

WEEDS TREES and TURF

OCTOBER 1967

**Combating
Aquatic
Weeds
Page 6**



**When
Where
and How to
Sod for Turf
Page 14**



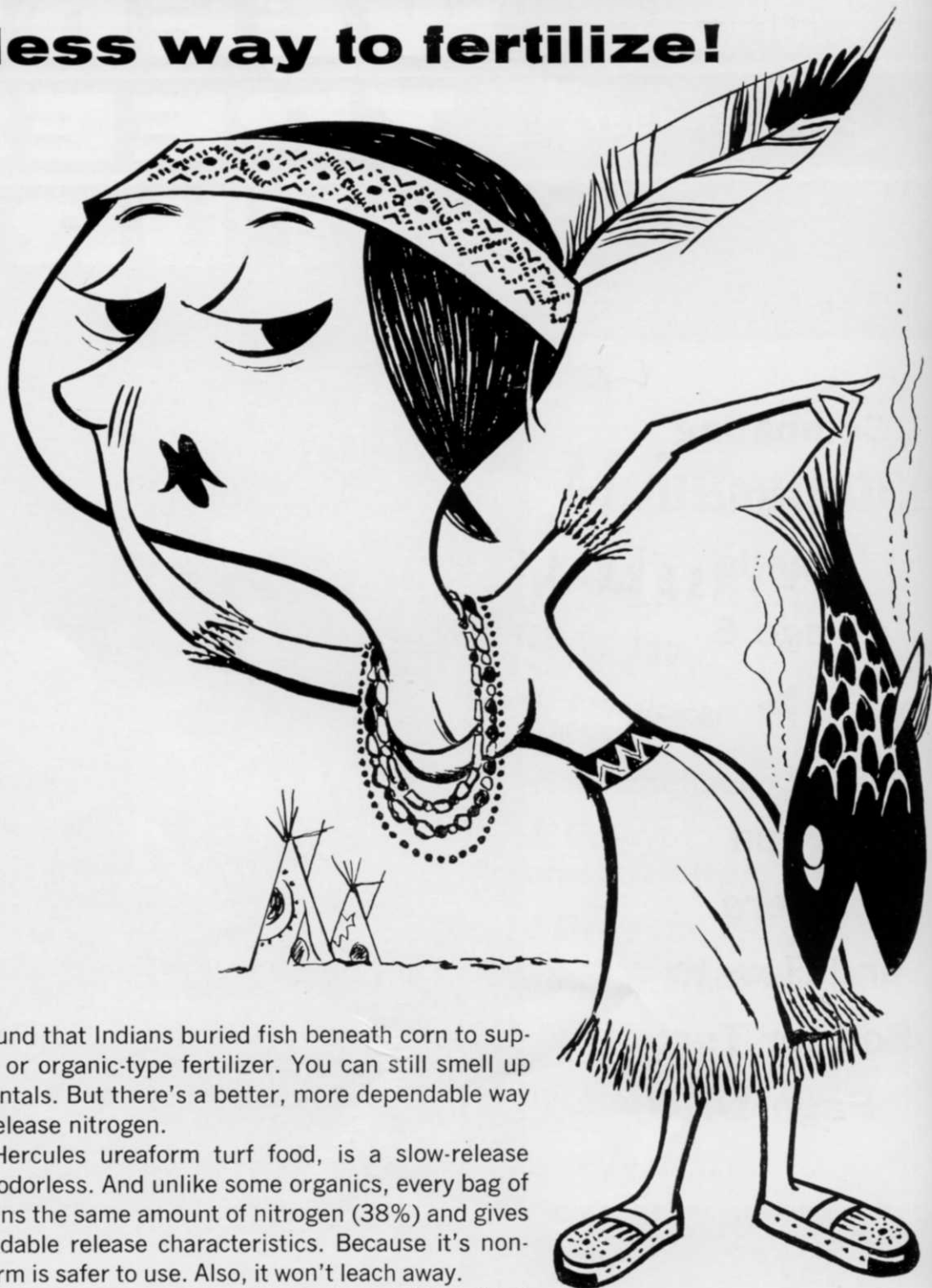
Would you believe . . . floating mat of alligatorweed over 22 feet of water. See page 6.

Midwinter Weed Control . . . Page 18

Monthly magazine of methods, chemicals and

equipment for vegetation maintenance and control

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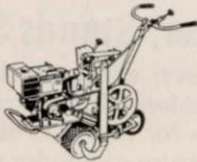
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WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

October 1967
Volume 6, No. 10

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Money For Your Advice

We are often reminded that Socrates went about giving advice. He was poisoned. But times have changed. People are willing to pay for value received, and today good advice carries a monetary value.

Norman J. Scott of Willowdale, Ontario, Canada, made this point at the recent International Shade Tree Conference at Philadelphia, Pa. After finding retirement a bit too monotonous, he started a horticultural consulting service. His point, directed to arborists attending the 43rd Conference was that they dispense advice freely with no thought of remuneration for advice only. He said this is not true of many other professions, the implication being that it should not be true in any business where technical information based on years of experience and background are so important in determining overall costs of a venture.

Scott has found that municipalities no longer depend on advice from a firm doing the landscaping or tree work but come to him for professional advice. He believes that the consultant in the horticultural field can serve a role parallel with that of the architect in the building industry.

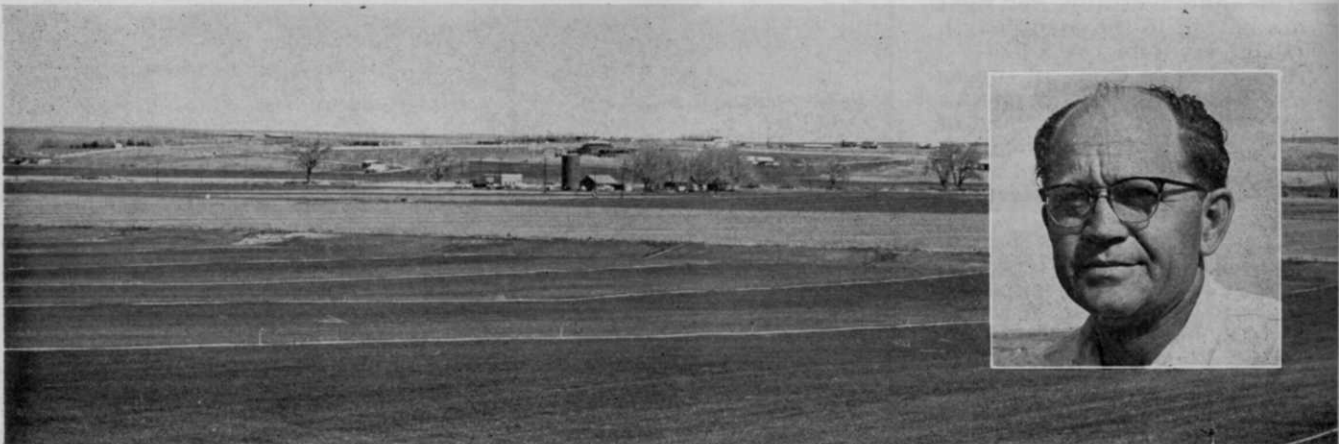
In talking to tree care company men and to contract applicators, we find they offer their qualified advice and many times see the job go to a competitor or even a part-time operator. Scott says there will be little business to be found with

the private homeowner on a strictly consulting basis. But government departments at all levels, industries, insurance companies, and large stores dealing in retail horticultural products can use a paid consultant to advantage.

We know that few tree men would give up their business for a strictly consulting venture. Nor would many choose this on retirement. But there are likely numerous tree companies with the size and experienced personnel to run a consulting service as a distinct and separate phase of the existing business. Queries which obviously call for advice which could logically be chargeable could be referred to this department.

Advertising by direct mail might bring in more business than expected. Scott has found that word of mouth by lawyers, real estate appraisers, and others have kept him busy.

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



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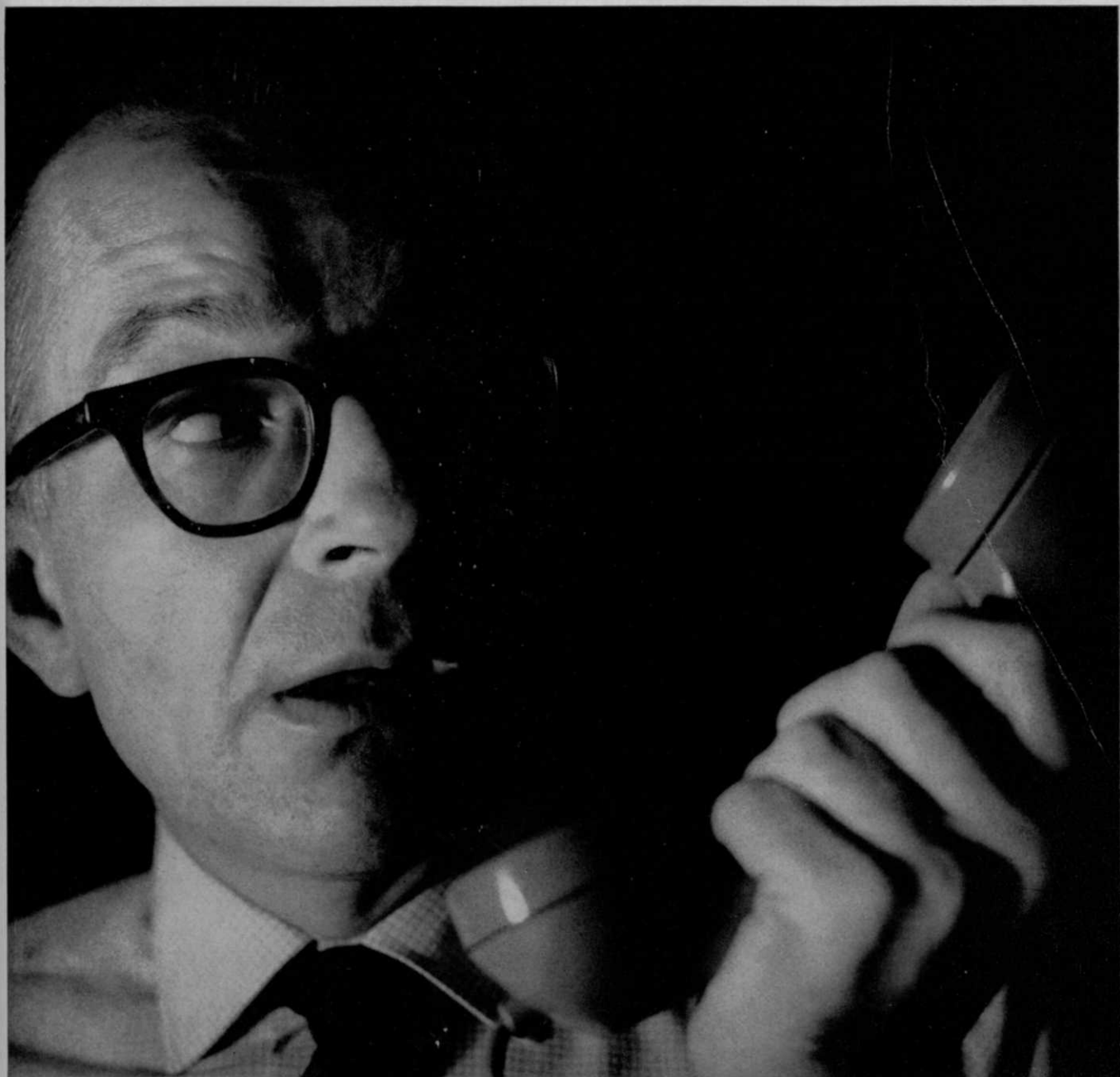
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Researchers Study New Methods For Combating Aquatic Weeds

LYLE W. WELDON and ROBERT D. BLACKBURN

Research Agronomist and Research Botanist, Crops Research Division, Agriculture Research Service, U. S. Department of Agriculture, Fort Lauderdale, Florida.

