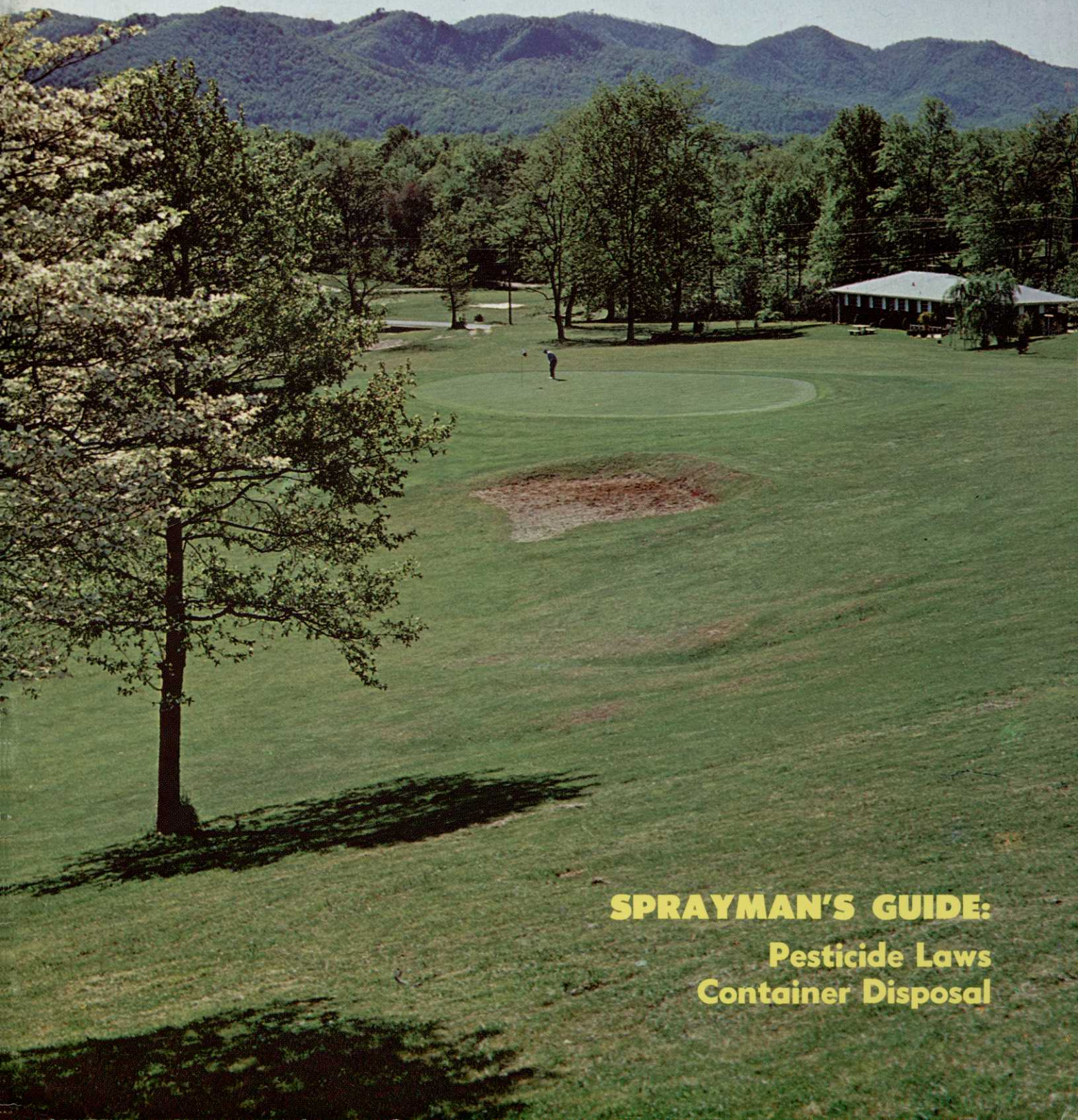


APRIL, 1970

# **WEEDS TREES and TURF**



**SPRAYMAN'S GUIDE:**  
Pesticide Laws  
Container Disposal



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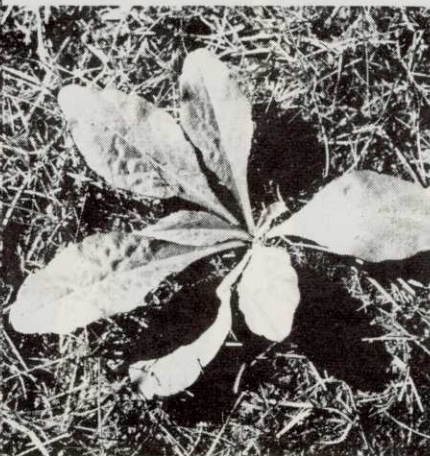
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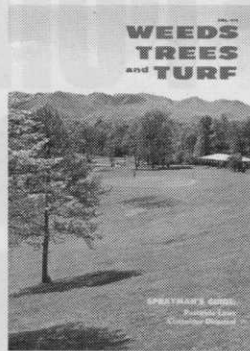
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## The Cover

With the Dogwood in bloom and the hazy blue Black Mountains all around, you would think it would take quite a phenomenon to attract attention. But Supt. Ross Taylor is convinced that golfers on the Black Mountain Country Club course nevertheless marvel at the perfection of the greens. Their quality, he says, comes from four years of testing fertilizer response of eight bentgrasses. His story begins on page 24. The cover reveals the picturesqueness of the North Carolina course, explaining why golfers don't mind at all tackling No. 17 hole, reported to be the longest hole in the world, a 745-yard, par 6 dogleg.



# WEEDS TREES and TURF®

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April, 1970

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## Five Behind, Five Ahead—Take a Look

A journalism conference speaker once suggested that attending editors go home, pull out a publication issue of five years ago and compare it with a current one. If the two look pretty much the same, he said, the publication is in trouble.

In retrospect, it seems the speaker was asking his listeners to do three things: (1) analyze themselves; (2) review what they had been doing; and (3) determine if their product was keeping up with change—or with competition.

The advice again came to mind at the Midwest Regional Turf Conference when banquet speaker the Rev. Joseph Wick of Lafayette's First Christian Church pursued a similar line of thought.

"Would you hire yourself?" he asked. "Are you concerned about your marginal areas of performance. Are you attempting to improve yourself?"

Do you have a give-and-take attitude and a sense of humor? he continued, for these qualities are important toward getting along with others.

Even the most basic aspect of personal public relations, appearance, often is overlooked. "Every person has his audience," the Rev. Wick reminded.

"What is your attitude toward work?" he asked.

Across the board, businessmen say getting and keeping labor is the major problem. Perhaps the pertinent question is: Would you do the same

work, for the same hours, under the same conditions for the same pay and benefits?

On the return flight from the turf meeting, an article in TWA Ambassador magazine pursued the self-analysis, company analysis theme a step further—of what to do about bad practices.

Considering the changes in the industry and made by competition, if your company is lagging, you and it may be problem-oriented.

Take five recent projects, proposals, or ideas, the article suggested. Were they rejected because of the problems involved, or because the objectives were unsound?

Decision-making that leads to improvement and progress, implied the article, comes after:

(a) analyzing the idea or proposal for the benefits it will bring; (b) recognizing problems involved in attaining the objective; and (c) basing the final decision on benefits of (a) vs. the costs of (c).

"The road to 'nowhere' is paved with objectives that aborted in the problem stage," the article concluded.

Upon evaluation of the past five years, perhaps the most motivating question will be: Based upon what you have been doing, at the end of the next five years, will you still be in business?

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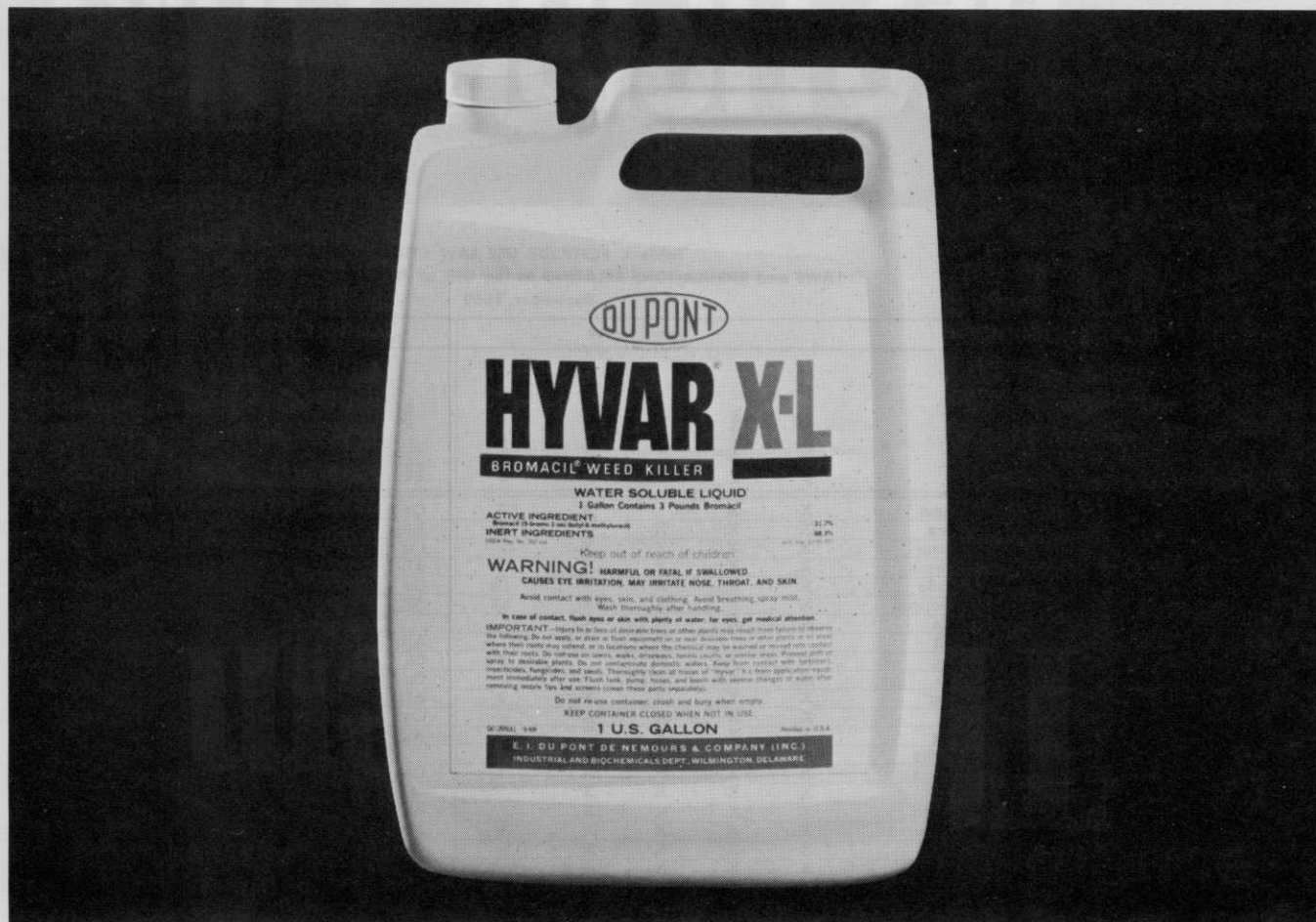


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# PESTICIDE LAWS



Table I. PESTICIDE USE LAW CHART  
LAWS and REGULATIONS RELATING to the USE of PESTICIDES GENERALLY  
December 1969

|                | Products Covered |            |            |              |        | Users Covered       |                    | Licenses or Permits Required |                    |        |
|----------------|------------------|------------|------------|--------------|--------|---------------------|--------------------|------------------------------|--------------------|--------|
|                | INSECTICIDES     | FUNGICIDES | HERBICIDES | RODENTICIDES | OTHERS | AERIAL APPLICATORS* | GROUND APPLICATORS | AERIAL APPLICATORS           | GROUND APPLICATORS | OTHERS |
| Alabama        | X                | X          |            | X            | 3      | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Arizona        | X                | X          | X          | X            | 1      | All                 | Cu                 | All                          | Cu                 | 10     |
| Arkansas       | X                | X          | X          | X            |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| California     | X                | X          | X          | X            |        | All                 | All                | All                          | All                | 5      |
| Colorado       | X                | X          | X          |              | 1,6    | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Connecticut    | X                | X          | X          | X            | 2,3    | All                 | Cu                 | All                          | Cu                 | 7      |
| Florida        | X                | X          | X          | X            |        |                     | Cu                 |                              | Cu                 |        |
| Hawaii         |                  |            | X          |              |        | All                 | All                | All                          | All                | 4,5    |
| Idaho          | X                | X          | X          |              | 1      | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Illinois       | X                | X          | X          |              |        | Cu                  | Cu                 | Cu                           | Cu                 | 8      |
| Indiana        | X                | X          | X          | X            | 2      | All                 |                    | All                          |                    |        |
| Iowa           | X                | X          | X          | X            |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Kansas         | X                | X          | X          | X            |        | All                 | Cu                 | All                          | Cu                 |        |
| Kentucky       | X                | X          | X          | X            |        |                     | Cu                 |                              | Cu                 |        |
| Louisiana      | X                | X          | X          | X            | 1      | Cu                  | Cu                 | Cu                           | Cu                 | 8      |
| Maine          | X                | X          | X          | X            |        | All                 | Cu                 | All                          | Cu                 |        |
| Maryland       | X                | X          | X          | X            |        | All                 | Cu                 | All                          | Cu                 |        |
| Massachusetts  | X                | X          | X          | X            | 9      | All                 | All                | All                          |                    | 9      |
| Michigan       | X                | X          | X          | X            |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Minnesota      | X                | X          | X          | X            |        | All                 | Cu                 | All                          | Cu                 |        |
| Mississippi    | X                | X          | X          | X            | 3      | All                 | Cu                 | All                          | Cu                 |        |
| Nevada         | X                | X          | X          | X            | 2      | Cu                  | Cu                 | Cu                           | Cu                 | 2      |
| New Hampshire  | X                | X          |            |              |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| New Mexico     | X                | X          | X          | X            | 1      | Cu                  | Cu                 | Cu                           | Cu                 |        |
| New York       |                  |            | X          |              | 8,9    |                     |                    |                              |                    | 8,9    |
| North Carolina | X                | X          | X          | X            |        | All                 |                    | All                          |                    |        |
| North Dakota   | X                | X          | X          | X            | 2      | All                 |                    | All                          |                    |        |
| Ohio           |                  |            | X          |              |        | 8                   | 8                  | 8                            | 8                  | 8      |
| Oklahoma       | X                | X          | X          | X            | 1      | Cu                  | Cu                 | Cu                           | Cu                 | 8      |
| Oregon         | X                |            | X          |              |        | All                 | All                | All                          | All                | 5      |
| Rhode Island   | X                | X          | X          | X            |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| South Dakota   | X                | X          | X          | X            |        | All                 | Cu                 | All                          | Cu                 |        |
| Tennessee      | X                | X          |            | X            |        | Cu                  | Cu                 | Cu                           | Cu                 |        |
| Texas          |                  |            | X          |              |        | All                 | All                | All                          | All                | 4,5    |
| Utah           | X                | X          | X          |              |        | All                 | Cu                 | All                          | Cu                 |        |
| Vermont        | X                | X          | X          | X            |        | All                 |                    | All                          |                    |        |
| Washington     | X                | X          | X          | X            | 1,6    | All                 | All                | Cu                           | Cu                 |        |
| Wisconsin      | X                |            |            |              |        | 9                   | 9                  | 9                            | 9                  | 9      |
| Puerto Rico    |                  |            | X          |              |        | 8                   | 8                  | 8                            | 8                  | 8      |

All—All users (those treating their own land and custom applicators)

Cu—Custom applicators only

1—Plant growth regulators and defoliants

2—Fertilizers and/or seeds

3—Sprays or methods used to improve the condition of trees

4—Manufacturers and dealers

5—Owner of land to be treated

6—Nematocides

7—Tree experts

8—Special statute relating to herbicides

9—Pertinent only to application of chemicals to water and to non-crop areas. See Statute

10—Growers and sellers

\* The federal government exercises some control over use of pesticides by requiring agricultural aircraft operators to obtain certificates when engaged in spraying economic poisons. Certification is awarded by the FAA only when certain standards are met by the pilot. No pilot may, under these regulations, dispense an economic poison that is registered under FIRA (1) for a use other than that for which it is registered, (2) contrary to any safety instructions or use limitations on its label or (3) in violation of any federal law or regulation. These rules do not exempt the aerial applicator from more stringent state laws which may be in effect.



## As They Stand; What Changes Could Mean . . .

**P**ESTICIDE-USE LAWS and regulations, in simply numbers, are practically unchanged from two years ago. A steady stream of amendments, however, is hitting state legislatures, calling for more joint-agency evaluations, more restrictive usage and application, and in some cases outright and across-the-board bans of a wide variety of pesticides and herbicides.

The startling aspect of the amendment onslaught is that sponsors and proponents seem to ignore, or choose to defy, the overwhelming evidence available that much of the legislation is unnecessary and some of it, according to an increasing number of scientists, could bring downright dangerous consequences.

A study of pesticide use and the impact of eliminating pesticides has just been published by the University of Nebraska. Authors are agronomist Orvin C. Burnside, Extension pesticide specialist John D. Furrer, and entomologist Robert E. Roselle.

If you ignore the probability or possibility of certain conditions developing, it's rather simple to come up with alarming projections, they suggest. Publicity to date, they charge, has been centered on the projections of the "anti-pesticide voices." The Nebraska study discounts the projections of attackers of pesticides and considers possible consequences of eliminating pesticide use altogether.

Among consequences:

Crop yields would drop from 20% to 30% and food prices would rise from 50% to 75%. Production of some crops would cease. Agricultural exports would end and a migration of labor back to the farm would have to occur to produce enough food.

Millions of lives would be lost again because of disease in duplications in many parts of the world of what actually happened in Ceylon. The introduction of a DDT mosquito eradication program reduced that

country's malaria cases from two million in 1950 to 17 in 1963. DDT use was then stopped, but by 1968 the malaria cases had again reached one million. The program was reinstated last year.

### Benefit-Risk Equation

Of course, the elimination of pesticide use entirely is remote, the report concedes. But information of this nature needs to be known by the general public to keep the value of pesticides in perspective.

What is needed, states the report, is public awareness of the "benefit-risk equation" as it relates to pesticides—an equation that has been applied to every other invention from the creative genius of man.

"Modern drugs save millions of lives, but some people have died because of them; the automobile kills and maims, but it has changed our lives generally for the better," state the Nebraskans.

"Chemical pesticides kill pests because they are toxic, and because they are toxic some are also capable, in excessive dosages, of causing illness, even death, in people and wildlife.

Perhaps the most prevalent misunderstanding, about pesticides, the report continued, is that "some people believe that if a chemical is toxic at high level it is toxic at all levels."

The ridiculousness of this assumption is exposed in the established fact that aspirin and even common table salt is more toxic than a number of the more common insecticides, herbicides and fungicides. (Table 2).

Furthermore, the deaths attributed to aspirin far exceed the deaths caused by all pesticides combined.

People fought the addition of flouride to drinking water, the report reminded, because of the publicized fact that flouride is toxic at high levels and despite the fact it is beneficial in reducing tooth decay at low levels. People brought about the ban of cyclamates because high dosages induced cancer in rats.

However, the report stated, "a human being would have to drink some 300 to 600 bottles of cyclamated beverage, depending on brand, at one time in order to equate the consumption by the rats."

### Myths About DDT

The Nebraskans took special offense at the exaggerated and unfounded attacks upon DDT that, for all practical purposes, has eliminated its use. As examples:

1. *That DDT and other pesticides have caused fish kills.* Table 3 sets

the record straight, showing that all insecticides, poisons, etc., have accounted for only 3%.

