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## THE FUTURE:

Dutch Elm Disease • Rights-of-Way Maintenance • Golf Courses



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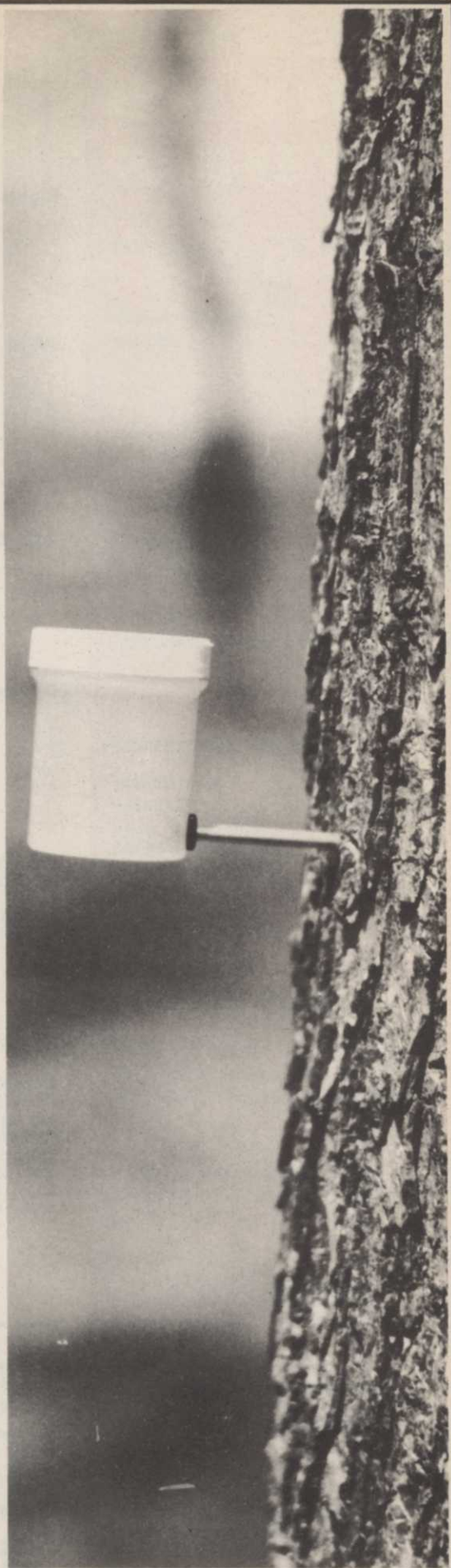
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# WEEDS TREES and TURF<sup>®</sup>

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James A. Sample  
Editor

Hugh Chronister  
President

Arthur V. Edwards  
Publisher

D. D. Langley  
Director of Circulation

## ADVERTISING SERVICES

Eric Lindsay  
Advertising Production Manager  
9800 Detroit Ave.,  
Cleveland, Ohio 44102  
Tel. 216+651-5500

## ADVERTISING SALES OFFICES

Headquarters  
Cleveland, Ohio 44102  
9800 Detroit Ave./216+651-5500  
Ext. 27

Chicago, Illinois 60601  
333 N. Michigan Ave./312+236-9425  
John Kielp

New York, New York 10017  
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Russell Bandy

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The Eschen Company  
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Henry Eschen

San Francisco, California 94104  
The Eschen Company  
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Rod MacDonald

## Rights-of-Way Maintenance — The Future ..... 9

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## What A Golf Course Should Be ..... 16

Construction of golf courses have come a long way since the early days of the game. Older courses need remodeling. Newer courses are incorporating new innovations in the planning phase. Richard M. Phelps cites trends in building and remodeling courses that may have affect on your course. He poses problems and suggests solutions to remodeling an older course.

## DED Control Kindles Strong Arborist Interest ..... 18

WEEDS TREES and TURF attends an arborist training workshop in Wisconsin. This exclusive report indicates that arborists are keenly interested in Benlate fungicide and learning to use the Mauget Tree Injector.

## Directory Of Sod Terms ..... 43

An informative glossary of terms used by sod producers and contractors in this growing business.

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## The Cover

Control of a crippling disease that has affected elm trees for over three decades is now available. Arborists across the country are quickly taking advantage of the opportunity to learn about the new control and the new techniques of tree injection. Our cover shows a training workshop in Eau Claire, Wisconsin where arborists gathered to hear Dr. Gayle Worf, extension plant pathologist at the University of Wisconsin and representatives of CLM National discuss new techniques in Dutch Elm Disease control. See story on page 18, this issue.

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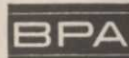
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## Editorial

### The DDT Finale

Seven months of exhaustive surgery consisting of exploratory probes, hearings, 8,900 pages of documented testimony and the consultation of the country's most eminently qualified practitioners has elicited from chief surgeon Edmund M. Sweeney the opinion that the patient, DDT, should live a normal healthy life.

Mr. Sweeney, in his report issued on April 25 by EPA, said that he could find nothing wrong with the patient. He said, "there seems to be little question of the far ranging public health and welfare benefits from DDT, historically." On the topic of human safety he is quoted: "Those that would ban all use of DDT because of the possibility of some damage to man, the evidence of which is said to consist of the results of a few experiments with animals, would do well to compare such skimpy evidence of risk with the well-documented proof of the benefits which DDT has bestowed on mankind."

The transcript of testimony of such witnesses as Dr. Jesse Steinfeld, Surgeon General of the U.S.; Dr. John Higginson, director of the International Agency for Research on Cancer; and the report of Mr. Sweeney form two-thirds of the evidence required by William D. Ruckelshaus, EPA Administrator, to make a final decision on DDT.

The remaining third took place in May. It consisted of oral and written arguments of lawyers representing the interested parties—EPA's Office of Pesticide, Environmental Defense Fund, industry petitioners and others, and the Public Health Service. All argument was held on exceptions to Mr. Sweeney's report.

At press time, an EPA spokesman said that the critical decision on whether the 320 products (DDT formulations) covering the 14 remaining uses should be retained or cancelled would be made by Mr. Ruckelshaus this month.

We must speculate that the fate of DDT has set a precedent for future hearings on chemical protectants. By association, DDT has become synonymous with all pesticides in the mind of the public. In putting DDT to the test, Americans also charted the future course of other chemicals, many far more toxic than DDT but having a shorter residual life.

We would hope that Mr. Sweeney's report, which cost many thousands of tax dollars to prepare, can now be used in a positive way to educate the uninformed on the scrutiny with which industry and Government test and register modern chemicals. It would be a waste to permit this document to rest in the back of a file drawer.



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# Government News / Business

The Williams-Steiger Occupational Safety and Health Act (OSHA) is beginning to flex its muscles in areas other than employee safety. Section 1910.67 of the Act specifies that vehicle-mounted elevating and rotating work platforms must meet the design, construction and test specifications of the American National Standard Institute A92.2-1969. This is a rather detailed standard that manufacturers of bucket trucks and other elevating platforms must now live by or face court action. The standard lists mechanical and electrical ratings, design and manufacture configurations, and testing and inspection controls. Arborists, tree care companies and others should be familiar with this standard and insure conformance with it.

The Federal Pesticide Control Bill, like an erratic clock, is on the move again. Although it has yet to appear on the Senate floor, action behind subcommittee doors is encouraging. Latest word, at presstime, by the subcommittee is approval and recommendation for full committee consideration of the Bill with amendments. The much debated "certified applicator" amendment has now been rewritten into language compatible with EPA and Green Industry lobbyists. It provides that "...unless otherwise prescribed by its labelling, a pesticide shall be considered to be applied under the direct supervision of a certified applicator if it is applied by a competent person acting under the instructions and control of a certified applicator who is available if and when needed, even though such certified applicator is not physically present at the time and place the pesticide is applied."

Three chemical protectants are being scrutinized by the Environmental Protection Agency. Lindane, benzene hexachloride and endrin are under the bright lights on a use-by-use basis to weigh the benefits against the risks. In another move, EPA suspended the registration of 23 other pesticides because manufacturers failed to provide data required for setting tolerance levels. By law, manufacturers are given 30 days to appeal.

Ecosystem Design and Management, a project funded by the National Science Foundation to the tune of 1.56 million dollars (to date), will have importance in world ecology in the future. The project is under grant to Michigan State University. Dr. William E. Cooper, co-director and MSU associate professor of zoology, says that research is designed to come up with techniques for dealing with environmental problems. Dr. Herman E. Koenig, project director and chairman of MSU's electrical engineering and systems science department says, "It's not as simple as picking up bottles and newspapers for recycling. Living within the constraints of the earth's ecological systems is going to mean a major social, economic and political readjustment for man. It's part of becoming a mature industrialized nation."



THE UTILITY VIEW



THE  
ECOLOGIST'S  
VIEW

THE  
PUBLIC  
VIEW

THE  
FUTURE

---

Rights-of-Way  
Maintenance





Rights-of-ways such as the one above have much potential for wildlife production and recreation. Opening areas where tree growth is heavy stimulates the production of ground and shrub vegetation. Food supplies for birds and mammals are improved. Better land management practices can be

adopted that will benefit the ecological balance of nature. Recreation possibilities include hiking, bicycling and in some areas skiing. The multiple purpose concept will gain increasing importance in the future.

## RIGHTS-OF-WAY MAINTENANCE — THE FUTURE

# The Ecologist's View

**T**HE U.S. Forest Service<sup>1</sup> states that, "There are over 50 million acres of rights-of-way in the United States — an area the size of the six New England States."

While commercial and economic considerations fully justify such use of the land, associated values have largely gone unrecognized and unexploited. We have already reached a period in the development of our country when it is no longer justifiable to ignore the potential productivity of a single acre.

In the course of travel, transport and transmission along these corridors, little intentional use has been made of the uncommitted surface area. Its maintenance in some acceptable condition has been a drain on

By  
**DR. DONALD A. SPENCER**  
Consulting Ecologist  
National Agricultural  
Chemicals Association

our available manpower and finances. We are alluding to the shoulders of canals, railroads and highways, and the entire expanse of the right-of-way over pipelines and under powerlines.

Our relatively affluent society, long relieved of the concern of where the next meal is coming from, now focuses its attention on the recreational and aesthetic values of the land about them. Unfortunately aesthetic consideration of the environ-

ment quite commonly ignores reality as it pertains to natural resources and to the wildlife we are endeavoring to perpetuate.

Equally disconcerting in environmental matters is the failure to comprehend that change or recycling of a renewable resource is not necessarily degradation.

Further, in the course of building a better habitat for ourselves and for wildlife, the final product must not be judged by transient conditions at the start. It is impossible to prepare a banquet without soiling some cooking and serving dishes.

Every new corridor — road or transmission right-of-way — must under Federal regulations prepare an *environmental impact statement* be-

(continued on page 24)



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## The Utility View

By

**GORDON MUNDRANE**

Superintendent of Operations  
Jersey Central/New Jersey  
Power and Light Company

**I**N NEW JERSEY, like many other states, we are confronted with an increase in regulatory agencies stressing environmental protection and concern with the impact of future transmission construction and maintenance on the land use plan.

By way of orientation, Jersey Central/New Jersey Power and Light Company, subsidiaries of General Public Utilities Corporation, supply electrical power to 555,000 customers in a service area representing approximately 43 percent of the State of New Jersey. The two utilities, operating as one company, are composed of six divisions located in the northwestern and east central part of the State.

Prior to 1947 our transmission

right-of-way maintenance program consisted of periodic cutting. This was an expensive and time consuming program. It was decided at this time to experiment with brush control by the use of chemicals and applied by a contractor. This pilot program was so successful both in maintenance results and economics that we decided in 1950 to continue the program on a permanent basis and to place all rights-of-way under chemical management.

Today, approximately 15,000 acres of transmission rights-of-way are under chemical control. Lines are currently under repetitive treatment cycles of from three to six years as the need requires. Basal spray treatment has been the primary application method in the maintenance program.

All chemical applications are selective. Our objective, of course, is to eliminate, within the confines of a right-of-way, certain specified undesirable vegetation, and to promote a stable ground cover of grasses, wild flowers and native low-growing shrubs and trees. To this end we believe that our right-of-way management programs have

*(continued on page 29)*

Permitting trees and other vegetation to grow where utility rights-of-way cross roads provides an effective visual barrier. However, because transmission lines cross many roads, future maintenance must include tree trimming costs. As

more and more visual barrier are permitted and rights-of-ways are allowed to return to more natural vegetation than before, future maintenance will include much hand labor and at a high cost per ROW mile.







Many rights-of-ways have practiced blanket spraying to control unwanted vegetation. The opportunity to create environmental diversity by encouraging the growth of a variety of low shrubs has been wasted. The transmission lines above would be little affected by low growing species of ornamentals. The 50 million acres of rights-of-ways have

great wildlife production potential. There is no need to condemn all woody vegetation as brush. Herbicides, properly used, are an important tool in vegetation maintenance. Rational and intelligent use of herbicides is all that the future asks.

## RIGHTS-OF-WAY MAINTENANCE — THE FUTURE

# The Public View

*Editor's Note: No issue is worth discussing unless all sides are presented. While we believe that many readers are familiar with the side of the utilities, less is known about the views of the ecologist and those of the public. We have presented the comments of Mr. Clement as the public view to provide a broader perspective from which to make an opinion. Publication of this article in no way constitutes an endorsement. The National Audubon Society continues to be instrumental in creating increased interest in wildlife preservation and conservation practices.*

**T**HE analysis of trends called for in the title of this discussion calls for recognition of the fact that current projections for supplying

By  
**ROLAND C. CLEMENT**  
Vice-President  
National Audubon Society

electric demands involve some 197,000 extra miles of right-of-way by 1990<sup>1</sup>.

However, I am interested in changing these trends because I believe that such growth projections are suicidal. Whatever the ultimate acreage we commit to rights-of-way, we can begin by recognizing that the existing 50,000,000 acres now so committed represent a nationally important open space in a diminishing pool of national open space.

**In short, we have already committed to rights-of-way an area the**

size of New York State, or ten times the size of Connecticut. The revolution in environmental awareness we are witnessing calls for giving this land use much more thoughtful consideration than it has had in the past.

As a wildlife conservation specialist, I call your attention to the fact that these 50,000,000 acres have a great wildlife production potential. Since these are mostly private lands, you need to be sensitive to the fact that wildlife includes several hundred species in addition to the pheasants and quail equated with wildlife in the past. The non-hunting general public is more interested in the scores of bird species that might utilize the rights-of-way than they

*(continued on page 25)*



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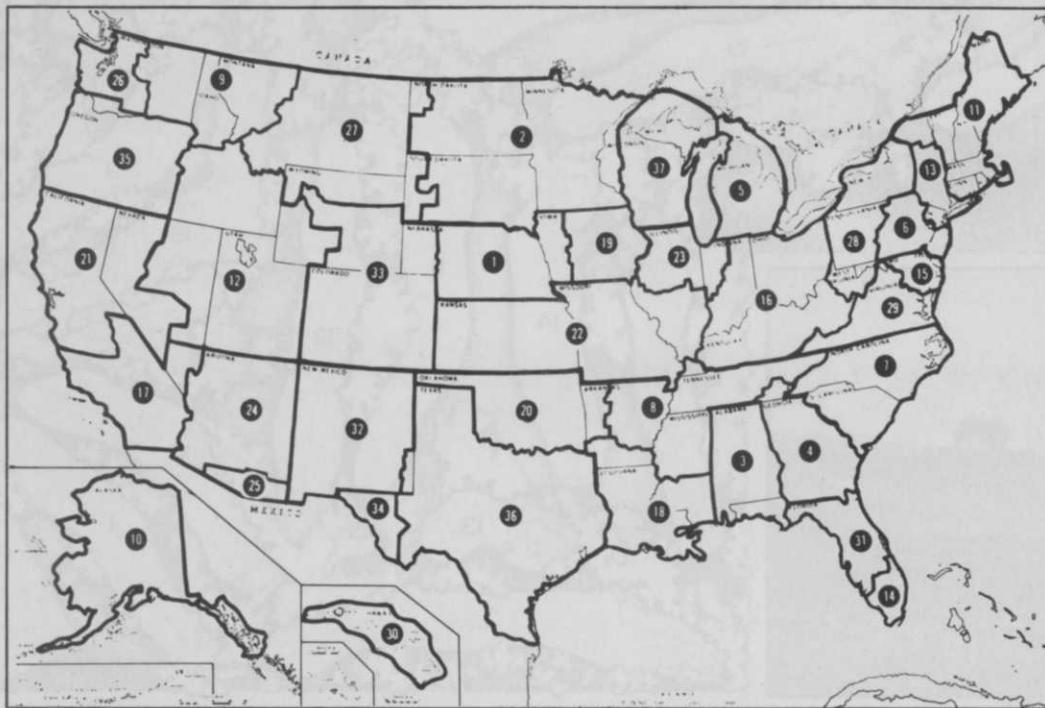
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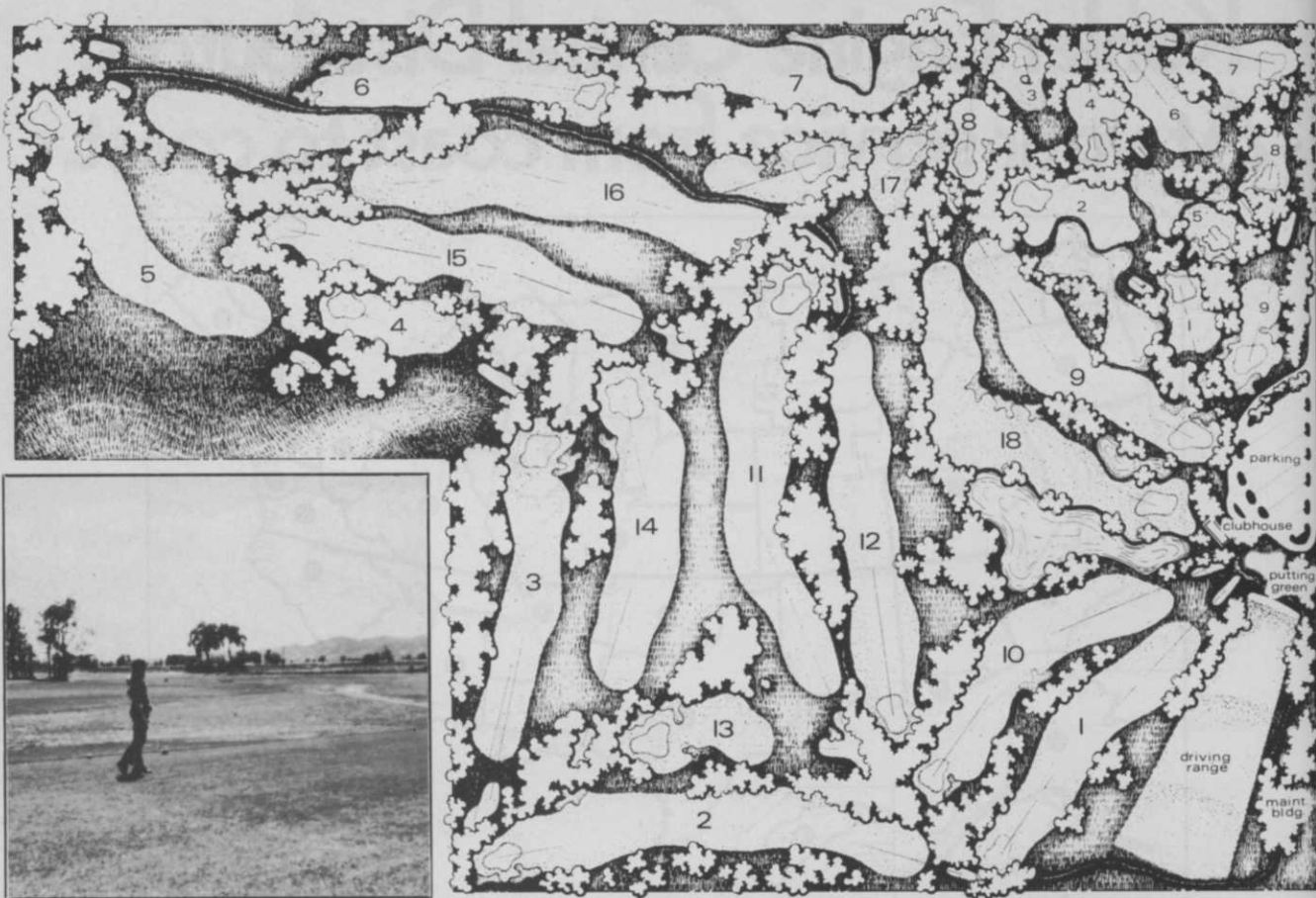
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A modern golf course makes maximum use of available land. Note the use of water hazards around fairway seven. In addition, the plan has enhanced the difficulty of the course by the judicious use of trees on the outside of dog legs. This course is the Foothills Golf Course, Lakewood, Colo. Inset shows player at the number one tee.

# WHAT A GOLF COURSE SHOULD BE

## Contractor Cites Building and Remodeling Trends

By **RICHARD M. PHELPS**  
Phelps-Brauer & Associates  
Lakewood, Colorado

**N**O two golf courses are alike. Each is a unique combination of a particular site, its environment and man's ideas of what a golf course should be.