THE unique field of aquatic weed control requires new approaches and concepts if aquatic weed nuisances are to be economically controlled. Proper placement of the chemical may be the most important factor for effective plant control.

Research on new application techniques has been part of the aquatic weed research program at the USDA, ARS aquatic research laboratory at Fort Lauderdale, Florida. Since a majority of aquatic plants float on the surface of the water, concentration of the chemical at the water surface would lead to more

efficient utilization of the chemical.

Walnut shells, corn cobs, and many other floating materials were tested as herbicide carriers in greenhouse tests. A coarse grade vermiculite granule was found to be the most effective floating material to serve as a carrier of diquat and paraquat. The granule formulation is either applied to the surface by blower or by simple hand distribution.

Floating granules of paraquat proved the most effective single treatment for control of alligatorweed in research conducted

in Florida, South Carolina, Georgia and Louisiana. Paraquat must be applied at the rate of 6 pounds active ingredient per acre. Though this chemical is not yet approved for use in aquatic weed control, it has proved itself at the research level. Tests generally showed that two or three applications were needed for control. Costs of paraquat could be expected to range from \$80 to \$100 per treatment. Thus 2 or 3 applications would make alligatorweed control exceedingly expensive.

Alligatorweed is a problem throughout the Southeastern US.

Floating granule formulation of paraquat as herbicide on vermiculite is applied by mistblower unit. Floating mats of alligator weed cover body of water 22 feet in depth. Making the application on water shoes is C. Elroy Timmer, technician for Agricultural Research Service, USDA.



It obstructs water flow, hinders navigation, and generally interferes with proper utilization of water.

Duckweed Common In Small Ponds

Duckweed is almost a universal problem in small ponds. It has been effectively controlled with floating granules of diquat in several farm ponds. The most satisfactory rate of application of diquat was found to be 0.5 parts per million of active ingredient. The granules blown onto the surface of a pond were found to move around the surface of the water with the floating fronds of duckweed.

Tests have been underway in



Vermiculite granules of paraquat have been used in Southeastern U. S. research on the control of duckweed and alligatorweed.



Floating granules of paraquat on body of water infested with alligatorweed. Floating granules of diquat also used in the research proved very effective on duckweed. Liquid formulations were used with equal effectiveness on duckweed.

not as yet by the floating granule technique.

A floating formulation for herbicide application is a new approach to herbicide placement in aquatic weed control. Research is constantly seeking such new innovations and methods for effective weed control.

Both Weldon and Blackburn, authors of this article, spend full time on aquatic weed control research at the USDA Agricultural Research Service facility at Fort Lauderdale, Fla. Both are active in the Hyacinth Control Society, an organization dedicated to control of noxious aquatic weeds. Blackburn serving as president and Weldon as secretary-treasurer.

connection with this research at the Fort Lauderdale experiment station for the past 6 years in cooperation with the U. S. Army Corps of Engineers and the Chevron Chemical Company.

Both diquat and paraquat are produced in England at the present time. When it becomes economically feasible to produce and distribute floating granule formulation and when and if label clearance is granted, the technique may prove a boon for aquatic weed control in this country.

Paraquat is used extensively in many foreign countries for control of aquatic plants. It is being used on Lake Kariba in Rhodesia to control salvinia, but

Area in foreground was treated twice with paraquat at 6 lb/A in 1966. The picture was taken 1 year after treatment.





Ronald L. Harper, left, Philadelphia Electric Co., Philadelphia, Pa., and Hyland R. Johns, Asplundh Tree Expert Co., Jenkintown, Pa., co-chaired the 43rd ISTC Conference. They were on hand to welcome the 1000 attending the event. They are using Asplundh Chipper Company's L-30 fibreglas boom and bucket.

Beauty Combined Is Pattern of

A WTT staff report on the 43rd International Shade Tree Conference at Philadelphia, Pa. meeting in conjunction with the ISTC were members of the National Arborists Association. The groups will meet next year at Chicago, Ill., August 11-16.

A NEW YORK CITY public affairs counsellor points to small businessmen as the group who have made the United States the economic symbol it is today. Even the most gigantic corporations began as small businesses. Speaking to delegates at the 43rd International Shade Tree Conference and National Arborists Association sessions at Philadelphia, Penn., Joseph J. Eley, president of Public Affairs Counsellors, Inc., challenged tree men to fight for responsible government.

Since 1953, Eley said, the federal government has frequently made noises that indicated concern for the small businessman through the Small Business Administration. Yet the truth is, Eley said, that small businessmen such as the tree care groups are very much on their own in our society. Eley pointed out that more people are engaged in service industries today than in manufacturing. There is little doubt but that the trend will continue. Henceforth, he pointed out, there will be increasing com-

petition for the service dollar. Thus, economic and political trends will have an immense effect on business operators such as arborists. The irony, according to Eley, is that while the small businessmen are the backbone of the free enterprise system, they are given least consideration by the government, by the economist, and by the political and economic press.

In stressing these opinions, Eley proved to be very close to the tone of thinking in evidence

by tree men attending the annual international conference. Many seemed concerned with the rising cost of doing business, and the necessity for care in keeping service charges keyed to costs of operation. At the same time delegates were highly enthusiastic about the impetus of the National Beautification Program and its impact on citizens at large. Business apparently is booming and at the same time more careful business manage-

John Bean's power spraying division exhibited the Model 100G Rotomist for shade tree, sanitation, mosquito control and leaf windrowing along with one of their truck mounted heavy duty sprayers. On Rotomist is A. O. Kalp, Middletown, N.Y.



With Business Management ISTC and Arborist's Annual

ment is required to produce a profit.

Secretary of Agriculture Orville Freeman, in his keynote speech, emphasized the Convention theme, "Beautify With Trees," when he reviewed the work of the Department in the beautification effort. Secretary Freeman said the national campaign involving the Department of Agriculture is to encourage individuals and communities to plant more trees. And not only to plant trees, but to plant the right trees, and to take care of them after they are planted. "Unfortunately," the Secretary said, "many Americans . . . have, for their entire lives, been separated from trees and from flowers . . . from something that I think is within us all, and has been since the Garden of Eden. It is an affinity with nature, of which we are a part. It is a longing for the beautiful and the good." This situation, the Secretary implied, may well be one of the complex factors responsible for the discontent in the land today. Crowded, ugly living, he said, creates what scientists call the "stress syndrome." In short, Secretary Freeman said, we need, as human beings, to "smell the flowers."

Like Secretary Freeman, Robert F. Lederer, executive vice-president of the American Association of Nurserymen, stressed the value to the nation of the



Outgoing ISTC President Richard J. Campana, chairman of the Department of Botany and Plant Pathology at the University of Maine, Orono, Me., at the left, gets the traditional tree planting ceremony underway at Fairmount Park.

Newly elected ISTC officers, President Elect Keith L. Davey, San Francisco, Calif., left, and President Freeman L. Parr, Hicksville, N.Y., center, visit with Executive Director Dr. L. C. Chadwick, Columbus, O., following board of governors session.

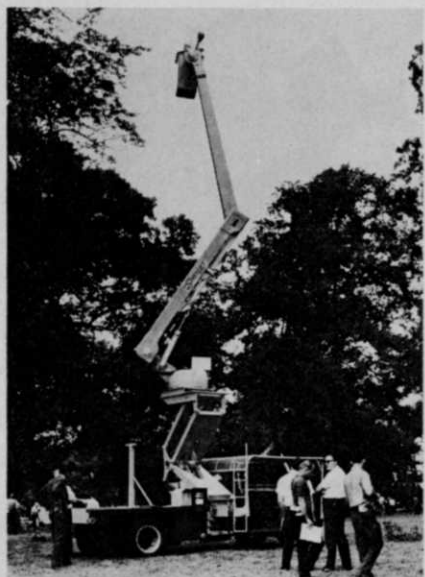




Fairmount Park was setting for buffet luncheon and massive field demonstration during Conference. Buffet included silver service, and park attendants along with Park Director Harold Schick served as hosts to Conference guests.



Myers demonstrated new TT29 Tall Tree mist sprayer. Equipment according to Myers representative is designed especially for tree protection, mosquito control, leaf windrowing, brush burning and sanitation spraying.



On hand at Fairmount Park was a demonstration of the Servi-Lift built by Hunt-Pierce Corp., Milford, Conn.

Fitchburg Chipper demonstration was staged, right, by Arborist Equipment Co., Philadelphia. Chipper is built by Fitchburg Engineering Corp., Fitchburg, Mass.



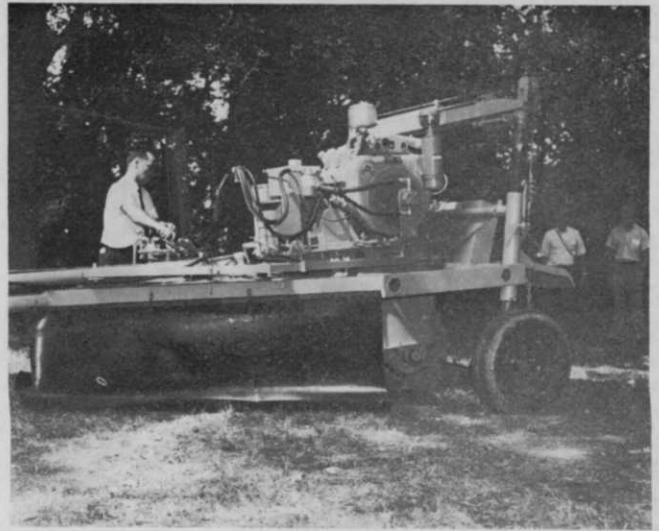
Prentice Hydraulics, Inc., Prentice, Wis., showed their hydraulic loaders, left, for logging and other tree service company utilization.



Weed Control Service, Inc., Portland, Ore., demonstrated the Ackley line of hydraulic and air powered tools. Ackley equipment is built by Ackley Manufacturing Co., Portland, Ore.

National Beautification Program. In talking to NAA members, Lederer urged that they not forget the profit motive of the total program. He reviewed the Federal Housing Administration problem in Florida where a backlog of foreclosed homes was not selling. After the FHA spent an average of \$1200 per home on landscaping, the homes were moved at a price which more than compensated for the additional investment. He also mentioned the program of the Volkswagen Corporation which has used landscaping as "a major step in attracting and holding

Vermeer Pow-R stump cutter, right, removes stumps 6" to 18" below ground level. Vermeer demonstrated this unit along with tree moving equipment.



Fairmont Hydraulics line of equipment included 7 hydraulic action tools. Tools are built at Chicago, Ill.



Baker Equipment Manufacturing Company has been selling their boom and bucket, above, in combination with Mitts and Merrill chipper pictured below.

high caliber employes who are specialists." Landscaping of dealer sites includes a patio, the primary purpose of which is a comfortable place for employes to relax during coffee and lunch breaks.