2. *That as many as 100 species of animals and birds are threatened with extinction because of pesticides.* Dr. D. A. Spencer, consulting ecologist of the National Agricultural Chemicals Association was quoted as noting that an estimated 99% of all species of life that have existed at one time or another are now extinct. The study charges that the critics perhaps have occasionally taken the easy way out by blaming DDT rather than studying the entire environment.

3. *That DDT is building up all over the world.* Francis Coon, chief of the Wisconsin Alumni Research Foundation's chemical department is quoted concerning the identification confusion with polychlorinated biphenyls. PCB produces almost an identical picture to DDT when analyzed on a gas-chromatograph, he stated. Most gas chromatographic assays, therefore, have overstated the amount of DDT in samples.

4. *That DDT is reducing bird populations.* Audubon Society bird counts for 1941 and 1960, before and after widespread use of DDT, show 131, 39, 21, 11 and 12 fold increases in grackles, blackbirds, cowbirds, starlings and robins, respectively.

### In 9,000 Years, Still Impossible

Perhaps the most exaggerated and unfounded claim is the widely publicized report that DDT would destroy the ocean's food supply because it affects the photosynthesis process in the phytoplankton. Concerning this preposterous fable, the report states:

"Presumably these predictions of doom for the human race are based on an article published by C. Wurstler, in *SCIENCE* in March, 1968, (and *WEEDS TREES* and *TURF*, August, 1969), where five species of marine algae were studied. To the water in which each of these algae was grown was added 500 parts per billion of DDT in ethanol although the solubility of DDT in water is only 1.2 parts per billion.

"That means the algae were exposed to DDT concentrations up to 400 times as great as would be present in an ocean saturated with DDT. At the 1.2 parts per billion DDT concentration, the algae photosynthesis was not affected, and it was only at the DDT levels far above its solubility in water that photosynthesis was depressed. This is an example of drawing conclusions from a laboratory experiment that has no relation to the natural environment.

"Calculations were made on how



long it would take to saturate the oceans with DDT, making three assumptions: (1) 300 million pounds of world DDT production per year; (2) no DDT breakdown would occur; and (3) all DDT produced was purposely added to the oceans. Even then it would take more than 9,000 years to reach 1 part per billion DDT in the oceans.

"At any conceivable DDT breakdown rate and at any reasonable rate of DDT production, saturation

of the oceans to 1 part per billion would be impossible."

#### Legislation Pending

Still the pesticide legislation floods the state houses. To name a few, bills are pending in New York (AB117), Virginia (SB56), Massachusetts (SB958 and HB345), Rhode Island (HB1014) and Oklahoma (HB 1587), reports the Chemical Specialties Manufacturers Association.

The bills call for bans on use or

sale of from one to eight chlorinated hydrocarbons. Punishment is called for to the extreme of \$10,000 and/or five years' imprisonment (Virginia) for each offense. This punishment covers other types of contamination also.

#### California Bans 35

Some state officials react to the outcry against pesticides philosophically, discounting any unbearable consequences.

The State of California has banned 35 chemical pesticides from use in weed and insect control along the 15,000-mile state highway system, forcing the use of environmentally safer, though perhaps more expensive, materials.

State Public Works Director James A. Moe said the order was in keeping with the state's increasing concern over protection of the environment from permanent contamination by persistent chemicals.

Moe said less persistent chemicals will be used on the highways in the future. The state maintains some 7,000 acres of landscaping and 3,000 acres of functional roadside planting, and most chemical applications are handled by the Division of Highways.

"We're the biggest farmer in the state," explained W. H. Armstrong, one of the two landscape specialists in the Division of Highways headquarters office in Sacramento. "But I don't think we'll suffer a bit. We may have to use something which will be a little less effective, or we may have to apply it a little more frequently, or something of this sort."

Armstrong said state weed and insect control is both a matter of protecting adjacent farm and rangelands and for highway appearance and landscaping maintenance. The biggest use of weed control chemicals is to create fire guard strips in forest and rangelands, he explained.

"There will be no let down in any of these programs," Armstrong promised.

The list of banned chemicals was taken from one developed by the State Department of Agriculture. By common name, the pesticides are DDT, DDD, TDE, Paris Green, TEPP, Parathion, Methyl Parathion, EPN, OMPA, Demeton, Phosdrin, Thimet, Di-Syston, Bidrin, 2,4,5-T, MCP, 2,4-DP, Silvex, 2,4-DB, Temik, Starlacide, Avitrol 100, Avitrol 200, Azodrin, Propanil, Chloropicrin, Dieldrin, Endrin, Toxaphene, Heptachlor, Kelthane, Ovex and Thiodan.

"The state has an excellent safety record with chemical products,"

Table 2. Pesticide toxicity in the U. S.

| Type of pesticide | Most widely used chemicals in 1969 | Acute oral LD <sub>50</sub> -values for rats mg/kg | Human deaths in 1961* |
|-------------------|------------------------------------|--|-----------------------|
| Insecticides      | Parathion                          | 4  | 18**                  |
|                   | Toxaphene                          | 80   | 2                     |
|                   | Carybaryl                          | 500  | 0                     |
|                   | DDT                                | 118  | 0                     |
|                   | Endrin                             | 7  | 1                     |
| Herbicides        | 2,4-D Ester                        | 700  | 1                     |
|                   | Atrazine                           | 3080   | 0                     |
|                   | Trifluralin                        | 5400   | 0                     |
|                   | Propanil                           | 2270   | 0                     |
|                   | Amiben                             | 3500   | 0                     |
| Fungicides        | Sulfur                             | —  | 0                     |
|                   | Copper sulfate                     | 300  | 0                     |
|                   | Captan                             | 15000  | 0                     |
|                   | Zineb                              | 5200   | 0                     |
|                   | Maneb                              | 7500   | 0                     |
| Other             | Aspirin                            | 365  | 182                   |
|                   | Salt                               | 3750   | —                     |
|                   | Picloram                           | 8200   | 0                     |
|                   | Amitrole                           | 15000  | 0                     |
|                   | Lead arsenite                      | 10   | 29                    |
|                   | Strychnine                         | 1  | 1                     |

\*Hayes, W. J. 1964. Occurrence of poisoning by pesticides. Archives of Environmental Health 9:621-625.

\*\*There were 4 deaths from parathion in 1952. Parathion use has increased more than 100% from 1961 to 1967.

Table 3. Pollution causing fish kill in the U. S. in 1967\*

| Source of pollution         | Reported fish killed | % of total |
|-----------------------------|----------------------|------------|
| Industrial wastes           | 8,087,091            | 72.7       |
| Municipal wastes            | 643,304              | 5.8        |
| Transportation wastes       | 143,123              | 1.3        |
| Other operations            | 638,266              | 5.7        |
| Insecticides, poisons, etc. | 329,130              | 3.0        |
| Fertilizers                 | 10,000               | 0.1        |
| Manure-silage drainage      | 1,268,137            | 11.4       |
| <b>TOTAL</b>                | <b>11,119,051</b>    | <b>100</b> |

\*Pollution caused fish kills—1967. Federal Water Pollution Control Admin., Washington, D. C. 8: 1-16.



Armstrong said. "But if there's a way we can make our operation a little safer by spending a little more money, why, this may be what we have to do."

#### Florida Restricts 35

At the other end of the country, in Florida, a more sensible approach has been taken regarding pesticide use. Rather than establishing outright bans, the legislation restricts usage to those who must prove there is a need and that they know how to apply the chemical properly.

The new Florida law restricts the sale, purchase, use and possession of 35 specific pesticides.

The primary purpose of the law is to limit the use of highly toxic pesticides to commercial agriculture. It also limits the use of certain materials, including DDT, Aldrin, Endrin, Dieldrin, and Heptachlor, according to James E. Brogdon, entomologist, Florida Agricultural Extension Service.

Dealers now must have a license to sell the pesticides, and purchasers must have a permit to buy them, Brogdon points out.

Permits are available to bona fide agricultural users who must be certified as such by county agricultural Extension directors.

Pesticides restricted in all concentrations are: Aldicarb (Temik); Azodrin, Bidrin, Carbofuran (Furadan) (Except granular 10% and below), liquid hydrogen cyanide; DDD (TDE), DDT, Demeton (Systox), Endrin, EPN (O-Ethyl-P-p-nitrophenyl phenylsophosphoanathioate) O-ethyl S-phenyl ethylsophosphodiathioate (Dyfonate), Fensulfothion (Dasanit) methyl bromide, methyl parathion, Mevinphos (Phosdrin), Parathion, Phorate (Thimet), Phosphamidon, Phosphorus (white or yellow), Prophos (Mocap), selenites and selenates, sodium fluoroacetate (1080), strychnine and its salts, TEPP (tetraethyl phosphophosphate), thallium compounds and Zinophos.

Restrictions on pesticides above certain concentrations include: Aldrin (above 10%); inorganic cyanides (5% and above) (except liquid hydrogen cyanide, which is restricted in all concentrations); Dieldrin (above 10%), Disulfoton (Di-syston) (above 2%), Guthion (above 1.1 pounds per gallon), Heptachlor (above 10%), Nicotine and its salts (above 5%), Paraquat (above 0.2% cation), Toxaphene (above 10%).

Arsenic compounds: inorganic insoluble (50% and above as the compound) including calcium arsenate, lead arsenate, magnesium arsenate, paris green. Inorganic soluble: in-

cluding arsenic trioxide (1½% and above), sodium arsenite, (2% and above), and sodium arsenate, (5% and above).

The user of the above pesticides must state on his application what he intends to use them for.

Permit to purchase and use "restricted pesticides" may be issued for any uses recommended for the pesticide in the labeling of that pesticide, which is registered with the Florida Department of Agriculture and Consumer Services or the United States Department of Agriculture, with these limitations:

Aldrin will be permitted only for use on pine seedlings; as seed treatments; as soil treatment for fruit trees; vegetables, turf; as soil treatment for foliage, flower, fern, and woody ornamentals; and by licensed pest control operators in accordance with federal registration.

Arsenic Trioxide (above 1½%) and Sodium Arsenite (above 2%) will be permitted only for termite control).

DDD (TDE) will be permitted only for use on cotton, corn, peanuts, soybeans, tomatoes, tobacco, chrysanthemums, gladiolus, and as soil treatment for vegetables.

DDT will be permitted only for use on cabbage, corn, cotton, peanuts, soybeans, sweet potatoes, public health use, and by licensed pest control operators in accordance with federal registration.

Dieldrin will be permitted only for use on peaches, and sweet potatoes; as seed treatments; as soil treatment for fruit trees, turf; as soil treatment for flower, foliage, fern, and woody ornamentals; and by licensed pest control operators in accordance with federal registration.

Endrin will be permitted only for use on cotton, sugar cane, cucurbit seed, and pine seed.

Heptachlor will be permitted only as soil treatment for fruit trees, turf; as soil treatment for flower, foliage, fern, and woody ornamentals; and by licensed pest control operators in accordance with federal registration.

Phosphorus (white or yellow) will be permitted for use as a rodenticide by licensed pest control operators and governmental agencies only, for use in commercial and industrial establishments.

Sodium fluoroacetate (1080) will be permitted for use as a rodenticide by licensed pest control operators and governmental agencies only.

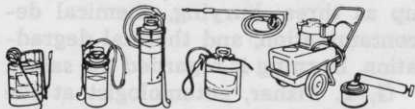
Thallium sulfate will be permitted for use as a rodenticide and for control of insects by governmental agencies only.

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*New low cost kit adapts late model wheel pump sprayers for towing behind small tractor.*



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Coopersville, Michigan 49404



# Pesticide Container Disposal

**A**BOUT A YEAR AGO when the noose began to tighten around DDT, one industry spokesman mused: "If there's a residue problem, the worst one will come with a ban of DDT . . . when all the people that have some on the shelf dump it down the drain."

If a pinch of sarcasm is noted perhaps it's justified. Behind every major instance of pesticide damage, there has been ample evidence that the chemical was not used according to label instructions. It would appear logical, therefore, that the least-risk method would be to use the product as recommended until it was gone.

Unfortunately, human nature prescribes quick disposal of a hot potato rather than careful handling until it cools off.

"You can't be too careful with some things," folks say, and chemicals are one of "them things." This feeling is a contributing reason for the FDA and USDA requirement that a chemical must have a 100-fold safety margin built in for the user and consumer. It's a strong building block in the sensitivity that has risen over pesticide container disposal.

Most certainly, containers should be disposed of carefully to avoid the risk of improper dosages at improper places.

Quite a bit of information is available, but research is continual. USDA bulletin 750 is helpful, however a department spokesman said new information was about ready to be released.

## Disposal Methods

Disposal methods can be summed up as three: burying, chemical decontamination, and thermal degradation. Burning is regarded the safest.

G. T. Fisher, entomologist at the University of New Hampshire, published these recommendations in February:

1. Container disposal — combustible bags, fiber drums, cardboard and wooden boxes. (a) Burn at public incinerator (must be capable of 900-1200 degrees Fahrenheit) except weed killer containers. Bury these. (b) Dump with prior permission of dump supervisor. (c) Bury on a flat-level area, away from water sources, at least 18 inches deep, and cover with soil. Crush containers. (Par. c sums up recommendation for disposing of DDT).

2. Container disposal — non-combustible metal cans, drums and glass containers. To decontaminate containers (5-30-55-gal. drums) carefully wash and rinse on the outside, then decontaminate chemically by alkaline decomposition of the residual pesticide by the following steps:

a. Drain container as completely as possible in the cleaning or burial area.

b. Carefully add water, detergent and caustic soda according to quantities needed (see Table I).

c. Close containers and rotate carefully to wet all inner surfaces with caustic solution. Let stand for at least 15 minutes, with occasional agitation. Prolonging the contact of the caustic solution improves decontamination.

d. Remove all bungs and closures and drain solution into the burial pit.

e. Rinse container inside and out and dispose of rinse in the burial pit.

If a pesticide container is to be burned by a commercial incinerator, the operator should be instructed in the complete nature of the material contained, Fisher cautioned.

## Pesticide Incineration

Research on chemical and thermal methods for disposal of pesticides has been under way at Mississippi State University for several years. A report in Residue Reviews in 1969





# ... a Look at Burning

states that while several disposal methods have been investigated, "none has proved to be ideal procedure, although some have varying degrees of merit."

The widely circulated recommendation of burying, for example, means the site is rendered useless for a number of other purposes "for any time in the foreseeable future."

The paper, by M. V. Kennedy, B. J. Stojanovic and F. L. Shuman, Jr., does conclude that "incineration is superior to chemical methods for the destruction of waste pesticide chemicals."

Simple incineration, however, is not sufficient, cautions Stojanovic. Incinerators should have the capability of recirculating and reburning flue gases. Otherwise, the escaping gases "would present a definite threat from the standpoint of air pollution. Also, it would endanger humans, animals, and vegetation for some distance around the incineration site upon combustion of certain pesticides."

The Mississippi study investigated the thermal degradation for 20 pesticide chemicals: 2,4-D (2 lb./gal. "formula 40"), Picloram (11.6% solution), Atrazine (80WP), Diuron (80WP), Trifluralin (4 lb./gal. — liquid), Bromacil (80WP), DSMA (3.2 lb. gal.) DNBP (3 lb./gal. "pre-merge"), Dicamba (4 lb./gal.), Dalapon (85WP), Paraquat (2 lb./gal.), Vernolate (6 lb./gal., liquid), 2,4,5-T (4 lb./gal.; 44.1% acid equivalent), Carbaryl (10% dust), DDT (technical flakes), Dieldrin (17.8% solution), Malathion (5 lb./gal.; 57% solution), PMA (Mersoite -88W; 95% water dispersable), Zineb ("Parazate" -C; 75WP), and Nemagon (8.6 lb./gal.).

A differential thermal analysis was conducted in which complete combustion was determined for a reference standard for the pesticide material and also for the commercial formulation.

The study showed that "complete incineration temperatures of the reagent-grade pesticides ranged from about 250 degrees Centigrade to about 850 degrees C.; 15 of the compounds were completely combustible at 700 degrees C. or below, while five required 700 degrees and 900 degrees C.

Under similar conditions, the commercial formulations required essen-

tially the same temperature ranges (See Table 2); dalapon, trifluralin, and nemagon required higher temperatures than the respective reagent-grade compounds. All but six formulations approached complete combustion at 800 degrees C. Atrazine, carbaryl, bromacil, and dalapon contained about 10% of uncombustible residue at 1,000 degrees C., whereas DSMA and zineb yielded

(Continued on Page 18)

TABLE 1. CAUSTIC RINSE SOLUTION FOR ORGANIC PHOSPHATE CONTAINERS

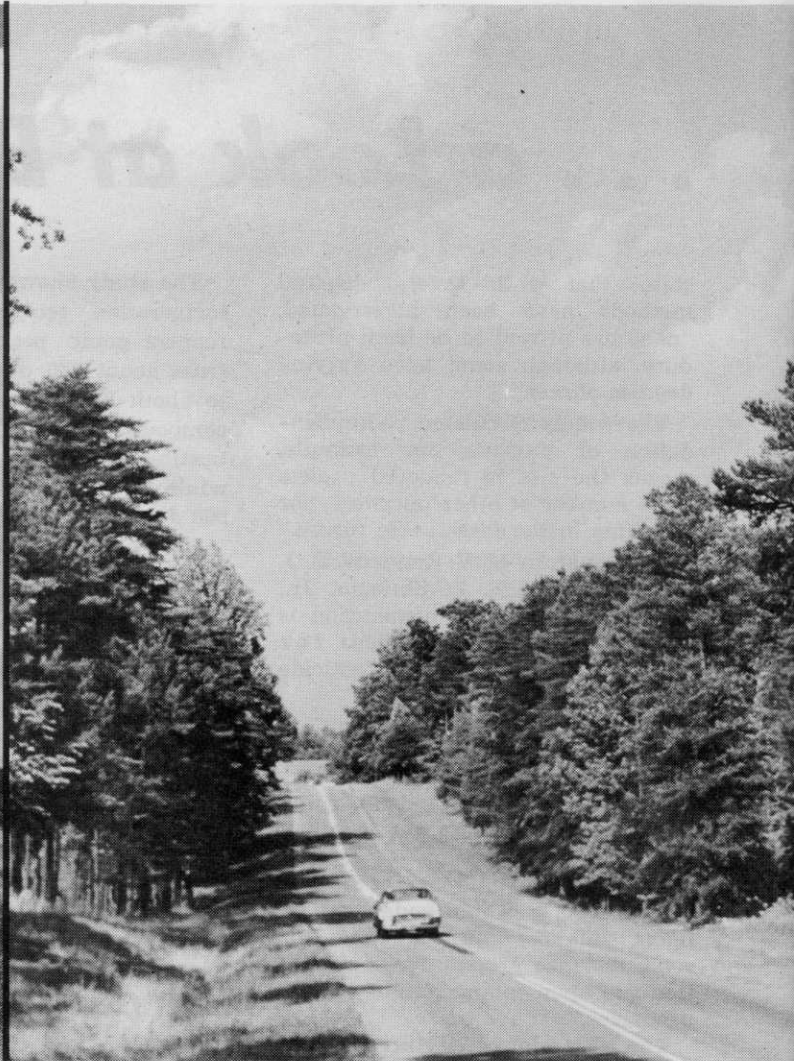
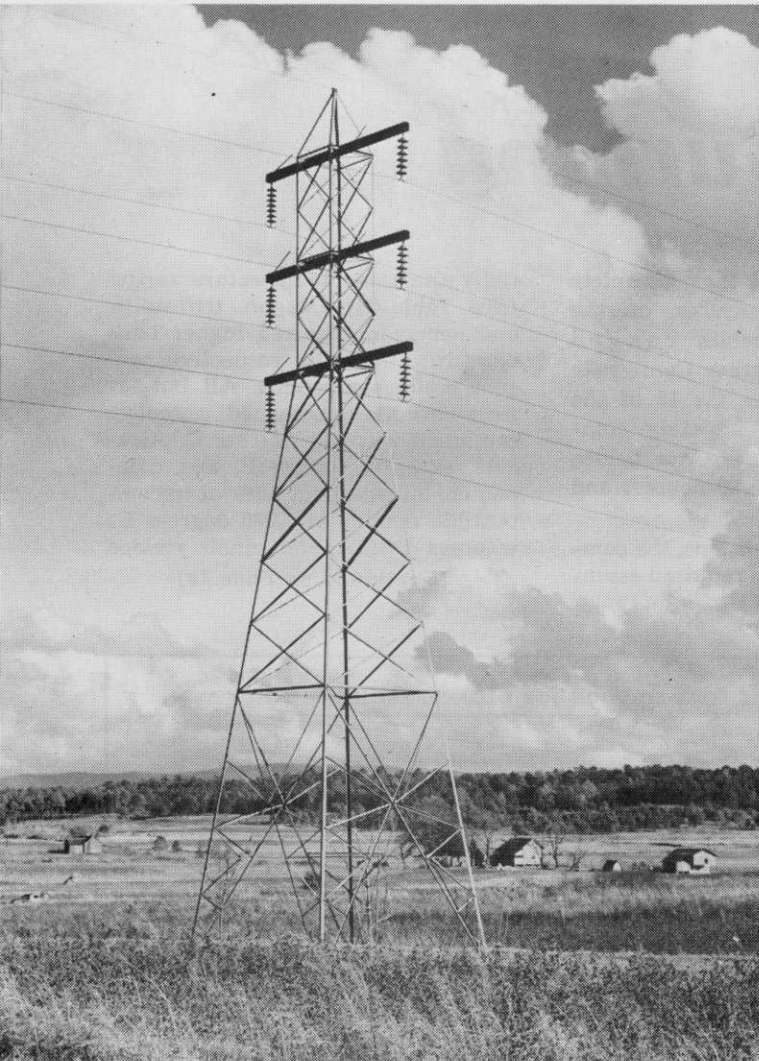
| Container Size      | Water      | Detergent     | Caustic Soda (lye) |
|---------------------|------------|---------------|--------------------|
| Less than 5-gallons | 1 pint     | 1 tablespoon  | 1-2 tablespoons    |
| 5-gallons           | 2 quarts   | 2 tablespoons | ½ cup              |
| 15-gallons          | 1½ gallons | ¼ cup         | ½ pound            |
| 30-gallons          | 3 gallons  | ½ cup         | 1 pound            |
| 55-gallons          | 5 gallons  | 1 cup         | 2 pounds           |