Golf is a battle with nature and self, within a set of man-made rules. An infinite combination of shots required to play a given course, exists. Thus, the definition of what makes a golf course, aside from 9 or 18 tees and cups, gives an architect considerable latitude.

Any comments about trends in design, or how to improve older courses, can only be general. There is no perfect golf course. The best, or what some people label "champion-

ship" layouts, probably fit this definition: *A golf course which by means of its design and standard of maintenance fairly tests the judgment of golfers of all degrees of skill and their ability to execute expertly all the various shots required in the game.*

Notice that this definition says nothing about length or difficulty. It does emphasize, however, the need for skill and judgment by architect, superintendent and player. The best golf courses are challenging and fun for all players, not just the experts.

Many new golf courses are still being built. Earlier this year the National Golf Foundation reported 290 new golf courses or additions to existing facilities in some stage of construction. (See p. 18, WTT, Jan. 1972) The boom of the 1960's has

slowed only a little. For the country, 3,229 new courses and 720 additions to operating courses opened for play in the past decade. As an example of one of the fastest-growth states Colorado has 113 courses, 12 opened in 1971, and about 20 more under construction.

While it is impractical to compare courses as to construction, layout and difficulty, an architect frequently analyzes trends in courses much like an agricultural economist views the livestock market. Here is what we see developing in new golf course design and development.

*More flexibility in length and/or shorter (executive) courses.* More than 20 percent of the new municipal courses that opened in 1971 were par-3 or executive layouts. Shorter

(continued on page 36)



# It's here!

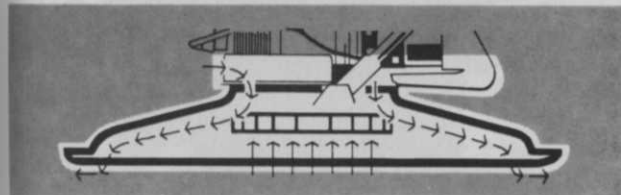
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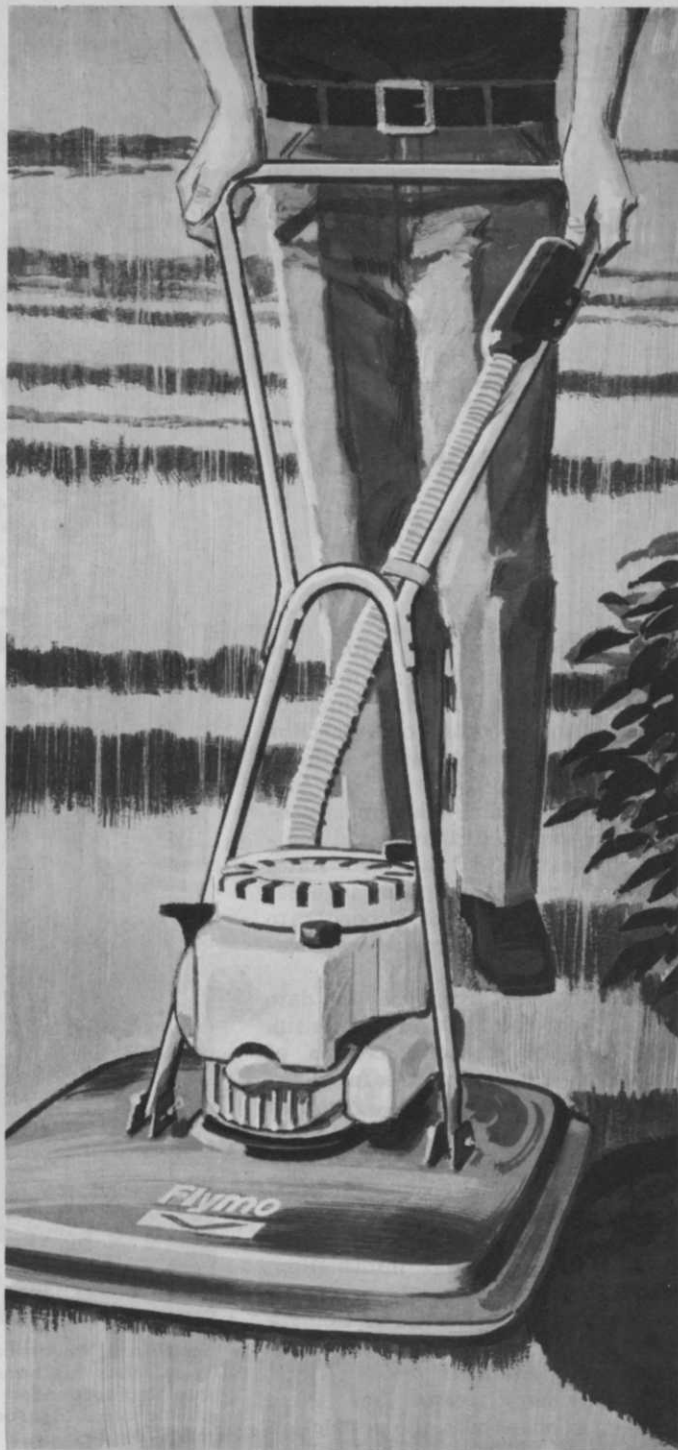


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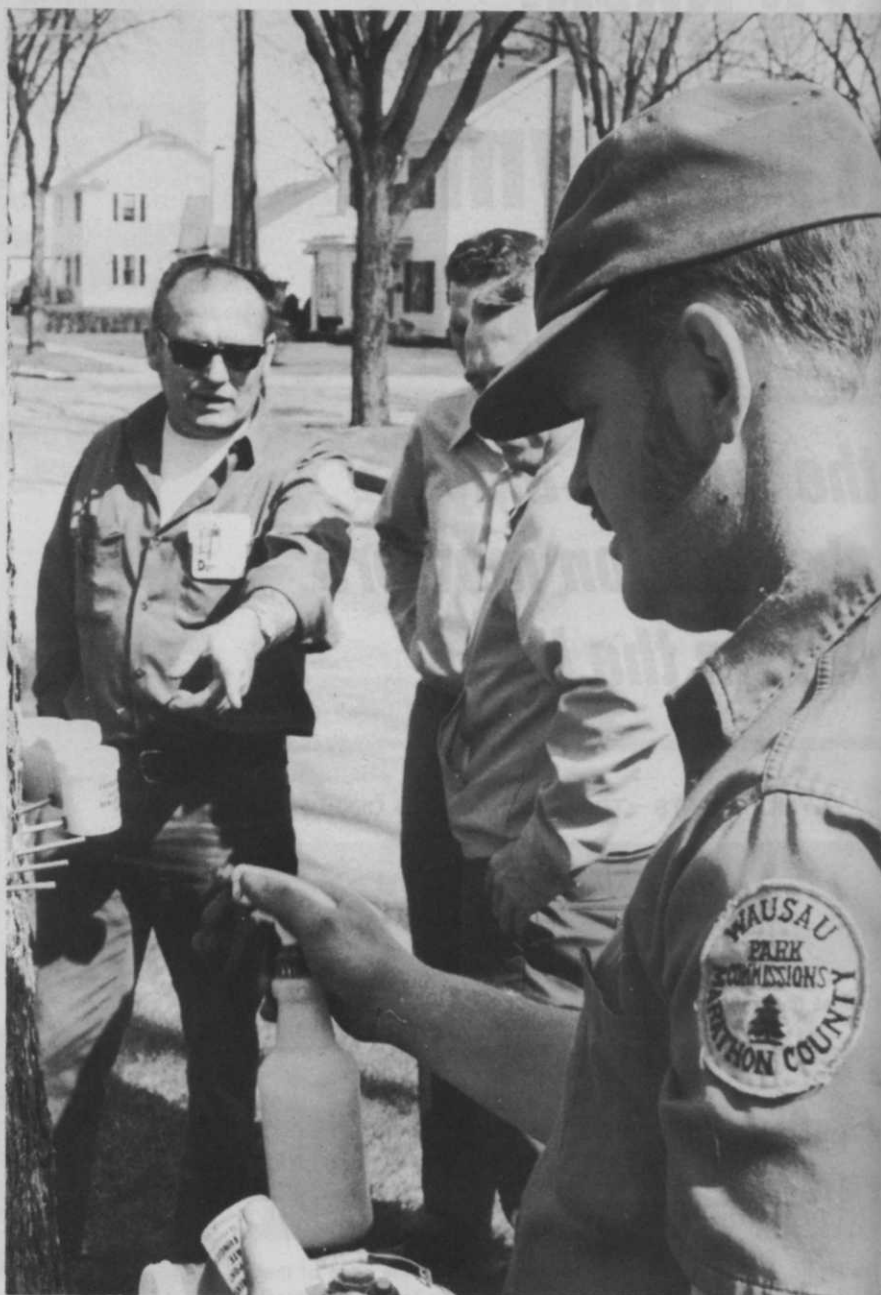
## DED Control Kindles Strong Arborist Interest

ARBORIST reaction across the country to the Federal registration of Benlate benomyl fungicide as an aid in the control of Dutch Elm Disease has been growing enthusiastically. While it can be said that the EPA label came when most people least expected it, state universities in heavy DED affected states have hurriedly whipped together training programs for arborists to comply with the Federal requirements.

Most notable response to date comes from the state of Wisconsin. In mid-April, capacity crowds of arborists — some from as far away as Texas and Maryland — jammed meeting sites in Madison and Milwaukee. (See p. 34, April 1972, WTT) Dr. Gayle Worf, Dr. Gene Smalley, plant pathologists at the University of Wisconsin, and a host of others presented background information, recent test results and university recommendations for use of Benlate both in foliar application and with the injection method.

The primary reason for these training sessions was the restriction on the use of Benlate by *trained arborists*. While it's still anybody's guess as to what constitutes a trained arborist, university extension specialists have assumed the responsibility for training within each state. As one Wisconsin extension specialist pointed out, "applicators need to know what results are realistic to expect, and how and in what way the product can be used to supplement existing control measures."

Wisconsin's training program consists of a training seminar and one or more field workshops. Four major areas have been discussed: 1. The biology of Dutch Elm Disease; 2. Dutch Elm Disease status, locally and regionally; 3. Benlate application



Scott Trull, an arborist with the Wausau Park Commissions in Marathon County, Wisc., tries his hand at learning the Mauget Tree Injection system. Here, he is inserting suspended Benlate into the feeder tube just prior to the placement of the plastic cup. All arborists attending this field workshop received training such as this.

and use procedures; and, 4. Tree physiology.

Currently, Wisconsin's field workshops are designed around the trunk injection technique. While this technique is admittedly more difficult for arborists to master, it eliminates certain hazards associated with foliar sprays. However, it is expected that later workshops will also include foliar application of Benlate.

Data presently available concerning effectiveness of this treatment are from trials conducted during the past three years. Early data suggested that the disease was arrested only when infections were quite

limited at the time of treatment. In 1970 researchers found that the most effective time period for treatment was after June 25, when only the new bark beetle-induced branch infections were appearing. Later, injection of healthy municipal elms on a preventive basis reduced the incidence of new infection from 16.4 percent to 6.5 percent.

While several methods of injection and other forms of application of Benlate are being tested this year — soil injection, sump treatment, collar method, Medicaps, trunk injection under high pressure currently being

*(continued on page 20)*



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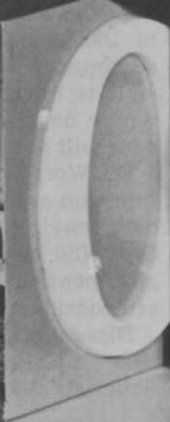
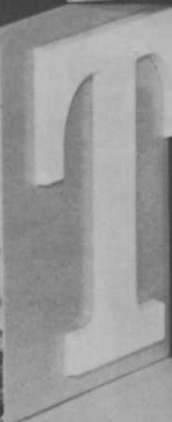
capability as the job demands it . . . or start with the mighty R65 and build an entire digging fleet with Ditch Witch modular attachments. Whatever your own particular needs, you'll get the same TOP performance from America's TOP producer of trenching vehicles.



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\*U.S. Dept. of Commerce, Bureau of Census, 50.5 per cent of 1970 sales (1971 sales figures not yet available).



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Del Kennedy, president of CLM National Company, says the Mauguet injector has been used in applying minerals and insecticides. It is only natural to consider it in terms of disease control, he says.

#### DED CONTROL (from page 18)

evaluated by the Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio, and others — the most popular method being demonstrated at DED training meetings is the Mauguet Tree Injector. Slightly modified from the Mauguet vials used to inject chelated iron and systemic insecticides, the Mauguet cups are designed to hold 65 ml or about 2 ounces to conform with the label for Benlate.

CLM National officials and the J. J. Mauguet Co. have given full support to the University of Wisconsin training sessions. As Del Kennedy, CLM National president put it, "We want to talk to arborists about their problems. We teach arborists the advantages of the Mauguet Tree Injection system by example. By attending meetings and giving demonstrations these men will gain a fuller understanding of this system and what it can do for them to control DED and increase local business."

Last month, Wisconsin arborists around Eau Claire, Wausaw and Milwaukee tried their hand at mastering the Mauguet tree injection. Meeting in areas of heavy elm populations,

arborists heard Rodney Johnson, a veteran DED specialist and forester for the Village of River Hills, Wisc. discuss mixing procedures.

"Benlate should be mixed at the rate of two pounds per 100 gallons of water," he said. "Thorough agitation is necessary because Benlate is a wettable powder that is suspended in water." Agitation before each step in the injection process will keep the chemical suspended for a longer period of time.

Following the mixing discussion, Del Kennedy demonstrated the various steps of the Mauguet system. Holding an inserting tool, he slipped a feeder tube over the penetrating pin. He then approached the tree at about chest level and taking a hammer drove the inserting tool at a right angle to the trunk through the bark or cambium layer into the xylem or sap wood. When the feeder tube was in place, he rotated the inserting tool and drew it straight out.

"We've found that slanting the beveled end of the feeder tube slightly to one side prior to injection improves the drainage and uptake by the tree," Kennedy told those present. "In addition, once the tube is in the tree, a light tap or two on the inserting tool will secure the tube and prevent it from falling out."

He then filled the feeder tube (sleeve) with the suspended Benlate. This expels air and prevents trapped air bubbles in the tube, he said.

The last step consisted of placing the reusable plastic body cup on the feeder tube and filling it with suspended Benlate.

He repeated the entire procedure at two inch intervals around the trunk of the tree.

Bill Bennett, vice-president of CLM, said that the chemical is absorbed by the tree within 24 to 48 hours, depending on environmental and climatic conditions. Once inside the tree, the chemical is translocated via the xylem to the upper parts of the tree and more particularly to the diseased area.

One arborist described this technique as the woodpecker approach to DED control. Others cited such advantages as: use in areas inaccessible to foliar sprays; application on windy days; and where public concern will not permit use of sprays.

Dr. Worf pointed out that with the injection system, there is no concern over environmental contamination. Only the target elm is treated. He also mentioned that equipment costs are considerably less.

Disadvantages to this method of tree injection are also evident. Arborists have already cited that

Benlate suspended in water will not stay this way for long periods at a time. Frequent agitation is needed. Following the uptake of the fluid in the two ounce plastic container there appears much white residue of Benlate that has settled out. This has lead arborists to speculate on the actual amount of chemical in the tree system.

Deane W. Finnerty, development and service representative for the Du Pont Company says that although this is a visual problem it is not one with which to be concerned. "Only an infinitesimal amount of Benlate is needed to control the disease," he told Weeds Trees and Turf.

Other disadvantages which arborists have mentioned include: excessive time consumed in application and removal of injection equipment; trunk wounds (no serious injuries to date); the possibility of erratic distribution of Benlate in the tree; uptake and translocation of the chemical is dependent upon external environmental conditions and the physical condition of the tree; and vandalism of injection equipment.

One major problem that still com-  
(continued on page 22)

C. B. (Bill) Bennett, vice-president of CLM National, demonstrates how to insert the feeder tube into the xylem layer of the tree. He says you can "hear" how far to insert the feeder tube. Tubes are placed at two inch intervals.

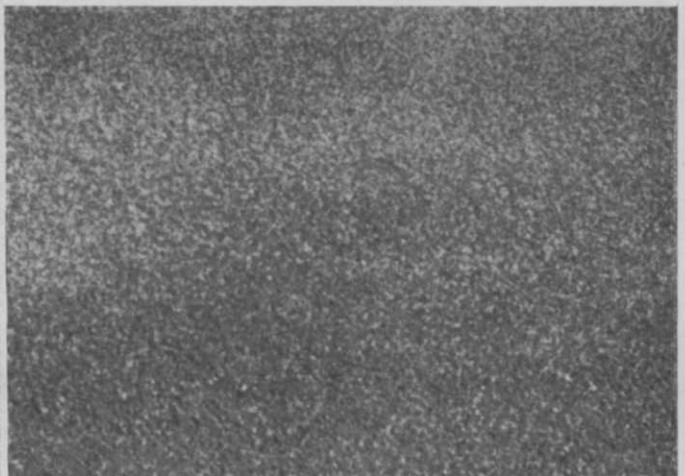




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## DED CONTROL (from page 20)

plicates the use of Benlate through trunk injection is in finding a suitable solubilizer for the chemical. Of literally hundreds of compounds tested, most have produced phytotoxicity in elms. Lactic acid, a compound familiar to cattle breeders, holds promise, but much research and testing still remain before solubilized Benlate will be available commercially.

Dr. Worf points to an additional concern. He believes that diseased elms should be exposed for a longer period of time to Benlate. Currently,



Dr. Gayle Worf, extension plant pathologist, Univ. of Wisc., has spearheaded the training program for arborists in this state. He and others have held seminars and workshops to teach new methods of DED control.

one application over a 24 to 48 hour period is made, followed by additional applications as prescribed by the arborist. Worf feels that this one shot approach should be more thoroughly tested. If Benlate were made available to the tree for periods of six weeks or longer, the elm would have a better chance of combating DED, he said.

Del Kennedy is quick to note that the Mauget system is still in its infancy. "We have not perfected every aspect of the injection concept," he said. "Our scientists are

testing pressurized capsules, slow release systems and others to determine the best system at a cost-effectiveness ratio that is not prohibitive.

In spite of the disadvantages and the imperfed techniques, it is interesting to note that response to DED control is highly in favor of the injection concept. Arborists not only in Wisconsin but more recently several hundred in Maryland and Ohio showed more than curiosity to the Mauget Tree Injector. Their presence at meetings sponsored by state universities and CLM distributors is testimony that interest is genuine.

Furthermore, DED control reopens a rather closed business that heretofore ended in removal of the dead elm. For the first time arborists can treat diseased elms with more than mild success.

Much is yet to be learned about tree injection with Benlate. But arborists who carefully learn the rudiments at this point will be better prepared when more sophisticated techniques are perfected.

## Sunshine State Site of Aquatic Weed Meeting

The Aquatic Weed Science Society, formerly the Hyacinth Central Society, will hold their annual meeting in Miami Springs, Fla., July 9-12.

The program will be centered around the latest policy regulating the use of pesticides. In addition, biological, mechanical, chemical and other new methods of controlling aquatic weeds will be presented.

This year's field trip will be to the USDA Research Center, Fort Lauderdale. Dr. David Sutton, Robert D. Blackburn, Dr. Kerry K. Steward and others will tour members through the facilities.

Ray Spirnock, field station chief, Central and Southern Florida Flood Control District is serving as local arrangements chairman. He has arranged an interesting and informative program for the ladies and children.

For more details contact Robert J. Gates, Society president, Box 508, Floral City, Fla. 32636.

## Chipman Chemicals, Ltd. Distributor For Cutrine

Applied Biochemists, Inc. has announced the appointment of Chipman Chemicals, Ltd. as exclusive distributor in Canada for Cutrine algacide.

Citrine was registered in Canada in 1971 for use in controlling algae in fire, farm and fish ponds and fish hatcheries. The product has been registered in the United States since 1965 and marketed nationally since 1969.

Applied president Donald Seymour pointed out that Chipman offers more than 50 years experience in the distribution, development and application of chemicals.

In Canada, water treated with Cutrine may be used to irrigate established grasses on turf, fairways, putting greens and established ornamental plants.

## Herbicide for Bentgrass Formulated by Mallinckrodt

A new formulation of Trex-San herbicide for weed control on bentgrass is now available, according to Mallinckrodt. Called Trex-San Bent, the product offers the same broad-spectrum activity as Trex-San, yet provides the safety needed to treat fine bentgrass greens.

According to Stan Frederiksen, manager of specialty agricultural products at Mallinckrodt, turf managers have sought a broadleaf herbicide with "built-in" extra safety, so accidental overdoses, even on fine bent putting greens, would do the complete weed removal job, yet cause no adverse effects. Trex-San Bent answers this special need.

In addition, golf courses sown entirely to bentgrass can use this complete herbicide with maximum safety to turf.

The new formulation controls more than 35 broadleaf weeds, from clover to dandelion.

For more details, circle 720 on the reply card.

## Univ. of Massachusetts Turfgrass Alumni Organize

Officers of the newly formed University of Massachusetts Turfgrass Alumni Association are: Paul J. O'Leary, president; Larry Bunn, 1st vice president; John O'Connell, 2nd vice president; Frank Santos, secretary; and, Dr. Joseph Troll, treasurer.