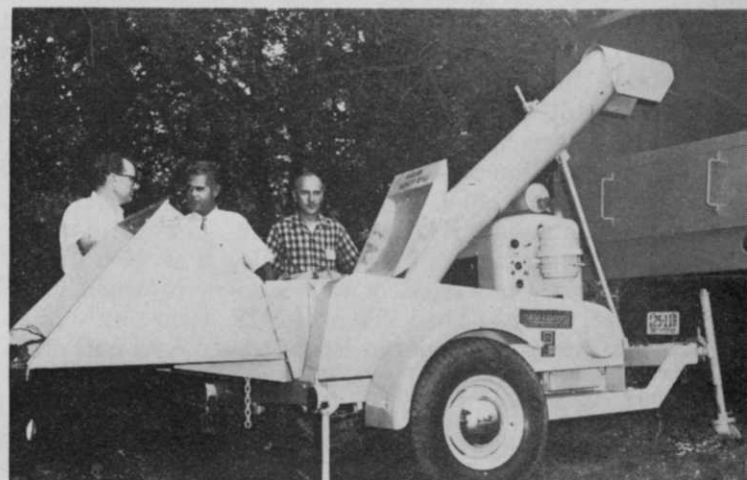
On sales and repeat sales, Archibald E. Price who operates his own tree care business at Glenview, Ill., reported that his firm tries to sell their service at a prestige level. "We try to do good work and we try to work at a profit, a good profit, but a fair profit," he said. One of the most important features of up-to-date service selling is keeping talk at a minimum, Price believes. He suggests saying as little as possible. Sell them and leave them is his motto. He told the group that if you cannot sell early during the call, leave quickly and return at a later date. The days of fast talking service selling are over, Price said.

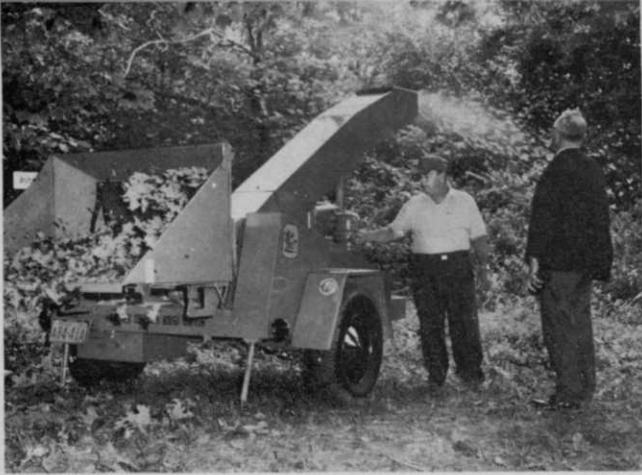
Price feels that a salesman should not be overtrained or

undertrained, but at the same time should have a good, basic knowledge of the work and sales approach. Price said that on sales calls, always made at the front door, when no one is home his salesmen leave a card to show that they are calling and are interested in the client's property.

Price says that when the sales-

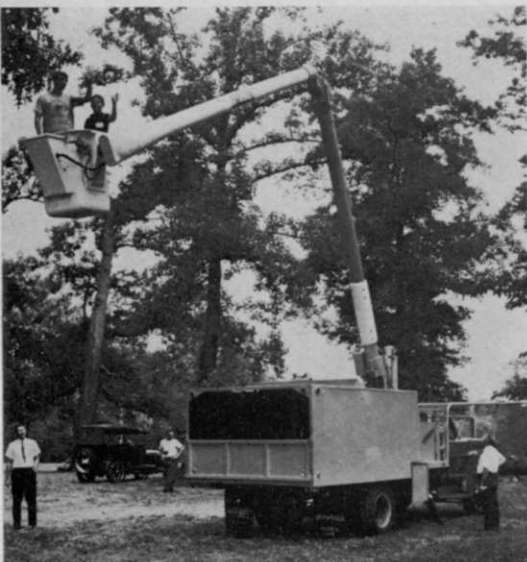
Mitts and Merrill chipper with swing-away feed chute and staggered knife pattern was demonstrated by representatives, Leon Baldwin, left, Suffern, N. Y., Gene Deas, center, Richmond, Va., and Jack Ramous, Saginaw, Mich.



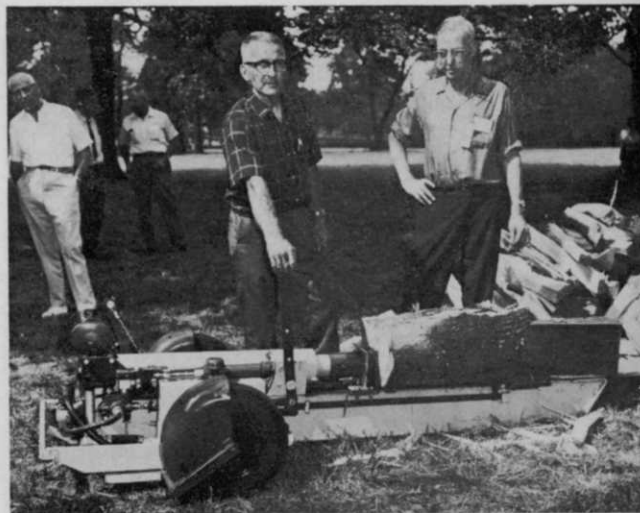


Asplundh chipper, built by Asplundh Chipper Co., Huntingdon Valley, Pa., is demonstrated here by Harold Gentile who during Conference served as chairman of trade exhibits.

and claims offer extensive work for the qualified consultant. As governments have widened streets, changed highways, and constructed throughways, Scott reported that he has found a need for an unbiased expert in the vegetation field. He has also found need for his services in settling insurance claims. He warned any arborist planning a consulting venture to be wary of the phone call from appraisers who are simply fishing for knowledge and who attempt to pick up bits and pieces of information. "We simply ask them if they wish to engage us," he



Skyworker bucket is available in heights of 26, 31, 36, and 45 feet. Comes with all fiberglass upper boom, built by Hughes-Keenan, Delaware, O.



Lickity Log Splitter built by Piqua Engineering, Piqua, O., comes in a number of sizes. Demonstrating at conference are Red Sanders, left, West Milton, O., and J. Ervin Shainline, Collegeville, Pa.

man cannot answer a client's question, he tells the client and then phones back the information.

In the Price firm, kicks are answered as fast as leads. Many complaints are mere misunderstandings. These, Price feels, need to be settled at once, to keep the customer happy, to keep him from talking to his neighbor, and to insure repeat sales. Service sales and repeat sales involve the entire spectrum of selling, Price believes. Salesmen are expected to follow through on each sale, insuring satisfied clients.

A bit unique on the Conference program was a discussion on operation of a consulting service by Norman J. Scott, owner of the Canadian Horticulture Consulting Company of Willowdale, Ontario, Canada. Scott who formerly operated Brookdale Kingsway Nurseries at Bowmanville, Ont., found after selling out his business that he tired of retirement.

Much of Scott's consulting

work consists of tree information, but he finds that as is true with most arborists that he deals in a number of phases of horticulture. With values in the economic world changing, Scott has found the public, especially corporations and governmental units, willing to pay for technical information relating to the field. Many arborists dispense advice freely with no thought of remuneration for this service. Such, Scott says, is not true of most other professions.

Scott told ISTC members and arborists that he had found a definite need for a consulting service in the horticultural field to work closely with architects on the outdoor aspects of business and municipal construction. The landscape architect, he said, does not fulfill this requirement.

Appraisals and valuations as they apply to expropriations



Lynn Partee, left, Blume System Tree Experts, Houston, Tex., receives Class I safety award from NAA safety division chairman, Glenn Burns. Blume won the award for companies with 100 or more employes for the 7th consecutive year.



Clarke W. Davis, left, executive-secretary of NAA, chats with newly elected president, Kenneth P. Soergel, Soergel Arborists, Gibsonia, Pa., center, and outgoing president, Harry A. Morrison, Wilmette, Ill.

with illustrations to assure identification. Among the most severe diseases this past year in Pennsylvania, according to Professor Nichols, was anthracnose on sycamore. Trees showed early symptoms which resembled frost injury. Sparse foliage, except for tufts of healthy leaves at the tips of the upper branches was also typical. Fortunately, he said, most trees recovered and sent out new crops of normal leaves. Much of the early infection could

said, "if not, no discussion about the problem."

Another phase of the business which has proved valuable is a contract he has with a large department store. This store with several hundred outlets seeks his advice on handling, care, and selection of their retail horticultural stock.

Scott has found that university staff personnel are pleased to assist him on a fee basis. He believes that consulting work offers an opportunity for the trained arborist with experience, but does not recommend it for a young man just out of college. He warns that the consultant cannot become personally involved but must rely on his judgment and professional knowledge. Also, he told the group that the consultant must stick to consulting problems only, keeping away from landscape planning and other similar areas.

Tree culture sessions, several of a workshop nature, made this

NAA board members, with the exception of newly elected Hyland Johns, Jenkintown, Pa., are: left to right, front row, Harry A. Morrison, Wilmette, Ill.; Kenneth P. Soergel, Gibsonia, Pa.; Riley Stevens, Portland, Ore.; and back row, Paul R. Walgren, Jr., Hamden, Conn.; William A. Rae, Arlington, Mass.; William P. Lanphear III, Cleveland, O.; and Glen Burns, Canton, O.



43rd Conference among the most productive for arborists. Typical of discussions was that of Professor Lester P. Nichols of the department of plant pathology at Pennsylvania State University, University Park, Pa. He demonstrated tree disease problems

have been prevented, Professor Nichols stated, by a single application of a phenylmercury spray at bud-break.

A rather common tree problem today is injury from salt used to deice roadways. Professor Nichols said much of the damage does not come from salt drainage, but from salt spray

(Continued on page 26)



Entertainment and Hospitality Chairman George T. Lewis, center, Lewis Tree Surgeons, Media, Pa., directs new Conference arrivals Mr. and Mrs. Marshall Sutherin, Sutherin Bros., Memphis, Tenn., about town.

Pitman chipper built by Pitman Manufacturing Co., Grandview, Mo., features according to the maker, shallow cutting action, unique self-aligning cutting blade and emergency safety brake.



When Where and How to



Intensified production and handling techniques result in a high quality product at a reasonable price. Customers, especially those building new homes, have demonstrated their willingness to pay for instant, carpet-like lawns.

Sod For Turf

By P. E. RIEKE and R. E. LUCAS

Department of Soil Science, Michigan State University, Lansing, Michigan

RAPID industrial and suburban development seems to require that period of "building and mess." Very shortly follows the day for moving in or dedication, when landscaping must be finished. A popular practice at present is the use of "instant turf"—grass sod—to give the landscape an early, beautiful setting.

Well over 50% of new lawns in Michigan are sodded. Sodding has a major advantage over seeding in that it can be done at any time the weather is suitable and the soil can be prepared. This normally means May through October in Michigan. It is particularly advantageous over seeding from May 15 through July, when uniform, weed-free seedings are difficult to obtain. Some sod is even laid during late fall or early winter, which does not permit good "knitting" of the roots into the soil previous to freezing of the soil. Under these conditions, desiccation, the dry-

ing out, of the sod may become a problem.

The use of sod for turf establishment on slopes has a decided advantage in preventing erosion. If the slope is very steep, it may be necessary to peg the sod strips to prevent slippage. Sodding the lawn of a new home can also reduce the dust and mud hazards of a seeded lawn.

Sodding may be more expensive than seeding, depending on location, but the advantages far outweigh the cost factor in the minds of many people in our present affluent society. The rapidly expanding sod production industry, with increased advertising and an improved image, make the buyer more aware of the use of sod for turf establishment as well.

The success of sodding is determined by the quality of sod used, the care taken in laying the sod and its subsequent management.

Quality turf begins with the seed source. Purchase sod from

a reputable sod producer who buys premium quality seed. The presence of weeds, especially weedy grasses such as bentgrass or annual bluegrass (*Poa annua*), can ruin a good quality turf. Quackgrass may also be a problem in poor quality sod obtained in northern climates.