TABLE 2. Percent loss on combustion of commercial formulations of pesticides at five temperatures.

| Commercial formulation | Loss (%) at |         |         |         |          |
|------------------------|-------------|---------|---------|---------|----------|
|                        | 600° C.     | 700° C. | 800° C. | 900° C. | 1000° C. |
| Picloram               | 90.8        | 91.8    | 95.6    | 98.7    | 99.2     |
| Atrazine               | 87.8        | 88.1    | 88.8    | 88.9    | 89.0     |
| Nemagon                | 99.6        | 99.6    | 99.6    | 99.6    | 99.6     |
| Trifluralin            | 99.7        | 99.8    | 99.8    | 99.8    | 99.8     |
| Malathion              | 95.3        | 96.0    | 96.3    | 96.4    | 96.7     |
| 2,4,5-T                | 99.9        | 99.9    | 99.9    | 99.9    | 99.9     |
| Zineb                  | 70.1        | 71.3    | 71.5    | 72.7    | 72.8     |
| Vernam                 | 99.6        | 99.6    | 99.6    | 99.6    | 99.6     |
| Paraquat               | 98.3        | 98.6    | 99.0    | 100.0   | 100.0    |
| Dicamba                | 98.6        | 98.7    | 98.9    | 99.0    | 99.4     |
| Bromacil               | 88.8        | 89.1    | 89.4    | 90.5    | 91.3     |
| Dieldrin               | 99.1        | 99.4    | 99.5    | 99.5    | 99.5     |
| DDT                    | 99.2        | 99.3    | 99.7    | 99.9    | 100.0    |
| Dalapon                | 64.3        | 64.3    | 67.8    | 73.8    | 91.0     |
| 2,4-D                  | 99.8        | 99.9    | 99.9    | 99.9    | 99.9     |
| Diuron                 | 94.6        | 95.0    | 95.4    | 95.5    | 95.7     |
| DNBP                   | 99.8        | 99.8    | 99.8    | 99.8    | 99.8     |
| DSMA                   | 80.6        | 80.7    | 80.7    | 81.2    | 81.2     |
| Sevin                  | 88.7        | 88.8    | 88.8    | 89.1    | 89.5     |



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More and more communities, companies, clubs and utilities are working BANVEL into their weed and brush control programs. Their evaluations of control methods show that BANVEL, either alone or in combination, produces wider, more thorough control for longer periods of time . . . and at lower cost.

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# weeds your...hell?



**Partial list of broadleaf weeds, weed brush, weed trees controlled by BANVEL, BANVEL/combinations**

|                      |                     |                 |
|----------------------|---------------------|-----------------|
| Ash                  | Mouse-ear Chickweed | Mesquite        |
| Aspen                | Oak                 | Cottonwood      |
| Basswood             | Persimmon           | Stinging nettle |
| Cedar                | Pine                | Smartweed       |
| Cherry               | Poplar              | Dog fennels     |
| Clover               | Sassafras           | Corn cockle     |
| Common chickweed     | Service berry       | Cow cockle      |
| Curly dock           | Sheep (red) sorrel  | Knawel          |
| Dog fennel (mayweed) | Sourwood            | Fiddleneck      |
| Elm                  | Sumac               | Canada thistle  |
| Hickory              | Sycamore            | Field bindweed  |
| Hornbeam             | Thorn apple         | Pepperweed      |
| Knotweed             | Thornberry          | Tansy ragwort   |
| Locust               | Willow              | Purslane        |
|                      | Witch hazel         | Sunflower       |
|                      | Yaupon              | Careless weed   |

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**TABLE 3. National Barrel and Drum Association firms having burning equipment.**

|   |  |  |  |
|---|--|--|--|
| Apex Drum Co.<br>6226 Ferguson Drive<br>Commerce, Calif. 90640  | Skolnik Drum Corp.<br>4601 West 48th Street<br>Chicago, Ill. 60632                                 | Midwest Barrel & Drum Co.<br>807 Farrington Avenue<br>St. Paul, Minn. 55117  | Standard Pail & Drum<br>8110 Preble Avenue<br>Cleveland, Ohio 44104                        |
| Myers Drum Co.<br>6549 San Pablo Avenue<br>Oakland, Calif. 94608<br>and<br>5400 South Soto<br>Los Angeles, Calif. 90058 | Sterling Drum Co.<br>610 West 81st Street<br>Chicago, Ill. 60620                                   | Northwestern Cooperage<br>42 Ferry Street<br>St. Louis, Mo. 63160            | Columbus Steel Drum<br>2829 East 4th Avenue<br>Columbus, Ohio 43219                        |
| A. Rooke Cooperage Co.<br>7702 Maie Avenue<br>Los Angeles, Calif. 90001   | Des Moines Barrel & Drum<br>S.E. 19th at Scott Street<br>Des Moines, Iowa 50316                    | Conway Barrel & Drum<br>Route 125<br>Haverhill Road<br>Kingston, N. H. 03865 | Lammers Barrel Corp.<br>Radio Rd., P.O. Box 3087<br>Overlook Station<br>Dayton, Ohio 43219 |
| Ted Levine Cooperate<br>9629 El Poche Street<br>South El Monte, Calif. 91733  | Sims Barrel Co.<br>1161 So. 12th Street<br>Kansas City, Kans. 66105                                | Bayonne Barrel & Drum<br>Raymond Boulevard & Route 1<br>Newark, N.J. 07105   | Reimann & McKenney<br>3000 N.W. St. Helens Road<br>Portland, Ore. 97210                    |
| S. Rose Cooperage<br>1051 Union Street<br>Montebello, Calif. 90640  | Allied Drum Service, Inc.<br>401 Colorado Avenue<br>P.O. Box 8055 Sta. E.<br>Louisville, Ky. 40208 | Gold Cooperage<br>401 South Street<br>Newark, N.J. 07105                     | General Cooperage Co.<br>2435 Island Road<br>Philadelphia, Penna. 19142                    |
| Lorentz Barrel & Drum<br>1515 South 10th Street<br>San Jose, Calif. 95112   | Export Drum Co.<br>7627 Scenic Highway<br>Baton Rouge, La. 70807                                   | Acme Steel Drum Co.<br>1050 Grand Street<br>Brooklyn, N.Y. 11211             | National Steel Drum<br>Ontario & Trenton<br>Philadelphia, Penna. 19134                     |
| Kaminsky Barrel<br>2200 Blake Street<br>Denver, Colo. 80205   | Geo. P. Garratt Sons & Co.<br>2815 Waterview Avenue<br>Baltimore, Md. 21230                        | H. Hyman Drum & Barrel<br>878 South Division Street<br>Buffalo, N.Y. 14210   | Southwark Cooperage<br>Meadow & Wolf Streets<br>Philadelphia, Penna. 19148                 |
| Drum Service Co. of Fla.<br>803 Jones Avenue<br>P.O. Box 278<br>Zellwood, Fla. 32798                                    | H. F. Clark & Sons<br>236 Third Street<br>Chelsea, Mass.   | Active Steel Drum<br>52-30 34th Street<br>Long Island City, N.Y. 11101       | New England Container<br>2072 Smith Street<br>Centredale, R.I. 02911                       |
| Atlanta Cooperage<br>647 Bankhead Avenue<br>Atlanta, Ga. 30318  | Ryan Barrel Co.<br>56 Pulaski Street<br>Peabody, Mass. 01960                                       | Academy Steel Drum<br>P.O. Box 455<br>Charlotte, N.C. 28201                  | D. F. Farrell Sons<br>Box 286<br>Coventry, R.I. 02816                                      |
| J & B Smith Co.<br>P.O. Box 10504<br>Station A.<br>Atlanta, Ga. 30318   | Acme Service & Cont.<br>12800 Eaton Avenue<br>Detroit, Mich. 48228                                 | Acme Barrel & Drum<br>16 - 38 DeCamp Avenue<br>Cincinnati, Ohio 45216        | Moore Drums, Inc.<br>Stark Industrial Park<br>Charleston Heights, S.C. 29405               |
| Georgia Steel Drum<br>Box 575<br>Austell, Ga. 30001   | American Renovating<br>9201 Freeland Avenue<br>Detroit, Michigan 48228                             | Alex Gottlieb Container<br>6401 Wiehe Road<br>Cincinnati, Ohio 45237         | Dallas Steel Drums<br>2215 North Beckley<br>Dallas, Texas 75208                            |
| Alsip Barrel & Drum Co., Inc.<br>4100 W. 123rd Street<br>Alsip, Ill. 60658  | Atlas Gottlieb Co.<br>1505 East Ferry Avenue<br>Detroit, Michigan 48211                            | Advance Barrel & Drum<br>6830 Beaver Avenue<br>Cleveland, Ohio 44104         | Drum Service Co.<br>P.O. Box 15337<br>Houston, Texas 77020                                 |
| Acme Barrel Co.<br>2300 West 13th<br>Chicago, Ill. 60608  | Michigan Drum Renovating Co.<br>24800 Schoenherr Road<br>Warren, Mich. 48089                       | Amity Drum<br>101 E. Amity Road<br>Cincinnati, Ohio 45237                    | Port Drum Co.<br>237 West 9th Street<br>Port Arthur, Texas 77641                           |
| American Steel Cont.<br>4445 West 5th Avenue<br>Chicago, Ill. 60624   | Dworsky Barrel Co.<br>260 12th Street<br>Minneapolis, Minn. 55401                                  | Queen City Barrel & Drum<br>1937 South Street<br>Cincinnati, Ohio 44404      | Northwest Cooperage<br>7152 First Avenue South<br>Seattle, Wash. 98108                     |
| E. Hansen Co., Inc.<br>2703 South Loomis Street<br>Chicago, Ill. 60608  | Minnesota Barrel & Drum<br>763 North 3rd Street<br>Minneapolis, Minn. 55401                        | General Steel Barrel<br>3967 Pearl Road<br>Cleveland, Ohio 44109             | Atlas Steel Drum<br>P.O. Box 187<br>Nitro, W. Va. 25143                                    |
|   | Industrial Steel Cont.<br>293 Commercial Street<br>St. Paul, Minn. 55106                           |  | Kitzinger Cooperage<br>2529 East Norwich Street<br>Milwaukee, Wisc. 53207                  |

## Pesticide Container Disposal

(Continued from Page 15)

19% and 23% ash, respectively, at 1,000 degrees C."

Work is continuing at MSU, Stojanovic said, to determine how the most efficient incinerator can be constructed.

### Drum Reconditioning

In view of the research data showing that burning is the best method

to dispose of waste pesticides, the National Agricultural Chemicals Association has conducted a survey of members of the National Barrel and Drum Association who have burning equipment. (Table 3).

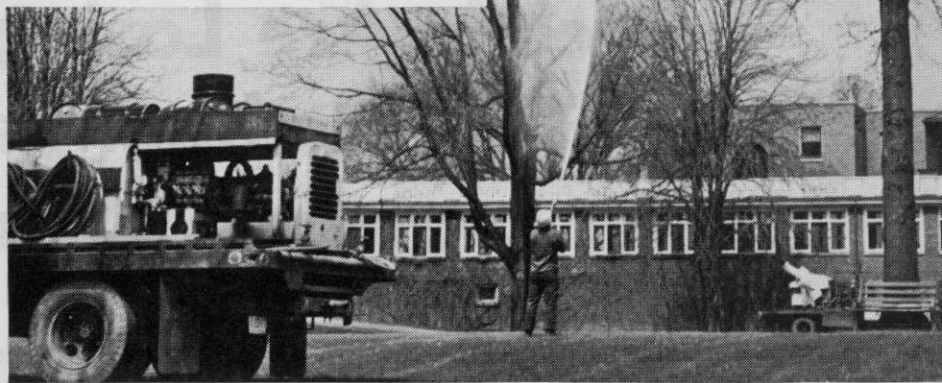
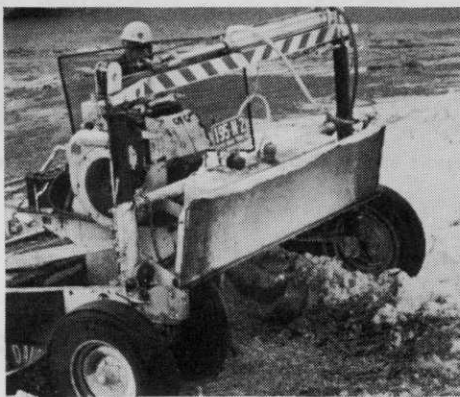
Large pesticide users stand to gain two benefits by choosing the burning method of disposal: getting rid of their containers and being reimbursed, to a small extent, for the cost of the container. Drum reconditioning firms pay from 50 cents to

\$2.00 for metal drums, depending on size (30 or 55 gal.) and condition.

These firms clean the drums thermally and/or chemically, strip them to bare metal (by blasting them with steel particles for example), reshape, repaint and then sell them for the same or different use.

Manufacturers selling products in drums can realize considerable saving by utilizing reconditioned drums. The practice is common in the petroleum industry.





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Coast to Coast and Canada



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Chemical Maintenance, Inc., of Shreveport sprayed Daconate. The blackened seed heads and fallen stems indicate weed kill.

*Report from Chemical Maintenance, Inc.*

## Weeds Are Losing The Ditchbanks In Louisiana War

Before the attack, waist-high Johnsongrass lined both sides of Bayou Pierre.



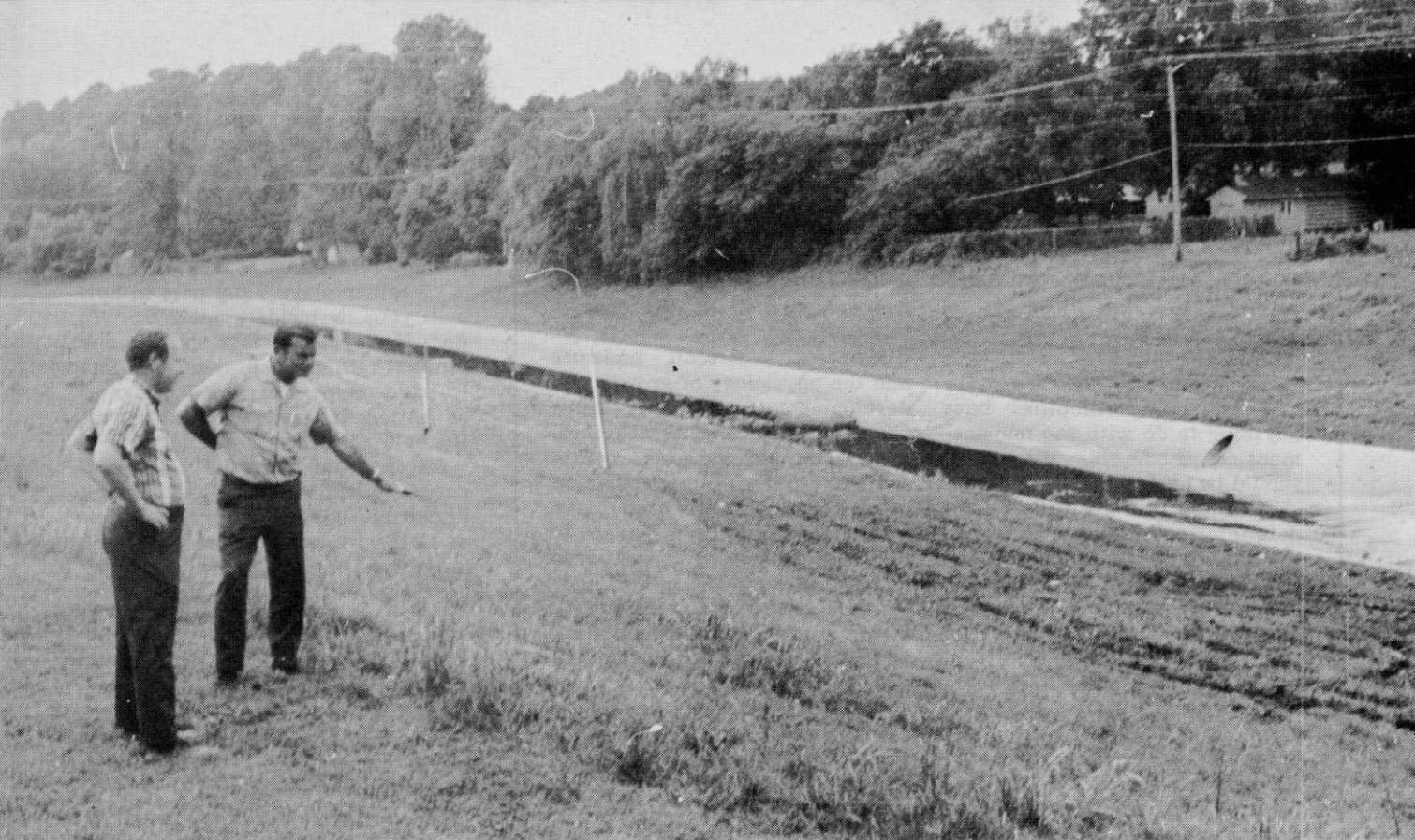
**I**T MAY NOT BE as bad as the Amazon basin jungle, but in steamy Louisiana it wouldn't take long for weeds and undergrowth to take over just as soon as man's bulldozer leaves. For those whose job is building ditches, levees, industrial plants, rights-of-way, etc., that fact is a headache that just won't quit.

For Jim McCoy and Max Edwards, operators of Chemical Maintenance, Inc., Shreveport, the fact that weeds grow like weeds in Louisiana is money in the bank. Their firm is the Excedrin for the builder's headache.

Chemical Maintenance, Inc., is basically in the business of industrial and right-of-way vegetation control. McCoy has been in the business for five years and Edwards for nine. Their work includes cleaning up weeds and underbrush around industrial plants, in ditches, along pipelines, highways, bayous, and just about anywhere that man wants to get rid of unwanted vegetation. In an area where just about every parish, or county, has miles and miles of drainage ditches and bayous to keep cropland and even cities above water level, this job can be considerable.

