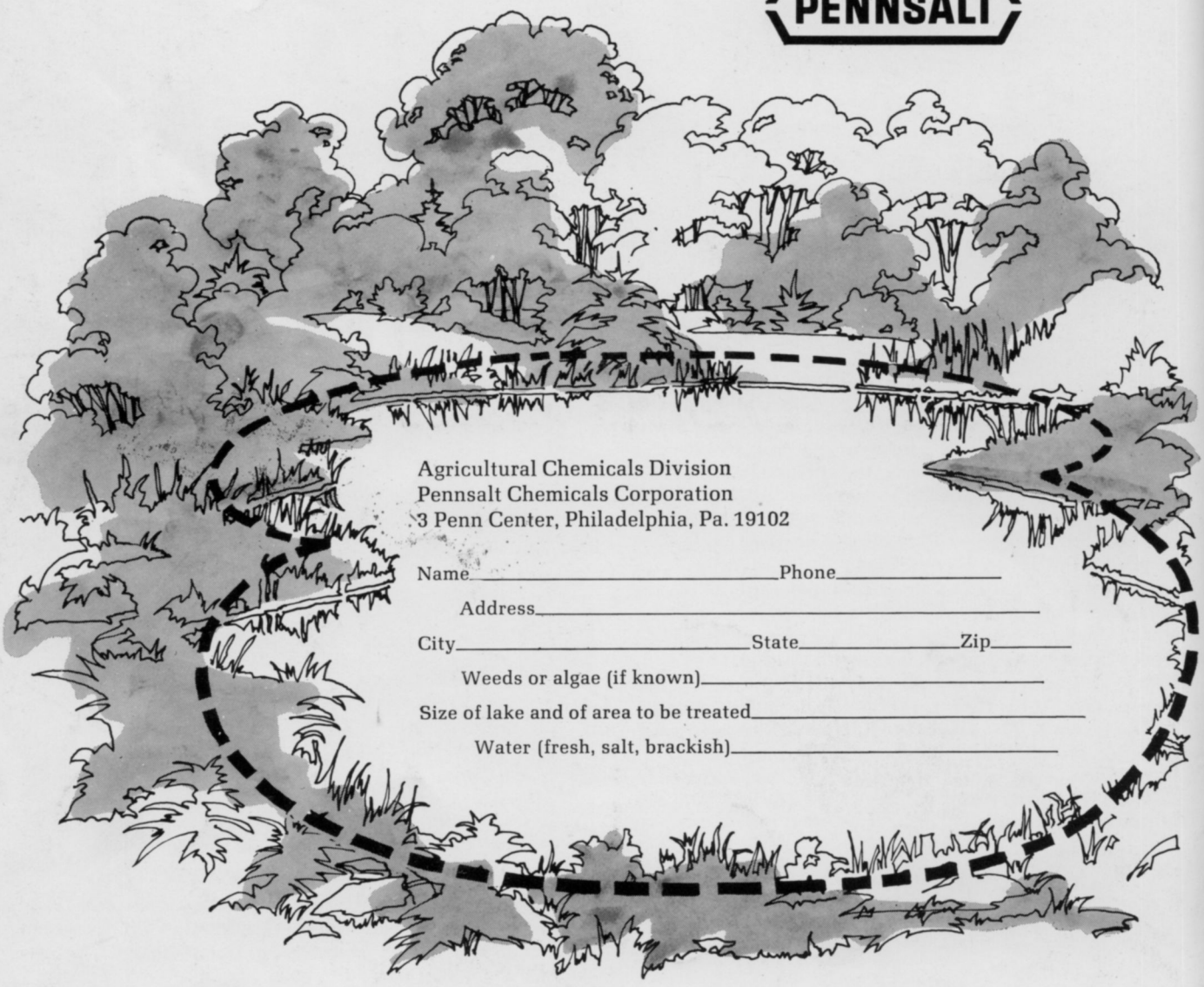

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Water (fresh, salt, brackish)_____

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