The soil on which the sod was produced is an important consideration for some projects. For example, sod used on football fields should probably be grown on mineral soils of sandy loam or loamy sand texture for best results. This should lead to a turf which is less likely to tear, will allow good water penetration and resist compaction. For general turf use, sod grown on organic soils will establish equally as well as that from mineral soil under desirable environmental conditions.

The trend in Michigan is to the production of Merion buegrass sod on organic soils. At least 15,000 acres are in production on



A beautiful turf can be most readily established on sloping areas with sod. Erosion is much less of a problem on terrain of this type.



Thinning of bluegrass sod will occur under shady conditions because of susceptibility to powdery mildew.

these soils. The acreage has been increasing between 10% and 20% each year. Organic soils offer such advantages as light weight and larger pay loads, ease of harvest, and good moisture retention. Grass grown on organic soils grows better in midsummer because of the radiation and loss of heat at night, which results in cooler temperatures. The result is a high quality sod.

Select Grass Variety To Fit New Site

The variety or species of grass should be taken into consideration. Personal preference as well as site and use of the area are important factors in selecting the type of grass to be used. The same principles apply as for establishing turf from seed. Bluegrasses, especially Merion bluegrass, should not be used under heavily shaded conditions because of their susceptibility to powdery mildew. A mixture of varieties and/or species is generally to be desired, because of a wider base for resistance against such diseases as powdery mildew, rust, leafspot and stripe smut.

Good quality sod should be uniform with a dense system of roots and rhizomes. The suggested thickness of roots and soil varies from three-eighths to one inch. It is generally believed that the thinner-cut sod will lead

to fewer management difficulties, once established, although no experimental evidence is available to substantiate this. If cut sod is to be held more than a day before laying, it should be unrolled and kept watered. Rolled or stacked sod may break down rapidly due to heating, especially under high temperature and moisture conditions. In recent years, some sod producers shipping long distances have vacuum-cooled their product to maintain quality. Future research on handling and harvesting techniques will surely lead to greater market potential for sod growers because of longer shipping time and distances.

Soil preparation is one of the most abused steps in the sodding operation because a poorly prepared seedbed can be covered up temporarily. This leads to a poor quality turf ultimately. The soil should be prepared just as carefully as when seeding a new lawn.

Adequate drainage should be provided. In most cases, surface drainage with a very gentle grade ($\frac{1}{2}$ to 1%) in all directions away from the building will be satisfactory. Any pockets where water will collect should be eliminated. If the soil drains slowly or surface drainage is not adequate, tile drainage may be necessary. This is especially important for areas which will re-

ceive heavy traffic, since excess water will lead to rapid compaction under traffic conditions.

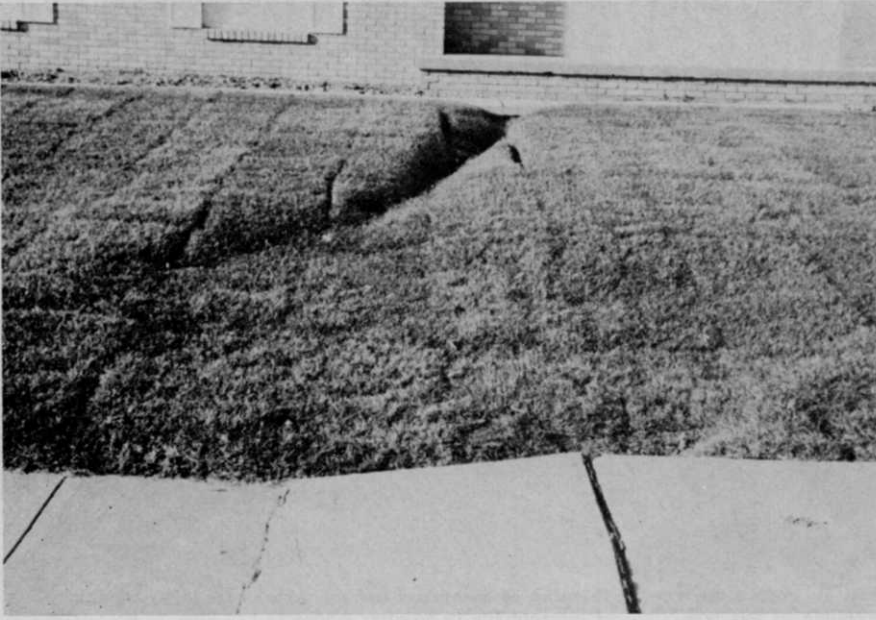
Settling Is Problem In New Lawns

Care should be taken to insure complete settling over tile and sewer lines and around buildings. Many beautiful turfs have been marred by settling in these areas.

If needed to improve soil physical properties, amendments may be added. The most desirable amendment would be a good topsoil, rather high in organic matter, of loam to sandy loam texture. Care must be taken to watch for weeds and weedy grasses in topsoil. A layer of at least six inches of topsoil should be used, unless this material is worked into the base soil. For clay soil, amendments such as peat and sand may be used, while peat and clay loam can be added to droughty, sandy soils. In order to prevent layering of these materials, they should be worked into the soil to a total depth of at least six inches.

In cases where the soil is heavily compacted to a considerable depth, it would be desirable to work the soil as deeply as possible in order to allow natural drainage to take place. Stones, sticks, and other debris should be removed and the soil tilled to break up large clods.

Fertilizer and lime should be



Expensive repairs are often necessary to correct improper soil preparation over sewer lines.

applied according to soil needs. A soil test can best give this information. If soil tests are not available, however, a general recommendation would be 15 to 20 pounds per 1000 square feet of a fertilizer such as 12-12-12, which contains approximately equal quantities of nitrogen, phosphate, and potash. The higher phosphate and potash containing fertilizers should probably be continued for a period of two to three years if subsoil is the base on which the sod is laid. Most recommendations suggest mixing the fertilizer with the soil.

Lime should be applied if the pH is below 5.5 to 6, especially for bluegrasses. It is particularly important for the lime to be worked into the soil, at least 4 inches deep, since it will not readily move into the root zone if applied on the surface.

A final raking will probably be needed. The soil is then often rolled to insure level conditions.

Sod should not be laid on dry, powdery soil. Under these conditions, it would be well to water the area one or two days previous to laying, if possible.

The first row should be laid straight, usually in some suitable direction that matches the landscape. Successive pieces of sod can be matched so the joints do not coincide across the yard. Care must be taken in making

sure the edges of the sod are in good contact with each other, yet not wrinkled or overlapped.

A light rolling to bring the roots into good contact with the soil should follow. New roots will likely dry up rapidly if they must grow into air pockets before reaching the soil surface.

The newly sodded turf is not yet established. A thorough watering should follow the final rolling operation. This is the homeowners responsibility. De-

pending on the time of year, subsequent watering may be needed every day to keep the sod moist, until the roots have grown down into the soil. This point is often overlooked, as sod has a tremendous evaporating surface. The available water in a layer of sod is less than $\frac{1}{4}$ inch. Once established, watering can be reduced to once a week or less, depending on the environmental conditions. Care must be taken not to overwater. Under slow drainage conditions, excess water would limit root growth. Soils containing little sand would also be quite subject to footprints and compaction if too wet.

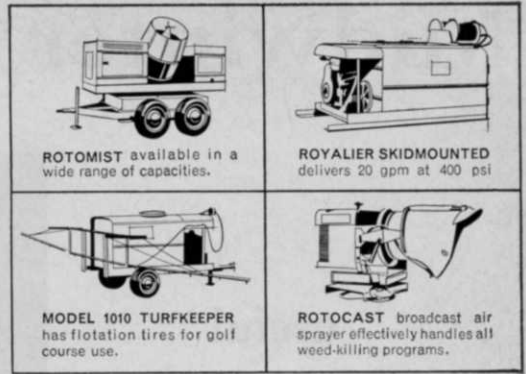
Once the roots have "knitted" into the soil below, good turf management practices should be followed for the given turf conditions. Special attention may be necessary in providing regular irrigation and fertilization, since the root systems may not be completely developed. This is especially important during the first year when nitrogen may be needed in greater quantities than in subsequent years.

When the base soil is an alkaline subsoil with a pH above 7.5, it may be necessary to use a regular program of iron nutrition until the grass is well established.

Delay in watering after the sod is laid can be costly, especially during hot weather.



This Rotomist® sprayer has the greatest "rate-of-work" capacity ever developed for shade tree work. It is a design that provides a *controlled air pattern*, all the way to the top of the tallest trees. This means adequate coverage, as well as more efficient use of your chemicals. It means versatility, because the Rotomist pivots 110° vertically, rotates through 360° horizontally. Which means you can put your spray material—either dilute or concentrate—anywhere you want it. Up in trees. Over an embankment. Down, to windrow leaves. And, of course, John Bean makes many Rotomist models to match your requirements. They all mean business.



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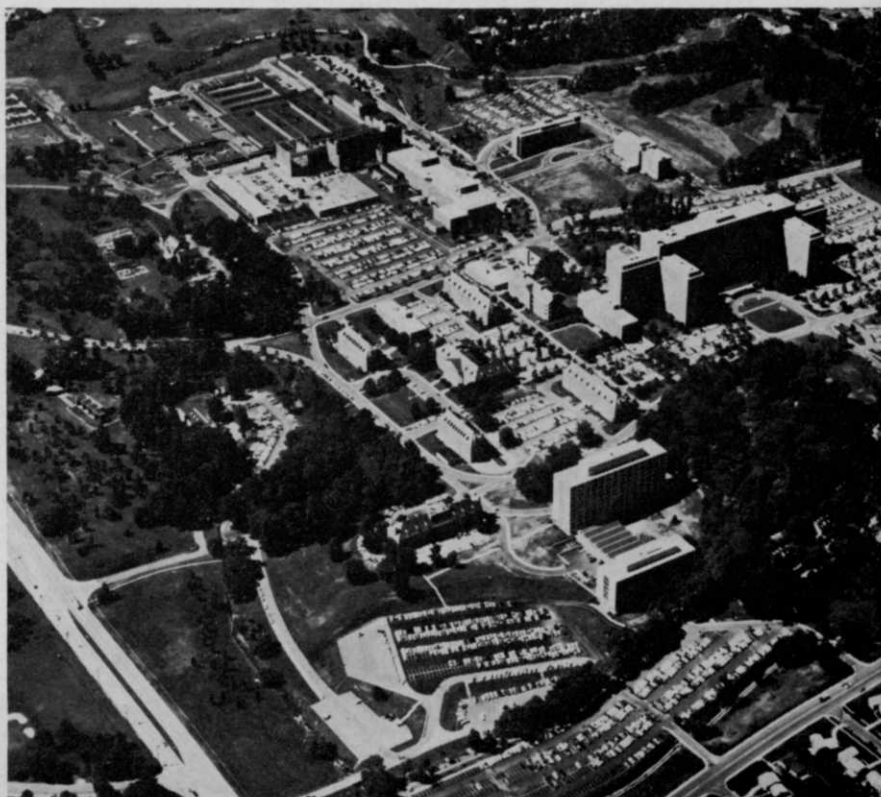
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of Health

By **GEORGE P. ROSENKRANZE**

Landscape Architect, National
Institutes of Health, Bethesda, Maryland



The National Institutes of Health located on 306 acres of ground in Bethesda, Maryland conducts a program of animal research and clinical studies in its own laboratories and promotes medical research in other institutions through a program of grants and awards. There are a total of 48 buildings on the NIH "campus".

DURING the fall of 1965, conditions here at the National Institutes of Health were rather hectic, for the turf unit, of grounds maintenance section. Many of our turf areas were in very poor condition. A 5-year drought, along with more foot and vehicular traffic, had weak-

ened and compacted large sections of turf. An extensive building program had torn up other large areas. These factors favored weed growth over turf growth, and an intensive renovation program was in order. Unfortunately, the trees began shedding leaves early. Most

leaves were down by late November and had to be removed. Enough rain fell, and temperatures were moderate enough that mowing was continued until mid-December.