"We do go around to industrial plants, inquire as to their weed control problems, try to point out needs and recommend programs, but the majority of our work—probably 65%—is in ditch and riverbank under-





Bermudagrass is taking over. Jim McCoy, right, shows the results to Bill Mosley, Diamond-Shamrock Chemical Co.

growth removal," McCoy explains. "We work within a 300-mile radius of Shreveport, and this includes 300 miles of drainage ditches in Caddo Parish, more than 300 in Bossier Parish and 500 miles of ditches in Tennesaw Parish."

Most of CMI's work is on a year-to-year contract basis, McCoy says, although they prefer to work out long-term contracts where they can do a regular removal job. "Actually," he explains, "we don't do ditches every year anyway; most are cleaned up every two to four years. Where we have long-term contracts with such groups as Parish Levee Boards, we may handle half of their levees and ditchbanks each year, keeping growth minimal and costs down."

Those people responsible for the maintenance of the levees and drainage ditches recognize weed and underbrush control as a necessary expense. If cultivated land is to be kept as free of weeds as possible, the ditchbanks and levees also have to be prevented from becoming weed-seed breeding grounds. Also, says McCoy, weeds and vines don't hold soil on a steep ditchbank like grass does, and it is necessary to get rid of the weeds for the bermudagrass to take over. "It costs a lot of money to dig ditches, and it's all wasted if a ditch gets clogged."

CMI's performance is measured in terms of percentage of kill, so the firm has to kill all trashy vegetation.

Governmental boards don't want to know about the weeds a herbicide doesn't get—they want to see the weeds cleaned out—period.

"Trees and woody underbrush are our biggest problem when it comes to permanent kill," McCoy says. CMI's tree removal technique involves injecting each tree with Croprider 2,4D amine, using a 2-inch pipe with a bit on the end and a pump as an injector. "We make a cut every two inches around the tree as close to the ground as possible," McCoy says. "It really does the job on willows and cottonwoods, although it's a little less effective than some other, hotter herbicides on hardwoods."

For general weed control on ditchbanks, CMI usually works with Daconate, Diamond Shamrock Chemicals' premium MSMA-surfactant formulation. The usual rate is about ¾-gallon of material per acre. "We really would like to combine the Daconate with a 2,4D for a really total kill," says McCoy, "but we're concerned that fumes from the phenoxy will get us in trouble with neighboring cottonfields or home gardens." One answer to that problem that McCoy is looking into is Dacamine, Diamond's completely non-volatile phenoxy.

A typical job for CMI is the Bayou Pierre ditchbank maintenance job. Awarded the contract to keep this ditchbank, which winds through

much of metropolitan Shreveport, free of noxious weeds, CMI found the weeds really growing rankly all along its length.

It would be some job—"The rough grasses like johnsongrass and other weeds were 2½ feet tall in most places," McCoy exclaims. "We saw some bermudagrass growing in spots among the weeds, and felt if we could get the big weeds down the bermuda would come in and choke out most further weed growth."

Use of standard 2,4D materials alone or in combination with arsonates was out of the question, because the ditchbank backs up on some of the finest homes in the city, with their beautiful and highly susceptible expensive shrubbery.

Where it was possible, CMI went in with a tanktruck, spraying Daconate through a 30-foot boom. "We used a real high pressure — 400 pounds per square inch—to try to get a fine mist and high-saturation coverage, since Daconate is a contact herbicide and we needed as much contact as possible," McCoy says. Where the truck couldn't go, a long hose and hand-held nozzle was used to wet down every weed they could spot. Rate was about 60 gallons of spray solution per acre.

"Our plan," McCoy continues, "was to hit the ditchbank twice this year. First we sprayed it in the latter part of May when the temperature was up. Then we came back in the heat



**TURFGRASS SCIENCE**, published by the American Society of Agronomy, 677 South Segoe Rd., Madison, Wis. 53711. Hard cover. Regular, \$12.50; ASA members, \$10.

If your responsibilities have anything to do with the management of turf, this new book should be on your shelf. Two reasons: There is a wealth of up-to-date information in the book, and the list of two dozen authors is priceless when the future produces a problem on which you need an authority's advice.

Turfgrass Science is No. 14 in the Agronomy series. Twenty-eight chapters total 715 pages. The editors are A. A. Hanson and F. V. Juska, Forage and Range Research Branch of USDA's Agricultural Research Service at Beltsville, Md.

"This monograph brings together the best thinking in turfgrass science," states Werner L.

Nelson, president of the American Society of Agronomy, in the foreword.

Chapters cover the history, climates and varieties. There is in-depth discussion of soil characteristics and their effects on turfgrasses. Nutrition, moisture and the physiology of growth and development range over three chapters. Four chapters deal with weeds, diseases, insects, nematodes and other pests. Production of seed and sod is covered.

Special attention is given to turfgrass ecology as it relates to climatic regions. There is a chapter each on turfgrass under cool, humid conditions; warm, humid; and semi-arid and arid. Chapters deal specifically with major areas of turfgrass uses, such as athletic fields, putting greens, golf fairways, tees and roughs, and highway roadsides.

The final chapter on commercial turfgrass equipment, covering 20 pages, is current enough to have been written from new product releases.

of August to get whatever young weeds sprouted since the earlier spraying." McCoy figures that two years of this program will clean up enough noxious weeds so that the bermuda will come in and choke out any remaining.

"Weather plays a big part in how well your herbicide application will do," McCoy adds. "We need a day without rain after spraying, and like to have temperatures of 75 degrees or better. In fact, the hotter it is the better it works."

Checked out after the first Dacotane application, the Bayou Pierre ditchbank showed ample evidence of CMI's success. Almost all of the tall, waist-high johnsongrass was gone, and bermudagrass was coming in strong. "That bermuda looks great," McCoy exulted. "Bermuda likes hot sun, light, water and nitrogen, and the johnsongrass was stealing all that until now."

Running five spray units, plus one barge to use in riverbank spraying, CMI handles something like 1,000 acres of weed-control work a year. "We usually have at least 12 men on the payroll year-round," McCoy says, "but during peak season we often go as high as 35 to 40."

It's a big job, keeping lowland Louisiana from reverting to a jungle.

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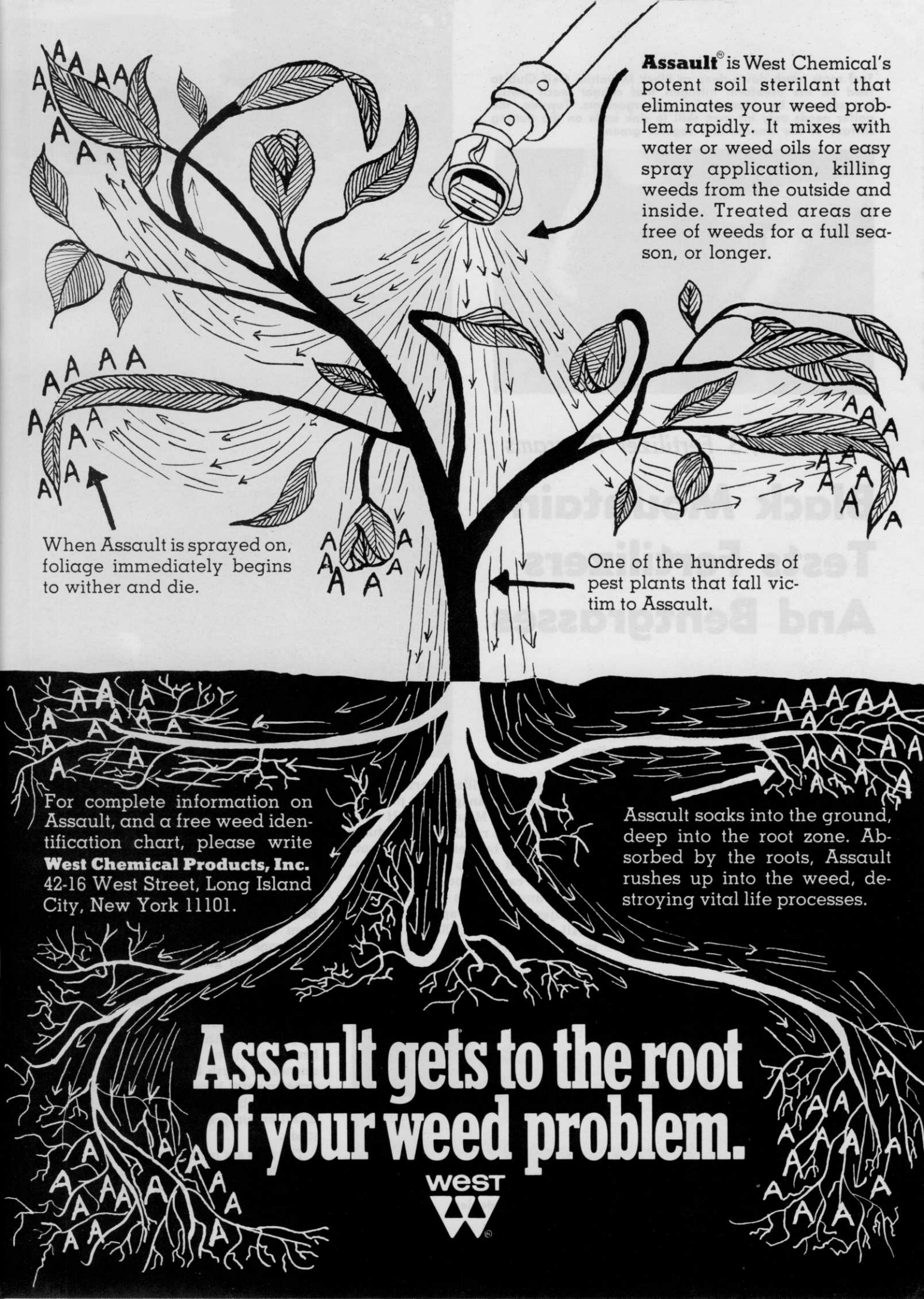
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*8 Varieties, 3 Fertilizer Programs*

## Black Mountain Tests Fertilizers And Bentgrasses

By ROSS TAYLOR

Superintendent, Golf Professional  
Black Mountain Golf Club  
Black Mountain, North Carolina

**B**ETWEEN 1962 and 1966, we made a comparative study of the response and adaptation of eight bentgrasses to three fertilization programs. This report has been prepared for the benefit of the golf superintendent and turf management specialist who may not have an opportunity to conduct such a study. We hope it will serve as a guide to those interested in choice of bent species

as well as in fertilizer performance.

Our greens management program today at Black Mountain Golf Club is based on the results of this study. And since our budget is modest, outstanding bent greens is our one feature that can compete with golf courses anywhere, as can be seen by the adjacent photograph.

All greens of 9,000- to 10,000-square-feet are seeded for economic

reasons, and now our choice is Seaside or Penncross. The smaller greens are vegetatively propagated; C7 Cohansey and Old Orchard have proved the most reliable for this purpose.

Black Mountain Golf Club is 15 miles east of Asheville, N.C., where the average elevation is 2,250 feet. Bentgrasses do well in this climate, even though we are in the transition zone between cool-season and warm-season grasses.



Superintendent Ross Taylor stands on the fairway of what he believes to be the longest hole in the world — Number 17, a 745-yard, par 6 dogleg.



### Experimental Plot Preparation

The test work was conducted in cooperation with Dr. William B. Gilbert, associate professor of crop science at North Carolina State. The experimental layout (Page 27) identifies the bent species and the fertilization programs included in this study.

The first six bentgrass species have to be vegetatively propagated; Numbers 7 and 8 are seeded species.

The plots were very carefully pre-





pared to assure uniform results. The soil was disked and harrowed before adding the sand and Turface. Turface was added at the rate the soil analysis indicated, and was worked into the plots using a rototiller. The ground was then raked, leveled, and rolled to firm up the soil before planting. Lime was spread at the rate of 100 lbs. per 1,000 square feet.

The powder type of ureaform fertilizer was applied by a mechanical spreader rather than the usual spray method. We believe that this gives more uniform coverage. The sprinkler was then used to wash the fertilizer into the soil. Fertilizer programs B and C were applied in the normal way. The three types of applications permitted us to evaluate difference in direct application vs. use of balanced fertilizers and the merits of monthly application vs. two applications annually.

Eight weeks after planting, difference in coverage by the various grass

strains was becoming apparent. (See bottom left, Page 27.) On the left is Pennncross; in the middle is C52 Old Orchard; and on the right is C50 Washington. Ten weeks after the plots had been planted or seeded the grass species showed good coverage.

During the five-year period of this study, annual soil tests were made to keep the proper balance of N, P, and K, and to maintain the correct pH. The plots were observed with regard to the weather, disease, and wear resistance of the various species.

The plots were mowed at 3/16 to 1/4 inch four to five times a week during the growing season. When rain was insufficient for moisture requirements, the plots were watered on the same basis as the regular greens. Other cultural practices such as aeration and/or verticutting were not followed because we wanted to keep the species confined to the designated plots.

Weeds were not much of a problem. The fertilizer programs kept most of the turf plots thick enough to prevent weed seeds from germinating. Where weeds or crabgrass appeared, they were removed by hand.

There was an annual disease control program for the plots. We applied fungicides such as mercury, Thiram, Tersan, Captan, P.M.A.S., or iron, or a combination of these, as a preventive when weather conditions were right for disease to develop. They were used as a corrective measure when disease appeared.

Since we did not observe any insect damage in these plots and no serious infestations occurred in the area, no insecticides were applied.

#### Five-Year Summary

A summary of the five-year results with the various turf strains follows:

1. C7 Cohansey and C15 Toronto showed exceptional weather, disease, and wear resistance in all plots, as did the Pennncross and Seaside strains.

2. C1 Arlington and C52 Old Orchard were very satisfactory in all plots.

3. Washington C50 showed up poorest of the eight species. Verticutting and additional fertilizing might have improved the performance.

4. The uniform growth of the three replicates of the C1-C19 Arlington and Congressional was very significant in the plots where powdered ureaform (Plot A) was used. There

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was no separation in these plots, as usually occurs with mixed species, but strains were completely separated in the plots receiving the other fertilization programs (Plots B and C). This difference was noticed after the first year of growth.

### Significant Observations

Over this five-year period the following significant observations were made with regard to the various fertilization programs.

1. In the spring Plots A and C always looked better than the plots B. The powdered ureaform Plots (A) always stayed greener longer in the fall.

2. All plots looked extremely good in the middle of the summer and in early fall.

3. The species in the plots that received the ureaform fertilization programs recovered from disease attack quicker and with less reduction of vigor.

4. One of the most interesting observations (See bottom right.) was to see the powdered ureaform plots real pretty and green when the temperature was 7 below zero!

### Program Recommended

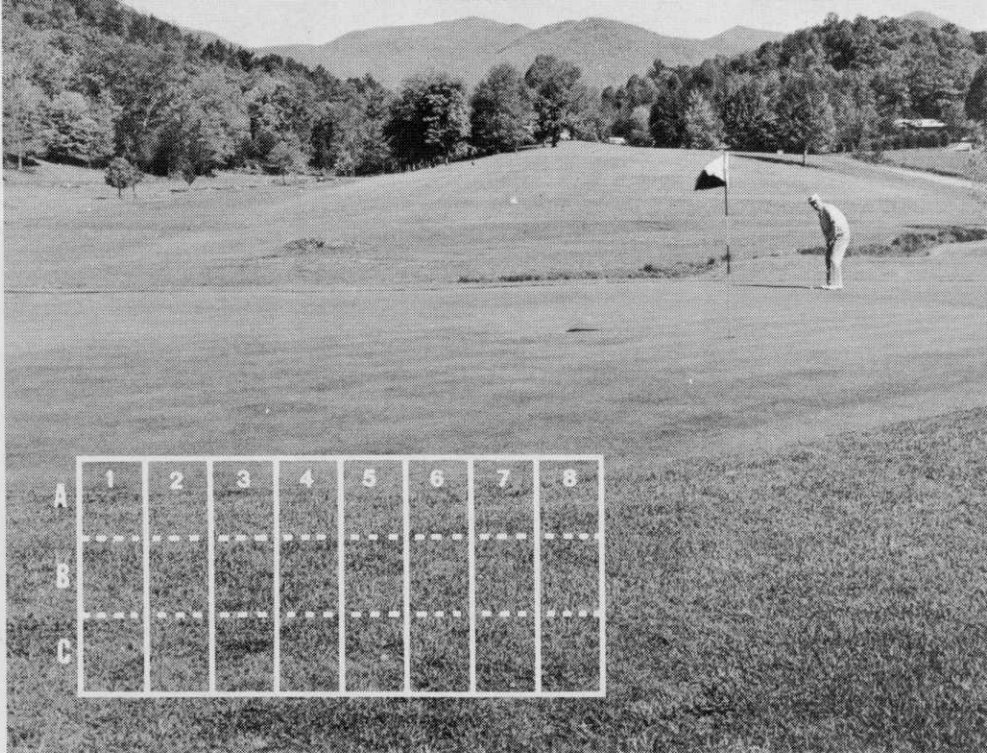
After evaluating these results and analyzing our economics, the turf maintenance program outlined below is followed for all 18 greens to keep them healthy with good color.

1. The Seaside species was selected for use on the larger greens that are seeded at Black Mountain. C7 Cohansey and Old Orchard are the choice for vegetative propagation.

2. Based on our soil analysis and the nutrient removal, we know we need a 4-1-2 fertilizer ratio.

3. Based on this fertilizer study, we selected a 16-4-8 with 60% ureaform nitrogen, and apply annually 10 to 15 lbs. of nitrogen/1,000 square feet to greens.

We make only three applications



Black Mountain's bentgrass experiment setup is superimposed above (not the location) showing three replications of eight bentgrasses. The plot size was 5x32 feet. Strains were: 1—C1 Arlington; 2—C7 Cohansey; 3—C15 Toronto; 4—C50 Washington; 5—C52 Old Orchard; 6—C1-C19 Arlington and Congressional; 7—Penncross; and 8—Seaside. Fertilization: Nitrogen, 10 lbs./1,000 sq. ft. annually. (A) Powder-type of ureaform: 6.5#N/1,000 sq. ft. 38-0-0; 15#/1,000 sq. ft. 0-10-20 in spring; and 3.5#N/1,000 sq. ft. 38-0-0; 15#/1,000 sq. ft. 0-10-20 in the fall. (B) Activated sewage sludge plus 3#KC1/50#, monthly applications April through October. (C) 10-6-4 commercial product with 60% N from ureaform, monthly applications April through October. The ureaform used in these experiments was "Powder Blue type of Nitroform"; the activated sewage sludge was "Milorganite."

a year to greens with the first about April 1 (12-15 lbs.), the second (10-12 lbs.) about May 30, and the final application (20-25 lbs.) between Sept. 1 and 5. This third application is the heaviest to be sure to have good nitrogen residual to carry us into the next spring.

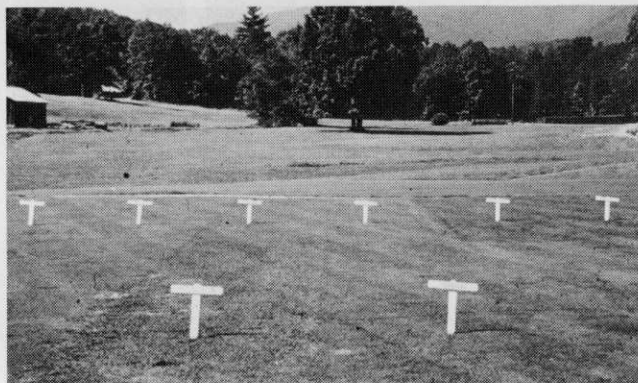
4. Proper cultural practices are also followed which include regular mowing at the proper height, and aerifying and/or verticutting.

5. On our bluegrass fairways we use a 12-4-8 (with 60% N from ureaform) and apply 300 lbs. per acre in the spring and 400 lbs. per acre in the fall.