The primary purpose of the alumni organization will be to raise funds for an accelerated program of turfgrass research at the University of Massachusetts.

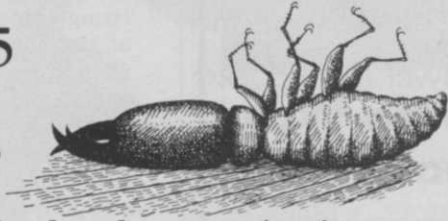
Alumni interested in contributing to the organization make checks payable to: Dr. Joseph Troll, Department Plant and Soil Sciences, Stockbridge Hall, Univ. of Massachusetts, Amherst, Mass. 01002.

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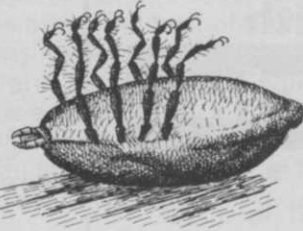
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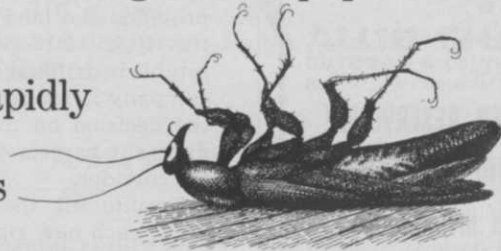
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## ECOLOGIST'S VIEW (from page 10)

fore authorization for construction is granted. Whatever can be achieved in minimizing aesthetic impairment of the environment without sacrificing other important values must be spelled out.

Thus on an electric transmission line a screen of trees can be left (or provided) where the corridor crosses a highway or stream. Likewise, on a rising slope where the straight line of the corridor becomes so obvious from the ground, the route can be angled, or broken by intermittent plant screens. In the manipulation or replacement of the general plant cover of the right-of-way, values other than aesthetic generally take precedence.

The great majority of pipeline and electric transmissions rights-of-way are just that, the right to install and service the line on property that is not purchased from the owner. The individual property owner retains the right to employ the surface area as he sees fit continuing to farm the area, use it for grazing, grow trees, control trespass, etc.

In developed areas, the owner, having no immediate plans, may relegate the responsibility of suppressing height growth of recovering vegetation to the transmission company.

On the other hand, the land owner may stipulate as part of the right-of-way lease or license that only tall-growing species of trees be removed and that native shrubs be damaged as little as practical in constructing the line.

Since ground cover must be promptly replaced to avoid erosion some transmission companies have provided the land owner a voice in the type of vegetation to be re-established. Thus the transmission company is far from a free agent in the decision on management of the different parcels of land crossed by the corridor.

Despite all the objections made when each new right-of-way is proposed, the corridor so formed is often of tremendous value to wildlife — both game and non-game species. This is particularly true when those rights-of-way cross forested country. Corridors, whether they be 50 or 300 feet wide, create openings where sunlight stimulates the production of ground and shrub vegetation. The closed canopy of a woodlot or forest is an excellent retreat and cover but is essentially lacking in food and browse plants.

Birds and mammals are the pro-

duct of the "edge" between food supplies in the open and shelter in the timber. We are seriously losing game and wildlife habitat in the United States by the declining number of small farms and the closing-in of maturing forests that 40 years ago were prime habitats for deer, rabbits, grouse, wild turkey, quail, and other species.

Fifty million acres in narrow linear corridors provide **edge effect** far beyond most other land management practices. In many parts of this country, developing these rights-of-way as open corridors with a plant cover favoring wildlife is not only compatible with their primary purpose (transmission) but will give the highest environmental return.

The state conservation department journals are beginning to sparkle with success stories in cooperative wildlife programs on transmission and pipeline corridors. For example, the Department of Fish and Wildlife Resources in Kentucky<sup>2</sup> just recently worked-out a cooperative plan with Columbia Gulf to seed sections of their 150 feet wide, 240 mile long pipeline with upland gamebird plant covers which include *Sericea lespezeza*, crown vetch, buckwheat, etc.

Georgia Power Company (Atlanta) actively promotes "Attract and Conserve Wildlife in your area: with help from the Georgia Power Company", and the Georgia Game and Fish Department pay them tribute<sup>3</sup>.

The Wisconsin Power and Light Company has been practicing selective vegetative management on their power line rights-of-way since 1955 and found it to be not only of public benefit but at a savings of maintenance costs to themselves<sup>1</sup>.

All this requires management and not just happenstance vegetative recovery and periodic knockdown. It calls for selective removal of undesirable trees, selective use of herbicides (such as stump treatments), use of growth-regulating chemicals, and cooperative programs with habitat management groups in vegetative programming.

While the foregoing has focused on those corridors where rather minor acreage is removed from vegetative production, it does not follow that other types of corridors such as highway and railroad rights-of-way and canal banks have no similar attraction for wildlife — they have.

In the midwest and Great Plains both pheasants and wild ducks make

(continued on page 27)

are in pheasants. And the general public doesn't shoot up transformers on high-tension lines.

In addition, in many suburban areas of the northeast there are unexploited opportunities for building good public relations by developing hiking trails along these rights-of-way, something most local conservation commissions would be glad to help with.

You have, however, three problems to overcome before your services will be widely accepted outside the utility industries which have so far been captives of unimaginative vegetation management techniques.

I predict that the utilities will not remain captives very long, however, because they are about to feel the crunch of justifying increasing electric power costs for the first time in their history. This will lead to new budget scrutiny that should favor more economic and more socially sophisticated programs of right-of-way management.

The first broad problem mentioned above is that associated with your credibility as scientists; the second has to do with the acceptability of your tools, the herbicides; and the third involves the acceptability of the effects of your practices in an increasingly sophisticated ecological age.

The question of credibility, like it or not, is entangled in the abuse of herbicides by our military in Vietnam. It is psychologically inevitable that the abusive use of a tool by one group will involve all other users of that tool in the public mind.

The way out of this dilemma is not to accuse the public of emotionalism, but to make sure no one abuses a good tool and that the public is educated to the realities of the case. This is not a passing fancy, because the concern of the American Association for the Advancement of Science dates back all of five years.

The Department of Defense's attempt<sup>2</sup> to answer its critics by having the Midwest Research Institute "assess the ecological effects" of herbicides only made matters worse among knowledgeable audiences because MRI was not competent to assess ecological effects. As Frank Egler<sup>3</sup> pointed out, this MRI review succeeded mostly in showing that there is very little science in Weed Science.

Let me elaborate on this last point to avoid insulting those of you who consider yourselves scientists. I refer here to the fact that science is necessarily reductionist. Science

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analyzes environmental reality on a piecemeal basis. This makes the scientist an expert in a very small area of the total reality that must concern us as citizens, and the trouble is that science, having dismembered reality for analytical convenience, is seldom interested in putting things back together again. What is required is an ecological point of view, but very few people have developed such a point of view as yet.

A generation ago Alfred North

Whitehead<sup>4</sup> pointed out that a proper profession is "an avocation whose activities are subject to theoretical analysis, and are modified by theoretical conclusion derived from that analysis." We've all been in such a hurry to keep up with the Joneses that we haven't done much philosophizing, which is what theoretical analysis is.

As a result, the Mrak report<sup>5</sup> to the Secretary of Health, Education and Welfare caught everyone by

(continued on page 28)





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## insect report



### INSECTS OF ORNAMENTALS

#### IVY APHID (*Aphis hederace*)

OKLAHOMA: Specimens from English ivy in Muskogee, Muskogee County. This is a new county record.

#### SOFT SCALE (*Lecanium kunoensis*)

CALIFORNIA: Counts of 10 per inch on pyracantha at San Jose, Santa Clara County. This is a new county record.

#### WEEVIL (*Scyphophorus acupunctatus*)

MISSISSIPPI: Specimens collected from century plants in Mississippi City, Harrison County. This is a new state record. This species native of southwestern U.S. and northern Mexico. Reported from California, New Mexico, Texas, Oklahoma, Arkansas, and Hawaii.

### TREE INSECTS

#### COOLEY SPRUCE GALL APHID (*Adelges cooleyi*)

PENNSYLVANIA: Egg laying underway at Mifflintown, Juniata County. Needles heavily infested in several acres of Christmas tree plantings; twisted needles abundant on 1971 growth.

#### ELM LEAF BEETLE (*Pyrrhalta luteola*)

OKLAHOMA: Adults on Siberian elm in Payne County and egg laying underway. First report of season. Adults in Major and Cleveland Counties. KANSAS: Adults, no eggs, on leaves of Siberian elm at Manhattan, Riley County. First of season. Adult damage heavy on some Siberian elms in Clark and Meade Counties. Egg masses observed on leaves of Siberian elms in Meade, Riley, and Shawnee Counties. No egg hatch noted. IOWA: Adults collected in Guthrie County. This is a new county record.

#### SOUTHERN PINE BEETLE (*Dendroctonus frontalis*)

Population increase noted in southeastern United States. Populations at serious outbreak levels in portions of LOUISIANA, MISSISSIPPI, ALABAMA, SOUTH CAROLINA and GEORGIA. Infestations increasing in TEXAS, ARKANSAS, NORTH CAROLINA, and VIRGINIA.

#### CALIFORNIA FLATHEADED BORER (*Melanophila californica*)

CALIFORNIA: Infested pine trees in Trinity National forest. About 20 trees in 10-acre stand involved.

#### SPRING CANKERWORM (*Paleacrita vernata*)

KANSAS: Very heavy on elms in Topeka, Shawnee County; 25-50 percent foliage consumed on leafed out trees. On many trees not yet leafed out, larvae damaged buds so many of these trees may not leaf out for some time. Early instars heavy on elm in Seneca, Nemaha County. Trace in Thomas, Ness and Hodgeman Counties. Many trees in Topeka banded with sticky compound to deter moths from climbing trunks. Infestations still heavy.

#### EASTERN TENT CATERPILLAR (*Malacosoma americanum*)

WISCONSIN: Hatch on April 27, 10 days later than in 1971. KENTUCKY: First hatch, April 1, Lake Cumberland State Park, McCreary County. MASSACHUSETTS: Hatch on April 19 in Hampden County.

#### CALIFORNIA OAKWORM (*Phryganidia californica*)

CALIFORNIA: Larvae, up to 12 per tip, defoliated 2,500-3,000 acres of oak in Contra Costa County. Very little biological control effects this pest.

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## ECOLOGIST'S VIEW (from page 24)

such use of roadside cover for nesting that the first spring mowing of the rights-of-way have to be postponed until after the eggs have far beyond most other land management. In the arid southwest the roadsides, because of the paved strip and the bordering bar pit, remain green long after the adjoining lands have dried up. In a way this attraction to these corridors is unfortunate for traffic moving at high speeds exacts a serious toll. For example, over 20,000 deer are killed each year on the highways in Pennsylvania. In contrast, pipelines and electric transmission lines, can be relatively disturbance free.

It would be an error not to cite the important bid man's recreational programs are making for these corridors. In addition to the necessity of establishing cross-country trails for hiking, bicycling, and skiing, the advent of OFF-ROAD-VEHICLES has put both public and private agencies under heavy pressure. Motorcycles, trail bikes, snowmo-

biles, dune and marsh buggies are here to stay, but their potential for damage to the natural environment is recognized. The goal is to get them off the public highways, away from critical wildlife habitat, and on to crosscountry trails designed and programmed for their use.

Wisconsin, by the fall of 1971, had registered over 127,000 snowmobiles and from these receipts has a program for trail development<sup>4</sup>. The average length of trail desired is about 25 miles, with minimum of 10. They now have 550 miles scheduled for construction.

Governor Rockefeller recently requested an inventory of abandoned railroad rights-of-way within New York State, having in mind their conversion to bicycle trails<sup>5</sup>.

Oregon State legislature is reported to have allocated \$1.3 million for bicycle trails.

It remained for the Illinois Department of Conservation to come up with one of the most unique trail systems. The state purchased the

abandoned Hennepin Canal and converted the majority of its 96.8 mile canal system to a cross-country pleasure boat "trail".

Corridors in the United States are thus headed for multiple purpose use. The competition for their supplemental use is apt to be keen, for many of these uses are not compatible, one with another.

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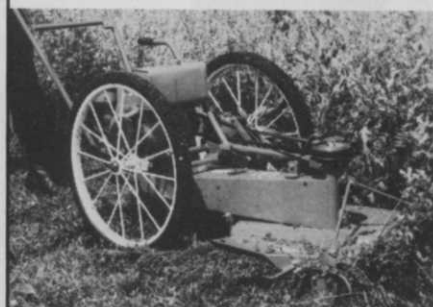
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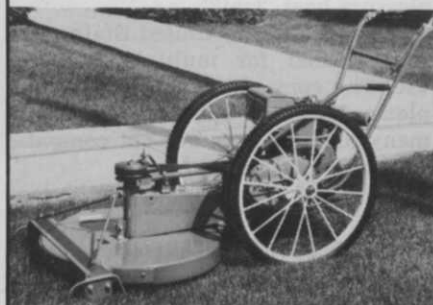
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## PUBLIC VIEW (from page 25)

surprise, and Theodor D. Sterling<sup>6</sup> pointed out that the questions of 2,4,5-T's toxicity and teratogenicity will not be soon settled because no one has yet put together a satisfactory experimental design to assess the effects of 2,4,5-T at low doses. This is certainly something you practitioners should have insisted the chemical companies do for you.

Perhaps the worst effect of past right-of-way management with herbicides has been the wasted opportunity to create environmental diversity by encouraging the growth of a variety of low shrubs by spot treatment with judicious herbicide applications instead of the wasteful blanket spraying that has been the rule. The electric utilities are even more to blame here for having allowed you to waste company funds that should have gone into environmental protection. This is where the real opportunities exist.

For over a decade, beginning in 1946, Frank E. Egler<sup>7</sup> published a long series of scientific and popular articles advocating spot control of woody vegetation by 2,4-D and 2,4,5-T, a methodology completely rationalized in his 1953 Smithsonian Institution Report, "Vegetation Management for Right-of-ways and Roadsides". William A. Niering of the Connecticut Arboretum repeated many of these studies and spoke to early Northeastern Weed Control Conferences about them.

In 1963 Niering and Richard H. Goodwin produced a homeowner's guide, "Creating New Landscapes with Herbicides<sup>8</sup>".

In 1961 the U. S. Forest Service<sup>9</sup> accepted Egler's vegetation management concepts in a publication of its own. And in 1966 the methodology was put into a popular book, *THE WILD GARDENER IN THE WILD LANDSCAPE*, by Warren G. Kenfield<sup>10</sup>.

**The crux of my message is that the science of right-of-way management is in print, but that few of you have used it.**

I acknowledge that some of you have accepted some of these ideas and tried to apply them, with more or less success; but I feel safe in saying that blanket spraying has been the rule. Too many of you have been concerned with "killing brush" rather than manipulating vegetation. The first approach is negative, the second both positive and dynamic.

The times call for working with Nature by adapting our technology to environmental dynamics. Herbicides, properly used, are an ingeni-

ous tool for molding the landscape by selecting out those few species that have a tendency to get in the way of growing into overhead wires, or otherwise interfering with our objectives.

There is no need to condemn all woody vegetation as "brush," as too many chemical company advertisements have done. There is no need to oversell herbicides; it is time to use them rationally, as the valuable tool they are when used sparingly and intelligently. This is all the future asks of you and me.

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## Grounds Management Society Schedules September Meeting

The Professional Grounds Management Society has announced the dates of their 1972 annual meeting. The Society will meet at the Twin Bridges Marriott Hotel, Washington, D. C., September 13-16. Registration will begin on the morning of the 13th. Members and non-members of the Society and all people interested in gardening and grounds management are urged to attend.

**UTILITY VIEW**(from page 12)

been most successful. It is not my intention to burden you with extensive cost figures. You might, however, be interested in one compilation relative to maintenance expenditures. Transmission maintenance cost of acreage treated annually over the period 1960 through 1971 averaged \$54.00 per acre treated.

In addition to the transmission program, over 700 miles of roadside distribution rights-of-way are also under chemical control.

Cooperative activities with municipal, county and state agencies have been an important part of our vegetation management program. We have had the privilege of participating in numerous projects related to soil stabilization, game food and cover plantings, roadside safety, and beautification. Herbicide applications have been made over all types of terrain under diverse soil and drainage conditions, through wild-life areas recreational areas and in close proximity to residential locations.

Acceptance by the general public of our transmission and distribution chemical programs has been most

favorable. We believe this has been largely due to the "selective" approach and timely scheduling of repetitive treatment resulting in the suppression or elimination of unsightly "brown out" areas, in short, aesthetics—and reasonable respect for the property of others. Since most of our transmission rights of way are easements, our contractor attempts to make a "courtesy call" to each property owner before traversing or treating the right of way on his property.

We believe *immediate personal contact* is essential to any spray complaint situation and our ability to reach and inform those questioning the operation has resolved many potential problems.

Objections attributable to the chemical programs over the past 23 years have been minimal, and those that have developed were usually found to be based on misunderstandings. However, the confusing and adverse national publicity of 1969-1970 associated with the use of herbicides did set the stage for a complaint of considerable magnitude.

In July 1970 we were the recipient of a continuing series of news re-

leases, soundly criticizing our work and the use of herbicides in general.

We feel that the use of the controversial herbicide was not the real problem. We are of the opinion that this was used as a tool to stimulate an emotional controversy, was political in origin, and designed to promote continuing newspaper coverage—which it certainly did—all unfavorable to the company image.

Unable to resolve the problem through normal means, and recognizing that defense of the chemical program was mandatory, our Public Information Department arranged a press conference—in order to place the company chemical vegetation management program before the public and in its proper perspective.

We are certainly aware that the activities of the company are under close public scrutiny, and accordingly, have made some changes in the transmission right of way management program. Consideration is given to reducing the repetitive treatment cycle in specific problem areas to further reduce "brown out" potential.

We are also able to customize the chemical applications to better

(continued on page 32)



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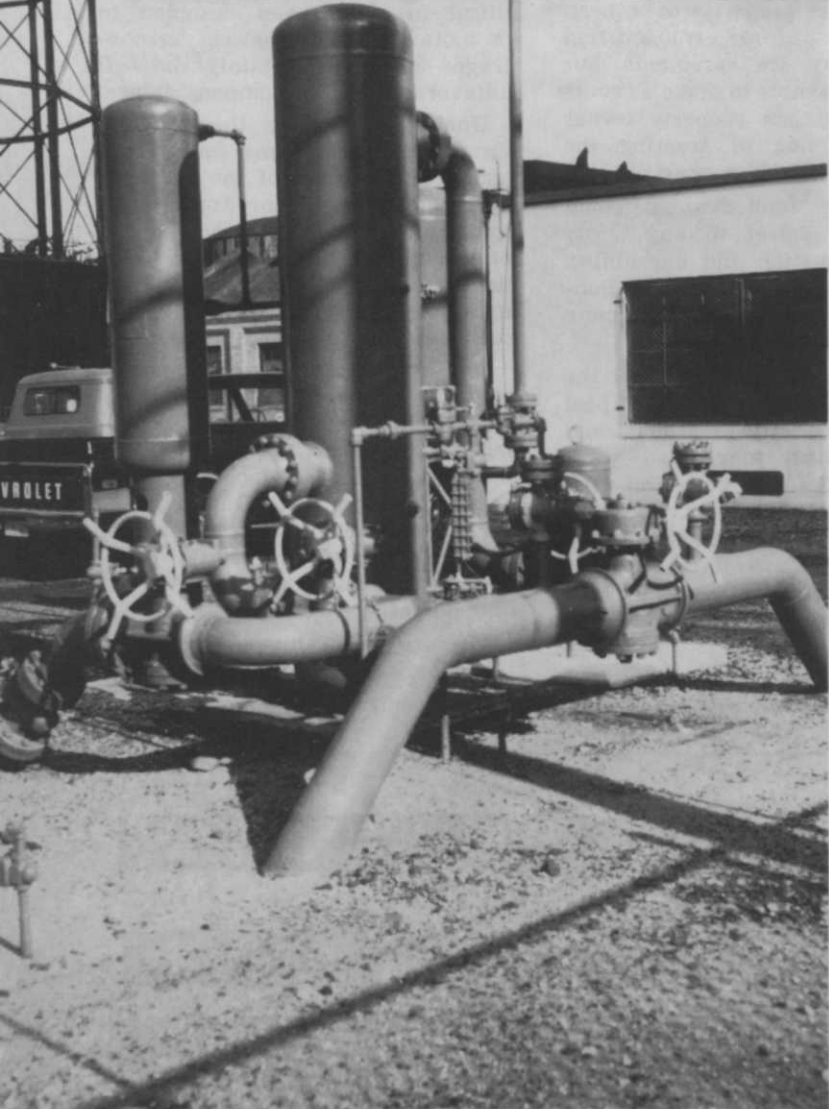
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Tandex can be sprayed or applied in dry granular form. It can also be combined with other herbicides for special control situations.

For more information, write to Industrial Chemicals Dept., Niagara Chemical Division, FMC Corporation, Middleport, New York 14105.

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| S  | M  | T  | W  | T  | F  | S  |
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| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |    |    |

**Turfgrass Sprinkler Irrigation Conference**, 10th annual, University of California Conference Center, Lake Arrowhead, Calif., June 16-18.