Because of these and other delays, the turf unit could not begin the fall herbicide program until after Christmas, and then only when the unpredictable Washington area weather permitted movement of spray equipment onto turf areas. Temperatures here normally fluctuate widely, in some cases, from 70°F to below freezing within a 24-hour period. There are enough days during winter, however, when temperatures are in the mid-30's and lower 40's to permit a modified weed control program to be carried out, provided that herbicides proved effective at these temperature ranges. The program was begun first week of January when frost was off the



Administration Building at the National Institutes of Health is surrounded by wealth of well maintained trees.

grass by 10:00 a.m. The soil beneath the turf was frozen fairly solid, so there was no damage from wheel ruts by sprayer or tractor. The sprayer used was an old but serviceable 300 gallon tank-type with three 8-foot booms which could be used separately in tree areas or all together in open areas to cover a 24-foot swath of turf. Pressure was found to be rather important, inasmuch as pressures much over 50 pounds created a drift problem, and anything much lower did not give good coverage between the fans of the spray nozzles.

It was decided to concentrate the control program on those species causing most concern here. The most troublesome winter weed pests at this location consist of smooth chickweed, mouse eared chickweed, clover, henbit, and ground ivy. Due to the late start for this program and the scarcity of suitable days for carrying it out, the scope of the operation was limited to those areas with heaviest infestations and where most obvious results could be noted.

Ten days after the first application, a light snow fell covering the area to a depth of one inch. This remained on the turf for several days. As the snow melted, the chickweed on treated turf areas turned bright yellow before shriveling and disappearing. The program was continued as weather permitted until early spring and, with the arrival of spring rains, a definite line between the treated and untreated areas proved success of the venture.

We decided to attempt a more general program during the winter of 1966-67. Plans were to cover the entire reservation or approximately 150 acres of turf area. Results to date in all phases of the operation have been quite good. The addition of dicamba to the spray mixture has given good kill on mouse-eared chickweed, henbit, and ground ivy which had shown some resistance to 2,4,5-TP alone at this time of year. No damage has been observed to any of the trees and shrubs on the grounds. It appears that a useful weed con-

trol program can be carried out in areas which are free of snow.

Two hand-propelled spreaders with a 4-foot coverage were purchased and used in more confined areas around shrub beds and narrow strips where it was not feasible to use the boom sprayer. This equipment covers by means of a revolving disk which slings the solution being used in a circle, rather than by pressure, and eliminates the drift problem found with pressure equipment. Results obtained with various weed species the previous winter also indicated the need for herbicide materials of more than one type, as well as a variety of concentrations. The 2,4,5-TP treatment was continued with spreader sticker in areas which covered the root zones of trees. The only change here was the addition of a wetting agent in small amounts, one ounce per tankful of solution in order to achieve better leaf penetration by the herbicide. In areas free of tree cover, a quarter pound of dicamba was added to one pound formulations of 2,4,5-TP per acre. Good results had been obtained with this combination during the summer where it had been used on knotweed and wild onions.

This program was started in December and continued as rapidly as conditions permitted. By late February the entire reservation had been covered by at least one application of spray.

With the approach of warm weather, some rather dramatic results were apparent. The only broadleaf weeds still remaining in our turf areas were those missed by the sprayers and seedlings which were just beginning to germinate, such as dandelions and plantains. Our grass benefitted by an early start and was well ahead of the winter weed horde. For areas where weather conditions permit use of equipment in winter months, this operation seems to be a useful tool in good turf maintenance.

(Ed. Note: Trade names are not permitted to be used by the National Institutes of Health. In the above instances Banvel-D (dicamba) and Silvex (2,4,5-TP) were the commercial chemicals used.)

Reprints Available

Survey on Turfgrass Management Training Series

WEEDS TREES AND TURF magazine is making available its series on Turfgrass Management Training which ran earlier this year. This series listed college level training available at 26 colleges and universities across the nation.

A number of universities have requested reprints for use with their own student counseling programs and for use by high school counselors.

If these can be used in your state, contact WTT. Because such information on training can help in informing prospective students about the industry, WTT is making these available at the reprint cost. Cost per thousand for the 10-page reprint will be \$30, plus shipping. Lesser amounts can be ordered at \$5 per hundred, plus postage.

For reprints, write:

**WEEDS TREES AND TURF
1900 Euclid Ave.
Cleveland, Ohio 44115**

4 reasons why it pays to spray for Dutch elm disease control this fall



1. Effective. Most authoritative researchers have stated that DDT sprays applied in the fall are just as effective in preventing elm bark beetle feeding, during the period of tree susceptibility to Dutch elm disease, as sprays applied in late winter or early spring. Our co-operative research tests with a Midwest University bear out this conclusion.

2. Better weather. There usually are more good spraying days in the fall than in spring. It is much, much easier to get thorough coverage on a pleasant, relatively calm fall day, than on a gusty day in spring.

3. Efficient use of labor. You get better distribution of work loads by beginning your Dutch elm sprays in the fall—finishing in spring, if necessary.

4. Fewer bird problems. There are fewer problems with birds and other wildlife (real or imagined) when you spray in late fall.

To assist you in saving our beautiful elms, we offer: **AMOCO® Elm Spray**—25% DDT plus White Oil, the “old standby” in Dutch elm disease control programs, proved effective in wide commercial use since its introduction in the early 1950’s.

AMOCO® Elm Spray-32.4—32.4% DDT in a carefully selected xylene solvent, also used with very satisfactory results since its introduction in 1960.

AMOCO® Methoxychlor Spray—Used in many control programs, mainly in the spring, for maximum safety to birds.

For products, information and American Oil help on your specific pest control problem, contact your local American Oil Office, your spray materials dealer, or write direct to: American Oil Company, 910 South Michigan Avenue, Chicago, Illinois 60605.



YOU EXPECT MORE FROM AMERICAN AND YOU GET IT!*

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Tractor reaches speed and incline which starts rollover.



Without safety bar tractor operator would be helpless.



Protective frame in this test protects dummy, but in regular operation would likely prevent serious injury or death to operator.

Anti-Roll Bars May Make Tractors Safer

More safety for the tractor operator may soon be built into tractors. International Harvester Company is testing a protective frame called an anti-roll bar at its Equipment Research and Engineering Center at Hinsdale, Ill.

Remote controls permit new model tractors to be driven at high speeds along a 42-degree bank and rolled at will. Electronic equipment records location and force of impact on the frame.

Strain gauges are cemented on

the protective frame at various locations and connected to a radio transmitter. Sound is transmitted through radio telemetry on impact of the frame with the ground. The tone change occurring is read by a receiver and recorded on tape.

In the laboratory, tape is played back into an analyzer which translates the tone into forces exerted on the frame. The test also checks on design and mounting of the frame itself.

Such tests help researchers design and build a frame to give the operator maximum security should an operating tractor tip.

So-Called Fire Resistant Plants Are Not

Two Californians are warning home owners via a new publication not to rely on "fire-resistant plants" for protection during the brushfire season.

Such so-called fire resistant plants do not exist according to Joe R. Goodin, University of California agronomist at Riverside, and Richard Maire, Los Angeles County farm adviser. Any plant, they say, will burn if subjected to enough heat.

The larger a plant grows, the more potential fuel it produces,

and the greater the fire hazard. As soil becomes dry, a plant takes up less water and has a lower moisture content. Irrigating can make the difference between an extremely flammable plant and one which will not burn as readily. Thus, the main protection is management.

Goodin and Maire pointed out that well-pruned, cleanly maintained, and irrigated areas did not carry fire during the California Bel Air conflagration of 1961. Sprinkler systems offered further protection.

Name of the new publication, soon to be released, is "Landscape for Fire Protection."

Sprayer Accessories Catalog Available

John Bean Division has published a 4-page, illustrated catalog describing the Division's line of "Agricultural Spray Accessories."

Shown are high-pressure guns, couplers, hoses, gauges, valves, filters, boom accessories and nozzles. Write L-1903, John Bean Division, FMC Corp., 1305 S. Cedar St., Lansing, Mich. 48910.

Non-Slip Floor Coating Resists Chemicals

A new non-slip floor coating that is impervious to most industrial chemicals is now being marketed. The new coating is called "Epoxo", produced by Falcon Alarm Company.

Tests show Falcon Epoxo resistant to most acids, chemicals, oil, grease, corrosives, and even salt water. Epoxo is so corrosive-resistant, Falcon reports, that it is used on the flight and weather decks of virtually every U. S. Aircraft Carrier in the first-line fleet.

Epoxo reduces accidents and helps prevent slips, skids and falls. It is designed for application around machinery, marine decks, oil rigs, loading ramps,

work areas, driveways, or any area that presents a slip hazard.

The new coating applies like butter with roller, trowel, brush or spray and adheres to any base. The maker reports a life of up to 5 years.

Colors include tile-red, grey, green, black, white and "safety orange". Five gallons of Falcon Epoxo cover up to 225 square feet. Cost is \$17.50 per gallon for one to four gallons, and \$15.95 per gallon for five gallons. Contact Falcon Alarm Co., Inc., 127 Stern Ave., Springfield, N. J. 07081.

Substitutes For Elms Recommended in Minnesota

Trees to replace diseased elms are being sought in many states.

In Minnesota, scientists at the University Agricultural Experiment Station have listed a number comparable in size to the American elm. All can be grown from seed.

Suggested are the American linden (*Tilia americana*) red

maple (*Acer rubrum*), sugar maple (*Acer saccharum*), green ash (*Fraxinus pensylvanica*), oak (*Quercus* spp.), hackberry (*Celtis occidentalis*), and Kentucky coffee tree (*Gymnocladus dioica*).

Smaller trees include ironwood (*Ostrya virginiana*), pagoda dogwood (*Cornus alternifolia*), river birch (*Betula nigra*), showy mountain ash (*Sorbus decora*), juneberry (*Amelanchier laevis*), and blue beech (*Carpinus caroliniana*).

Seven Times As Many Weeds At Low Mowing Heights

Weed counts on 2-year old turf showed 7 times as many weeds when cut at 1½" heights compared to 2½ inches in a University of Maryland study.

Dr. Elwyn E. Deal, Extension turf specialist, says that grass may not look greener and more attractive at the taller height. But it will be healthier, will survive summer heat and drought better, will have more resistance

to disease attacks, and will have fewer weeds. Further, Dr. Deal reports that greater mowing heights do not require more frequent mowings. Regardless of mowing heights, the rule is to remove 1/3 or less of the height with each mowing. By following the rule, the low-cut turf needs to be cut more often.

The Maryland turf-weed study for 2-year old turf showed the following number of weeds per 100 square feet:

| Mowing Height | Crabgrass | Broadleaved Weeds | Total |
|---------------|-----------|-------------------|-------|
| 2½ inches | 1.7 | 6.0 | 7.7 |
| 1½ inches | 21.0 | 32.3 | 53.3 |

Weed counts on 1-year-old turf were much greater in favor of the higher mowing height. At the 2½" height, only 0.4 weeds per 100 square feet were spotted, compared to 15.3 weeds for the same sized area at the 1½" mowing height.

Coming in November
Eurasian Watermilfoil
Underwater Menace

Faster emerging, faster establishing 0217[®] sod-lift in only 6 months

Plant 0217[®] Fylking Kentucky Bluegrass in the early fall. If correct management procedures are followed, you can lift it by spring or plant early spring, lift late fall. A vigorous rhizome producer, the fast root propagation and establishment creates tightly-knit sod rolls and strips which retain soil. Its aggressiveness crowds out weeds. Turf quality is rated "best obtainable" by noted authorities.