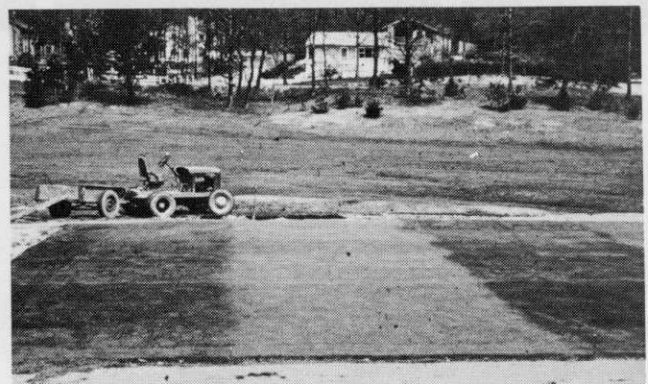
### Home Irrigation Guide Available From Buckner

A brochure for planning a home lawn sprinkling system is available from Buckner Sprinkler Co., Fresno, Calif.

Called "Six Easy Steps to Permanent Home Irrigation," the brochure covers design of an underground sprinkler system, sprinkler head positioning to insure uniform watering, pipeline layout, material needs, installation directions, and conversion to automatic controller operation. For more details, circle (712) on the reply card.



Experimental plots showed this good coverage in 10 weeks. Stolons were topdressed after first cutting.



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# GUIDELINE SPECIFICATIONS soil preparation and sodding

"Turf quality and performance on sodded areas depends on a number of closely related and interdependent factors. These include the selection of adapted turfgrasses, adequate preparation of site, proper installation of sod, and good management practices which will result in fast establishment and good growth of the turf."

This paragraph is contained in the introduction of a publication entitled "Guideline Specifications: Soil Preparation and Sodding" and published by the University of Maryland and Virginia Polytechnic Institute.

"Although this publication has been available for only about six months, we are already seeing tremendous benefit from it," reports

A. J. Powell, turf specialist from the University of Maryland.

"Contractors and architects are very interested, and are using all sections or those sections which apply to their project. This will definitely help to improve turf quality and performance.

"As far as we know, these were the first specifications published in the U.S. for this purpose."

Close behind the Maryland-Virginia specifications has come the announcement that a similar guide is available for the Midwest. At its January annual meeting, the Midwest Turfgrass Growers Association announced that a booklet by the same title was being published.

The table of contents of the Maryland-Virginia guide is reproduced to give a quick idea of what is contained in the specifications. The outline is helpful for other sod producers' groups who might want to draw up specifications for their regions. The Virginia-Maryland guide is available for 15 cents by writing the agronomy departments of the respective universities.

The guide is divided in such a way to allow maximum flexibility for architects and contractors. Each

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# meeting dates

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|    |    | 1  | 2  | 3  | 4  | 5  |
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| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | 31 |    |    |

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

**California Park and Recreation Society** announces three regional workshops. Apr. 7 at Palo Alto Community Center on Middlefield Road; Apr. 8 at Carriage House Restaurant, 1210 N. Blackstone Ave., Fresno; and Apr. 9 Parnell Park Activity Building, Whittier.

**National Golf Foundation** annual meeting at Stouffer's Riverfront Inn, St. Louis, Mo. Apr. 16.

**22nd Annual Nurserymen's Refresher Course**, sponsored by the California Association of Nurserymen at Cal Poly, San Luis Obispo, June 9-11.

**Ohio Chapter, International Shade Tree Conference**, at the USDA Shade Tree and Ornamental Plants Laboratory at Delaware, Ohio, July 8.

**American Sod Producers Association** 4th annual conference and field day, Ramada Dorchester Inn, Dolton, Ill., and the H & E Sod Farm, Momence, Ill., July 28-30.

**46th International Shade Tree Conference**, Hotel Flagship-Rochester, N.Y., Aug. 9-14.

**Sprayorama '70 Pacific Northwest Pesticide Applicators, Inc.**, annual meeting, Thunderbird Motel, 1401 N. Hayden Island Dr., Portland, Ore., Sept. 10-12.

section can stand alone or be incorporated into an overall set of specifications for an entire sodding project. Contractors who specialize in a certain type of activity have the opportunity of bidding on only a portion of a project if the specifications are so designed — for example, supply and install topsoil, install sod, or maintain turf after sodding.

An appendix to the Maryland-Virginia guide explains about the two-state classification of sod:

"Certified Sod" is superior sod

grown from "certified" seed. It is inspected and certified by the State Certifying Agency to insure genetic purity, overall high quality, and freedom from noxious weeds, as well as excessive amounts of other crop and weed plants at the time of harvest. The sod must meet published state standards and bear an official Maryland, Virginia, or other state "Certified Sod" label on the bill of lading.

"Approved Sod" is inspected and approved by the State Certifying

Agency to insure overall high quality and freedom from noxious weeds and excessive amounts of other crop and weed plants at the time of harvest. It may be composed of a mixture of two or more varieties or species. The sod must meet published state standards and bear an official Maryland, Virginia "Approved Sod" label on the bill of lading.

Appendix B describes the composition of sod that is suitable for the particular region.

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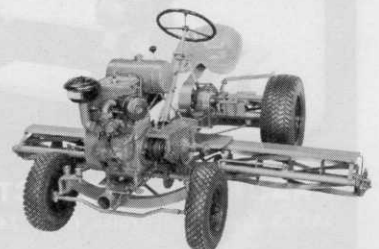
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The number of hours a day and days per season acceptable for dormant-season spraying with pesticides may be extended greatly, thanks to research done at Iowa State University, Ames.

How? By using methyl alcohol with water instead of water alone for preparing spray formulations, it is possible to have sprays that can be used at temperatures down to zero degrees Fahrenheit.

Dr. A. H. Epstein, extension plant pathologist at ISU, who is concerned with Dutch elm disease control, examined the exacting conditions required for spraying for the elm bark beetle which spreads the disease. Normally to spray, bark has to be dry, the wind can't exceed 5 mph and the temperature must be above freezing, simply because if it's colder, spraying equipment may be damaged or ruined by ice.

Some seasons this combination of conditions just doesn't occur in some localities. Being able to spray at temperatures below freezing would almost eliminate one of the limitations, Epstein noted.

Working with methoxychlor, Epstein observed that spray mixtures generally used in helicopter sprayers and mist blowers consist of either 12.5% or 16% insecticide in an emulsifier (xylene) mixed with water.

"A 12.5% spray emulsion could be prepared by mixing water and 25% spray concentrate on a 1-to-1 basis. This emulsion would freeze at or very slightly below freezing," he says.

However, by using methyl alcohol, the freezing point of the mixture can be lowered. Using 10, 20, 30, 40 and 50% alcohol concentrations, Epstein found he could lower the

freezing point to 28, 24, 16, 10 and 0 degrees Fahrenheit, respectively.

Examination of results of spraying glass slides and elm bark with the low-temperature sprays showed resulting residues were quite similar in evenness and concentration to those left by more conventional applications made in "normal" warmer temperatures.

"The spray droplets dried into spots that looked like dried varnish," the plant scientist says. Additionally, study of residues of the same sprays applied in March to trees outdoors showed that substantial amounts of methoxychlor remained on them 123 days later. Use of the low-temperature formulation did not appear to affect the residual qualities of the pesticide.

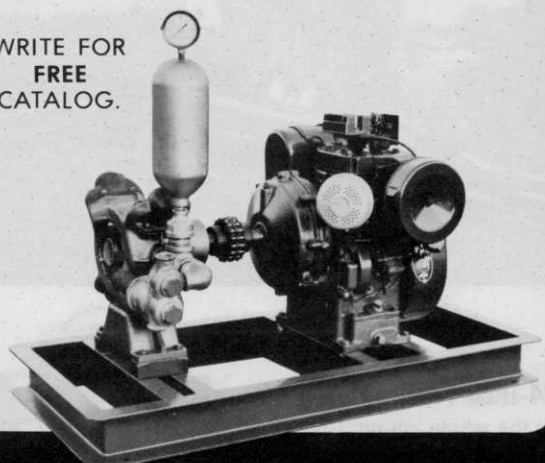
Presently, treating for control of elm bark beetles, and, in turn Dutch elm disease, is the main application of dormant-season sprays. However, Epstein says, additional work is being done and winter spraying of other plants could become practical for some pest control problems.

So, the possibility of adding an "anti-freeze" to pesticides may become important in the near future.

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Officers and directors of the re-organized Virginia Turfgrass Council are, from the left: Harvey Carpenter, Jr., Carpenter's Seed Cleaning Plant, Mitchells; B. K. Powers, Weblite Corporation, Roanoke; William P. Mooney, superintendent, Langley Air Force Base Golf Course; John F. Cook, superintendent, Country Club of Virginia, Richmond; W. R. Clements, Virginia Department of Highways, Richmond; Earl

H. Odell, Todd Company, Chesapeake; Ralph W. Firebaugh, Martinsville; J. L. Kidwell, Kidwell Turf Farms, Culpeper; Sheldon R. Betterly, Centreville Sod Growers, Inc., Nokesville; Lee C. Dieter, superintendent, Washington Golf and Country Club, Arlington; also pictured is John F. Shoulders, Extension specialist, turf, V.P.I., Blacksburg.



Robert F. Shields, past president of the Golf Course Superintendents Association of America, presents a GCSAA scholarship to Timothy P. Hutchison of Chantilly.



Dr. Fred V. Grau, left, world turf authority, and Dr. R. E. Blaser, president of the American Society of Agronomy were conference speakers.

## Turf Council In Virginia Re-Organizes

Virginia Turfgrass Council reorganized and received its charter of incorporation during the recent 10th Virginia Turfgrass Conference at Fredericksburg.

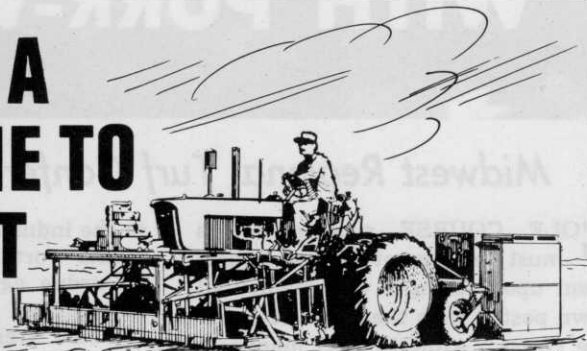
More than 280 superintendents, representatives of industry and others attended, reports J. F. Shoulders, Extension specialist in turf at V.P.I.

The program featured three general topics: soils, nutrients, and turf response; developments for improved turf quality; and developing and maintaining large turf areas.

Appearing on the program were Dr. Fred V. Grau, world renowned turf authority; R. E. Blaser of V.P.I. and president of the American Society of Agronomy; Holman Griffin of U.S.G.A. Greens Section; Dr. C. Reed Funk, Rutgers University; and Dr. D. V. Waddington of Penn State.

At the organization meeting of the board, Lee C. Dieter, superintendent of the Washington Golf and Country Club, Arlington, was elected president; J. L. Kidwell of Kidwell Turf Farms, Culpeper, vice-president; and Earl H. Odell, Todd Company of Chesapeake, secretary-treasurer.

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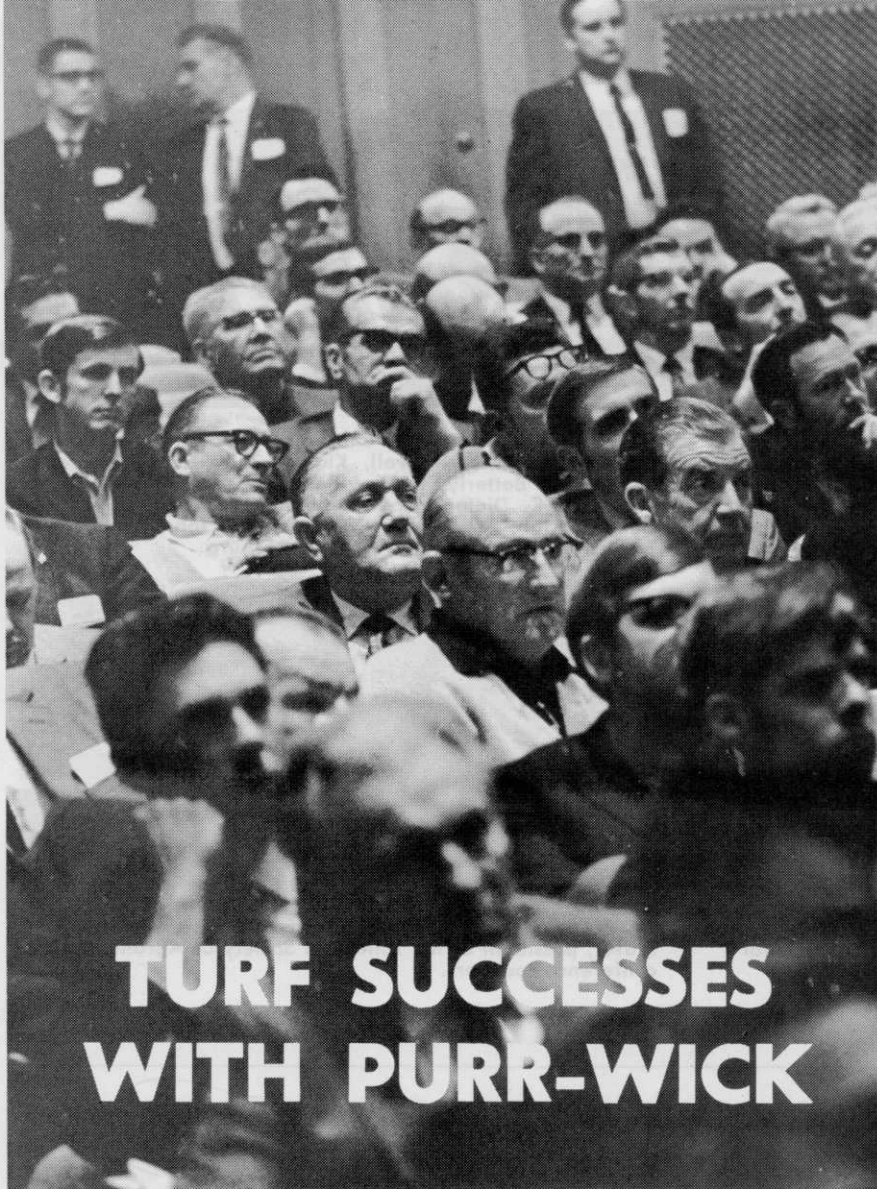
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# TURF SUCCESSES WITH PURR-WICK

## Midwest Regional Turf Conference Report

**G**OLF COURSE superintendents must get a great deal of amusement upon seeing a well-manicured lawn posted with the sign: Keep Off the Grass." Athletic field managers and sod growers must snicker a bit, also, about the owner's concern over damage from a few people walking or a few youngsters romping on the grass.

For the commercial turf industry's greatest challenge and biggest headache, of course, is to build and maintain the best turf exactly where the heaviest traffic and worst punishment will occur. The problems aren't entirely solved, and that's why about 700 turf specialists came to Purdue University, Lafayette, Ind., March 2-4, for the Midwest Regional Turf Conference.

### 10 Ways to Build

A positive theme of "Success With Turf" carried the implication that at least some researchers and turf men

in the industry had realized achievements worth talking about.

Purdue agronomist W. H. Daniel summarized 10 ways to build high use turf areas:

1. *Use any subsoil*, mud in and shape to grade (and leave the troubles as soon as paid, he quipped).
2. *Topsoil onto topsoil*. Avoid any subsoil, avoid working when wet. Conserving what's good can save funds. Most likely success comes with sandier soils.
3. *Subsoil under topsoil*. When a major fill is necessary, conserve and replace four to 10 inches of topsoil.
4. *Subsoil under topsoil plus drainage*. Add pea gravel backfill within six inches of surface. Tile 20 to 30 feet apart and 18 to 30 inches deep.
5. *Same as Number 4 plus sand (60%) and peat (20%) mixture*, or a variation of the ratio, mixed into the top two to four, even 10, inches of top soil in hopes of getting better water movement and less compaction.



Purdue students Carl Landgrebe, left, of Valparaiso, Ind., and Steven G. Lambert of Eaton are smiling about the \$400 scholarships they've received to further their turf studies. Landgrebe received the Mueller Sod Farm grant; Lambert got his from the Golf Course Superintendents Association of America.

6. *Intimate topmix*, prepared off-site, based on USGA green section research. Ten to 14 inches of settle topmix over two inches of washed sand over four inches of pea gravel over field tile drainage.

7. *Thin rootzone* on contoured subgrade, place small plastic drains (1.5- to 2-inch pipe with frequent narrow slits) into shallow, narrow trenches (10 feet apart). Backfill with coarse sand to overflow trench, then place 4-6-inch washed fine sand over loosened subgrade. Cover with one inch of peat and one-half inch of calcined aggregates and fertilizer. Mix well into upper one-half of sand. Compact and plant. Can be five to eight inches in total depth.

8. *Impermeable layer*, giving zero tension as it isolates subgrade. Plastic sheet is spread over contoured subsoil. Slitted plastic drain pipe is laid onto plastic sheet 10 to 20 feet apart. Coarse sand is spread over drains, then selected available sand spread 10 to 20 inches deep, based on fineness. Add peat, fertilizer, calcined aggregates. Mix into surface one to three inches. Compact and plant, mulch and keep moist.

9. **PURR-WICK** (Plastic under sand reservoir rootzone) (Figs. 1 & 2) is essentially No. 8 plus reservoir pools that store water and feed root systems through wick action. Tiers of flat pools are formed as needed beneath the even or contoured surface. Three- to six-inch ledges are built around each pool and around the edge of the total area. Interior pool edges can be stabilized by using





Officers for the 1970-71 year of the Midwest Regional Turf Foundation are, from the left, James Kirchdorfer of Irrigation, Inc., Louisville, Ky., vice-president; Theodore Woehrle, superintendent of Oakland Hills Country Club, Birmingham, Mich., president; and W. H. Daniel, Purdue turf specialist, executive secretary. Daniel received a huge "birthday cake" at the conference banquet from outgoing officers. The cake, aglow with candles signified several things, said president Robert Meier, Jr., the 33rd year of the conference, 25th anniversary of the Foundation, and the 20th year of Daniel's service as executive secretary of the Foundation.

four-inch pipe, stake anchored. Eight- or 10-mil polyethylene sheeting is used to cover the entire pool area, overlapping one to three feet and taped for extra seal. A double thickness of six-mil sheeting is adequate. Add plastic drain pipe as indicated in No. 8 and drain plugs as shown in Fig. 2. Coarse sand or gravel can be used to cover drains. Laboratory analysis of sand particle size and uniformity determines depth. These factors determine how far moisture will rise by wick action to be utilized by turf roots.

It's important that the sand be uniform in size with most particles in the range of 0.25 to 0.50 mm (60-35 mesh).

Extend the drain pipes through the plastic by cutting an X somewhat smaller than the pipe. Ease pipe through, tape it generously then concrete. Another way is to use bolted, flanged, waterproof collars of plastic. Spread sand, compact and plant as in No. 8.

10. The PURR-WICK system can be refined one more step by incorporating sub-irrigation with a chamber and adjustable float valve for each tier, thus achieving desired wetness automatically. Soil sensing probes could be used to regulate the system.

The major advantages of the PURR-WICK system, developed at Purdue University, is that it gives the manager absolute water control, can be built on any subgrade material, allows long periods between irrigation, conserves water to the maximum, stores some nutrients as dilute solution (but may

need more frequent fertilizer), and plays uniformly moist.

An ingredient table is shown in Fig. 3. Detailed specifications are available by writing the Midwest Regional Turf Foundation, Department of Agronomy, Purdue University, Lafayette, Ind. 49707.

Ask for MRTF leaflet No. 40, dated January, 1970. The leaflet describes the system and research done since 1960 by W. H. Daniel, David Ralston, David Bingaman, Mel Jansen, Robert Montgomery, H. Kohnke, Ed Monk, and others.