**Watersheds in Transition**, a national symposium, Colorado State University, Ft. Collins, Colo., June 19-21.

**National Golf Foundation Western Seminar**, Sunriver Lodge, Sunriver, Oregon, June 26-30.

**Aquatic Weed Science Society**, formerly Hyacinth Control Society, annual meeting, Miami Springs Villas — Kings Inn, Miami Springs, Fla., July 9-12.

**American Sod Producers Association**, annual meeting, Skyline Hotel, Toronto, Canada, July 10-12.

**Ohio Chapter, International Shade Tree Conference**, summer meeting, Secor Park, Metropolitan Park District, Toledo, Ohio, July 12.

**American Association of Nurserymen**, Statler Hilton, Washington, D.C., July 16-19.

**Society for Economic Botany**, 13th annual, University of Mississippi campus, University, Miss., July 30-Aug. 2.

**National Golf Foundation Eastern Seminar**, Pine Needles Country Club, Southern Pines, N.C., Aug. 7-11.

**Rutgers Turfgrass Research Day**, College of Agriculture, College Farm Road and Dudley Road, New Brunswick, N.J. August 10.

**International Shade Tree Conference, Inc.**, 48th annual, Newporter Inn, Newport Beach, Calif., Aug. 13-17.

**American Association of Nurserymen Management Seminar**, Syracuse University campus, Aug. 13-18.

**Canadian Parks/Recreation Association**, 1972 conference, Ottawa-Chateau Laurier Hotel, Aug. 14-17.

**Northern Michigan Turfgrass Field Day**, Traverse City Country Club, Traverse City, Mich., Sept. 13.

**Eastern Kentucky Turfgrass Field Day and Conference**, Powell Building, Eastern Kentucky University, Richmond, Ky., Oct. 10-11.

**Turfgrass Equipment and Materials Educational Exposition**, 12th annual, Southern California Turfgrass Council, Brookside Park, Pasadena, Calif., Oct. 11-12.

**Missouri Lawn and Turf Conference**, 13th annual, Ramada Inn, Columbia, Mo., Nov. 7-8.

**Nebraska Turfgrass Conference**, Kellogg Center, University of Nebraska, Lincoln, Nebr., Nov. 20-22.

**Ohio Turfgrass Conference and Show**, Franklin County Memorial Building, Columbus, Ohio, Dec. 12-14.

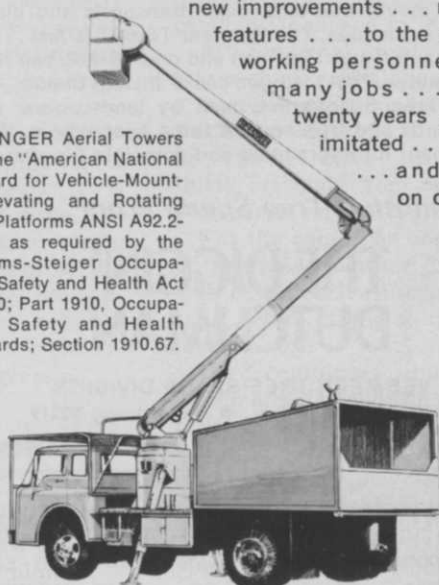
**Southern Weed Science Society**, 26th annual meeting, Jung Hotel, New Orleans, La., Jan. 16-18.

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### UTILITY VIEW (from page 29)

suit local conditions. For example, heavily populated areas, major recreational areas, camp sites, summer colonies, and similar facilities are treated only during the dormant season.

In 1970 we altered our chemical program to eliminate applications on all existing transmission lines at primary and secondary road crossings to facilitate the return of natural visual barriers at these critical locations.

We believe we have been operating a sensible, well supervised, aesthetically acceptable and safe chemical program. It is our intention to continue the vegetation management maintenance program on the system transmission and distribution rights of way wherever it is inappropriate.

After much public opposition to a proposed 500,000 volt overhead steel tower line, the New Jersey Public Utility Commission, in 1969, gave our neighbor, Public Service Electric and Gas Company, approval to proceed—but six precedent setting requirements had to be met. Essentially these were:

1. Use of available railroad or other existing rights-of-way.
2. Tower locations related to topography to minimize appearance.
3. A program of tower painting designed to minimize effect on surroundings.
4. Where practical, permit special uses of the rights-of-way for farming, recreation, etc.

5. Non-uniform clearing of rights-of-way and retention of a maximum number of trees.

6. Landscaping of conspicuous right-of-way areas.

Our company is also committed to the pursuit of these and similar requirements.

In the past all of our rights of way have been "clear cut," stump sprayed and maintained chemically. Our experience with the new concept of selective clearing is limited to one 230,000 volt right-of-way, 120 feet wide and approximately 11 miles long. The right-of-way was predominantly farm or open land, with some forested areas and hedgerows. Approximately 35% of the right-of-way was wooded. Selective tree removal and/or trimming was undertaken at road crossings and at each end of the forested areas.

We have no way of estimating future maintenance tree trimming costs on this right-of-way. The use of herbicides in future maintenance work on this line is questionable at this time. We cannot, however, consider the line a typical right-of-way experience.

In addition to the right-of-way restrictions imposed by the New Jersey Public Utility Commission, the State of New Jersey enacted the New Jersey Pesticide Control Act of 1971. This Act formulates State policies regulating, among other things, the use of herbicides. Among its shortcomings, municipal ordinances which may be impractical and unrealistic can take precedence over the State Act. To date, this Pesticide Control Act has had no impact

on our vegetation management program.

Approved in 1968, Chapter 245 of the laws of New Jersey authorize municipalities to establish conservation commissions. Their functional range covers:

1. Open Space preservation.
2. Scenic, aesthetic preservation, and beautification.
3. Pollution control.
4. Waste disposal.

There are over 100 active commissions in New Jersey today.

Our experiences to date with municipal conservation commissions involved property owner complaints related to our transmission chemical program. Through our education of these municipal commissions as to the benefits of our chemical program and the proper application of chemicals, the commissions in turn were able to alleviate the fears of the property owners who considered the chemicals dangerous.

A most important regulatory control facing the utility industry in New Jersey today is Chapter 2, New Jersey Air Pollution Control Code—Control and Prohibition of Open Burning. The revised chapter stipulates, among other things, that "plant life" may not be disposed of by open burning. This takes effect January 1, 1973. "Plant Life" includes all vegetation.

Some municipalities have already prohibited all open burning, by local ordinance, in advance of the effective date of this Act.

An all-encompassing solution to the problem of transmission right-of-way tree and brush disposal is

not now known. The alternatives of logging, stacking, burying or chipping are not entirely compatible with selective clearing and trimming.

Elimination of open burning, while reducing air pollution, compounds the problem of refuse disposal. However, the regulation will enhance the minimal clearing requirements versus clear cutting by reducing plant material disposal requirements.

In a few words, let me summarize where we are and where I think we are going in the area of right-of-way maintenance. The rights-of-way presently under chemical maintenance will be permitted to continue as it. The right-of-way requirement of tomorrow will be different than it is today. We presently use 34,000 volt as a subtransmission voltage to feed substations. These lines run cross-country creating many rights-of-way. Tomorrow they will be the distribution voltage in the street and will require maintenance trimming only. The cross-country steel tower line will still be in demand but will make better use of the right-of-way corridors such as railroad rights-of-way, gas transmis-

sion rights-of-way, etc. Where new rights-of-way are created, total clearing will be minimal or non-existent, being replaced by selective removals and line contour trimming. Access roads to and on the right-of-way will be in some cases be non-existent. This all means that right-of-way maintenance will be mostly by trimming and thus very costly.

We are presently negotiating for a 500,000 volt right-of-way across state lands. If successful, we know that tree removal will be very selective, contour tree trimming a must but, most important, it is questionable whether or not we will be able to construct access roads. This means that this portion of the line may be constructed by helicopter and tree trimming done entirely by climbing. The art of right-of-way maintenance is retrogressing.

### Clean Chemical Containers Combat Contamination

What to do with used pesticide containers is the nagging problem that has the chemical industry exploring new methods of packaging materials. But until these new packages are perfected, metal or glass

containers remain a potential contamination hazard to soil and water.

The National Agricultural Chemicals Association (NACA) suggests a procedure based on the techniques used by laboratories to reduce the concentration of material in a container. It's a simple rinse and drain procedure employed at the time the pesticide is placed in the spray tank.

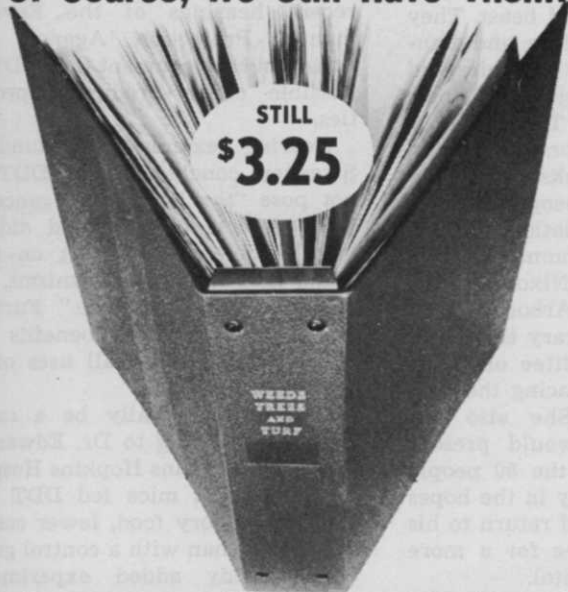
After normal emptying, the container should be allowed to drain in a vertical position for 30 seconds. For best results the container should be rinsed three times, allowing thirty seconds for draining after each rinse, says NACA.

Fill the container one-quarter full with water or other diluting material. Drain each rinse into the spray tank before filling it to the desired level.

Used containers which have been rinsed and drained are ready for disposal by accepted local standards as crushing and burying or by recycling for scrap when appropriate.

For a free instruction sticker to attach to spray equipment, send a self-addressed, stamped envelope to: Safety Division, National Agricultural Chemicals Association, 1155 Fifteenth Street N.W., Washington, D.C. 20005.

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Arbor Day ceremonies were climaxed in the planting of a fern leaf beech on the White House lawn. Arbor Day celebrated its 100th anniversary this year. Pictured above (l-r) are: Mrs. Richard M. Nixon, honorary trustee of the Arbor Day committee, Allen Davis, designer of the District of Columbia Arbor Day Poster, Mayor Walter Washington, and Robert Felix, NAA president.

## White House Tree Planting Highlight of Arbor Day

The 100th anniversary of Arbor Day celebration culminated in the planting of a 12 foot fern leaf beech on the West Wing Portico lawn of the White House by Mrs. Richard M. Nixon.

In a short ceremony preceding the planting, Robert Felix, president of the National Arborist Association said, "... Physically, trees give shelter to both man and beast. They reduce noise, wind, glare and temperature. They purify our air, and they stabilize our soil with their massive root systems. Trees give us food to eat, timber for our homes, and paper for our books . . . In behalf of the American people, the National Arborist Association is honored to present this commemorative tree to Mrs. Richard Nixon for the 100th anniversary of Arbor Day."

Mrs. Nixon as honorary trustee of the Arbor Day committee officially planted the tree by placing the first shovel-full of soil. She also announced that NAA would present seedling hemlocks to the 80 people attending the ceremony in the hopes that each person would return to his home and plant a tree for a more beautiful national capitol.

Also present at the ceremony were: Walter Washington, mayor of Washington, D. C.; Vern Livingston, president of the Nebraska Arbor Day Centennial; Mrs. Gerald Livingston, chairman of the Nebraska City Arbor Day committee; Mrs. Rogers Morton, wife of the Secretary of Interior; Senator Curtis of the state of Nebraska.

Representing NAA was president

and Mrs. Robert Felix and vice president and Mrs. John A. Shullenbarger.

Following the tree planting, Mrs. Nixon received the guests in the State Dining Room of the White House.

## DDT Not Carcinogenic Scientists Tell EPA

Scientific experts testifying at recent hearings of the Environmental Protection Agency have ruled out the argument that DDT has possible cancer-producing properties.

Hearing examiner Edmund M. Sweeney concluded that DDT did not pose "the hazards of cancer or birth defects in man and did not have a deleterious effect on fresh water fish, estuarine organisms, wild birds or other wildlife." Furthermore, he ruled that benefits outweigh the risks for all uses of the pesticide.

DDT may actually be a cancer fighter, according to Dr. Edward R. Laws, Jr. of Johns Hopkins Hospital. In a study of mice fed DDT with their laboratory food, fewer cancers developed than with a control group.

The study added experimental support to an observation made in 1967 among a group of workers exposed on their jobs to high levels of DDT for 10 to 20 years. "It is noteworthy that no cases of cancer developed among these workers in some 1,300 man-years of exposure, a statistically improbable event," Dr. Laws reported in the American Medical Association journal, Archives of Environmental Health.

Nearly eight percent of the DDT-fed mice inoculated with tumor cells were without malignancy. All mice in the control group developed cancer. All cancerous mice died but those with DDT in their systems lived significantly longer, Dr. Laws reported.

"DDT may have an anti-cancer producing potential the physician said.

Among those who testified on the DDT issue in the EPA hearings were: Dr. Jesse Steinfeld, Surgeon General of the U.S. and a cancer researcher; Dr. John Higginson, director of the International Agency for Research on Cancer; Dr. Lorenzo Tomatis, chief of the chemical carcinogenesis unit for the same organization; Dr. William Butler of the Medical Research Council of Great Britain; Dr. Wayland J. Hayes, Jr., professor of medical toxicology at Vanderbilt University and former chief of the toxicology laboratory of the U.S. Public Health Service; and Dr. Ted A. Loomis, chief of toxicology for the State of Washington.

All testified that there is no evidence that DDT causes cancer in man.

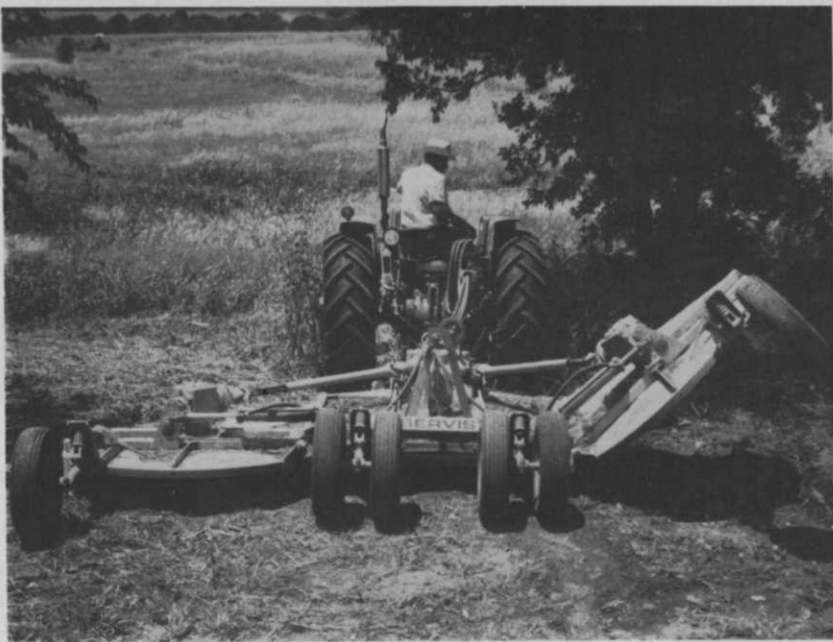
## Two Environmental Health Bulletins Available From Dow

Hearing Conservation Services is the title of the third bulletin in a series on environmental health services published by Dow Chemical. The fourth bulletin is titled Analytical Services.

Hearing Conservation Services was designed to assist industry and government in developing or implementing hearing conservation programs. Capabilities offered by Dow include: surveillance, noise exposure evaluation, noise control and consultation.

The fourth bulletin, Analytical Services, lists the capabilities for complete quantitative and qualitative environmental analysis of air, water, soil contaminants; determination of residue levels in fish, vegetation and animal life; assays of heavy metals and toxic chemicals in biological specimens. Techniques of analysis include the latest equipment available. Scientists can separate, identify and determine as part of the process analyses trace organics, metals and other pollution parameters.

For more information on the Hearing Conservation Services, circle (721) on the reply card. Circle (722) for additional information about Analytical Services.



## Time is money. Save BOTH with the Servis FLEX XV

**CUTS A FIFTEEN-FOOT SWATH** in a single pass and shortens time in the field. Makes fast work of right-of-way, brush, orchard, stalks, and pasture cutting. Virtually eliminates downtime. The Flex XV saves *time*.

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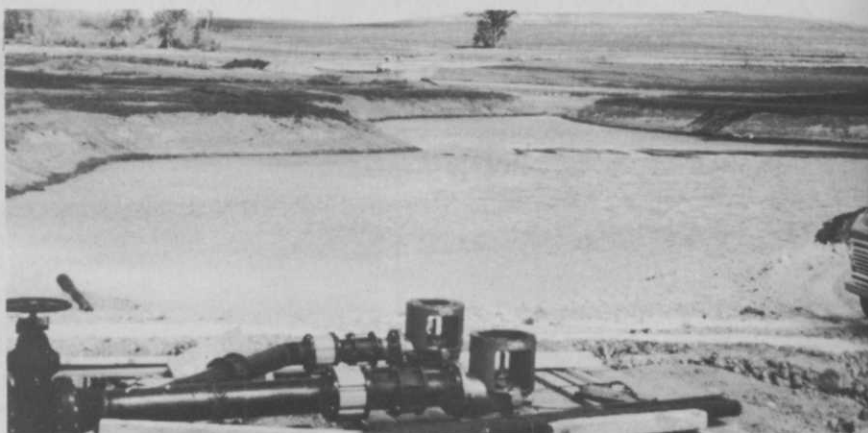


## GOLF COURSE (from page 16)

courses are usually less expensive to build and maintain. Less land is needed, meaning lower initial expense in acquisition. In addition, a smaller area can leave room for other facilities, either park areas if municipal or living units if a private or resort development. Such a course will appeal to more players of all abilities.

*More use of water hazards for irrigation water storage and course strategy.* Architects and golf superintendents find that this dual role of water decreases initial investment and maintenance costs. Irrigation water is increasing in importance and a ready supply insures use when needed. At the same time, we are building fewer sand traps, to speed up play. This again lowers maintenance costs.

*More combination golf course and residential or resort developments.* People like to live around golf courses, for access and beautiful scenery. About 40 percent of all new courses being built are of this type. In addition, the Bureau of Outdoor Recreation (U.S. Department of Interior) has made available \$255 million for grants to states and their cities and counties under the Land



Irrigation potential and water hazard were taken into account during the construction of the lake at the Foothills Golf Course. Large pumps capable of handling many thousands of gallons of irrigation water daily were installed.

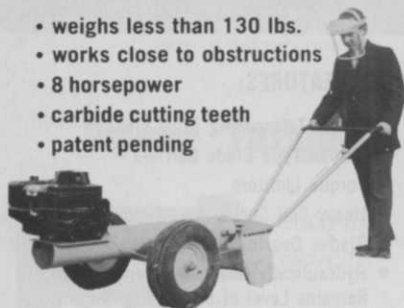
and Water Conservation Fund for development of public outdoor recreation areas and facilities including golf courses. Importance is attached to areas where concentrations of people live. A combination golf course and residential or resort complex could qualify for these Federal funds to be matched by the individual states. Such developments require good planning coordination between the golf course architect, residential area planner and owner. We must be sure to leave safety

space between golf holes and private property. Often the end result is that the golf course superintendent takes on the larger responsibility of watching over the total development.

*More automation and wider coverage by irrigation systems.* These modern underground irrigation systems are often the difference between a barren site and a beautiful, green course. But as these systems are asked to do more, the cost goes up. The demands on the water source  
(continued on page 42)

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that flywheels can tear apart, are hard to stop, and retard re-acceleration. You won't have these problems with M-B FITCHBURG exclusive design.

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## industry people on the move



**Steve Derrick**, named division advertising manager for Diamond Shamrock Chemical Company. Also promoted were: **John Anderson**, to product manager for Dacthal herbicide, and **Wayne Carruth**, to product manager for turf, phenoxy and arsonate.

\* \* \*

**Charles B. Lounsbury**, promoted to product manager for Toro's rider and lawn tractor lines. He was district marketing manager for the midwest.

\* \* \*

**Frank J. Illnick**, becomes national sales manager of Applied Biochemists, Inc. Will be responsible for expansion of nationally distributed proprietary products of the company.

\* \* \*

**Keith Tordsen**, joined Geigy Agricultural Chemicals as a field sales representative. He is a 1971 graduate in agronomy from the University of Minnesota and a member of the American Society of Agronomy.

\* \* \*

**Richard B. Seely**, named product manager for fluoro-difen and chlorbromuron herbicides for Nor-Am Agricultural Products, Inc. Also named product manager of fluometuron and chloroxuron herbicides was **H. Broughton Smith**. **George W. Banta**, to product manager for insecticides.

\* \* \*

**Lester M. Minsuk**, named general production manager for the Chipman Division of Rhodia, Inc. Also appointed to Chipman's executive force is **John B. Clapp, Jr.**, now general sales manager for agriculture chemicals.