Fylking is a beautiful, deep green from spring through late fall, maintaining color much longer than any other bluegrass.

0217[®] Fylking is resistant to stripe smut, leaf spot, stem rust, leaf rust and more resistant to Fusarium roseum than most other varieties. Five year tests have proven the superiority of Fylking.

For additional information and names of authorized distributors, write Jacklin Seed Co., Inc., Dishman, Wash. 99213.



FYLKING KENTUCKY BLUEGRASS

Chemicals Control St. Augustine Grass In Bermudagrass Turf In Texas Tests

BY B. E. BORDEWICK

Associate Professor, Biology Department, Del Mar College, Corpus Christi, Texas.

Most all lawns and parks in the Corpus Christi, Texas, area are composed of St. Augustine grass. Though subject to disease and chinch bugs, by and large it is satisfactory for these purposes.

St. Augustine, however, is definitely not desirable as a golf course turf. Where it has accidentally become established on bermudagrass fairways or tee areas, as is common in older golf courses, it poses several problems. It gives an uneven, patchy appearance. More important, it greatly slows down the forward progress of a golf ball. St. Augustine grass is so coarse and tough as to often interfere markedly with proper execution of a golf shot. It is a strong competitor and ultimately may

crowd out bermuda and other grasses. This characteristic is desirable in lawns and parks, but is a problem in golf courses.

To date, the only eradication methods have been either to dig out the area containing the St. Augustine or to kill the area with a non-selective herbicide and to reseed with bermuda. Neither is effective. Both leave unsightly denuded areas that tend to become weedy before the reseeded bermuda is established. Moreover, digging out large areas and reseeding is expensive and time-consuming. The practice also normally fails because any remaining sprig of St. Augustine can serve as the beginning of another patch. Further, in non-selective killing, many of

the St. Augustine runners which have crept far out into the bermuda often are missed with the treatment because of hesitancy to destroy more turf than is absolutely necessary.

A selective weed-killer would appear to be the answer to this problem. A discussion of tolerances of bermuda, St. Augustine, and several other grasses for the methylated arsenicals (Callahan, L. M., *Turfgrass tolerances do differ*, WEEDS, TREES, AND TURF, Nov. 1966) indicates that one or more of these materials might be sufficiently effective in killing St. Augustine without being unduly destructive to bermuda.

Therefore, investigations were begun involving the effects of 3

Tiff Green-St. Augustine plot showing several treated rows. Row in left center received 1 overall and 2 spot applications of MSMA and shows no St. Augustine grass. Row in right center received 1 overall and 2 spot applications of AMA and shows several St. Augustine plants. Details on this and in succeeding pictures will be found in Tables 1 and 2 on page 24 of the sod industry section.



Rows from Jean Tiff-St. Augustine plot. Row on the left had 1 over-all and 2 spot applications of MSMA. Shows no St. Augustine plants and about 70% regrowth of bermudagrass. Center row had 1 over-all and 2 spot applications of Calar. Shows several St. Augustine plants and approximately 70% regrowth. Right row is untreated control.

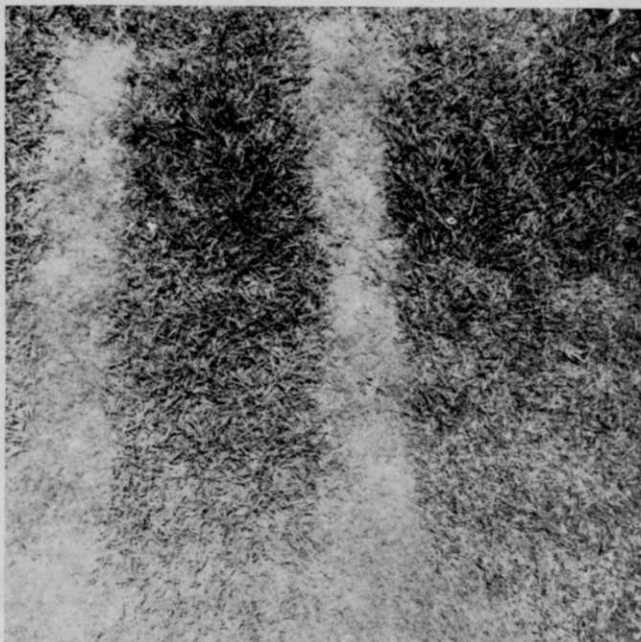


TABLE I. Number* of leaves of St. Augustine grass remaining 3 weeks after each application (numbers 50 and over are approximate)

| CHEMICAL | DILUTION | TIFF GREEN-ST. AUGUSTINE PLOT | | | JEAN TIFF-ST. AUGUSTINE PLOT | | | COMMON BERMUDA-ST. AUGUSTINE PLOT | |
|----------|----------|-------------------------------|----------------------|----------------------|------------------------------|----------------------|----------------------|-----------------------------------|------------------|
| | | OVERALL APPLICATION | 1ST SPOT APPLICATION | 2ND SPOT APPLICATION | OVERALL APPLICATION | 1ST SPOT APPLICATION | 2ND SPOT APPLICATION | OVERALL APPLICATION | SPOT APPLICATION |
| MSMA | 2 oz | 200 | 36 | 0 | 100 | 16 | 0 | | 0 |
| MSMA | 2 oz | 400 | 200 | 0 | 500 | 16 | 0 | | |
| MSMA | 4 oz | 150 | 32 | 0 | 150 | 33 | 16(2 actual) | | 0 |
| MSMA | 4 oz | 100 | 50 | 0 | 150 | 0 | 0 | | |
| CALAR | 2 oz | 400 | 150 | 13 | 350 | 100 | 6(1 actual) | | 0 |
| CALAR | 2 oz | 400 | 100 | 18 | 150 | 50 | 0 | | |
| CALAR | 4 oz | 350 | 100 | 42 | 200 | 34 | 0 | | 0 |
| CALAR | 4 oz | 400 | 100 | 0 | 250 | 45 | 0 | | |
| AMA | 2 oz | 600 | 450 | 150 | 600 | 50 | 0 | | 42(14 actual) |
| AMA | 2 oz | numerous | 300 | 150 | 500 | 16 | 0 | | |
| AMA | 4 oz | numerous | 100 | 10 | 400 | 0 | 0 | | 0 |
| AMA | 4 oz | numerous | 100 | 0 | 850 | 50 | 0 | | |

*corrected; a corrective factor was employed in each case to adjust actual counts because the volunteer St. Augustine grass was not uniform throughout any of the plots.

TABLE II. Approximate % regrowth* of bermudagrass varieties 2 months after 1st (overall) application of chemicals in the case of Tiff Green and Jean Tiff, and 1 month after 1st (overall) application in the case of common bermudagrass

| CHEMICAL | DILUTION | TIFF GREEN-ST. AUGUSTINE PLOT | JEAN TIFF-ST. AUGUSTINE PLOT | COMMON BERMUDA-ST. AUGUSTINE PLOT |
|----------|----------|-------------------------------|------------------------------|-----------------------------------|
| MSMA | 2 oz | 60 | 60 | 30 |
| MSMA | 2 oz | 50 | 20 | |
| MSMA | 4 oz | 40 | 30 | 10 |
| MSMA | 4 oz | 30 | 40 | |
| CALAR | 2 oz | 50 | 60 | 40 |
| CALAR | 2 oz | 50 | 40 | |
| CALAR | 4 oz | 70 | 80 | 40 |
| CALAR | 4 oz | 60 | 30 | |
| AMA | 2 oz | 70 | 80 | 30 |
| AMA | 2 oz | 60 | 80 | |
| AMA | 4 oz | 70 | 60 | 20 |
| AMA | 4 oz | 70 | 50 | |

*corrected; a correction factor was employed in each case to adjust actual readings because the volunteer St. Augustine grass (and, thereby, the bermudagrass variety) was not uniform in any of the plots.

methylated arsenicals (Calar, AMA, and MSMA)* on volunteer St. Augustine grass. Three plots were set up at the turf nursery at Oso Beach Municipal Golf Course in Corpus Christi in March, 1967. One plot was composed of common bermudagrass (widely-used in this area for fairways), another of Tiff Green bermudagrass (widely-used in this area for tees and greens), and the last of Jean Tiff bermu-

*Calar (or Super Dal-E-Rad) = 10.3% calcium acid methyl arsonate AMA (or Super Crab-E-Rad) = 8.0% octylammonium methyl arsonate plus 8.0% dodecylammonium methyl arsonate MSMA (or Weed-E-Rad-W) = 35.33% monosodium acid methanearsonate (all products of Vineland Chemical Co., Vineland, New Jersey)

dagrass (formerly used for tees and greens). All plots contained much volunteer St. Augustine grass. Two different dilutions of each of the 3 chemicals were used and were applied along one-foot rows with a 2-gallon knapsack sprayer. The plots made up of Tiff Green bermuda-St. Augustine and Jean Tiff bermuda-St. Augustine each contained one replication of each treatment and 3 control rows. The common bermuda-St. Augustine plot was small and no replications were possible; there were 2 control rows.

The chemicals were applied in all cases to recently soaked turf approximately 2" high in sunny

afternoons in mid-and late spring. Air and soil temperatures were measured before each application. The air temperature varied from 74° to 88°F. No temperature effects were noted or studied. The Tiff Green bermuda-St. Augustine and Jean Tiff bermuda-St. Augustine plots had 3 applications (one over-all and two spot treatments). The 1st spot treatment was made approximately 2 weeks after the over-all application, and the 2nd spot treatment was made approximately one month after the 1st spot treatment. The common bermudagrass-St. Augustine plot had only 2 applications (one over-all and one spot treatment), the spot treatment being made about 2 weeks after the over-all treatment. The rate of application of each material was 1 gal/150 square feet of turf or to the extent that the foliage was thoroughly soaked and dripping. The 2 dilutions employed were 2 oz./150 square feet and 4 oz./150 square feet. All plots were fertilized approximately 1 week after the first (over-all) application with Pro-Turf (5-2-0) Houactinite activated sludge fertilizer at the rate of 80 lbs./200 square feet of turf, using a fertilizer spreader for even application, and sprinkled thoroughly immediately. All plots were well cared for, but were mowed much less frequently than golf course turf customarily is.

Results of all tests are given in Tables 1 and 2. A summary of results shows that all 3 chemicals have a marked selective killing effect on St. Augustine grass. Each has a temporary burning effect on bermudagrass with MSMA causing the most burning, especially at the higher concentration. From these experiments MSMA at both dilutions in all but one case** seems to give 100% destruction of St. Augustine grass. Although severe burning of all 3 bermudagrass varieties occurred with MSMA

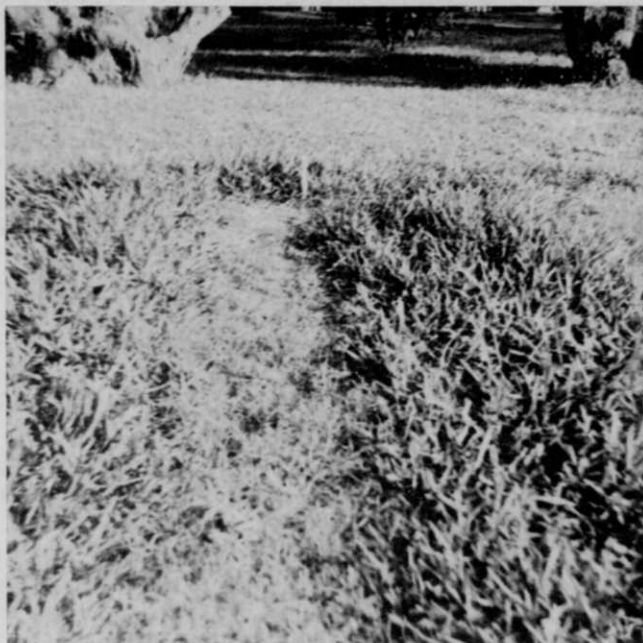
**As will be noted from Table 1, in one case (Jean Tiff) 2 leaves (one plant) remained after all 3 applications. It appears likely that this one plant was missed with the spray material.

at both dilutions (especially at 4 oz./150 square feet), complete and permanent killing did not occur. As will be noted from Table 2, in the rows treated with MSMA in the Tiff Green and Jean Tiff plots the bermudagrass had filled in on the average of 40% within 2 months. In the common bermudagrass plot it had filled in 20% in 1 month. In all test rows involving all 3 chemicals at both dilutions bermudagrass regrowth appeared healthy and apparently would soon cover 100%.