#### PURR-WICK in the Field

A panel of five men who have

built or maintained PURR-WICK systems in golf courses discussed their experiences.

Costs can vary considerably, depending on the local price for suitable sand. William Story, superintendent of Carmi, Ill., Country Club, reported a 4,000 sq. ft. green for \$2,280, with sand costing \$2.60 per ton. Charles Tadge, superintendent of the Mayfield Country Club, South Euclid, Ohio, built a ladies' tee, 20x30 feet, for \$642 with sand costing \$4.20 per ton.

Morgan Boggs, golf course architect, Louisville, Ky., currently is building 19 PURR-WICK greens (12 are done) using sand on the site.

Particular care must be taken, the panel said, in dumping and spreading the sand to avoid tearing or moving the plastic sheeting. George Lumpkins, superintendent of the Owensboro, Ky., Country Club reported using plywood sheets at the edge of the green to permit truck dumping of sand nearer the center. Ready-mix concrete trucks were suggested also as a means of distributing the sand. Flotation tires at reduced pressure were also suggested by Lumpkins for tractor-dozer units.

Recommended seeding rates for PURR-WICK installations are one pound of Penncross or the equivalent, two pounds of bluegrass or equivalent, or three pounds of grass mixture per 1,000 sq. ft. Spread stolons at the rate of eight to 10 bushels per 1,000 sq. ft. Sod should be cut as thin as practical and be greens-aired once or more after laying, plus topdressed.

Story of Carmi Country Club re-

Figure 1. Idealized cross section of PURR-WICK construction.

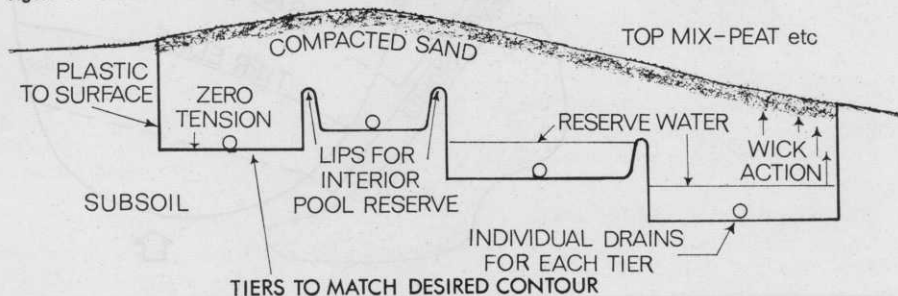
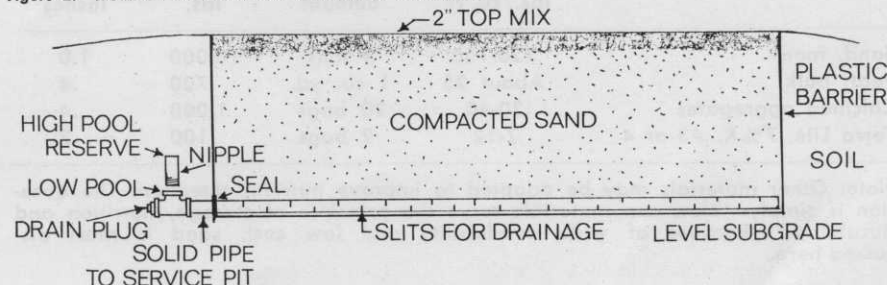


Figure 2. Idealized cross section of one tier of PURR-WICK.







Members of this panel discussed their experiences with PURR-WICK constructed greens or tees. From the left, they are William Story, superintendent of the Carmi, Ill., Country Club; Birdie Shelton, Superintendent of the L & N Golf

Course at Brooks, Ky.; Charles Tadge, superintendent of the Mayfield Country Club, South Euclid, Ohio; George Lumpkins, superintendent of Owensboro Ky., Country Club; and Morgan Boggs, golf course architect of Louisville, Ky.

ported that "We seeded Penncross on Sept. 4, mowed it eight days later, and opened for play on Oct. 10."

Birdie Shelton, superintendent of the L & N Golf Course at Brooks, Ky., seeded half of a green and stolonized the other half as a check. "The seeded established first, but in four months the stolonized had caught up and was a darker green,"

he said. Charles Tadge sodded the ladies' tee with Warren's A20 blue-grass sod.

#### Landscaping Eases Stresses

The conference program was rounded out with reviews on turfgrass disease, athletic field maintenance, weed control methods, sod handling, fertilization, irrigation,

and reports from the European tours of turfgrass areas taken as a part of last summer's International Turfgrass Society conference in England.

If properly planned and managed, landscaping can significantly alleviate human stresses caused by pollution, contended Dr. F. O. Lanphear, Purdue horticulturist. He said vegetation can reduce thermal pollution in urban areas by more than 10 degrees Fahrenheit.

"Air pollution can be reduced to some extent by large masses of vegetation, such as green belts and highway plantings," he continued. "Landscape plantings also reduce noise significantly, particularly high frequency noise," Lanphear added.

Speaking of Purdue's landscaping program, he emphasized it had grown from 10-15 students — its first year, 1964 — to more than 70 students today. More than 20 graduate students are now involved in the program and three full-time landscape architects are on the staff.

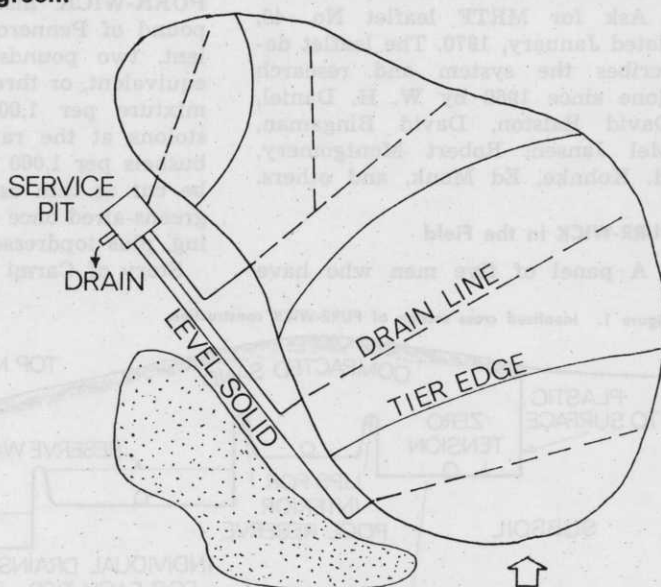
Scope of the landscape architectural program at Purdue includes regional land planning, institutional sites, parks, highways, industrial and commercial sites, and residences, he said.

#### New Officers

Officers of the Foundation, elected for 1970-71, are Theodore Woehrle, superintendent, Oakland Hills Country Club, Birmingham, Mich., president; James Kirchdorfer, Kirchdorfer Irrigation, Inc., Louisville, Ky., vice-president, and W. H. Daniel, Purdue turf specialist, executive secretary (re-elected).

New directors are John Fitzpatrick, Cincinnati, O.; Paul Morgan, Middletown, O., and John Dunlap, Cleveland, O.

Figure 3. Schematic of four tiers and drains in a golf green.

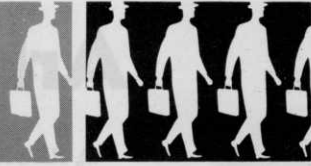


| Some Materials           | Estimated    | Per 1,000 sq. ft. |        |        |
|--------------------------|--------------|-------------------|--------|--------|
|                          | lbs./cu. ft. | amount            | lbs.   | inches |
| Sand, moist              | 120-150      | 5 tons            | 10,000 | 1.0    |
| Peat, bulk               | About 25     | 1 cu. yd.         | 700    | .4     |
| Calcined aggregates      | 30-40        | 20 bags           | 1,000  | .4     |
| Terra Lite, 7%K, #3 or 4 | 7-12         | 2 bags            | 100    | .2     |

Note: Other materials may be adapted to improve nutrient retention. The question is simply: "How can materials serve the principle of storage, nutrition and durability?" Because of wide availability and low cost, sand is most discussed here.



## industry people on the move



**New Jersey Society of Certified Tree Experts** has elected these officers for 1970: President — Richard F. Walter of Maplewood; vice-president — Carl Rose of Kearney; secretary — Jacob E. Bruinooge of Park Ridge; and treasurer — Harry P. Banker of Hanover.

\* \* \*

**Michigan Association of Landscape Architects** has selected these officers for 1970: President — Don Reetz; vice-president — Versile Fraleigh; secretary-treasurer — Pete Klan; and executive secretary — Jane Smith.

\* \* \*

**TUCO Division** of the Upjohn Company has added Marvin Eugene Parr to its agricultural chemicals sales unit. Parr will be responsible for sales in Virginia and North Carolina.

\* \* \*

**Fred Shuler** has been appointed project leader for Velsicol Chemical Corporation's industrial markets. Shuler will be responsible specifically for developing markets for Velsicol's Banvel herbicide along highways, railroads, utility lines, and similar non-cropland areas.

\* \* \*

**Roger Gold and Ken Bigman** have joined the staff of sales representatives for Valley Crest Landscape, Inc., a division of Environmental Industries, Inc., with offices in Van Nuys, Santa Ana, San Diego, and Concord, Calif. Gold is servicing the Los Angeles area; Bigman, the northern California area.

\* \* \*

**Ryan Equipment Company**, St. Paul, Minn., has announced the appointment of Frank Buschini and Harry Murray, Jr., as regional sales representatives. Buschini was named eastern sales representative to succeed Charles K. Curry, who recently became Ryan sales manager. Murray is the midwest representative, a newly created post.

\* \* \*

**Servis Equipment Company**, Dallas, Tex., has announced six management advancements:

John C. Collins was named executive vice-president and will serve as chief operating officer. Leighton R. Glass is the new vice-president of sales. Al Scifres, the first Servis salesman to sell \$1 million in one year, is the new assistant sales manager. Raymond Crawford has become controller. James W. Compton is the company's first assistant controller. Howard Humphrey is now director of marketing.

\* \* \*

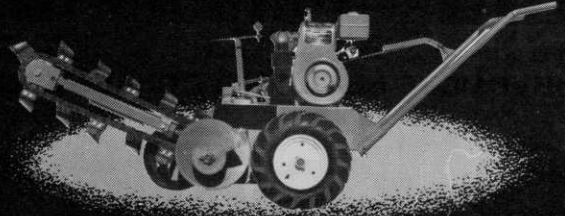
**Dr. Lambert Erickson**, University of Idaho plant scientist, recipient of one of two Fulbright Travel Scholarships for Scandinavian countries, is presently in Norway on sabbatical leave doing research in weed taxonomy, ecology and control.

\* \* \*

**The Pennsylvania-Delaware Chapter** of the International Shade Tree Conference elected the following officers at its Feb. 20-21 fifth annual symposium: President — Robert C. McConnell, arborist, Fairmount Park Commission, Philadelphia; vice-president-elect — Earl A. Blankenship, director of forestry, Pittsburgh; vice-president — Joseph L. Hayden, arborist, Lower Merion Township, Montgomery County, Pa.; secretary-treasurer — John C. Anspach, city forester, Bethlehem, Pa.

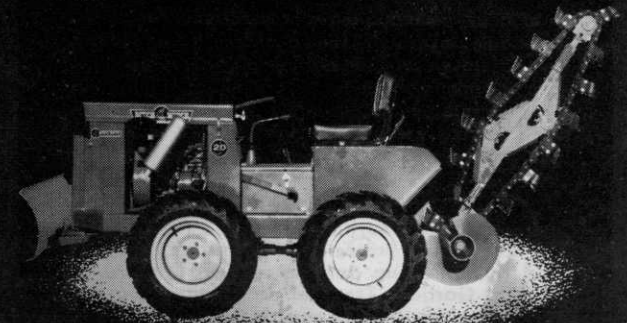
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**J20** is an 18-HP, four-wheel-drive unit which can dig up to 900 FPH in ranges up to 5' deep, 12" wide. It offers three mechanically-selected digging chain speeds, plus reverse, and has hydraulically-controlled boom, backfill blade, steering and travel speed control. While trenching, travel speed is controlled hydraulically, allowing full mechanical power to be used independently for selective digging chain speeds. Designed to operate at full engine RPM providing full power efficiency for trenching. Can be equipped with boring attachment.

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# Arborists Soak



**A**RBORISTS do hold some answers to the country's great problems, Jack MacDonald of Arizona Public Service Company told the national gathering at its February annual meeting in Phoenix.

You can see that it's the arborist who really cares for the spindly tree surrounded by concrete and asphalt, he said. The arborist is charged with the responsibility—and the pleasure—of making the country a more beautiful and a better place to live.

MacDonald, director of special services for Arizona Public Service Company and a member of the executive committee of the Governor's Commission for Arizona Beauty, provided the inspirational ingredient for the National Arborists Association program. He described the community beautification effort that is taking place across the state, from the gestures of new mothers giving memorial trees, to city-wide tree-planting endeavors, to state-wide long-range planning.

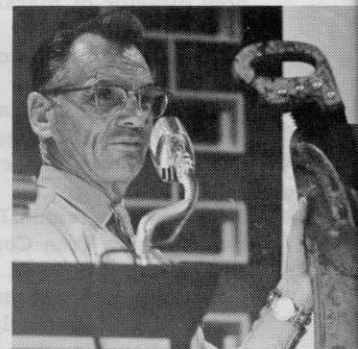
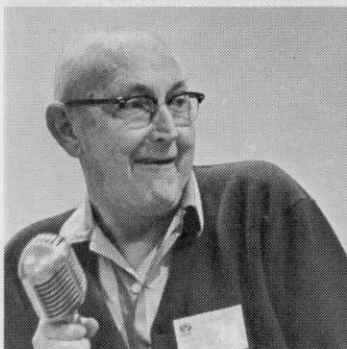
Those attending responded to MacDonald's enthusiasm by donating enough money to buy 100 citrus trees for the Phoenix tree planting program. The gesture also was in keeping with the National Arborist Association tradition of presenting a tree to the city where it meets.

## Finding, Keeping Good Help

Subject matter for the remainder of the four half-day business sessions was directed toward solving arborists' own every day problems. Speakers, panelists and floor discussions ranged over recruiting, training and holding employees, safety, DDT substitutes, and line-clearing practices.

Difficulties of recruiting and hold-

National Arborist officers for 1970 (front to rear): President — William A. Rae, Jr., Frost and Higgins Co., Burlington, Mass.; first vice-president—William P. Lanphear III, Forest City Tree Protection, Cleveland, Ohio; second vice-president — Glen Burns, Karl Kuemmerling and Associates, Canton, Ohio; secretary — John Shullenbarger, Gustin Gardens Tree Service, Gaithersburg, Md.; treasurer — Robert Felix, Harder Services, Inc., Hempstead, N.Y.; director — Thomas Morrison, arborist, Wilmette, Ill.; director — W. Roland Shannon, Shannon Tree Co., Milford, Pa.; and Past president — Paul Walgren, Walgren Tree Expert Co., West Hartford, Conn. Another director, Paul Ramsey, N. G. Gilbert Corp., Muncie, Ind., was not present.



Among program participants, from the left, were longtime arborist Gordon H. Knowles, who presented the attendance prize (Heller-Gro liquid fertilizer, of course); Kenneth Kirk, president of Shield Shade Tree Specialists, St. Louis, who

talked about employee incentives; Carl C. Brigham, management consultant, who discussed employee motivation; and William Johnson ("Badger Bill"), the Phoenix area host and who talked about desert tree care.



# Up Ideas and Sunshine

ing employees can be reduced markedly if the right people are hired in the first place contended Carl C. Brigham, management consultant.

"Try to find out what motivates the man you're considering, he said. As you interview, "watch for his basic, or psychic, energy level, his level of aspiration, his ability to stand frustration."

Brigham said there are up to eight basic needs that most people have. These are the need for: security, status, power, investigation, excellence, perfection and service.

Tree work, he averred, satisfies the need for excelling, perfection, serving and investigating. So, he concluded, you look for a man who rates these needs highest.

And William Johnson, owner of Badger Tree Service, Phoenix, noted: "A good tree man is a good artist."

Company image can exert drawing power upon the more capable men in the labor market, suggested William A. Rae, Jr., Frost and Higgins Co., Burlington, Mass.

"You're more likely to get the good employee if the company has good looking equipment and uniforms," he said. "We feel ours is the company to work for in our community."

Panelists pretty much agreed with Ray Gustin, Jr., Gustin Gardens Tree Service, Gaithersburg, Md., that benefit programs are important for attracting and keeping good men, but that for the younger employee "loyalty is tied pretty closely to wages per hour."

## Employee Incentives

Several incentives were discussed, with all tied to ability and varying amounts of employee attitude and discipline.

"We offer a 5¢/hr. accumulative bonus payable at the end of the year," reported Kenneth Kirk, president of Shield Shade Tree Specialists, St. Louis. "After two years' tenure, we have a profit-sharing program based on hours worked, years of service, attitude, appearance and ability.

"We pay up to four weeks' vacation. After the first year, three days; second year, a week; and so on. We give seven paid holidays, but the employee must work the day before and the day after to qualify.

"We have a life insurance pro-

gram, and the company pays about a third of the costs.

"A uniform change is provided every day or every other day."

In return, the 22-man force is required to show up two hours every day, regardless of weather, for such activities as clean-up, wash-up and repair work. They must be clean

shaven, there are no "long hairs."

Shield men normally work a nine-hour day, six-day week, getting time and a half for overtime. They take no coffee breaks, and never park equipment in front of a tavern. And no "moonlight" tree work is allowed.

Johnson of Badger Tree Service listed the ingredients of a successful tree company as good men, education, and public relations.

Build a sense of belonging in your employees, he advised. Uniforms are one way to do it. They don't have

## Mitts & Merrill Brush Chippers For...

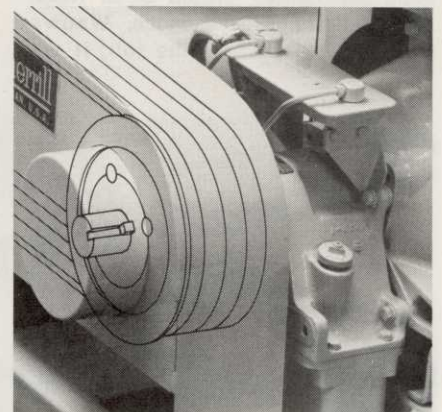


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to be elaborate; they have to be practical. "Our men all wear levis, yellow T-shirts and yellow helmets."

#### Training Prospective Employees

Of utmost importance is to determine if a man really likes tree work. Rae said Frost and Higgins accomplishes this objective as it trains. The company goes into schools to recruit college and high school men. A six-weeks' training course is offered to them, with pay and "no strings attached." At the end of the training, the prospective employee knows whether he likes the work and he's trained and ready to work permanently.

Training is conducted on weekends. Rae says 60% have joined the company afterward.

"Another good source of employees is from your present staff. If an employee brings in a man that stays five weeks, we pay the employee a bonus."

An obvious but often overlooked way to keep employees, Rae added, is to tell them when they've done a good job. "A little praise does go a long way."

C. G. Wilhelm of Denver follows the practice of leaving a card with the customers for them to rate work done. "They do send in the cards, and our employees do read them."

#### DDT Substitutes

"Talking about DDT substitutes... that could be very short; there is no good substitute," stated C. L. Wachtel, Wachtel Tree Service, Wauwatosa, Wis. "DDT did the job; it was



Entertainment included a tour of the Desert Botanical Garden of Arizona . . .

there when the beetle emerged."

"We intend to intensify our sanitation program of removing all diseased trees. We'll continue to use bidrin injections, a pretty good substitute but one that depends on the skill of the applicator. Vapam is used to isolate diseased trees by preventing root graph.

"Methoxychlor doesn't have the killing power or residual of DDT, but we'll just have to try harder getting good timing."

Edwin Irish of Charles F. Irish Co., Warren, Mich., reported acceptable results with methoxychlor. "We started two years ago, and use it 80% of the time.

Del Kennedy of Ukiah, Calif., sees

the possibility that "in three to five years the state will darn near take your sprayer away from you and say this is it."