\* \* \*

**Edward P. Whaley**, appointed general manager of H-M Plastics, a partnership between Hercules and Mitsui Petrochemical Industries Ltd. Formerly director, quality assurance, he will manage activities related to the production of polyethylene plastics and polyethylene bottles.

\* \* \*

**Gary Clark**, becomes head of entomology research program at O. M. Scott & Sons.

\* \* \*

**Jim K. Smith**, appointed manager of international marketing for the Charles Machine Works, Inc., manufacturer of Ditch Witch trenching equipment. He succeeds **Ed Maldonado**.

\* \* \*

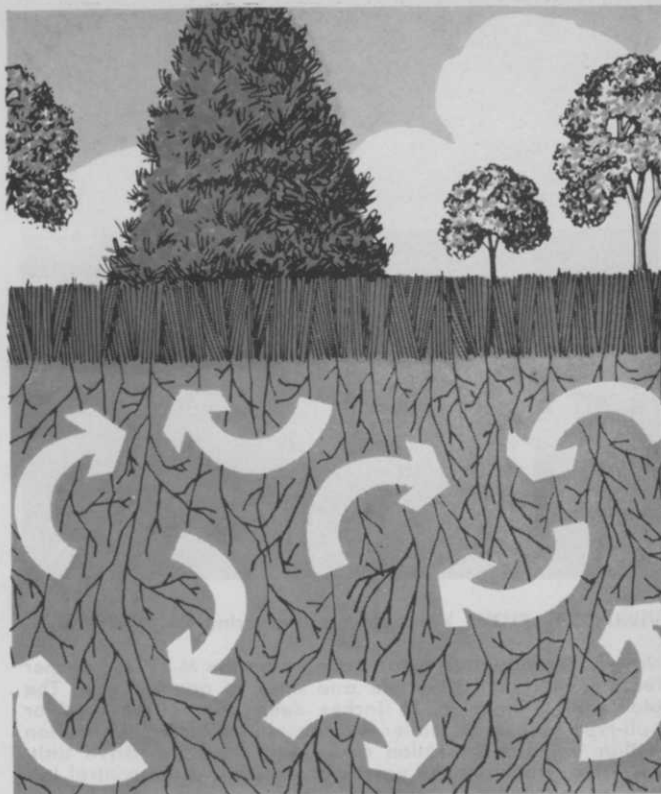
**Robert N. Shreve**, to manager of Conwed Corporation's industrial products group. He replaces **F. T. Weyerhaeuser**, former vice president and manager of the group who has assumed presidency of the corporation.

\* \* \*

**Ed Littooy**, formerly president of Colloidal, named chairman of the board, a newly created position. His career embraces a span of 47 years with Colloidal. **Stanley W. Strew** has been named president.

\* \* \*

**D. E. Anderson**, to manager of dealer marketing; **R. G. Miller**, to manager of municipal products; **Larry Vizenor**, to supervisor of industrial product sales; **R. L. Lindboe**, to manager special markets. All are newly created positions of Wayne Manufacturing Co.



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**Grand Prize<sup>®</sup> Lawn & Garden Gypsum** is winning fast acclaim among professional turf and nurserymen wherever heavy soil presents growing problems. This natural soil

conditioner turns hard-packed clay into an open porous structure; permits soil to breathe, air and water to penetrate, and roots to grow deep. Grand Prize Lawn & Garden Gypsum supplies neutral and readily available calcium and sulfate-sulfur, each vital to plant growth; helps stimulate decomposition of organic material; absolutely will not burn. Write for specifics. 101 South Wacker Drive, Chicago, Illinois 60606, Dept. WTT-52



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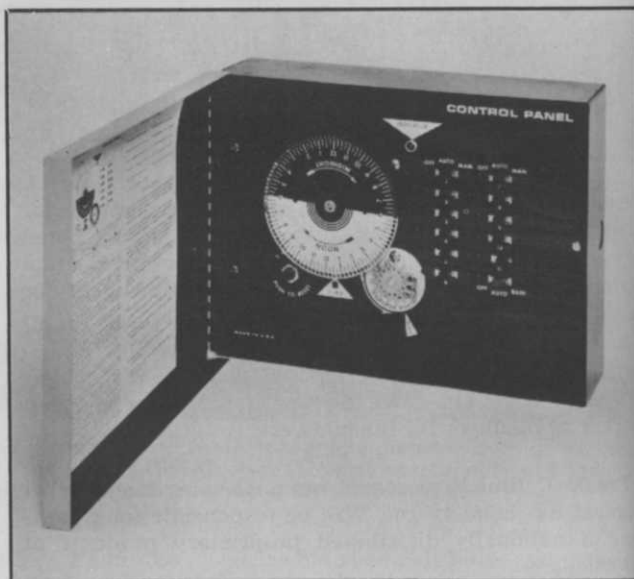
For More Details Circle (118) on Reply Card





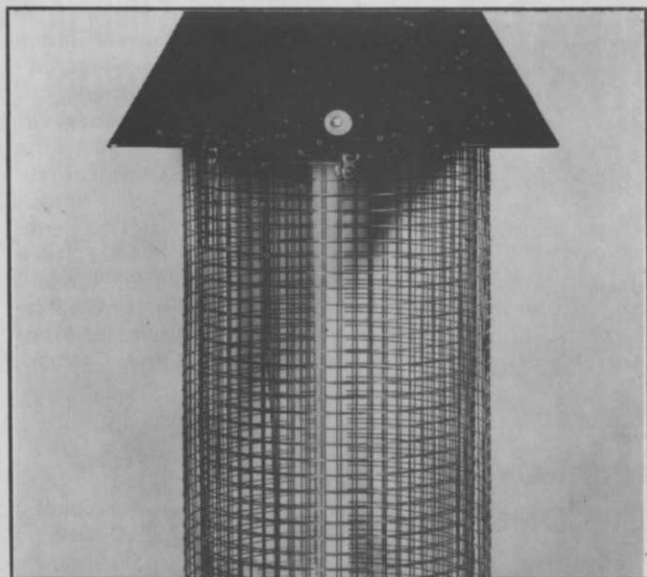
**VIBRATORY PLOW:** Vermeer Manufacturing Co., Pella, Ia.

New P-10 plow attachment mounted on the M-174H trencher features a compact, simple and easy to operate unit. The plow buries lines to 15 inches deep with either feed or pull-type blades. Its trailer-type design isolates the vibration within the plow-in action and away from the drive unit. PTO-drive transmits the power. Hydrostatic drive control lets anyone be an operator in minutes. A single control lever changes speeds and direction with no clutching or shifting required. Also available is a heavy-duty trencher that digs 3-5 inches wide, down to 30 inches deep, and a 16 inch by 42 inch dozer blade that angles a full 30 degrees, left or right, for backfilling. For more details, circle (701) on the reply card.



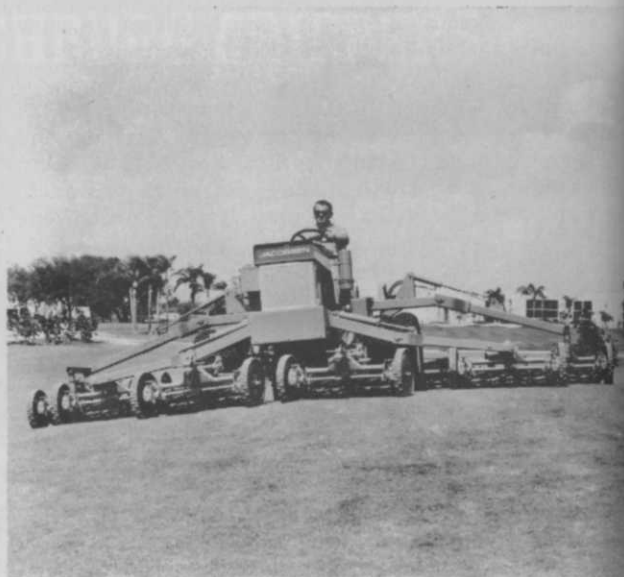
**UL APPROVED ELECTRONIC CONTROLLER:** Turf Irrigation, Div. of Melnor Industries, Moonachie, N.J.

Completely automate the operation of your underground sprinkler system with this easily installed controller. Equipped with a 14 day calendar wheel and 24 hour dial, the unit can be set to establish regular watering time for specific areas. A master switch turns the system on to fully automatic operation. A rain switch can temporarily stop the system without destroying the controller sequence. Each zone may be manually operated for any desired length of time. A pilot light indicates when watering is in progress. The walnut-grained, modern designed, controller box is wall-mounted. A circuit breaker in the panel assures electrical protection. For more details, circle (702) on the reply card.



**ELECTRIC INSECT KILLER:** Vandermolen Corporation, Livingston, N.J.

Here's a large, outdoor unit designed to keep areas from one third to three acres free of mosquitoes and other flying insects. The model G-15 accommodates up to 11,000 square feet. The cylindrical design attracts insects from all sides to a black light. Pests are incinerated in seconds when they reach the electrically charged grid surrounding the light. Powered by regular 110 volt current, the unit operates for pennies a day. For more details, circle (703) on the reply card.



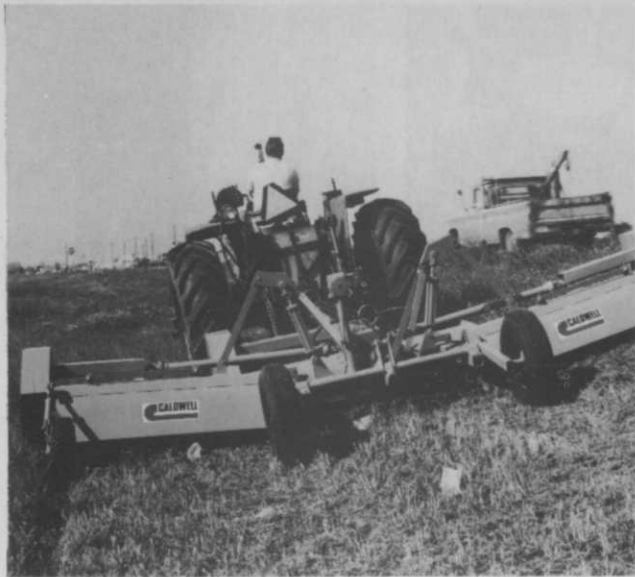
**F-20 TURF TRACTOR:** Jacobsen Manufacturing Co., Racine, Wisc.

Capable of cutting 19 feet in one pass, this 9 gang mower boasts a time-savings of 25 to 30 percent over existing 7 gang units. The unit sports the low profile and compactness of turf tractors yet is powered by a 68 hp gasoline industrial engine. It is ideally suited for road travel between job sites with all mower units capable of being hydraulically lifted to a transport position. Other features include self-adjusting hydraulic automotive brakes on drive wheels, a mechanical brake, spring loaded cushion seat and back rest and hand and foot throttles. A tool box and utility carry box are standard equipment. For more details, circle (704) on the reply card.



**EASY MARKER:** Fox Valley Marking Systems, Bartlett, Ill.

Make layout of shrubs, trees, parking lots and other areas quick and efficient with this new paint marker. It uses aerosol cans of paint that make highly visible, long lasting marks on grass, soil, pavement or gravel. It is easily operated from the ground or from a vehicle by activating the trigger mechanism on the handle of the unit. This precision unit can also be used to write instructions to working crews. Paint comes in colors of yellow, silver and fluorescent red. For more details, circle (705) on the reply card.



**FLEXIBLE FLAIL MOWER:** E. L. Caldwell & Sons, Corpus Christi, Tex.

Follow the contour of the ground with this three section, flexible flail mower that cuts a 15 foot swath. The mower is composed of a center six foot section and two five foot wings. The sections overlap six inches for no-gap mowing. Hydraulics are standard equipment. The five foot wings hydraulically fold for road travel and can easily pass through an eight foot gate. Cutting blades are reversible and mounted on a dynamically balanced rotor. Highway litter is thrown down into the ground and not out onto traffic. Shielded belts, U-joints and chain guards provide operator safety. For more details, circle (706) on the reply card.



**MASS-HOPPER SPREADER:** Willmar Manufacturing Company, Willmar, Minn.

Par I and Par II are two new spreader models designed for precision application of fertilizer materials. Apply as little as 41 pounds per acre up to 1,156 pounds per acre. The units float over turf with 12.5 x 15 tires while carrying up to 1 1/2 tons of fertilizer. A maximum of 20 pounds per square inch down pressure is exerted when fully loaded. Other features include twin spreading discs, heavy-duty construction, easy on- and off-controls and low profile design. For more details, circle (707) on the reply card.

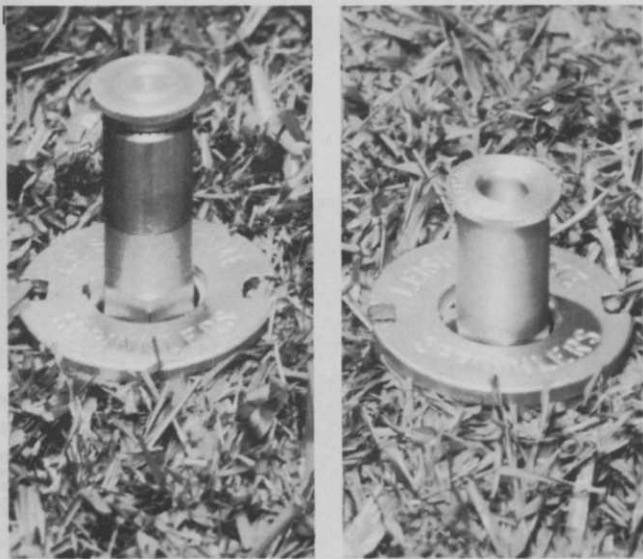


**POP DOWN SPRAY HEAD:** Rain Bird Sprinkler Mfg. Corp., Glendora, Calif.

Activated during a watering cycle, this spray head sprinkler, the 2800 PD, pops above ground when water is turned on and retracts to ground level when off. Heavy duty stainless steel retract spring assures positive action every time. No more nozzles hanging up above ground when watering is through. A self-flushing feature removes dirt and debris before and after each use. An adjusting screw allows easy regulation of flow and radius of throw. Eight spray patterns are available. For more details, circle (708) on the reply card.

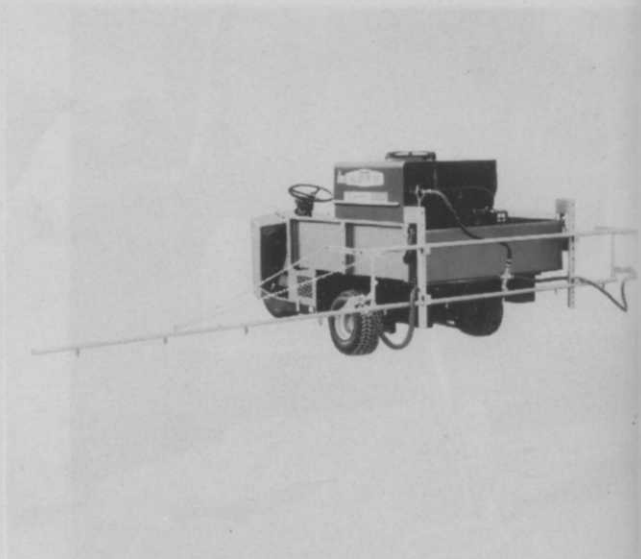






**POP-UP SPRINKLERS:** New England Union Company, Inc., New York, N.Y.

Bronze constructed models SP2 and SP3 install flush with the ground and pop-up to maintain 1 1/8 inches and 2 inches rise respectively with normal water pressure. The units are designed to accommodate a full line of mist and jet spray nozzles with a variety of spray patterns. Each model is self-flushing and retracts even with the ground when the water is turned off, minimizing the hazard of protruding sprinklers. For more details, circle (709) on the reply card.



**TURFKEEPER:** John Bean Division, FMC Corporation, Jonesboro, Ark.

Two new Turfkeeper golf course sprayers are now available. Model MF-100-G is PTO driven and model MF-100-GE is recommended for utility vehicles without PTO. Both units are equipped with lightweight, 3-section, 15-foot booms with 5-foot foldaway wings and 19 nozzles spaced at 10 inches. The G model features pressure hydraulic agitation while agitation on the GE model is mechanically driven by a five hp engine. Complete mixing and suspension of chemicals is assured in the 100-gallon leakproof steel tank. The PTO model utilizes a 3 to 1 pump drive ratio which provides enough force to apply 3 to 5 gallons spray per thousand square feet at low engine RPM. For more details, circle (710) on the reply card.



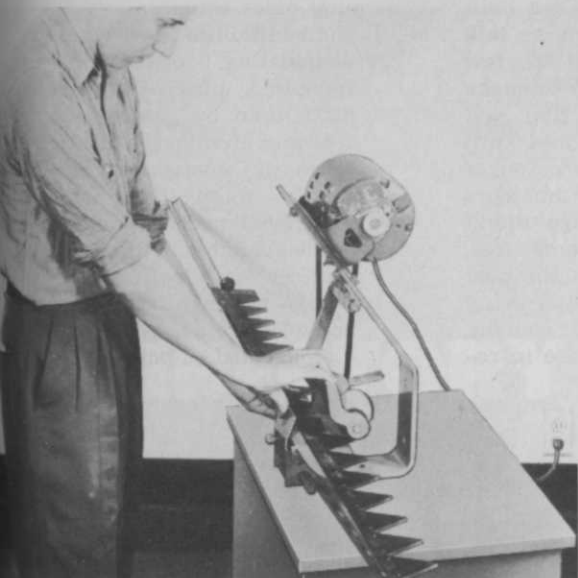
**OFF-THE-ROAD BRUSH CHIPPER:** Wayne Manufacturing Co., Pomona, Calif.

This chipper was designed for rough terrain. It is available in either 12 inches or 16 inches rotor blade sizes. A V-8 engine rated at 210 hp delivers smooth power. The unit trails behind a tractor or is available as a base, skid mounted or off-the-road model. A rugged and safe feed table completely encloses the rotor blade opening when the unit is closed and locked. This bars access to the knives when the unit is idle and locks down in open position to provide a firm working surface when operating. A special six-sided, disposable bed knife is used on all models. For more details, circle (711) on the reply card.



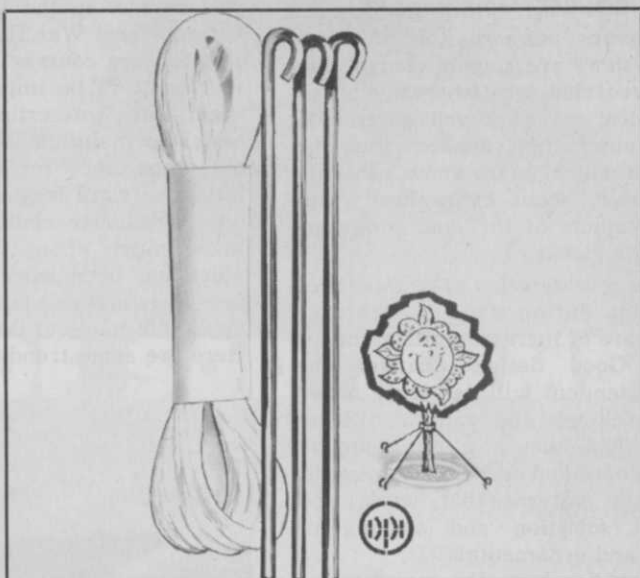
**HEAVY DUTY SHADE TREE TRIMMER:** Limb-Lopper Co., Inc., Santa Fe Springs, Calif.

Designed primarily for use with 1000-1500 psi (4-5 gpm) closed center hydraulic system of the M.A.T. Hi-Ranger lift, this model HL trimmer features a 2 1/2 inch cutter capacity. It is designed with fewer moving parts and a simplified external adjustment. The insulated model HL weighs 9 lbs. 15 ozs., and is 78 inches in length overall. Non-insulated versions are available in lengths up to 7 feet. Standard 3/8 inch female threaded connections are used and a foam heat-barrier is incorporated in the handle and trigger guard. For more details, circle (712) on the reply card.



**SWINGIN' SICKLE GRINDER:** Lantz Manufacturing Div., Greenville, Ohio

An exclusive swinging arm brings the grinding wheel to the sickle bar to assure faster, more accurate sharpening and uniform edge on this new machine. One man, unassisted, can use this compact, light-weight unit and sharpen most any sickle bar with ease. Other features include a spring-loaded table that holds the sickle bar against the wheel with uniform pressure, extension arms that support the sickle ends and easy belt adjustment. It is available with two grinding wheels. For more details, circle (713) on the reply card.



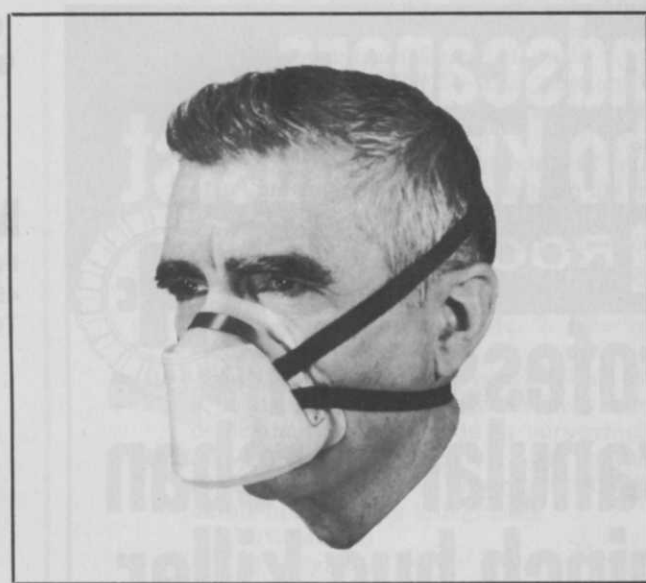
**TREE BRACE:** Decorative Products, Inc., Oshkosh, Wis.