In all control rows both St. Augustine and bermudagrass grew abundantly and no disease or insect infestations were noted anywhere in the plots.


As can be seen further from Table 1, both Calar and AMA gave virtually 100% destruction of St. Augustine grass in the Jean Tiff and common bermudagrass plots, but did not do so in the Tiff Green plot. All plots were treated the same and were nearby, although not adjacent, so that environmental conditions

Row from Jean Tiff-St. Augustine plot, showing results of 1 overall and 2 spot applications of Calar. One St. Augustine plant (with approximately 10 leaves) can be seen in the foreground.



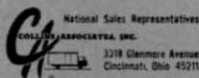
from plot to plot were considered almost identical. Both Calar and AMA gave less burning of bermudagrass than did MSMA, and, as can be noted from Table 2, regrowth of bermudagrass was faster with these than in rows treated with MSMA.

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Page 11

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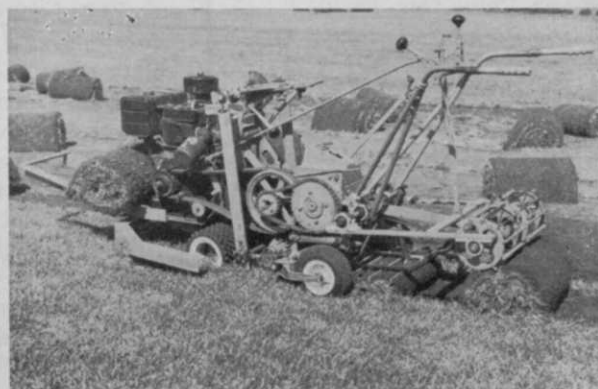
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Meeting Dates



Arizona Agricultural Chemicals Association, Annual Meeting, Arizona Biltmore Hotel, Phoenix, Ariz., Oct. 12-13.

Industrial Weed Control Conference, Texas A&M University campus, College Station, Tex., Oct. 22-24.

New England Agricultural Chemical Conference, New Hampshire Highway Hotel, Concord, N.H., Oct. 24-25.

National Agricultural Chemicals Association, Annual Meeting, Holiday Inn, Palm Springs, Calif., Nov. 5-8.

American Society of Agronomy, Annual Meeting, Sheraton-Park and Shoreham Hotels, Washington, D. C., Nov. 5-10.

Texas Fertilizer Association's 1967 Agricultural Exposition, KoKo Inn, Lubbock, Nov. 9-10.

Fertilizer Industry Round Table, 17th Annual Meeting, Hotel Mayflower, Washington, D. C., Nov. 15-17.

Entomological Society of America, Annual Meeting, Hotel New Yorker, N.Y.C., Nov. 27-30.

National Fertilizer Solutions Association, Annual Convention, Denver-Hilton Hotel, Denver, Colo., Nov. 28-30.

National Aerial Applicators Association, Annual Conference, Marriott Hotel, Dallas, Tex., Dec. 3-5.

North Central Weed Control Conference, Civic Auditorium, Fargo, No. Dak., Dec. 5-7.

Illinois Turfgrass Conference, University of Illinois campus, Urbana, Ill., Dec. 7-8.

Ohio Turfgrass Foundation Turfgrass Conference, Sheraton-Cleveland Hotel, Cleveland, O., Dec. 11-13.

Northeastern Weed Control Conference, Hotel Commodore, New York, N. Y., Jan. 3-5.

Virginia Turfgrass Conference, Virginia Turfgrass Council and V.P.I., Golden Triangle Motel, Norfolk, Va., Jan. 23-24.

California Weed Conference, 20th Annual, El Rancho Hotel, Sacramento, Calif., Jan. 22-24.

Weed Society of America, 1968 Meeting, Jung Hotel, New Orleans, La., Feb. 6-8.

American Sod Producers Association, First Annual Meeting, In conjunction with Golf Course Superintendents Assn. Convention, San Francisco, Calif., Feb. 18-23.

ISTC Report (from page 20)

whipped up by passing traffic. Because such problems do not fit the general pattern of pathogenic symptoms which plant pathologists and arborists normally seek, they are sometimes difficult to diagnose. Therefore, he urged arborists to keep records of weather, or at least the unusual weather conditions, of spray applications of pesticides and wood killers, of the use of wood preservatives on fences near shade trees, of the laying of gas or water lines, and the use of salt on roads near trees. Such records help since many times the non-pathogenic factor which caused the problem occurred earlier than the resulting damage. There is an answer to every tree problem, Professor Nichols said, if the clues are carefully sought out and used for diagnosis.

Woody Species Are Now Problems

Woody species which are resistant to the standard stem foliage spray of 2,4-D and 2,4,5-T have become problems on utility rights-of-way during the past few years. J. W. Kirch, Amchem Products, Inc., Ambler, Pa., discussed steps his company has taken to develop prescription vegetation control. Kirch said that with species susceptible to the standard stem sprays largely killed out, that resistant perennials such as milkweed, horsetail, and chickory, along with woody vines such as honeysuckle, kudzu and trumpetvine have taken over. Several new compounds, he said, have been found effective on these hard to kill species. Small amounts of the new compounds mixed with 2,4-D or 2,4,5-T will clear the right-of-way without substantially adding to the cost.

Cold hardiness in plants is a subject of great importance to the arborist, especially injury during the winter period. Dean R. Evert, horticultural graduate assistant at the University of Minnesota, St. Paul, Minn., reviewed physiological changes which occur as plants harden during the fall. Changes occur

during a 2-stage process in the fall season. The first stage of cold hardiness begins in late summer, triggered by the decrease in day length. The second more intense stage comes with freezing temperatures. Spring growth then breaks the period of hardiness. Since little is known about winter injury, Evert reported that no strong recommendations can be made to guarantee freedom from winter injury. However, he did say that it is important to use materials which are known to be locally hardy. When this is not possible, Evert suggests selecting materials from a similar geographic area or from one which has a more severe climate. In all plants, he said, because energy is needed by the plant to harden, it is necessary to maintain a good level of food reserves during hardening. This means as much light as possible and adequate water. Finally, Evert said that the fertilizer program should be such that late fall growth is discouraged by keeping the levels of nitrogen and phosphorus low during hardening.

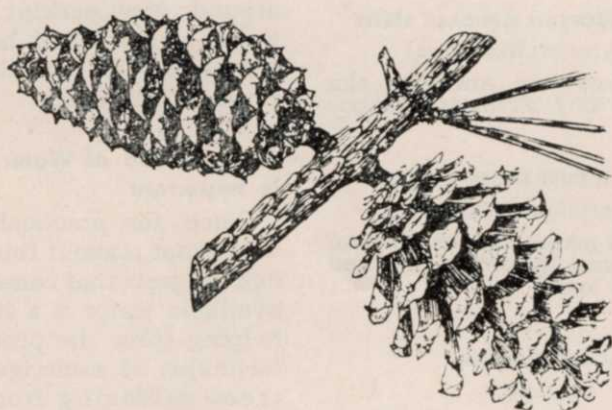
Dr. Philip L. Rusden, plant pathologist at Bartlett Tree Research Laboratories, Stamford, Conn., reports that his company has been expending considerable effort on drought effects. How this problem which has been common in eastern sections of the nation for the past several years can best be handled is of considerable economic importance to the industry. Drought can breed drought, Dr. Rusden said, the same as we can expect a series of wet seasons to breed wet seasons. Not only do the records prove these points, but meteorologists have established a scientific basis for this natural phenomenon.

To bring the problem into focus, Dr. Rusden reminded arborists that an acre inch of water weighs about 100 tons. An inch of water on one square mile amounts to about 65,000 tons. In an area such as the Northeastern U. S. where foliage normally enjoys an average rainfall of 44 inches per year, a drop in rain-

(continued on page 28)

SHORTLEAF PINE

(*Pinus echinata*)



Drawing from: Manual of the Trees of North America, by Charles S. Sargent, Dover Publications, Inc. Reprinted through permission of the publisher.

Prepared by J. H. Kirch, forester and horticulturist serving as Marketing Manager, Industrial Chemicals, for Amchem Products, Inc.

Shortleaf pine, a member of the southern yellow pine group, is a medium-sized to large tree 80 to 100 feet in height and 2 to 3 feet in diameter. It is found on many sites, but mostly in pure or mixed stands on dry upland soils. Shortleaf pine is found in the Southeastern United States from Eastern Texas and Oklahoma to the Coast and north as far as Southern Pennsylvania. It does not grow in the Mississippi Valley region or in the peninsula of Florida.

Shortleaf pine, because of its remarkable ability to sprout after the main stem is destroyed, makes it the most difficult of all pines to control on eastern rights-of-way. In most instances the sprouts emerge from dormant buds located in the vicinity of the root collar, but when the aerial portion of the plant is totally destroyed, buds can arise on the short horizontal portion of the doubly curved tap root.

This pine may be distinguished from other southern yellow pines by its 3 to 6 inch long needles which generally appear two to a fascicle with occasionally three. Loblolly pine (*Pinus taeda*) generally has three needles per fascicle, occasionally two, and the needles are nearly twice as long as those of shortleaf pine. Pitch pine (*Pinus rigida*) needles are arranged in clusters of three. They are usually somewhat twisted and stand out at right angles to the twig. The angle of loblolly and shortleaf pine needles is more acute. Pitch pine often has tufts of needles produced in water sprouts along the trunk.

Shortleaf pine differs from Virginia pine (*Pinus*

virginiana) which has short, twisted needles arranged two to a fascicle.

Whether a plant species is desirable or undesirable often depends on the situation in which it occurs. This is true of all the trees to be discussed in this series of articles on identification. For example, maple (*Acer rubrum*) is a useful ornamental in landscape plantings because of its early red flowers, pleasing growth habit, and spectacular autumn foliage coloring. It is a nuisance on the right-of-way because of its resistance to chemical treatment. Similar comments could be made about the other species to be described. They have ornamental, and economic value, but not on a utility right-of-way which must be kept clear of tall vegetation. Strong resistance to treatment makes it especially important that a few "problem" species be clearly recognized when they are encountered in clearance work. Otherwise there may be needless disappointment, and waste of time and material through inappropriate treatment. J. H. Kirch.

which has short, twisted needles arranged two to a fascicle.

The twigs of shortleaf pine are reddish brown, stout, and very brittle as compared to other pines. The cones are 1 1/2 to 2 1/2 inches long and mature in two seasons. Mature cones are short stalked or sessile. Cone scales have slightly enlarged ends terminated by weak or deciduous prickles.

Shortleaf pine may be controlled by foliar sprays of 2,4-D/2,4,5-T providing at least 15 gallons of oil per 100 gallons water is added to the spray solution and thorough wetting is obtained. TCA (trichloroacetic acid) has been used, but the percent root kill is less than 50% unless a minimum of one hundred pounds per acre is sprayed.