"Systemics will be the answer," he said. "Can we make any money at it? About three times more than spraying."

Kennedy reported working with bidrin, methylcystox and Monitor. He sees "injecticides" coming on in the form of fertilizers, fungicides and pesticides.

#### Line-Clearing Changes

Tree companies can no longer afford to have "hatchet men" on line-clearing jobs, said Riley Stevens, Stevens Tree Surgery Co., Portland. "People have come to recognize the tree as a thing of beauty, as something to be preserved."

Stevens said he was at a loss to predict how much line-clearing there would be for his son. There's a trend to put lines underground, especially in new areas. He predicted that the next decade might bring the end of overhead wires except for principal power lines.

Trenching equipment and growth inhibitors are going to play important roles in right-of-way maintenance practices, said Glenn Burns of Kummerling and Associates, Canton, Ohio.

He told of tree experiments in which treated trees grew to 5½ feet in two years while untreated trees reached 17½ feet high. Mechanical tree trimming will diminish; chemical trimming will increase, he said.

Utilities make the mistake of asking for the kind of job they've determined the public approves of, then accepting the lowest bid from



Dan Lynch, executive secretary, discusses some last-minute program changes with Don Quintero, center, and Freeman Parr, program chairman. Lynch and Quintero are staff members of Executive Consultants, Inc., Washington, D.C., the new management firm for the National Arborists.





W. H. Earle, director of the Papago Park garden, points out dark red cactus flowers.

a contractor to do the work, said another panelist.

"Often they don't get the quality of work they expected," said W. Roland Shannon, Shannon Tree Service, Milford, Pa.

"They need to remember that the contractor is a representative of the utility he's working for."

Shannon sees a public relations bonus for the utility or tree company that can find a way to decrease the visual brown out from brush-killing materials such as 2,4,5-T.

Safety awards were presented to Farrens Tree Service, Jacksonville, Fla.; Charles F. Irish Co., Warren, Mich., and Landscape Foresters, Ltd., Bronxville, N. Y.

### USDA Bans Aldrin, Dieldrin For Aquatic Environments

USDA on Mar. 9 canceled federal registrations for all uses of aldrin and dieldrin insecticides in aquatic environments" in an effort to further reduce pollution of the nation's water resources and potential contamination of fish and other aquatic life."

ARS cancellation of aquatic uses includes all uses in marshes, wetlands, and adjacent areas including treatments for control of mosquito larvae, filter fly larvae in sewage systems, and tabanid larvae in outdoor areas.

Individual product cancellations

take effect 30 days after manufacturers receive cancellation letters from ARS.

### Hybrid Spruce Developed At Michigan State University Has Fast Early Growth

A new hybrid spruce has been developed at Michigan State University that combines the early growth characteristics of the white spruce with the ornamental qualities of the blue spruce.

The hybrid was developed from a new cross between blue spruce and white spruce, reports Dr. James Hanover, Michigan State University forestry researcher.

The blue spruce is known for its ornamental qualities of form, appearance and drought resistance. Blue spruces are also used for Christmas trees and windbreaks, but are slow growing in their juvenile stage (the first 10 years). The white spruce is primarily a timber tree, fast growing in both its early and late stages.

Dr. Hanover has grown some of the new hybrid spruces to a height of 24 inches in less than two years under greenhouse cover. This year, although he will produce enough seedlings for further intensive testing in nurseries and plantations, he will not have seed for large-scale release of them, he reports.

The hybrid was produced from man-made crosses because white spruce and blue spruce do not grow together naturally due to their adaptation to different climates.



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# 2,4,5-T Issue Phony, Say Weed Experts

by THORNE GRAY  
Modesto, Calif.

Weed control experts are on the offensive in California to stand behind chemical herbicides, especially the controversial 2,4,5-T and its relative 2,4-D, in the face of what some consider a "phony" pesticide issue.

"This whole flap has no scientific meaning whatsoever, none whatsoever," is the way Professor Boysie E. Day of the horticultural science department at the University of California at Riverside summed up the controversy. "It's a phony issue."

Day and others made their views known in interviews during the 22nd annual California Weed Conference held in Anaheim Jan. 19 and 21. What to do about 2,4,5-T and 2,4-D, and what to do without them if they are restricted, were the hottest topics of conversation among the more



Day

Schweers

Elmore

Sylwester

than 800 conference participants.

The herbicide 2,4,5-T came under fire last October from Dr. Lee A. DuBridge, science adviser to President Richard Nixon, who was influenced by findings in a government-contracted study by Bionetics Research Laboratories. The studies, since considered suspect because of a chemical impurity in the samples used, showed a correlation between birth defects and deformities in laboratory animals and exposure to the pesticide. At about the same time, other reports were linking the herbicide to birth defects being noted in Vietnam, where 2,4,5-T is used extensively as a jungle and brush defoliant and where pregnant Vietnamese women may have been directly sprayed.

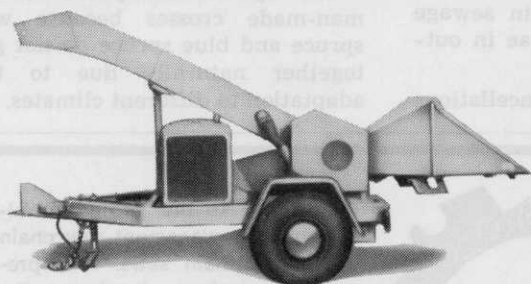
"2,4,5-T has never appeared in any

significant quantity in the food environment at all," said Day, who said he made a special effort to find out what was motivating government sentiment against the chemical.

"Over the past two years in some 25,000 market place analyses, 2,4,5-T was discovered in three samples and the average rate of occurrence was about .008 parts per million in those," he said. "If we can assume this is an average, and that's a fair number of samples to base an average on, there is not enough 2,4,5-T in all the food in the world to affect one person if he could eat that much."

Day said the Bionetics study indicated a pregnant woman weighing 125 pounds would have to ingest about 250 milligrams per day for six days to "get near the threshold of

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causing some birth defects." Based on the 25,000 food samples, he calculated the woman would have to eat no less than 1,000 tons of food per day just to consume one milligram of the herbicide. "I submit this is meaningless," he concluded.

Dr. E. P. "Dutch" Sylwester, a weed control specialist from Iowa State University and conference key-note, said troubles with herbicides have arisen in many instances "from misuse rather than use."

"If we are using dangerous things, let's drop them so as to be beyond reproach," Sylwester said. "Let's use only the best. There are more than 800 materials, and not all of them pesticides, which are under close scrutiny but while they are at it, why not look at some of the things which we have always taken for granted like aspirin, tetraethyl lead, fingernail polish, turpentine, alcohol, tobacco or exhaust fumes."

Conference participant Clyde Elmore, a botanist and turf specialist from the University of California at Davis, stressed the importance of 2,4,5-T and 2,4-D to the turf industry.

"I would say if any homeowner is interested in killing weeds in his lawn, he would use one of these," Elmore said. "There is a tremendous acreage just in the homeowner and turf industries which could be or would be hampered by the loss of any one of the compounds in the 2,4,5-T family."

Elmore said an overdose or a misapplication of the herbicides is easy to detect from crop damage, and therefore the chemicals are not likely to be used near food crops or at strengths for which they are not registered. He also noted 2,4,5-T and 2,4-D break down relatively quickly into harmless components, in contrast to "persistent" pesticides such as DDT, and they do not accumulate in food chains.

"We know that weed control chemicals are safe if used according to label instructions and no one need worry about any chemical residue on their food," said UC farm adviser Vincent H. Schweers of Visalia, president of the weed conference. "Weed control chemicals are checked and rechecked and then registered with the federal and state governments for specific safe uses. The University of California gathers its own performance data and spot checks residue data on weed control chemicals before giving a University recommendation. As a follow-up, the federal Food and Drug Administration and the State Department of Agriculture participate in monitoring crops for residues. The facts are in our favor."

## A Chewings Fescue Variety Licensed for Canada Use

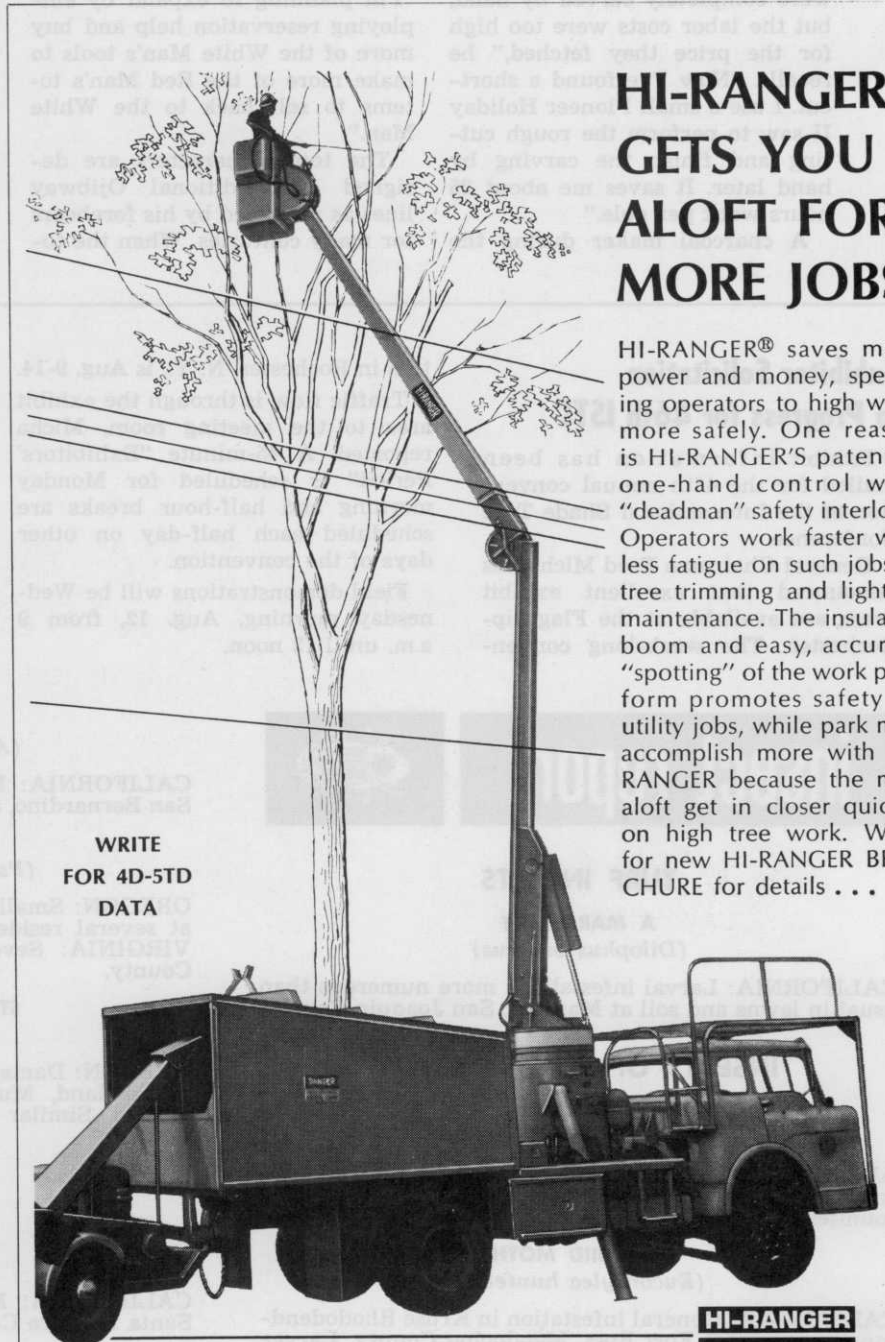
A new turfgrass variety, Highlight Chewings Fescue, has been licensed for sale in Canada by the Canadian Department of Agriculture.

A product of Ontario Seed Cleaners and Dealers, Ltd., of Brampton, Ontario, Highlight is said to be the first variety of Chewings Fescue to show sufficient winter hardiness to be used safely across Canada. It has been tested and is in use also in

the U.S. and Europe.

Ontario Seed Cleaners says Highlight should be used in a mixture with a blend of Kentucky Bluegrass for lawns and fairways. It can be blended 50/50 with Penncross Bentgrass in golf greens or other places where close mowing is desirable. The seed firm says Highlight tends to "lift" Penncross and reduces thatching.

Highlight is said to have good disease resistance, excellent color and fine texture, and ability to thrive under both sun and shade conditions.



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## Indian Joe Mechanizes Carving

"Indian Joe" Sylvester has re-discovered a lively and lucrative hobby — totem pole making.

He is a member of the Ojibway band at Christian Island in Georgian Bay, Canada — and after a 30-year layoff from totem pole making, his new creations now adorn the driveways of many summer cottages in the area.

"The totems I made years ago were completely carved by hand, but the labor costs were too high for the price they fetched," he recalls. "Now I've found a shortcut. I use a small Pioneer Holiday II saw to perform the rough cutting and finish the carving by hand later. It saves me about 25 hours work per pole."

A charcoal maker during the

spring and summer months when seasonal demand is good, Joe was formerly unemployed during the fall and winter. After making two totems for "something to do," he soon discovered a big untapped market in cottagers. Now, even with the help of the saw, he has an awesome backlog of orders.

"Business has been much greater than I can handle," he observes. "I'm planning to expand by employing reservation help and buy more of the White Man's tools to make more of the Red Man's totems to sell back to the White Man."

The totem characters are designed on traditional Ojibway lines as practiced by his forebears for many centuries. When the to-



tems are completely carved, they are painted in intricate color combinations that make attractive symbols at cottage entrances and on barbecue sites.

## Exhibitor Solicitation In Progress for 46th ISTC

Exhibit information has been mailed for the 46th annual convention of the International Shade Tree Conference.

General Chairman Fred Micha has announced that excellent exhibit areas are available at the Flagship-Rochester. The week-long conven-

tion in Rochester, N. Y., is Aug. 9-14.

Traffic flow is through the exhibit area to the meeting room, Micha reported. A 45-minute "Exhibitors' Period" is scheduled for Monday morning and half-hour breaks are scheduled each half-day on other days of the convention.

Field demonstrations will be Wednesday morning, Aug. 12, from 9 a.m. until 12 noon.

## Dow Dicamba Available

Marketing is under way on Dow Dicamba Herbicide, a broad spectrum weedkiller. Dow Chemical Company is merchandising the product through a joint marketing arrangement with Velsicol Chemical Company, which will continue to market Dicamba products under the Banvel trademark.

## insect report



### TURF INSECTS

#### A MARCH FLY

(*Dilophus orbatus*)

CALIFORNIA: Larval infestations more numerous than usual in lawns and soil at Manteca, San Joaquin County.

### INSECTS OF ORNAMENTALS

#### BAGWORM

(*Thyridopteryx ephemeraeformis*)

ALABAMA: Examination of eggs on some juniper indicates high overwintering survival in Lee and Chambers counties.

#### GELECHIID MOTHS

(*Eucordylea huntella*)

CALIFORNIA: General infestation in Kruse Rhododendron Reserve near Fort Ross, Mendocino County. Larvae causing 50-75% bud kill.

#### CUBAN-LAUREL THRIPS

(*Gynaikothrips ficorum*)

CALIFORNIA: Medium on *Ficus nitida* at Monrovia, Los Angeles County.

#### WALNUT SCALE

(*Aspidiotus juglansregiae*)

CALIFORNIA: Medium on *Prunus cerasifera* trees in San Bernardino, San Bernardino County.

#### WHITE PEACH SCALE

(*Pseudaulacaspis pentagona*)

OREGON: Small infestations found on Akebono cherry at several residences in Portland, Multnomah County.

VIRGINIA: Severe on peach and lilac in Arlington County.

#### STRAWBERRY ROOT WEEVIL

(*Brachyhinus ovatus*)

OREGON: Damage on arborvitae noted in field nursery at Portland, Multnomah County. About 1% of twigs girdled. Similar girdling also noted at Salem, Marion County.

### TREE INSECTS

#### A CYNIPID WASP

(*Callirhytis perdens*)

CALIFORNIA: Medium in live oak trees in Solvang, Santa Barbara County.

#### A WEEVIL

(*Cylindrocopturus eatoni*)

CALIFORNIA: Generally infested ponderosa pine 20-acre stand in Quality Mills area of Tuolumne County. Infestation increasing.

## Ansul Company Announces Three Herbicide Products

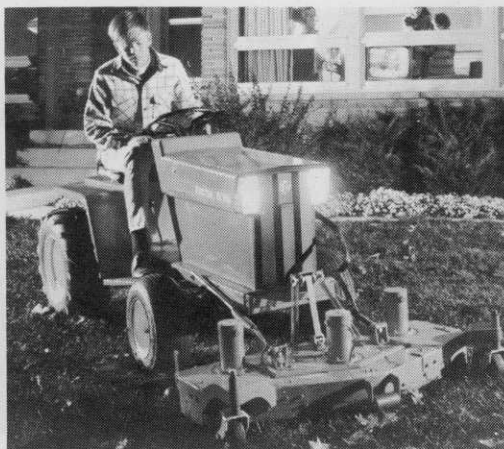
A new general post-emergent weed control agent and two improved selective post-emergent weed control products have been introduced by the Ansul Company, Marinette, Wis.

The products are: "Broadside," a combination of monosodium acid methanearsonate (MSMA) and sodium cacodylate; Ansar 529 H.C., a MSMA liquid plus surfactant; and Ansar 170 H.C.

Broadside is designed to provide quick knock-down of above-ground vegetation and at the same time act systemically on deep-rooted perennial weeds and grasses. It is recommended for use in non-crop areas such as rights-of-way, fence rows, along highways, utility lines, pipelines, drainage ditches, and around buildings and storage areas.

Dr. Charles Bursleson, manager of agrichemical development, said Ansul became interested in the herbicide when it was observed that the combination of MSMA and cacodylic acid produced a synergistic effect on certain plant species.

Ansar 529 H.C. has been registered



General Electric has announced the first commercially available totally electric, compact tractor — the "Elec-Trak." Three models are available, E12, E15 and E20. GE says that although these models compare in price with 10, 12 and 14 horsepower gasoline-powered units, the Elec-Trak models offer higher performance in most respects because of the high applied torques available from the DC drive and attachments motors. A 36-volt outdoor power outlet is designed into the tractor body to operate a GE line of 36-volt power tools, such as earth augers, hedge shears, drills, lawn edgers, grass trimmers, and chain saws. For 110-volt tools, a 110-volt ac inverter will be available as optional equipment. For more details, circle (713) on reply card.

for both cotton and non-crop applications. The product is a highly concentrated formulation of the company's Ansar 529. The new product provides one-third more coverage per gallon. For non-crop application, it is recommended for grassy weed

control on drainage ditch banks, rights-of-way, fence rows, and general storage areas.

Ansar 170 H.C. is a MSMA liquid without surfactant added. For more details, circle (711) on the reply card.

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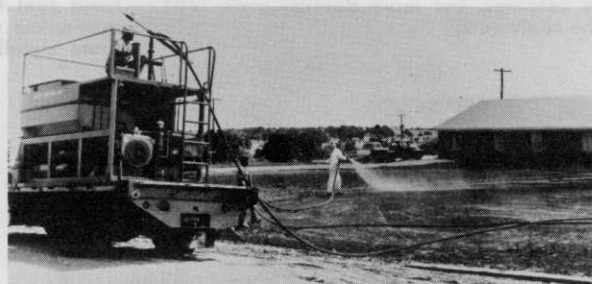
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**Jomac Products, Inc.,** Warrington, Pa., offers a free catalog kit containing literature for its terrycloth gloves, PVC-coated gloves and PVC safety clothing. A 10-page terrycloth production glove catalog also features mitts, pads, sleeves, hand guards, aprons and spats. A second catalog, an eight-page PVC-coated glove catalog, carries the Jomac line of liquid-proof and chemical-resistant gloves used in a wide variety of industries. The third catalog, 16 pages on PVC protective clothing, displays the full line of safety clothing, ranging from linemen to workers in petroleum, chemical, food, steel, airport, construction, lumber, paper and railroad industries, among many others. Recommended usage and suggested applications for the individual products are spelled out in all three catalogs. For more details, circle (701) on the reply card.