Brace young trees to insure straight and strong growth with this tree brace. It consists of three metal stakes and enough cord to brace one tree. In use the stakes are driven into the ground at an angle away from the tree in a three or four foot radius from its base and spaced evenly. A plastic collar fits around the tree and rope is threaded between the collar and the stakes. For more details, circle (714) on the reply card.



**TRUCK-MOUNTED BACKHOE:** Tractor and Implement Operations, Ford Motor Company, Troy, Mich.

This one's so new that the welds are still hot. Mated together for the first time by one company is this truck-mounted backhoe available with a 13- or 15-foot boom. The backhoe consists of boom, dipperstick, double-acting lift, crowd and bucket cylinders, swing system, stabilizers, operator's console and seat, chain hook and stop switch. The unit is mounted on an F-600 series truck and the entire unit can quickly reach job sites at highway speeds. In less than three minutes the operator can begin digging. Backhoe features Auto-Dig cycle which reduces operator fatigue in crowd, lift and curl operations. For more details, circle (715) on the reply card.



**DISPOSABLE RESPIRATOR:** General Scientific Equipment Co., Philadelphia, Pa.

Approved by the Bureau of Mines, Model 7165 meets the requirements for dusts which have a Threshold Limit Value not less than 0.1 mg./cu. m. or 2.4 million particles/cu. ft. Simply throw the respirator away after use. This eliminates costly cleaning and maintenance. Large, wrap-around filter resists particulate clogging. A special inhalation and exhalation valve system prevents moisture build-up and permits cool breathing. Facepiece remains comfortable and pliable at all temperatures. Molded of non-irritating material, it can be worn with safety glasses or goggles. Elastic headbands are fully adjustable. Weighs less than two ounces. For more details, circle (716) on the reply card.





## GOLF COURSE (from page 36)

and pumps increase, too. In some water-short areas, golf courses are using recycled, treated sewage effluent. Most have proved successful. More automation dictates that the superintendent must know virtually everything about hydraulics, water requirements of turf and programming via clocks.

*More consideration of maintenance problems during design.* Architects are aware of increasing maintenance costs. Good design assumes the superintendent will use large mowing machines and minimize hand work. This means a minimum of steep slopes and odd-shaped hazards, drainage patterns that work, and careful selection and spacing of plants and ornamentals.

Money has been the major motivator of all these trends. Golf courses are getting more and more expensive to build. Costs of construction have increased an average of eight percent a year over the past five years. That's why all the courses being built in Colorado are either municipal, financed by bond issues and backed by taxes, part of planned residential communities and resorts, or financed by land sales.

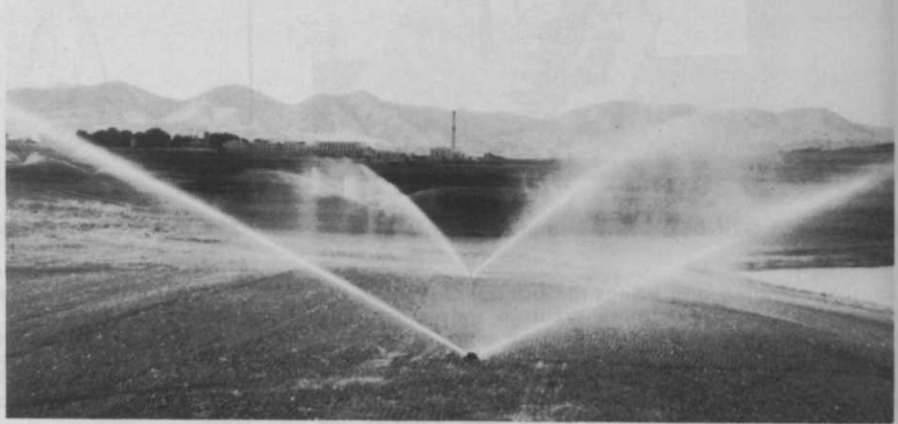
Nearly half of the present 10,500

golf courses in the U.S. were built before World War II. When we talk about older courses, there are few that couldn't be improved to make them more interesting to play and easier to maintain. Many are worn out, too short for today's longer hitters, or were designed by amateurs who a quarter century ago didn't know much about the game. Yet, much has been learned in the past few years and this is currently being applied to many of the older courses. Here are some trends we see in re-

modeling older courses:

1. The addition of 9 more holes to an existing 9 or 18 to handle increased play. The criteria often used by greens committees and architects are whether there is enough market to justify more facilities, and whether there is adjoining land space available. With a growing number of golfers, nearly every metropolitan course could utilize more holes.

(continued on page 56)



Water plays an important role in keeping greens, tees and fairways in shape. Older courses with antiquated irrigation are trading up to larger systems. Newer courses are designed with heavy-duty systems capable of delivering water to every part of the course.

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# DIRECTORY OF SOD TERMS

## EDITOR'S NOTE:

Sod producers who sell to contractors can be confused by terminology used in contract specifications. Likewise, contractors who write sodding specifications have been under pressure, especially in states where sod laws have been enacted, to be more specific. Because nearly every modern industry has a jargon or set of descriptive words, we have presented below a glossary of turfgrass terms compiled by the American Sod Producers Association. These terms and written specifications are contained in a booklet "Guideline Specifications For Sodding." For more details on the booklet, circle (719) on the reader reply card. JAS.

**ABSORPTION**—The intake of water or other substance by a cell, a root, or other plant organs.

**ACID**—A condition in which the acidic elements in a solution overbalance the basic elements: associated with a greater concentration of hydrogen than of hydroxal ions.

**ACID SOIL**—In practice, a soil with a pH of less than 6.6.

**ACRE**—A unit of surface area consisting of 43,560 square feet or 4,840 square yards. 640 acres equals one square mile.

**ACRE INCH OF WATER**—A quantity of water sufficient to cover an area of one acre to a depth of one inch and equal to 3,630 cubic feet or 27,154 gallons, or 220,000 lbs.

**ADAPTABILITY**—The adjustment or modification, or the ability for adjustment of modification, of an organism to environmental conditions.

**ADHESION**—The adhering or sticking together of substances in contact with each other. In soils, this may pertain to mineral and organic soil particles.

**AERATION**—The mixing of air with water or soil to improve the oxygen supply of plants and other organisms. (see also soil aeration.)

**AERIFIERS**—Tools used to make frequent vertical holes (and remove cores) in established turf, which loosen and cultivate the soil.

**AGGREGATE**—An inert material, such as sand, gravel, shell, or broken stone, or combination thereof, with which a cementing material is

mixed to form a concrete or macadam.

**ALKALINE SOIL**—A soil having a pH 7.3 or above. (7.0 is neutral)

**ANNUAL**—A plant that completes its life cycle in one year, germinating from seed, producing seed, and dying in the same growing season.

**APPROVED SOD**—Approved turfgrass sod is sod grown from high quality seed of known origin. It is inspected by an official Certification Agency of the state to insure over-all high quality and freedom from noxious weeds as well as excessive amounts of other crop and weedy plants at time of harvest. Approved sod is grown from Certified seed.

**AVAILABLE NUTRIENT**—The portion of the supply of a nutrient which can be assimilated by a plant.

**AVAILABLE WATER**—The portion of a supply of water in the soil which can be assimilated by a plant.

**BACKFILL**—1. The replacement of excavated material as into a pit or trench, against a structure, over and around culverts, and around plant materials, etc. 2. The replacement material.

**BASE LINE**—1. A line from which a start is made. 2. A line of known length from which other determinations are made in surveying.

**BLEND**—A combination of varieties of the same species of turfgrasses in any percentages. Example of Kentucky bluegrasses.

50% Merion  
25% Fylking  
25% Kenblue

**BROADCAST**—To scatter seed or fertilizer, rather than to sow it in rows with drills.

**BROADLEAVED**—Any plant or group of plants with broad leaves which have netted venation.

**CERTIFICATION**—A system for or act of documentation of inspection and approval.

**CERTIFIED SOD**—Certified turfgrass sod is superior sod grown from the Certified high quality seed of known origin or from plantings of certified grass seedlings or stolons. It is inspected by the official Certification Agency of the state to assure satisfactory

(continued on next page)



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genetic identity and purity, over-all high quality and freedom from noxious weeds as well as excessive amounts of other crop and weedy plants at time of harvest. It may be of either one variety or composed of a mixture of two or more varieties or species. However, all seed in a mixture must be certified. The sod must meet the published state standards for certification.

**CLAY**—1. Small soil particles less than 0.002 mm in diameter whose chief property is plasticity when wet. 2. A soil textural classification containing forty percent or more clay, less than forty-five percent sand and less than forty percent silt.

**CLAY LOAM**—A soil material which contains from twenty percent to thirty percent clay particles, and from twenty percent to fifty percent sand particles, the remainder consisting of silt particles.

**CLIPPING HEIGHT**—Distance above soil line at which grasses are clipped.

**COMMON NAME**—Plant name used by the general public as distinguished from the botanical or scientific name.

**COMPACTION** — Manipulation by mechanical means to reduce volumes, thereby increasing density and bearing strength: state of being pressed closely together, as soil particles.

**COMPLETE FERTILIZER**—A mixed fertilizer which contains the three major elements, nitrogen, phosphorous and potassium.

**CONTINGENCIES**—Clauses in a contract or items in an estimate to cover unforeseen occurrences.

**CONTOUR**—An imaginary line or its representation on a map of all points of the same height above or below a given datum. Mean sea level (zero elevation) is generally the given datum.

**COOL SEASON GRASSES**—Retain their green color throughout the year with little winter dormancy, include bentgrasses—creeping, Colonial and velvet: bluegrasses—Kentucky rough, Canada and annual: fescues—red, chewings, and tall: ryegrasses—annual and perennial.

**CORRECTIVE**—A material added to a spray material that reduces its possible injurious influence on the host plant.

**CULTIVAR**—A "variety" of plants denoting an assemblage of cultivated individuals which are distinguished by any significant characteristics, and which when reproduced (sexually or asexually), retain their distinguishing features. See horticultural variety.

**CULTIVATED SOD**—Any sod planted on cultivated agricultural land and grown specifically for sod purposes. It shall have been mowed regularly and carefully and otherwise maintained from planting to harvest to maintain reasonable quantity and uniformity.

**CULTIVATION**—1. To prepare, or to prepare and use soil for the raising of crops. 2. to loosen or break up the soil about growing plants as in order to kill weeds.

**DEFICIENT**—Having less than normal, inadequate, expressed as symptoms or indicated by analysis.

**DENSITY**—1. The degree of consolidation or compactness. 2. The ratio of weight to volume of a substance. (water is 1.0 at 5 degrees C at sea level.)

**DISEASE**—A malady or expression of pathological infestation or weakening. (as leafspot caused by *H. vagans*.)

**DOLOMITE**—(Dolomite Limestone)—A limestone rich in Magnesium Carbonate.

**DORMANT**—Not in an active growing condition. Capable of resuming growth when environmental conditions become favorable.

**DRAINAGE**—Surface or subsurface removal of water.

**DRESSING**—1. The application of fertilizers, lime, gypsum, compost, or the like to improve the soil. 2. The operation of squaring and smoothing stones for buildings. 3. Also applied to smoothing lumber. (See also top dressing.)

**EMULSION**—Systems of oil dispersed in water or systems of water dispersed in oil. A more or less stable mixture but not a true solution.

**ENVIRONMENTAL FACTOR**—A constituent of an environment considered separately from other constituents such as: biotic, climatic, edaphic, and topographic.

**ERADICATION**—Removal or elimination.

**EROSION**—The process of wearing away of rocks and soil by natural agents.

**ESTABLISHMENT PERIOD**—The time necessary after the installation of a plant to assure continued growth.

**EVAPO-TRANSPIRATION RATE**—The moisture loss of a plant and/or soil due to evaporation and transpiration.



AQUA PROBE

## INSTANT READINGS OF SUB-SOIL MOISTURE

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**FEEDER ROOTS**—The hair-like roots through which the plants obtain water and nutrients.

**FERTILE**—Capable of being reproductive.

**FERTILIZER**—Any natural or artificial material added to the soil to supply one or more of the plant nutrients.

**FERTILIZER BURN**—Death or damage to plant tissues sometimes resulting from the direct application of dry fertilizer to the plant foliage or roots or from excessive application of fertilizer.

**FIBROUS ROOT SYSTEM**—Systems composed of profusely branched roots with many lateral rootlets, and often with no main or taproot development.

**FIELD CAPACITY**—1. The ultimate amount of plant materials which can be grown upon a plot of land. 2. Amount of water soil can hold after gravitational water has moved downward.

**FIELD SOD**—See pasture sod.

**FINE GRADING**—Refer to finish grade.

**FINE LEAVED**—Having narrow leaves in comparison with common types.

**FINISH GRADE**—The final earth work which leaves the terrain at the designated elevation as required by the site grading plans.

**FRENCH DRAINS**—A porous media below grade to aid in water absorption, usually dug and filled.

**FRIABLE SOIL**—A granular soil, easily crumbled by cultivation.

**FROST**—Frozen dew.

**FROST ACTION**—The formation of expanding ice crystals between particles, with heaving and lifting resulting.

**FUMIGANT**—A chemical used in the form of a volatile liquid or gas to kill insects, nematodes, fungi, bacteria, seeds, roots, rhizomes, or entire plants; usually employed within an enclosure or the soil.

**FUMIGATION**—Treatment of the soil, plants, or a greenhouse with a gas, smoke, or vapor to rid it of pests.

**FUNGICIDE**—A material used to destroy fungi or protect plants against their attack.

**FUNGUS**—A parasitic or saprophytic plant organism.

**GENUS**—A category of closely related organisms below the family in scope and above a species in scope.

**GERMINATION**—1. The process of sprouting or

coming into active growth. 2. The starting of plants from seed.

**GERMINATION COUNT**—Specific tests used to determine what percentage of the seeds are capable of growth.

**GRADING**—The modification of the ground surface by either cuts and/or fills.

**GRADING PLAN**—A plan showing existing and proposed elevations, which establishes levels for buildings, roads, retaining walls, outside steps or ramps, and other ground surface areas.

**GRADING TOLERANCE**—1. Variances in size or quality allowed plant materials due to conditions beyond the control of the grower. 2. Variations allowed in site grading.

**GRASS**—A large and important family of monoecious flowering plants with simple leaves.

**GRAVEL**—Hard rock particles larger than 2.0 mm in diameter, sometimes broken or angular but usually rounded. Aggregates larger than three inches are commonly called stones.

**GROUND LIMESTONE**—Particles of crushed rock selected for spreading into soil. (The finer the more quickly soluble.)

**GROUND WATER**—Subsurface water occupying the zone of saturation, the gravitational water below the water table.

**HARDINESS**—The adaption of a plant or other organisms to the rigors of a climate, particularly to the occurrence of freezing, although conditions of moisture, extreme heat, etc. may influence the ability of a plant to survive.

**HERBICIDE**—A material used to destroy weeds or other herbaceous plants.

**HUMUS**—1. A material formed by the partial decomposition of organic material in or on the soil. 2. The organic portion of soil.

**HYDRATED LIME**—Calcium hydroxide: results from adding water to burnt lime (CaO). Slaked lime. (Reacts faster than ground limestone.)

**INORGANIC**—All chemical compounds in nature, except the compounds of carbon, but including the carbonates.

**INSECTICIDE**—A material used to kill insects or protect against their attack.

**IRRIGATION**—The artificial distribution of water onto land to promote the growth of vegetation.

**LAND LEVELING**—The reshaping of a land surface to smooth level planes.

*(continued on next page)*

## American Sod Producers Assn. Plan Canadian Summer Gala

Plans are being finalized for the annual meeting of the American Sod Producers Association, Skyline Hotel, Toronto, Canada, July 10-12.

The schedule of events includes registration and get-acquainted party on the first day, compliments of the Ontario Nursery Sod Growers.

On Tuesday, July 11, ASPA members will visit the Smilsky sod farm where loading and transporting equipment will be on display. A discussion on sod marketing is also slated. Next stop will be the Mc-

Cague mink and fox ranch and cattle farm. At the McCague sod farm harvesting equipment, pre-marking tillage equipment, transporting equipment and sweeper and marketing techniques will be featured.

The annual meeting will be conducted during the evening.

The following day, members will tour the Evans turf farm where a hauling fork lift will be featured. Guests will then visit the Belhaven turf farm, an excellent example of muck sod production and irrigation. Bentgrass sod will be featured on the next stop of the tour at the Bluegrass turf farm.

The entire afternoon will be devoted to field demonstrations of various makes of sod harvesting equipment. Site of these demonstrations will be the Brouwer sod farm where members will tour a pallet plant and sod harvester manufacturing facilities.

The meeting promises an opportunity not only to observe the featured attractions at each stop but also to get a first hand view of sod production in Canada.

For more details, call or write Dr. Henry Indyk, Executive Secretary, ASPA, New Brunswick, N. J. 08903. Tel. (201) 247-1766, Ext. 1453.



**LANDSCAPE**—1. A portion of land which the eye can comprehend in a single view, especially in its pictorial aspect. 2. A picture representing inland natural scenery. 3. To improve by landscape architecture or gardening.

**LANDSCAPE ARCHITECT**—A practitioner of the design profession of landscape architecture.

**LANDSCAPE ARCHITECTURE**—The art of arranging land and the objects upon it for human use and beauty.

**LANDSCAPE CONSTRUCTION**—The alteration of existing ground conditions together with construction and development of ground features including minor structures.

**LANDSCAPE CONTRACTOR**—A contractor that specializes in work dealing with all phases of landscape planting and construction.

**LANDSCAPE DESIGN**—A creative environmental problem solving process to organize external space and attain an optimum balance of natural factors and human needs.

**LAWN**—A land area covered with short grass, usually kept in this condition by mowing.

**LEACHING**—The washing out of soluble constituents from the soil.

**LIME**—Materials including limestone, shell, marl, slag, gypsum, containing calcium and magnesium compounds which are capable of neutralizing soil acidity.

**LOAM**—A soil containing a mixture of sand, silt, and clay particles in such proportion to exhibit light and heavy properties in about equal proportions.

**MEADOW**—A field of grass usually grown for hay or pasture.

**MICRO-NUTRIENT**—Certain elements which are essential to the growth of plants, but are required only in minute amounts.

**MINERAL SOD**—Sod grown on mineral soils.

**MIXTURE**—A combination of two or more different species (kinds) and/or varieties. Example:  
40% Merion Kentucky Blue  
40% Fylking Kentucky Blue  
20% Pennlawn Creeping Red Fescue

**MOISTURE CONTENT**—The ratio expressed as a percentage, of the weight of water contained in soil or other material, to the weight of solid particles (dry weight).

**MOWING HEIGHT**—Distances above ground line at which grasses are clipped.

**MUCK SOD**—Sod grown on muck soils.

**MULCH**—Any loose and dry material as straw, leaves, manure, litter, etc., used as a thin protective covering over the soil.

**MULCHING**—The application of a protective cover to the soil to conserve moisture, lessen temperature variation, protect against run-off and erosion and surface compaction by rain, improve aeration, and discourage weeds.

**NATIVE**—A plant that grows naturally in a region, not introduced nor naturalized.

**NEUTRAL SOIL**—In practice, a soil which has a pH range between 6.6 and 7.3, thus is neither excessively acid nor alkaline. Specific 7.0.

**NITROGEN**—One of the major essential plant nutrients, especially noticeable in stimulating leaf and stem growth of darker green color.

**NONSELECTIVE HERBICIDE**—Chemicals or formulations which destroy or prevent plant life in general without regard to species.

**NOXIOUS WEED**—A weed arbitrarily defined by law as undesirable, troublesome, or difficult to control.

**NURSERY SOD**—See cultivated sod.

**NUTRIENT**—Any element necessary and normal within plant.

**ORGANIC**—A substance produced by plants or animals and thus containing carbon compounds.

**ORGANIC FERTILIZERS**—Usually refers to fertilizers derived from natural organic materials. (Urea is a synthetic organic but releases nitrogen for plants more rapidly than natural organics.)

**ORGANIC SOIL**—A soil or a soil horizon consisting principally of organic matter, such as peat or muck. Usually over 20% organic based on dry weight.

**OVERSEED**—To add seed to an area presently covered with vegetation.

**PASTURE SOD**—Sod obtained from meadows or fields that have served as a grazing area for animals. Also known as field sod.

**PEAT**—Organic matter of geological origin, excluding coal, formed from dead plant remains in water and in the absence of air.

**PEAT HUMUS**—Peat which contains less than 33% fiber based on oven dry weight.

**PERCOLATION RATE**—A measure of the rate at which water passes through the soil.

**PERENNIAL**—A plant that continues to live from year to year. In cold climates, the tops may die but the roots and rhizomes persist.

**PERMANENT GRASSES**—Grasses which are perennial in habit and which can be expected to persist in a turf.

**PERMEABILITY**—The degree to which any material permits the injection of liquids or gases. Measured in terms of rate of flow through a unit crosssection (of saturated soil) in unit time.

**PESTICIDE**—Any substance or mixture of substance intended for controlling insects, rodents, fungi, weeds and other forms of plant or animal life that are considered to be pests.

**pH**—A symbol denoting the negative logarithm of the concentration of the hydrogen ion in gram atoms/liter, used in expressing both acidity and alkalinity.

**PLUGGING**—Vegetative establishment of turf-grasses by planting small plugs (approximately two inches) containing the top growth, roots, rhizomes or stolons of the turfgrass.

**POST-EMERGENCE**—Term used in reference to treatments, e.g., herbicides, made after seedlings have emerged from the soil.

**PRECIPITATION**—Moisture falling upon the earth's surface in any form.

**PRE-EMERGENCE TREATMENT**—Treatment made after a crop is planted but before it emerges. Contact pre-emergence treatment is made after weed emergence, but before crop emergence. Residual pre-emergence treatment kills the weed seeds as they germinate or as they emerge, either before or after crop emergence.

**RELATIVE HUMIDITY**—The amount of water vapor in the atmosphere expressed as a percentage of the amount required for saturation at a given temperature.

(continued on page 49)







# Watch for chinch bugs and use Aspon<sup>®</sup>

Insecticide

Chinch bug invasions in healthy green turf can quickly turn it brown and dead. These tiny bugs suck the life out of grass in days, and populations explode to destroy entire grass areas.

You can stop chinch bugs with quick-acting, long-lasting Aspon insecticide. One application destroys chinch bugs in 48 hours and prevents re-infestation for 3 months. One application may last the entire season in the North.

Safer to use than many insecticides, Aspon controls all chinch bugs, including those resistant to other materials. Watch for spots of dead, brown grass due to chinch bugs... and use Aspon promptly as spray or granules. You can get Aspon from your local turf products supplier. Stauffer Chemical Company, Agricultural Chemical Division, Dept. HD, Westport, CT 06880.

Aspon<sup>®</sup> from 

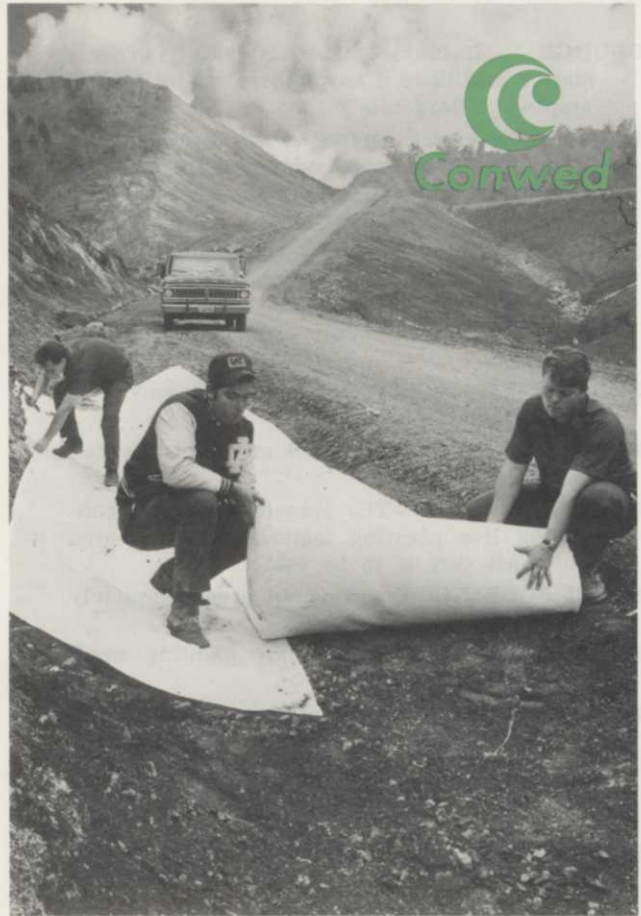
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## SOD TERMS (from page 46)

- RENOVATION**—To renew, make over or repair turf.
- RESIDUAL**—Having a continued effect over a period of time.
- RESIDUAL SOIL MATERIAL**—Soil particles and minerals in a mixture, derived from the weathering of rock material.
- RESISTANT**—Tolerant and capable of withstanding adverse conditions.
- RHIZOME**—An elongated and underground stem, usually horizontal, capable of producing new shoots and roots at the nodes.
- ROOTS**—The parts of a plant containing the organs which absorb water, gases, and nutrients from the soil and atmosphere.
- ROOT HAIRS**—Numerous hair-like tubular outgrowths near the tip of a rootlet, performing the work of absorption.
- ROOT SPREAD**—The horizontal area penetrated by the roots of a plant.
- ROUGH GRADING**—The stages of earthwork operations, cuts and fills preliminary to final work.
- RUNNER**—A long, slender, trailing stem that puts out roots along the ground where the nodes make contact with the ground, thus producing new plants.
- SALINITY**—Degree of saltiness.
- SAND**—Mineral particles between 0.05 and 2.0 mm in diameter.
- SCALPING**—Mowing a lawn so closely that the green foliage is removed and the brown stems and soil are revealed.
- SCARIFICATION**—1. A process of loosening and aerating the soil without turning it over. 2. A method of scratching hard-coated seeds to weaken seed coats and thus hasten germination.
- SCARIFIER**—A machine equipped with steel teeth used to loosen the soil surface.
- SEED**—1. The small body produced by flowering plants which contains an embryo capable of developing by germination. 2. The male ovule of a flowering plant.
- SEED SOWING**—The placement of the seed in a desired location to induce germination.
- SEEDLING**—Young or small plants propagated from seed.
- SELECTIVE HERBICIDE**—One which has greater toxic effects on some plants than on others.
- SHADE**—The area of reduced light caused by partial or complete obstruction of direct sunlight.
- SHADE TOLERANT**—Plant materials which will sufficiently carry out their life processes, while growing in shade or partial shade.
- SHOOT**—A vigorous side branch or a new growth from the root of an old plant.
- SILT**—Soil particles 0.002 to 0.05 mm in diameter.
- SITE PLANNING**—A design process which explores the relationships between building masses, vehicular and pedestrian circulation, ground forms, vegetation, and appropriate use of all the land to produce an esthetic and functional development.
- SLOPE**—The face of an embankment or cut section; any ground whose surface makes an angle with the plane of the horizon.

(continued on page 50)



## Promotes germination, reduces soil erosion Conwed® Turf Establishment Blanket

Write for the facts. Learn how this lightweight bonded-fiber mulch blanket backed with plastic netting can help establish turf in high-erosion areas—including steep slopes, ditches, channels, loose soils.

Conwed Turf Establishment Blanket, unrolled and stapled to seeded areas forms a thick mulch held in place by a strong plastic netting. The mulch blanket protects seed from moisture loss and temperature extremes; the netting helps reduce water and wind erosion. Easy to handle rolls 50" x 200' weighing about 25 lbs. permit rapid installation with reduced cost.

Your request will also bring you information about Conwed's complete line of other turf establishment products. Write now to: Conwed Corporation, Dept. WTT-62, 332 Minnesota Street, St. Paul, Minnesota 55101.





## SOD TERMS (from page 49)

**SLUDGE** — Insoluble materials largely organic matter, and little if any mineral material. Example—"Milorganite"

**SOD**—1. The grassy surface of the ground. 2. A section cut from grassland, containing the top growth, thatch, rhizomes, roots, and the soil clinging to it. (See also turf.)

**SOD PAD**—A unit of Sod (Turf) firmly held together by roots, rhizomes or stolons and adhering soil. This unit may be of any standard dimensions as commonly used by a producer in lifting.

**SOD CUTTER**—A Tool for undercutting and trimming strips of sod for lifting.

**SODDING**—A process by which an area is covered with sod.

**MULCH SODDING**—The spreading of soil containing live planting material over an area on which turf is to be established.

**SOLID SODDING**—Covering an area completely with pieces of sod.

**SPOT SODDING** — Sodding by planting small pieces of sod at intervals.

**STRIP SODDING**—The use of strips of sod spaced at intervals—usually across a slope. Depends upon spreading of the grass to form complete cover. Sometimes the area between strips is seeded.

**SOIL**—A natural layer on the earth's surface in which plants grow, composed of mineral and organic materials and living forms.

**SOIL AERATION**—Loosening or puncturing soil by mechanical means to increase its permeability to air and water.

**SOIL AMENDMENT**—A chemical or mineral element added to the soil to improve soil characteristics such as: porosity and aeration, drainage or moisture retention.

**SOIL CLASS**—The various textures by which soils are classified.

**SOIL CLASSIFICATION**—An arbitrary division of a continuous scale of sizes of soil particles such that each scale unit or grade may serve as a convenient class interval for conducting an analysis or for expressing the results of an analysis.

**SOIL COMPACTION**—The reduction of volume by pressure or rearrangement of the particles in soils, resulting in decreased permeability to air and water. (See also compaction.)

**SOIL CONDITIONER**—A material which when added to compacted soil, tends to make it more loose, crumbly, or porous.

**SOIL CREEP**—The movement of soil particles down a slope due to gravity.

**SOIL FERTILITY**—The ability of a soil to supply nutrients in sufficient quantity to meet the growth requirements of plants, when other growth factors are favorable.

**SOIL MOISTURE**—All water held by a soil at a given time.

**SOIL PROFILE**—The natural textural and chemical variation formed within a soil matrix under a climate and vegetation.

**SOIL SOLUTIONS**—The mixture of soluble materials and soilwater.

**SOIL STABILIZATION**—The treatment of soil to

provide protection or resistance to forces of erosion.

**SOIL STERILIZATION**—The process of reducing harmful organisms in or similar material by heat, steam, or fumigation.

**SOIL STRUCTURE**—The individual and group arrangement of the mineral particles in the soil.

**SOIL TESTING**—Scientific chemical and physical analysis of the composition, texture and acidity of a soil sample. (To determine its suitability for particular uses or modifications necessary to adapt the soil to desired uses.)

**SOIL TEXTURE**—Refers to the size of and the proportion of sand, silt, and clay.

**SOUR SOIL**—1. Soil that becomes toxic to plants through the accumulation of carbon dioxide and the absence of oxygen. 2. An acid soil with a pH of 5.5 or less.

**SPECIES**—A group of plants that resemble each other closely and that interbreed freely. The unit in the botanical classification of plants.

**SPECIFICATION**—A written document stipulating the kind, quality, and sometimes the quantity of materials and workmanship required for any construction or work.

**SPHAGNUM PEAT**—Peat which contains a minimum of 66% sphagnum peat fibers based on oven-dried weight.

**SPOT-SEEDED**—Seeding small irregular areas.

**SPRAY**—To disperse, as a liquid in fine droplets, or to scatter as fine particles.

**SPREADER**—1. Any low growing plant which naturally grows broader than tall. 2. A material sometimes added to spray materials to improve their spreading qualities, usually by reducing their surface tension. 3. A mechanical device to facilitate the distribution of dry materials.

**SPRIG**—A small stem, shoot or stolon.

**SPRIGGING** — The planting of healthy living stems (stolons or rhizomes) of perennial turf-forming grasses.

**STABILIZE**—To bind aggregates, etc., together by adding and thoroughly mixing the proper amount of clay, or other binding materials.

**STABILIZER**—A substance that when added to a spray material tends to keep it from deteriorating, breaking down, or settling out.

**STOLON**—A stem growing horizontally on or just below the surface of the ground and capable of producing at nodes new roots, leaves and stems.

**STOLONIFEROUS** — Having creeping surface stems or runners.

**STOLONIZE**—To plant surface runners.

**STRAW MANURE**—Chiefly applied to the manure from stables in which straw was used as bedding, as distinguished from stables in which sand, sawdust, shavings, etc., are used as bedding.

**SUBGRADE**—The prepared ground level, upon which a pavement, lawn, garden, etc., is constructed.

**SUBSOIL**—Soil below the usual depth of cultivation, containing little or no humus, and characteristically more dense than topsoil.

**SWALE**—A gentle man-made or natural depression in grade for drainage of surface water.

(continued on page 54)



Ag-Organics Department, Midland, Michigan 48640

**Dursban insecticide. Bugs have another name for it.**

They call it "The Unsurvivable One!" Because nothing wipes out chinch bugs, sod webworms and many other serious turf pests like DURSBAN\* insecticide. And DURSBAN insecticide won't leach. It has excellent residual activity. It's safe, too, for all common turf grasses. And economical—you get more bugs for your buck, because so little goes a long long way. Ask your Dow distributor or your contract applicator for "The Unsurvivable One!"

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DOW CHEMICAL U.S.A.



## Jacklin And Vaughan's Seed Company To Merge

A merger of two nationwide seed, garden and nursery suppliers into a single corporation will become effective June 30.

The Vaughan Jacklin Corporation is being formed from Jacklin Seed Co., Inc. and Vaughan's Seed Company, according to Arden W. Jacklin and Gager T. Vaughan, presidents of the two firms, respectively.

Jacklin, a Spokane valley based

firm, is well-known as one of the world's largest producers of Merion and 0217 Brand Fylking Kentucky bluegrasses. It supplies seed and sod producers and distributors throughout the world.

Vaughan's is one of the world's primary horticultural suppliers to greenhouses, garden stores and nurseries. The company originated in Chicago in 1876 and currently is headquartered in Downers Grove, Ill. Other offices are located in Bound Brook, N.J., Ridgefield, N.J., and Ovid, Mich.

As a division of the new corporation, the Jacklin operations with its many growers will continue to function much as before, Arden Jacklin said.

The two firms reported annual sales in excess of \$21 million last year.

## Geigy's Shortstop Herbicide Registered In California

A registration for the State of California has been granted the Ciba-Geigy Corporation for Shortstop 80W terbutryn herbicide.

Shortstop, a triazine herbicide, controls most annual broadleaf weeds and grasses for short-term weed control in non-crop areas.

According to Geigy, primary uses of the herbicide include reducing possibilities of fires in vacant lots and keeping roadsides and intersections clear of weed-caused visual obstructions.

When used according to recommendations, the product eliminates the need for mowing or cutting weeds. Lawns, shrubs and other ornamentals may be planted 6 to 12 months following application.

Shortstop may be applied pre-emergence or postemergence until weeds are eight inches tall. When applied on growing weeds, it may be mixed with a surfactant to increase effectiveness.

## Amchem's Directa-Spra Reduces Spray Drift

Directa-Spra, a spray applicator that fits into the palm of a man's hand, yet does the work of a 25-foot boom and reduces drift to a minimum, has been announced by Amchem Products.

The applicator has a rotating nozzle that is particularly adapted for roadside, railroad and ditchbank spraying, according to R. R. Johnson of Amchem.

Conventionally as well as specialized formulations of herbicides can be applied with the Directa-Spra. The unit has been used successfully on nearly every vehicle commonly used for spraying, including boats for aquatic weed control.

"We can spray a 20- to 30-foot-swath at 30 psi," he says. "With different inserts, we can spray sectors of 90° and 180° with the unit mounted directly on the side of a spray vehicle. The unit has removable tips which enables the operator to change the spray pattern and the swath width."

## "EVER-GREEN" TURF IRRIGATION VALVE BOX COVERS...



**GO UNNOTICED** →

### ...other advantages are more obvious!

Golf courses, estates, parks, cemeteries, private clubs, landscaped lawns—why put up with ugly concrete or rusty cast iron turf irrigation valve box covers? Now you can have green covers that blend beautifully with the turf. And they're made of tough SUPERFLEXON® thermoplastic that lasts and lasts. Thermoplastic valve and meter boxes are resistant to moisture, and unaffected by temperature changes. They're also less brittle than concrete or cast iron... and much lighter, easier to install and to store. And they cost less! Thousands are in use from coast-to-coast—Philadelphia, Pa. to Sunnyvale, California.

Thermoplastic turf irrigation valve boxes with "ever-green" covers offer a new dimension in appearance as well as utility.

For complete details, write: AMETEK, INC., Plymouth Plastics Division, 502 Indiana Avenue, Sheboygan, Wisconsin 53801.



Meter Pits (round) and Meter Boxes (rectangular) can be supplied with "ever-green" cover.



Also available: Durable, easy-to-install AUTOSTOP®, less costly than concrete curbs. Weather and crumble proof. Never needs painting; impregnated yellow, green, forest brown or white. Write for facts.

**AMETEK / Plymouth Plastics**

# AMETEK

For More Details Circle (124) on Reply Card



# Roll-On to Toronto



**FOR AN ACTION-PACKED SOD GROWERS FIELD TOUR  
AND THE ANNUAL MEETING OF THE AMERICAN SOD PRODUCERS ASSOCIATION  
July 10-12, 1972**

**ALL SOD GROWERS  
ARE INVITED**

ASPA members extend a special invitation to all sod growers to join them in a major Canadian event hosted by the Ontario Nursery Sod Growers Association.

**Featuring:**

July 10 — 7:00-9:00 p.m.

Registration and Get-Acquainted Party

July 11 —

Loading and Transporting Equipment; Sod Marketing; Harvesting Equipment; Pre-Marking Tillage Equipment; Sweeper; Evening Annual Meeting

July 12—

Hauling Fork Lift; Muck Sod Production; Irrigation; Bentgrass Production; Pallet Plant; Sod Harvester Manufacturing Plant; Demonstration of Various Makes of Sod Harvesters

**Annual Meeting Headquarters: Skyline Hotel, Toronto, Ontario, Canada**

*American Sod Producers Association*

Call or write: Dr. Henry Indyk, Executive Secretary, P.O. Box 231,  
New Brunswick, N.J. 08903. Tel. (201) 247-1766, Ext. 1453



**SOD TERMS** (from page 50)

- SYRINGING**—Applying light amounts of water to reduce temperature, transpiration and wilting.
- TERRACE**—An essentially level and defined area, often raised, either paved or planted, forming part of a garden or building setting.
- TERRAIN**—An area of the earth's surface immediately under observation.
- TEMPORARY GRASSES**—Those grasses which are not expected to persist in a permanent turf. Usually germinate very rapidly.
- THATCH**—The accumulation of an undecomposed

and leaves on the soil surface and below the green topgrowth of the turf.

- TILLAGE**—The cultivation of loosening of soil: (to layer of dead and dying stems, roots, rhizomes make it more favorable for plant growth.)
- TILLER**—A stem developing from crown, a sprout or stalk.
- TOP-DRESSING**—Application of material (topsoil, manure, or gravel for example) to a surface without working in, as in turf maintenance or in road surfacing.
- TOPSOIL**—1. A fertile soil or soil material rich in organic matter. 2. Surface soil. 3. The original darkcolored upper soil ranging from a fraction of an inch to many feet in depth.
- TOXIC**—Poisonous, injurious to animals or plants through contact or systemic action.
- TOXICANT**—A specific ingredient that gives a preparation or mixture its principal value as a poison.
- TRACE ELEMENTS**—The rarer micro-nutrients.
- TRANSITION AREA**—An area between adjacent areas where the influence of each is dispersed, diminished or changed to that of the other. (see zone map)
- TRANSPIRATION**—The emission of water vapor from the aerial parts of a plant chiefly through leaf stomata.
- TRANSPLANT**—To move a plant from one growing area or medium to another.
- TURF**—The live dense topgrowth of turfgrasses maintained at a specific height by frequent mowing, together with the thatch roots and upper stratum of earth. (See also sod.)
- TURFGRASS**—Those species used in the production of Turf.
- VARIETY**—A subgroup of plants in a species with similar characteristics as prescribed.
- VIABLE**—Capable of germination or growth.
- WARM SEASON GRASSES**—Those surviving winter by dormancy or survival in milder climate and grow only in warm weather—bermudagrass, zoysiagrass, Bahiagrass, carpetgrass, St. Augustinegrass. See "Zones" for turfgrass adaption.
- WATERING**—Application of water to plants to aid their growth and survival.
- WEED**—An unwanted plant, especially if it aggressively competes with desired varieties of plants.
- WILT**—Plant diseases whose symptoms involve wilting, such as oak wilt.
- WILTING**—The limp and drooping condition of leaves and stems, a symptom some plants display when the tissues are inadequately supplied with water.
- WILTING POINT**—The point in decreasing soil moisture when a plant is unable to extract sufficient water for its needs, ceases to grow and wilts.
- WINTER INJURY**—Various types of damage ascribed to cold weather, extreme temperature drops, wind desiccation, etc., such as freeze back and bark splitting.
- WINTER-KILL**—The death of plants in winter due generally to sudden changes of temperature or to the ground becoming frozen too deeply.
- ZONE**—1. An area characterized by similar conditions such as a planting season or growing season. 2. A land use classification.

**RESIST TEMPTATION!**  
... this is worth waiting for.

**ADELPHI**  
**KENTUCKY BLUEGRASS**  
(U.S. Plant Patent No. 3150)

MAN-CONTROLLED BREEDING gives it  
DARKER GREEN COLOR and HIGHER  
TEST RATINGS for QUALITY & PERFORMANCE  
THAN ANY OTHER BLUEGRASS  
currently in widespread use!