**O & R Engines, Inc.,** Los Angeles, Calif., has introduced a one-horsepower, air-cooled, compound reduction engine with the exceptionally low shaft speed of 900 rpm. The new engine, Type 196, features a gear reduction ratio of 6.921 to one. The gear reduction is made of die cast aluminum alloy with oil-impregnated, sintered-steel gears and roller-bearing-mounted shaft. It has the standard steel centrifugal clutch. The weight is about five pounds, depending on type of gas tank and engine accessories. As with other O & R engines, the Type 196 has as standard equipment, full roller bearings at four points of the crankshaft, multi-attitude diaphragm carburetor, drop-forged hardened steel con rod, chrome-faced steel rings pre-lapped to eliminate break-in and focus fuel injection. Uses have ranged from mini-bikes to earth augers and winches. For more details, circle (702) on the reply card.



**The Naval Jelly Company,** Kansas City, Mo., announces a super naval jelly, with p-Navaxanthene, for unusually difficult rust removal problems. The additional strength comes from the development of a better gelling agent, which allows maintenance of plasticity with spreadability over a vastly wider pH range. The Super Naval Jelly is said to be nearly double in strength to the regular product. Brush it on, wash it off. It clings to verticals and overhangs, removes rust from iron and steel. For more details, circle (703) on the reply card.

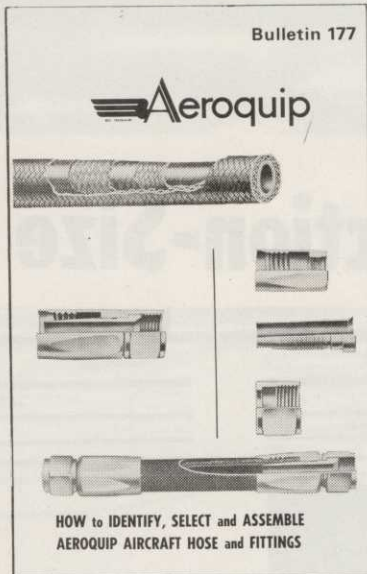


**Allis-Chalmers,** Milwaukee, Wis., announces that among the range of implements and attachments for its Allis-Chalmers 12-hp Model B-212 lawn and garden tractor is this three gal./min. sprayer. The tractor has a Vari-Shift transmission with seven forward speeds in any of three gear selections, and reverse from 1.7 to 3.4 mph. Vibration is held to a minimum with "Synchro-Balanced" crankshaft. The power unit is a Briggs-Stratton engine. The tractor has front, center and rear PTO points. For more details, circle (707) on the reply card.



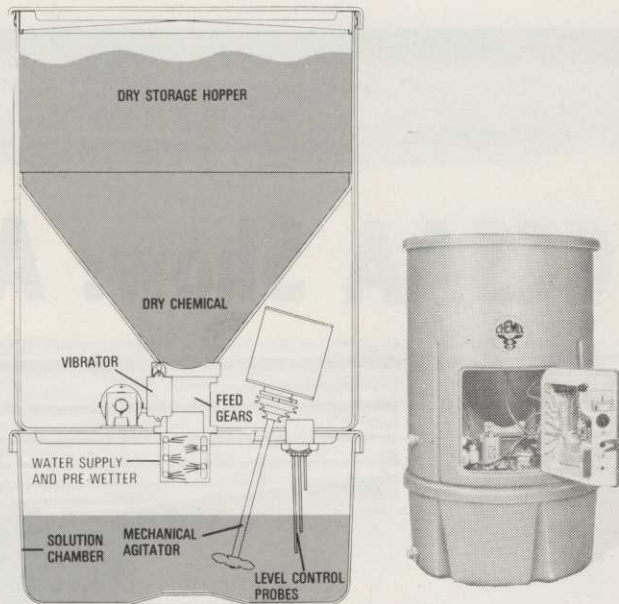
**Cushman Motors,** Lincoln, Neb., announces a four-wheel turf-truckster. It carries a passenger and a half-ton cargo, also. The four-wheel models include: the pickup with a stationary 53x57-inch box; the pickup with a 53x57-inch manual-dump box; the flat bed, with a cargo area of 51x60 inches; and the chassis model, for use with the Tyne-Mite hydraulic dump bed that will meter out sand, gravel and top dressing, or for mounting the purchaser's own body or equipment. All four-wheel Turf-Trucksters are equipped with 18-hp gasoline engines and 42-amp alternators. Automatic steering and four-wheel hydraulic brakes are featured. Turf protection is provided by 8.50x8, four-ply Terra Tires with traction treads on the rear. To make the Turf-Truckster serviceable in any weather, a wind-shield, fiberglass cab with folding doors, and rear view mirrors are offered as options. For more details, circle (708) on the reply card.



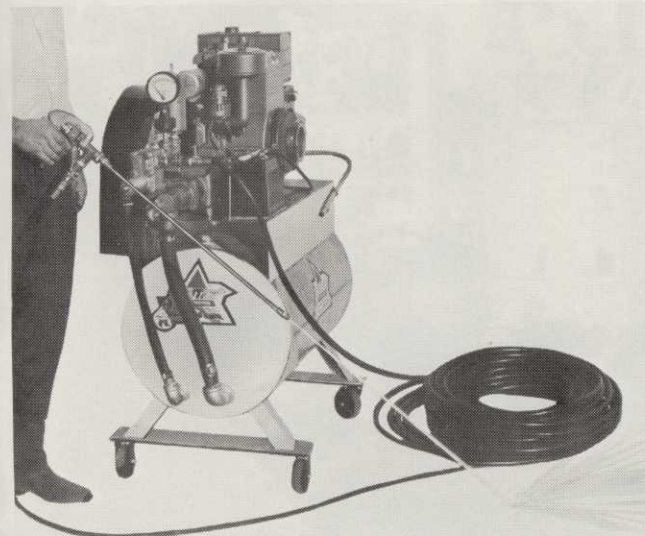


**Spraying Systems Company**, Bellwood, Ill., announces a new series of hollow cone spray disc-type TeeJet nozzles for spraying concentrates at low capacities and at higher pressures up to 600 psi. Nozzles are of tungsten carbide orifice discs and cores. Choice of capacities at 200 psi range from .21 to .45 gpm. At this same pressure spray angles will range from 72 to 100 degrees. Orifice diameters of the discs range from .041 to .094 inches. For more details, circle (704) on the reply card.

**Aeroquip Corporation**, Jackson, Mich., has published a booklet, "How to Identify, Select, and Assemble Aeroquip Aircraft Hose and Fittings." The booklet explains in simple terms the basic identifications and procedures involved in the use of hose assemblies. It's a handy guide for persons working with aircraft. The 40-page booklet has four sections. The first discusses basic hose types, including construction and identification; the second provides similar information about hose fittings; the third covers fundamentals of hose assembly procedures; and the final section deals with maintenance. For more details, circle (705) on the reply card.



**Chemix Corporation**, Troy, Mich., offers a volumetric mixer that's suited for virtually all industrial applications. The Chemix Volumetric Mixer mixes dry chemicals with liquid giving a predetermined percentage of solution automatically and accurately. A four-page brochure listing capacities, construction, installation requirements, dimensions, and operating instructions is available. The mixer is 32½x55 inches and weighs 150 lbs. Hopper capacity is 9 cu. ft. of dry material; solution chamber, 35 gals. Dry material can be mixed at rates up to 28,380 cu. in. per hour; mixed solution or slurry, up to 180 gals. per hour. A 1½" drain outlet provides for rapid discharge of mixed solution. Installation requires one half-inch IPS water inlet line with pressure range from 25 to 125 psi and one electric outlet conforming to voltage and cycle requirements. For more details, circle (706) on the reply card.



**TriTan Corporation**, Houston, Tex., announces the new MINI HYDRO-LASER, a portable, self-contained spraying unit for use in ground-level or truck-mounted spraying of pesticides, fertilizers, fungicides, or detergents. Also can be used for spraying rust preventative, water/sand blasting to remove loose paint. The MINI HYDRO-LASER produces up to 1,000 psi with a water usage of only 8 gpm. It requires no compressed air supply. A 30-gal. heavy duty all-welded reservoir tank serves as base for the entire unit. The unit has fixed and swivel rubber-tired wheels and pull bar for inplant operation. It can be obtained for stationary mounting. For more details, circle (709) on the reply card.



**Friend Manufacturing Corp.**, Gasport, N.Y., offers the Hy-Ride Junior for brush and weed control and ditch sterilization. Front-mounted on truck frame, available for cab-over-engine style or standard chassis with operator's controls in cab. The Junior (a larger, Senior, model is available) is designed specifically for counties, townships, custom applicators, utility companies, etc. Features include: 90-degree swing; extended length to 15 feet; mounted base that allows mast to move out eight inches for truck clearance; effective spray pattern up to 25 feet; clearance for mail boxes, guard rails and obstructions up to six feet. For more details, circle (710) on the reply card.



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# GCSAA Show: Action-Size Catalog





# of Turf Equipment



**C**OMMERCIAL TURF operations still dominate the big international show staged annually by the Golf Course Superintendents Association of America.

This year at Houston (Feb. 8-13) a record attendance was on hand for the most extensive educational program and equipment exhibit ever put together. Total registration was 3,620 (See Table 1). A total of 125 companies exhibited, filling 341 booths.

Norman W. Kramer, superintendent at Point O'Woods Country Club, Benton Harbor, Mich., was elected president. He had been a director since election to the board in 1966. He succeeds outgoing president John Spodnik, Westfield Country Club, LeRoy, Ohio.

Elected along with Kramer were: Richard C. Blake, Mt. Pleasant Country Club, Boylston, Mass., vice-president; Palmer Maples, Jr., Charlotte Country Club, Charlotte, N. C., director; Garold Murphy, Somerset Country Club, St. Paul, Minn., director; and Clifford A. Wagoner, Del Rio Country Club, Modesto, Calif., director.

This group along with the complete board will be responsible for the 1971 conference and show. This coming event will be held at the Denver Convention Center, Denver, Colo., February 7-12.

## Management Motivation

The program featured specialists from throughout the nation. Wallace A. Micheltree, Rutgers, New Brunswick, N. J., discussed motivation as a must phase of management. He said that a manager of a golf course which employs people should have the attitude that people basically want to work.

Micheltree believes that managers need to look on employees as a production unit, and not as a production cost. He feels employees have the same goals as management. He believes that as the manager relinquishes part of his authority over employees, that the manager's influence increases over said employees. Allowing employees to help establish purposes, goals, and targets aids in acquiring maximum production.

"If a manager holds the concept that people basically want to work,"

Name your interest in commercial turf equipment, and it was easy to spot at the GCSAA exposition, an integral part of the annual turfgrass conference. The 41st session was at Houston's Convention and Exhibit Center, which offers more than 300,000 square feet of usable space.





Ryan sod cutter and roller get close check from these convention guests. At right picture, Cecil F. Kerr, Rhodia, Inc., Chipman Div., New Brunswick, N.J., left, visits with Russell



Bandy, New York advertising manager for Weeds Trees and Turf. John Kiehl, Chicago advertising manager, and Arthur Edwards, editorial director, also represented this magazine.

Micheltree said, "his attitude in giving orders, his facial expressions, even the inflection of his voice are different from the manager who believes otherwise." By contrast, he went on, "the manager who subscribes to the philosophy that people do not want to work admits that there is nothing he can do toward managing his employees.

"The only control a person has over people who work for him is the control that they will give him," Micheltree stressed. He said further that, "control is directly proportional to the opinion that employees have of a person as a manager. If they

hold him in high esteem and have an extremely good opinion of him, they give him a considerable amount of control over them. If they do not, then they will give him little or no control. If the employees have a good opinion of their supervisor they will in turn want him to have a good opinion of them."

#### Let Buyer Be Aware

Another popular speaker was Robert T. Miller of DuPont, Wilmington, Del. He pointed out that the image of the so-called "peddler" has changed radically in recent years.

Miller said that no longer is the term "Let the Buyer Beware" apropos. Today, he feels the slogan should be, "*Let the Buyer Be Aware.*" The con-man today is the exception. Reliable companies generally sell the chemicals, fertilizers, and equipment to manage the cultural practices necessary on a golf course. Miller pointed out that the buyer today has the protection of the Better Business Bureaus, the federal government's Pesticides Regulation Division and attendant regulations such as label requirements, plus competition. Many states also license sale of certain products, par-

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L. C. Wood of Febco, Sun Valley, Calif., and Ernest F. Wolfgang, Jamaica Plains, Mass., talk about irrigation automatic controls. And in the right picture, Mr. and Mrs. Clyde Mc-



Cune, distributors at Omaha, Neb., talk herbicides with Roger Gilmore, turf products manager at Diamond Shamrock's Cleveland, Ohio, headquarters.

ticularly pesticides.

Thus, Miller pointed out that the buyer has ample opportunity to get the products which best suit his needs. Miller suggested that superintendents "be aware of the problem, aware of their needs, aware of products available, and buy products best suited for their purpose." A manufacturer, Miller stated, to be successful in the turf market must understand the problem, develop new products, reevaluate older chemicals, promote programs to provide results required by superintendents, and at the same time return a profit to both the distributor and himself.

#### Changes Coming on Golf Course

Looking ahead to golf courses in the 70s, Geoffrey S. Cornish, golf course architect at Amherst, Mass., specified 18 coming changes. First, he said that golf courses and superintendents will play a role in controlling smog and pollution. The four-day work week may require up to 1,000 new courses each year (more than 2½ times the current rate of construction). His third and succeeding points were: new courses will be designed for all types of golfers; heavier play on existing courses and greater use of golf cars; greater demand for turf perfection;



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Outgoing President John J. Spodnik, left, passes the gavel to newly elected President Norman W. Kramer, superintendent at Point O'Woods Country Club, Benton Harbor, Mich.

greater demand for eye appeal; ever rising construction and maintenance costs; labor shortages to become more critical; machine maintenance to become a must; improvement in labor saving equipment and irrigation systems; older courses to require extensive changes; improved construction equipment and techniques; improved grasses, fertilizers and soil conditioners; improved weather

forecasting; limitation of use of certain pesticides by legal decree; greater knowledge of biological and radiation control; new and more selective chemicals; and more knowledge of the "delayed action" of chemicals and their role, if any, in turf injury in periods of stress. Cornish felt that, as a result of these changes, the 1980s will find more and better golf courses in operation.

**Table 1. Record Conference Attendance in 1970: Again the GCSAA International Turfgrass Conference broke attendance records. Statistics for the past four years are:**

|                    | Houston,<br>Texas (1970) | Miami Beach,<br>Florida (1969) | San Francisco,<br>California (1968) | Washington,<br>D.C. (1967) |
|--------------------|--------------------------|--------------------------------|-------------------------------------|----------------------------|
| Members            | 1182                     | 1078                           | 902                                 | 1066                       |
| Ladies             | 592                      | 620                            | 610                                 | 565                        |
| Guests             | 189                      | 194                            | 192                                 | 246                        |
| Greens Chairmen    | 211                      | 506                            | 90                                  | 110                        |
| One Day Admission  | 419                      | 285                            | 286                                 | 315                        |
| Turf Students      | 52                       | 57                             | 13                                  | .....                      |
| Exhibitors         | 975                      | 771                            | 730                                 | 738                        |
| Total Registration | 3620                     | 3511                           | 2823                                | 3040                       |



Officers and directors elected at the 1970 GCSAA conference are, from the left: Norman W. Kramer, president; Richard C. Blake, vice-president; Clifford A. Wagoner, director; Garold Murphy, director; and Palmer Maples, Jr., director.





**FLORIDA** Associated Nurserymen, Inc., has announced a \$1,000 award and certificate of merit to the person who first produces a quickly degradable chlorinated hydrocarbon pesticide of low toxicity to warm-blooded animals that would be adaptable for general use in agriculture and horticulture. "We invite our fellow citizens to join with us, adding their interest, humane and monetary, to what we believe to be a most worthy as well as necessary proposal."

\* \* \*

**SOD FARMING** will be Delaware's biggest crop by 1980, predicts Elwyn Deal, University of Maryland turf specialist. To be profitable, it must be done on a large scale, and there is no place in the industry for poor quality and cut-rate prices, he said. The difference in high-quality sod and cheapest field sod for a typical suburban home is about \$200, he said. For the \$30-\$40 thousand home, cheap sod is a disservice, he added.

The average return to the grower in Maryland, Deal calculated, is about \$330 per acre.

\* \* \*

**THE SAD STORY** from Fort Worth is that SAD (St. Augustine Decline) has killed the Tarrant County Courthouse lawn. County Agent Gene Graves reported that the disease also had destroyed many home lawns in the county.

\* \* \*

**MISSOURI CITIES** hard hit by Dutch Elm Disease, or other arboricultural problems, for that matter, can request help from foresters of the Missouri Conservation Commission. Osal Capps, state forester, told the Kansas City Star that "In communities of less than 10,000, we'll help on specific problems or on a complete civic program for planting and maintenance. But in larger cities, we'd have to restrict help to specific problems. We'll be advisers only."

\* \* \*

**NEW ZEALAND** has reached a new plateau in governmental efficiency by decreeing that rabbit inspectors will now become noxious weed inspectors also. Apparently, the theory is that where you find one you'll find the other.

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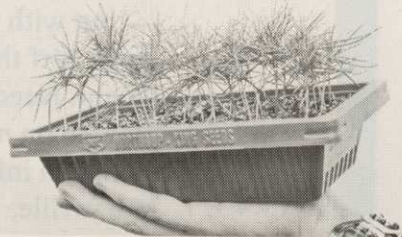
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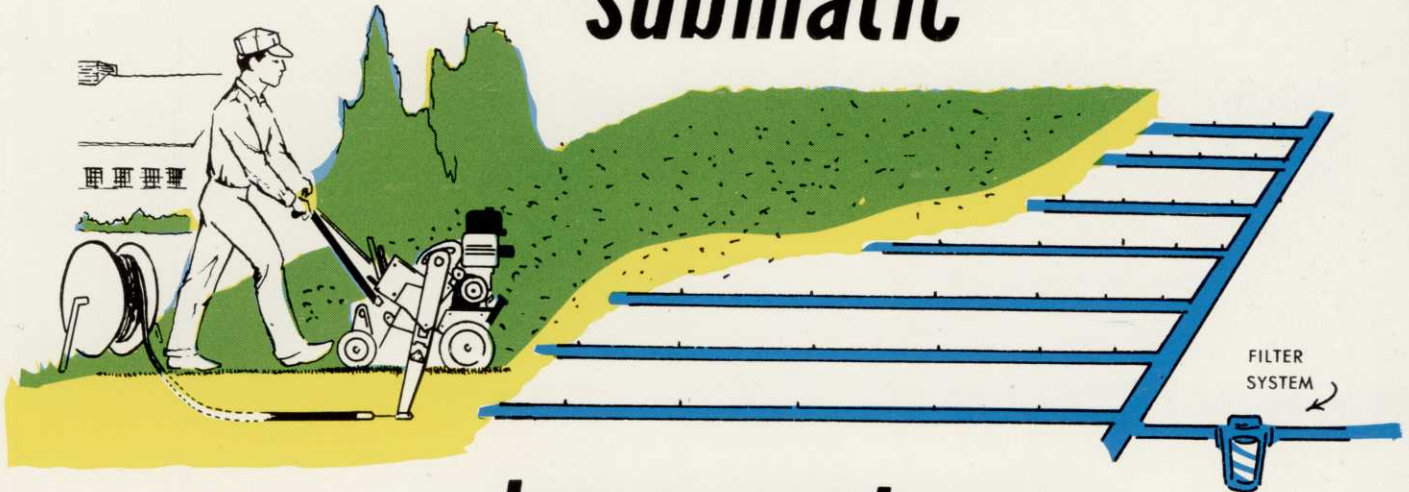
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