Available this Fall. For details, contact:  
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JONATHAN GREEN & SONS, Kearny, N.J. 07032  
NORTHRUP, KING & CO., Minneapolis, Minn. 55413  
VAUGHAN'S SEED CO., Bound Brook, N.J. • Downers Grove, Ill.



For More Details Circle (110) on Reply Card

**4 RAIN JETS OUTPERFORM  
24 ORDINARY SPRINKLERS**



RAIN CHET

Use the Best  
**RAIN JET**  
SPRINKLERS  
PATENTED



CHOICE OF PATTERNS

**get the best...they cost you less!**

- \*When comparing sprinkler prices, compare sprinkler performance—and the price of the complete, installed sprinkler system. You'll find RAIN JET costs you far less.
- \*RAIN JET supplies all the component parts—valves, flexible pipe, full-flow fittings, rigid risers, sprinkler heads in a choice of patterns and easy to understand installation instructions.
- \*Ideal for landscaped industrial plants, homes, schools, churches, parks, freeways. RAIN JETS fit any size yard. Installation is fast, easy, inexpensive.

SEND FOR FREE "HOW TO INSTALL" BROCHURE  
**RAIN JET CORPORATION, Dept. SS**  
301 S. Flower St., Burbank, Calif. 91503

# Introducing KROVAR I

## a new one-two punch for tough weed problems

KROVAR I is really two great herbicides in one—bromacil and diuron. Each chemical has certain advantages over the other, and together they produce a single product with many superior advantages . . .

### Controls more weeds and grasses.

KROVAR I controls a wider spectrum of weeds and grasses than HYVAR® X or KARMEX.® It even gets tough ones like water grass, groundsel and filaree. Applied at higher than normal rates, it actually suppresses the tougher perennials, such as bermuda grass, salt grass and yellow nut grass.

### Gives you an edge on the weather.

In high-rainfall areas, KROVAR I doesn't dissipate as rapidly. In low-rainfall areas, it takes only a little moisture to start KROVAR I working against weeds. Result? Better control in a wide range of rainfall.

The interval between application and rainfall is less critical than with other residual herbicides. KROVAR I effectively reduces weather as a factor in weed control.

### Economical.

KROVAR I gives such effective, long-lasting control that it substantially reduces the need for follow-up sprays later in the season. In many areas, one application takes care of weeds and grasses all season long. Additionally, KROVAR I used in retreatment extends the desired controls and reduces the need for "touch-up."

### Large safety factor.

When used as directed, KROVAR I is safer to trees, shrubs and other desirable vegetation than "straight" HYVAR products. It's non-volatile, non-flammable, non-drifting. Pick up a supply of KROVAR I soon and specify it in your orders for custom application.



*With any chemical, follow labeling instructions and warnings carefully.*



**KROVAR® I**  
WEED KILLER

For More Details Circle (121) on Reply Card



## GOLF COURSE (from page 42)

2. Adding to and/or replacement of an inadequate manual irrigation system. Golfers demand high quality turf, which has created a market for better and more irrigation equipment. Most courses "trade up" to automatic systems when they need to replace an old system.
3. Rebuilding an/or enlargement of small or worn-out greens and tees. Some old courses were not designed or built properly. Time and increased play have compacted soils.

Increased use has worn-out turf. Few public courses old or new have large enough tees or greens with enough cup areas to permit good rotation during constant, heavy play.

4. Improvement of drainage by reconstruction and/or slit trenches (French drains). In dry climates such as in parts of Colorado, wall-to-wall irrigation systems create situations where much water falls daily on our golf courses. It has to drain somewhere. On clay soils, this water stands and causes

turf problems. It also interferes with the golfer's game. Slit trenches have been used to solve the problem on some courses. On others, major remodeling with design that considers total drainage is the best answer.

5. Creation of a long-range planting plan to remove and replace undesirable vegetation and generally improve appearance and play of wide-open courses. Trees are living things and have a life cycle. Any golf course, old or new, needs a long-range planting plan that can guide the superintendent in his course improvement program.

An experienced golfer or superintendent can probably find faults on his own course. Some are easily corrected; some will require major construction. Here are examples to consider:

**Problem:** Distance from tee to dogleg corner too far (more than 225 yards) or too near (under 175 yards) to tee. **Solution:** Move tee so tee shot requirement is 175-225 yards for men, 150-200 yards for women, and/or lengthen fairway elbow area.

**Problem:** Not enough safety space between greens and following tees. **Solution:** Move tee areas to one side or ahead to allow greater spacing from previous green, and/or to shorten hole.

**Problem:** Greens all too much alike, or too flat for good drainage or too small. **Solution:** Redesign and rebuild new greens with variety of shapes and sizes according to shot requirements, allowing good drainage and several cupping areas.

**Problem:** Severe slopes on edges or across middle of some greens, making putting unfair and maintenance difficult. **Solution:** Strip sod, flatten base contours and replace sod.

**Problem:** No separate tees areas for women, making course play long and too difficult for them. **Solution:** Review playing yardages vs. difficulty and women's par on each hole, then design and build separate ladies tee areas.

**Problem:** Blind or severely-sloped tee shot landing areas. **Solution:** Re-grading of knobs to make landing zones visible, and reasonably level to hit to and from.

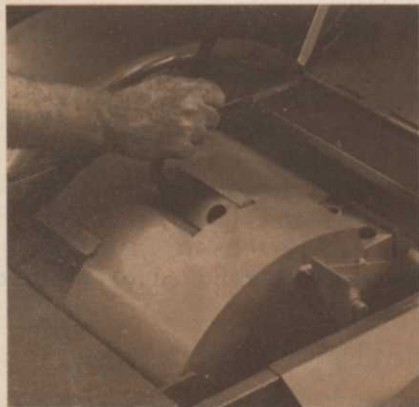
Each course has its own unique problems. Some are inherent in the site; most are caused by what man did to the site. But what man did wrong, he can usually improve, with courage, knowhow and money.

## Mitts & Merrill Brush Chippers For...



## better design... more efficiency

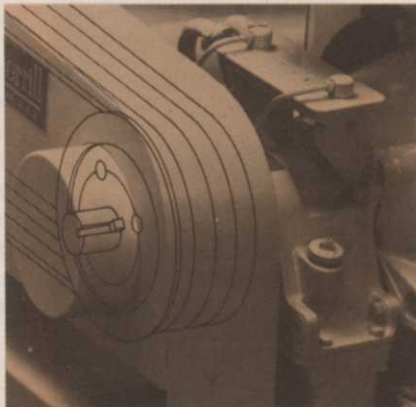
For more than 115 years Mitts & Merrill has been making specialized machinery for industry. A major part of our business is equipment to reduce scrap and waste. This experience is incorporated into design features on our brush chippers that result in higher efficiency and longer, trouble-free service for you. Only Mitts & Merrill brush chippers offer features like these:



**Staggered knife pattern** for smoother cutting action. Mounted on an all-steel cylinder that, even without an external flywheel, is heaviest in the industry. Each cylinder revolution gives more cuts, produces smaller chips of uniform size. Self-adjusting knives are reversible; give twice the service between sharpening.

### Plus...

- **Positive safety-lock pin** for greater operator safety
- **Swing-away, folding feed chute** protects cutting chamber; allows instant access and increases maneuverability
- **Heavy duty construction** includes coil spring, torsion-type suspension, and box tubular steel frame.



**Optional torque converter** isolates engine and transmission from cutting shock to minimize maintenance. Makes operation virtually fully automatic; increases operator productive time. Available on all models.

mitts & merrill



Dept. WT-67, 109 McCoskry St., Saginaw, Michigan 48601



# classifieds



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

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

## USED EQUIPMENT

**FOR SALE: 1972 Chevy 3/4-ton and 10' camper \$4,800.** IHC Twin Screw tractor, \$2,200. 7 gang Roseman mowers \$1,000. 13-gang Roseman \$2,200. Single mowers \$150. KB 8 Twin Screw off road \$500. 1957 Dorsey 34' flatbed \$850. 6000# Tow-motor forklift \$1,700. Pellets 32 x 48 \$1.00 each. 130-acre farm. Phone: 414 484-3941.

**RECONDITIONED brush chippers, sprayers, log splitters, stump routers, bucket trucks.** Let us know your needs. Equipment Sales Company, 5620 Old Sunrise Highway, Massapequa, New York 11758. Phone 516 799-7619.

**1966 DODGE WITH Prentice loader,** 14' bed, \$7,000. 1969 Ford F750 with 62' R & O crane, \$10,000. Vermeer No. 18 stump cutter, \$2,500.00. Bob's Tree Service, 5148 No. Flora, Kansas City, Mo. 64118. Phone: 816 454-2242.

**TM-700 Tree mover, TS-44 tree spade, model 10 Vermeer Stump chipper, and (3) Elliott hi-reach basket trucks.** York Tree Service, RR1, East Peoria, Illinois, 61611 or call 309 566-8575, 309 566-8562.

## FOR SALE

**DOUBLE EDGE sod cutter blades.** Will fit any Ryan sod cutter. Works like double edge razor blade. Cuts much more sod per blade. Made to bolt on both ways. \$24.00 plus postage. New automatic sod loaders for direct loading to pallets, trucks or trailers. No workers needed on ground. Both products developed and designed by Hadfield. Write or call Glen Hadfield, 4643 Sherwood, Oxford, Michigan 48051. Phone 313 628-2000.

**LANDSCAPE BUSINESS, nursery and garden center.** Located in progressive college town in south Alabama for sale. Has been operated as

sideline by present owner, with volume in excess of \$50,000. Call or write John Harvell, Country Club Road, Troy, Alabama 36081.

**FOR SALE: Stump cutter teeth** at realistic prices. Distributor inquiries also invited. From the folks who make the tough teeth. D. J. Andrews, Inc., 17 Silver St., Rochester, N.Y. 14611. 716 235-1230 or 716 436-1515. It costs nothing to investigate.

## SEEDS

**LAWN GRASS SEED** — Full line including sod-quality Merion, Fyking, bluegrasses, fescues, bentgrasses, ryegrasses, etc.

We specialize in custom mixing.

**OLIGER SEED COMPANY**

P.O. Box 3765, Akron, Ohio 44314

Phone 216/753-2259

**SOD QUALITY MERION SEED** for discriminating growers. Also Fyking, Delta, Park, Newport, Nugget and Pennstar 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.

**CROWN VETCH SEED** Penngift and Chemung varieties in good supply. Direct all inquiries to: Walter C. Mehlenbacher, Castile, New York 14427. Phone 716 493-2553.

## EDUCATION-BOOKS

**LEARN AUTOMATIC IRRIGATION.** Easy to follow text and diagrams on latest valves, heads, controllers. System design, operation and trouble shooting. Write for free outline on this ten lesson low cost course. Larson Company, P.O. Box 4453, Santa Barbara, Calif. 93103.

## MISCELLANEOUS

**LANDSCAPE DESIGN KIT, 37 rubber symbol stamps and ink pad.** Postpaid \$25.00. C.O.D. \$26.00 plus postage. Order direct or brochure sent. California add tax. T-Gordon's Box 741T, Reseda, Calif. 91335.

## HELP WANTED

**HELP WANTED: Distributors** to stock our stump cutter teeth, blocks and bolts. Our high strength carbide combined with a patented braze assures you of a top quality tooth. Add to this the best price in the U.S.A. Exclusive territory, advertising at our expense, and you have our story. Why not drop us a line and say hello. D. J. Andrews, 17 Silver St., Rochester, N.Y. 14611. 716 235-1230 or 716 436-1515.

A major advantage of Betasan, according to the brochure, is its safety to established turf grasses. These include bluegrass, fescue, bentgrass, Bermudagrass, Zoysia, Bahiagrass, Centipedegrass, perennial Ryegrass, Red Top and St. Augustinegrass.

A special section covers application rates.

For more details, circle (726) on the reader service card.

**SUPT. OF PARKS—City of McPherson, Kansas** (Population 11,000). With overall responsibility under Park Board for planning, administering and directing municipal park system, (approximately 100 acres), swimming pool and city forester. Salary open. Send complete resume to City Clerk, Box 650, McPherson, Kansas 67460.

**WANTED — Graduate Landscape Architect.** Key position with large established firm in Central Florida. Operational and financial background and experience helpful. Send resume to Box 85, Weeds, Trees & Turf, 9800 Detroit Ave., Cleveland, Ohio 44102. All inquiries confidential.

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## Betasan Literature

### Released by Stauffer

Stauffer Chemical Company has released a new brochure on the control of crabgrass and poa annua on many kinds of turf with Betasan selective herbicide.

The literature states that Betasan also controls redroot pigweed, lambsquarters, henbit, shepherdspurse and barnyardgrass.





**WORLD'S WORST WEEDS**, not necessarily a best seller but certainly an informative publication, is being written by Drs. LeRoy Holm, Juan Pancho and Donald Plucknett, senior fellows at the University of Hawaii's East-West Food Institute. About 200 species of about 5,000 weeds surveyed are considered acute problem weeds. Thirty weed species have wide geographic distribution and may be an important economic threat to 10 or more of the world's major crops. What's the worst weed? Purple nutsedge. It is found in almost every crop in nearly every country with tropical agricultural areas.

**MISTER YUK** is the latest euphemism for the skull and crossbones that adorns containers containing poisonous substances. Results of a study conducted for the Poison Control Center at Pittsburgh Children's Hospital revealed that the skull and crossbones may actually attract children's attention. The new symbol is a nauseous green face with a tongue hanging out. While it may be effective in warning of danger, it connotes a rather vivid impression of Saturday morning cartoons.

**A COLLISION COURSE** was cried 30 years ago when it was discovered that the U.S. harvested 20 percent more trees than it grew each year. Today we grow 61 percent more wood than we harvest or lose to fire, insects and disease.

**DANVILLE JUNIOR COLLEGE**, an Illinois school, has developed a three-prong system of education and training in landscape horticulture, turf management and commercial floriculture. Since 1965 there have been 175 participants in the two-year programs. The triad approach features technical classroom training and instruction, practical laboratory experience and supervised occupational experience with on-the-job training. Among the many facilities are 43,000 square feet of turf plots, a golf course green constructed by former students and maintained by present students, two acres of nursery stock and a 500 square foot lath house.

When surveyed, 57.9% of WTT readers use irrigation commercially in their business or service operation.

## Penn State Bulletin Features Pollution Solutions

A special issue of "Science in Agriculture" the research quarterly of the Agricultural Experiment Station at Penn State University features solutions to several problems of wastes and pollution.

Describing research findings and studies underway by scientists of the Experiment Station, the 24 page publication is free of charge and is available in large quantities for use by schools as well as organizations dealing with pollution abatement and environmental improvement.

"Science in Agriculture" opens with an article stressing the need to develop corrective systems to curb environmental pollution. This is followed by 15 articles describing solutions to pollution abatement and improvement of the environment.

The 15 topics describe reclamation of coal mine refuse banks, milkhouse wastes, liquid cattle manure, organic wastes, cheese whey, poultry manure, and sewage effluent and sludge. Protection of the environment is described as one longtime objective of the College of Agriculture.

One article shows that stream quality influences recreational expenditures and regional income level. Problems with septic tanks on certain soils of Pennsylvania are stressed. Possible use of a "dry phosphoric acid" to deactivate herbicides in soils is featured. Soil chemists state a need for a new approach to soil testing, a method to provide minimum soil pollution with economical crop yields. And potential hazards endangering foods are described.

For more details, circle (724) on the reader reply card.

## Major Turf Diseases

By **DR. HOUSTON B. COUCH**

Head, Department of  
Plant Pathology and Physiology  
Virginia Polytechnic Institute  
and State University



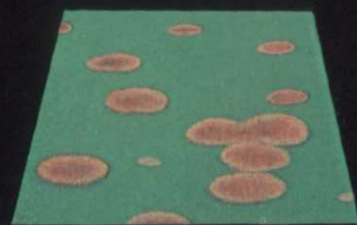
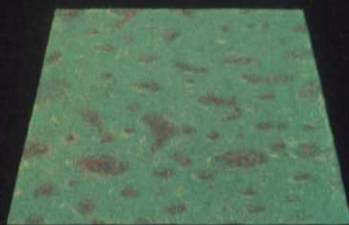
There are a great number of turfgrass diseases. Fortunately, however, not all are capable of causing extensive damage, and the more destructive ones are fairly easy to recognize.

Four of the major turfgrass diseases—snow mold (*Fusarium nivale*), leafspot (*Helminthosporium spp.*), dollar spot (*Sclerotinia homoeocarpa*), brown patch (*Rhizoctonia solani*)—are identified from various degrees of closeness on the adjacent chart. The chart also illustrates which months the four diseases are active.

Brown patch, for example, may become a significant problem during the hot, humid months from mid-May to mid-September. The cool, moist weather from November through March often brings an attack of snow mold. Dollar spot may occur during hot, dry weather while leafspot, one of the most destructive turf diseases, is active during the spring, early summer and fall when moist conditions exist.

**EDITOR'S NOTE:** An 8½ x 11-inch color print of the disease chart shown at the right is available, at no charge, by writing to: O. M. Scott & Sons Company, Marysville, Ohio 43040.

# FOUR MAJOR TURF DISEASES



**SNOWMOLD**

**LEAFSPOT**

**DOLLAR SPOT**

**BROWN PATCH**

JAN      FEB      MAR      APR      MAY      JUN      JUL      AUG      SEP      OCT      NOV      DEC

**SNOWMOLD**

**SNOWMOLD**

**LEAFSPOT**

**LEAFSPOT**

**DOLLAR SPOT**

**BROWN PATCH**



# baron

## KENTUCKY BLUEGRASS

Today, when knowledgeable agronomists talk about The Greening of America, they're talking about Baron Kentucky Bluegrass—discovered in Holland by the renowned plant breeder and seedsman, Barenbrug of Arnhem, The Netherlands, and now grown in America exclusively by Lofts Pedigreed Seed, Inc.

Baron Bluegrass germinates rapidly, grows slowly, and is adapted to mowing as low as  $\frac{3}{4}$ " . . . making it ideal for golf courses, fine lawns, and industrial properties. Its broad blades interlock to make a crisp surface ideal for holding a golf ball on the fairway.

Baron Bluegrass is extremely winter hardy, maintains a fine winter color, and is highly disease resistant.

All Baron seed is CERTIFIED BLUE TAG, poa annua and bentgrass free.

U.S. PLANT PATENT #3186 has been issued by the federal government for Baron Kentucky Bluegrass.



Dr. C. R. Skogley examines a strip of Baron sod.

Dr. C. Richard Skogley, Professor of Agronomy, Plant and Soil Science at the University of Rhode Island, reports: "In America, Baron has perhaps been grown longer on the proving grounds at Rhode Island than at any other locale and has performed exceedingly well in our trials. It has consistently rated among the best. It resembles Merion in many respects but seems less subject to dollarspot and less demanding of fertilization. So far we have seen no stripe smut, and leafspot incidence has been very light."

Dr. Skogley has recently released from the University three new improved varieties of grasses—Jamestown Red Fescue, Exeter Colonial Bentgrass and Kingstown Velvet Bentgrass—which are now available from Lofts.



Exclusive North American Grower and Distributor:

**Lofts  
Pedigreed Seed, Inc.**

Bound Brook, N.J. 08805 / (201) 356-8700

**Availability information and  
pricing, write or call:**

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Div. of Lofts Pedigreed Seed,  
Inc.  
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Bound Brook, N. J. 08805

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Waterloo, Iowa

##### Kentucky

CAUDILL SEED CO.  
1201 Story Ave.  
Louisville, Ky. 40206

#### Michigan

COWBELL SEEDS, INC.  
Wayland, Michigan 49348 &  
Brighton, Mich. 48116

#### TERMINAL SALES CORP.

12871 Eaton Ave.  
Detroit, Mich. 48227

#### Minnesota

PETERSON SEED CO.  
P. O. Box 186  
Savage, Minn. 55378

#### Missouri

STANDARD SEED CO.  
931 West 8th St.  
Kansas City, Mo. 64101

#### ED MANGELSDORF & BRO., INC.

P. O. Box 327  
St. Louis, Mo. 63166

#### Ohio

DEWINE SEED CO.  
Yellow Springs, Ohio 45387

#### Ohio

LAKESHORE EQUIPMENT &  
SUPPLY CO.  
10237 Berea Rd.  
Cleveland, Ohio 44102

LEATHERMAN'S, INC.  
501 McKinley Ave. N.W.  
Canton, Ohio 44702

#### MIDWEST

##### Colorado

CANNON SEED CO.  
8106 Turnpike Drive  
Westminster, Colo. 80030

LONGMONT SEED CO.  
P. O. Box 923  
Longmont, Colo. 80501

##### Kansas

THE BOWMAN SEED CO.  
Concordia, Kansas 66901

#### WEST COAST

##### California

BERGER & PLATE CO.  
351 California St.  
San Francisco, Calif. 94104

FERRY MORSE SEED CO.  
P. O. Box 100  
Mountain View, Calif. 94040

##### STOVER SEED CO.

598 Mateo St.  
Los Angeles, Calif. 90013

##### Oregon

GREAT WESTERN SEED CO.  
P. O. Box 387  
Albany, Oregon 97321

#### CANADA

##### Ontario

OSECO LTD.  
P. O. Box 219  
Brampton, Ontario