Picloram at rates of one pound per 100 gallons of water has been very effective. Dicamba and 2,3,6-TBA at two pounds per 100 gallons water have also given good control.

The problem encountered with shortleaf pine is that in a right-of-way situation it is nearly always present with other conifer or hardwood species. Recently mixtures of picloram plus 2,4-D, and 2,3,6-TBA or dicamba with 2,4-D plus 2,4,5-T have given excellent root kill.

Aerial applications of 2,4-D and/or 2,4,5-T in mixture with picloram, dicamba or 2,3,6-TBA have been less effective than ground applications, largely due to the difficulty of obtaining good coverage with the low volumes normally applied by air. Thorough wetting with any material is necessary for good control of this species.

Insect Report

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

Turf Insects

FALL ARMYWORM

(*Spodoptera frugiperda*)

Georgia: Light on golf greens in Decatur County.

A FLEA BEETLE

(*Chaetocnema* sp.)

California: Adults heavy on dichondra lawns at Escondido, San Diego County.

A FALSE CHINCH BUG

(*Nysius* sp.)

Nevada: Heavy in yards, lots, and rangeland in southern Washoe County.

AN OLETHREUTID MOTH

(*Bactra verutana chrysea*)

California: Larvae and pupae heavy on 5 acres of nutgrass at Orland, Glenn County.

A SOD WEBWORM

(*Crambus* sp.)

Oklahoma: Heavy on lawns in Altus, Jackson County.

Insects of Ornamentals

AZALEA CATERPILLAR

(*Datana major*)

Georgia: Heavy on azaleas in Camden and Clarke Counties.

AZALEA LEAF MINER

(*Gracillaria azaleella*)

California: Heavy on azalea plants in Danville, Contra Costa County.

TEA SCALE

(*Fiorinia theae*)

Florida: All stages moderate on 50 percent of 200 camellias and 80 percent of 100 Burford holly plants at nursery in Longwood, Seminole County.

WHITE PEACH SCALE

(*Pseudaulacaspis pentagona*)

Florida: Moderate on stems of 87 nursery plants of golden raintree (*Koelreuteria* sp.) at Lake Helen, Volusia County.

AZALEA WHITEFLY

(*Pealius azaleae*)

Ohio: Moderate to heavy on 8,000 plants in Lake County.

Tree Insects

ELM LEAF BEETLE

(*Pyrhalta luteola*)

California: Eggs and larvae heavy on elm in San Jacinto, Riverside Coun-

ty. This is a new county record. Adults heavy on cottonwood in Twain Harte, Tuolumne County. Heaviest in State for past several years. **Nevada:** Damage very heavy to elms in Caliente, Lincoln County. **Utah:** Damage heavy to elm foliage in Fillmore area, Millard County. This is a new county record. **New Mexico:** Heavy on elms in Roswell, Chaves County. This is a new county record.

SMALLER EUROPEAN ELM BARK BEETLE

(*Scolytus multistriatus*)

Colorado: Heavy on American elm near Canon City, Fremont County.

LOCUST BORER

(*Megacyllene robiniae*)

Ohio: Larval mining serious problem on black locust in southeastern and east-central areas.

ENGRAVER BEETLES

(*Ips* spp.)

Georgia: Heavy on pines in Worth and Tift Counties.

BOXELDER LEAF ROLLER

(*Gracillaria negundella*)

California: Severe on boxelder in Alturas, Modoc County; browning widespread.

COMSTOCK MEALYBUG

(*Pseudococcus comstocki*)

California: Heavy on fruitless mulberry trees (*Morus* sp.) Delimiting survey shows many mulberry trees and very few catalpa trees infested. Mulberry severely damaged.

NANTUCKET PINE TIP MOTH

(*Rhyacionia frustrana*)

Oklahoma: Damage heavy in ornamental pine plantings in Mayes County.

FALL WEBWORM

(*Hyphantria cunea*)

Wisconsin: Heavier than normal in State; many half-grown and some full-grown larvae. Webs larger than usual. **Iowa:** Heavy on elm, ash, and walnut in southeast area; up to 5 webs on some trees. **New Mexico:** Heavy on shade trees at Fort Stanton, Lincoln County; ranged 10-20 webs per tree on walnut.

Compiled from information furnished by the U. S. Department of Agriculture, university staffs, and WTT readers. Turf and tree specialists are urged to send reports of insect problems noted in their areas to: Insect Reports, WEEDS TREES AND TURF, 1900 Euclid Ave., Cleveland, Ohio 44115.

ISTC Report

(from page 26)

fall shows the tremendous pressure placed on large trees. A lack of one inch of water can add up to a serious threat in a very short time. Man, Dr. Rusden said, appears to be somewhat guilty of accentuating drought by paving, draining land, and just walking around. New parking lots, highways, airports and housing developments all contribute to the pressure of foliage.

Conservation of Water Is Important

Since, for practical purposes, we cannot make it rain, Dr. Rusden suggests that conservation of available water is a step toward helping solve the problem. The technique of subirrigation helps trees suffering from drought. Such irrigation helps by putting water into the soil, especially when nutrients in solution are added, by aerating the soil, and by breaking up compacted soils.

Surface watering is also helpful where a source of local water is available. Mulches are familiar and help greatly by holding water loss by evaporation to a minimum and in keeping soil in the root zone cooler and more moist. Anti-desiccants or anti-transpirants in the form of plastic or wax preparations also help reduce water loss. Dr. Rusden also mentioned the use of mechanical barriers to protect plants from sun, especially during moving. Pruning can also help a drought stricken tree, Dr. Rusden said. A small root system cannot support a large crown. Thus reduction of the crown relieves pressure on the roots to supply moisture. He related that at the Bartlett Tree Research Laboratory that some trees were pruned over a 30-year period. Trees that normally would have been 40 feet in height were kept to about 12 feet. Dr. Rusden implied that more water short years are in sight and called for additional research on the problem.

Root systems of deciduous trees are quite different than most people believe, according to

(continued on page 29)

Classifieds

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

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PARK MAINTENANCE MANAGER, Fairmount Park Commission, City of Philadelphia, Salary \$10,175-\$12,691. Administrative divisional head position, under general supervision of Park Director in large diversified city-wide park system of seven thousand acres. Involves planning and directing maintenance services for grounds (parkways, fountains, drives, streams and river frontage, squares); buildings (including historic homes and museums); and recreation facilities (five golf courses, swimming pools, nine day camps). The manager is responsible for supervising specialized subordinates who direct a large trades force and related personnel. Some budgetary knowledge necessary. Applicant should possess a college degree with major course in park management, horticulture architecture or a related field, and three years of experience in management or supervision of the maintenance and upkeep of a large park system, including a variety of park facilities and buildings. Additional experience in lieu of the required years of education will be considered. Forward applications to: Andrew Dehel, Personnel Officer, Fairmount Park Commission, Belmont Office, West River Drive, Philadelphia 31, Pennsylvania.

ISTC Report

(from page 28)

Dr. Benjamin B. Stout, of the department of horticulture and forestry, Rutgers State University, New Brunswick, N. J. Dr. Stout exploded two common myths which people believe about trees. First is the dumbbell concept of shape. Most people, he said, conceive of the tree as having comparable sized crown and root systems which are about the same shape. These form the bells, and the trunk forms the handle. Beyond the seedling stage, there is little evidence to support this, he said. The second myth is that every tree has a taproot. Such is not the case, according to Dr. Stout. In his studies at Harvard Black Rock Forest, Cornwall, N. Y., he found that rooting systems vary greatly between species and within the species itself. The root system largely depends on the site where the tree is growing.

Generally, Dr. Stout said, the lateral spread of the root system is greater than the spread of the tree crown. Crown spread is usually less than tree height, which is less than root length. Further, the direction of root spread is not predictable. It may be evenly distributed around the trunk but is more likely to spread toward the more favorable moisture supply.

Grafting of roots between trees depends largely on density of roots within a species, nearness to base of the tree, and depth of soil. For example, Dr. Stout reported on 2 white oaks growing only 4 feet apart. More than 20 root grafts were counted. But 5 feet beyond the base of these trees no grafts were found. Roots from nearby trees of other species did not graft with the white oaks even though their roots grew through the white oak systems.

Of 25 trees in one study, Dr. Stout found that the lateral spread of the root systems averaged 4½ times the crown spread. He believes that rooting habits, both depth and lateral, are related to species and site. Generally, he said, rooting depth

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proved to be quite shallow, usually 4 feet or less with roots concentrated in the upper one foot or so of soil. Because of this relationship and balance, Dr. Stout speculated that shade trees planted along streets frequently sit for years before making any significant growth. Both crowns and root systems have been severely pruned and are presumably in balance. But the large vascular system probably requires almost all the energy captured in photosynthesis for maintenance. Little is left for growth. Thus, Dr. Stout suggested that a tree needs to be balanced in 3 parts, rather than 2, the 3 being transpirational surface, vascular system, and the root system extent.

At the combination conference of ISTC members and National Arborist Association members, staged Aug. 27-Sept. 1, more than 795 persons registered. This figure included exhibitors and guests in addition to members of the two organizations.

ISTC members of the Board of Governors elected Freeman L. Parr, Parr and Hanson, Inc., Hicksville, N. Y. as president to succeed outgoing President Richard J. Campana, University of Maine, Orono, Me. Parr who last year was vice-president and normally would have moved into the president-elect position was elected president by virtue of the resignation of the 1966 president elect, C. Elmer Lee, Southern California Edison Co., Los Angeles, Calif. Keith L. Davey, president of Keith L. Davey Tree Surgery Co., Limited, San Francisco, Calif. was named president elect. Richard E. Abbott, Ohio

Power Co., Canton, O., was elected vice-president. Succeeding Davey on the board of governors for the Western Chapter was Jack R. Rogers, Los Angeles.

Among meeting invitations tendered for coming ISTC conferences was one extended by Davey for 1969 to Portland, Ore., and one to Long Beach, Calif., for 1972, to be held on the Queen Mary which has just been purchased by that city. Invitations were also extended to the group to meet at Miami, Fla., and at Montreal, Canada. The 1968 session will be held August 11-16 at Chicago, Ill., with headquarters at the Pick-Congress Hotel.

The National Arborists elected Kenneth P. Soergel, of Kenneth P. Soergel Arborists, Gibsonsia, Pa., as president. He succeeds past president Harry A. Morrison, Wilmette, Ill. Edward C. Shearer, Farrens Tree Surgeons, Inc., Jacksonville, Fla., was named 1st vice-president; Paul R. Walgren, Jr., Walgren Tree Experts Inc., Hamden, Conn., 2nd vice-president; William A. Rae, Frost & Higgins, Arlington, Mass., secretary; and William P. Lanphear, Forest City Tree Protection Co., Cleveland, O., treasurer. Hyland R. Johns, Asplundh Tree Expert Co., Jenkintown, Pa., was named to the NAA board.

Awards presented by the ISTC were as follows: Author's Citations, Dr. Spencer Davis, Rutgers University, N. Y. and Dr. Curtis May, USDA, both for sustained publishing of research in shade tree and ornamental plant pathology; Awards of Merit, Mrs. L. B. Johnson, Washington, D. C., for initiative, leadership and influence in developing the National Beautification Program, and to the Honorable Harold E. Hughes, governor of Iowa, for leadership and support of research in Dutch elm disease and development of the Elm Research Institute; Honorary life memberships, Max Watson, San Jose, Calif., E. A. Sanford, Freeport, O., and R. J. Campana, Orono, Me.; Past president's plaque was awarded outgoing President R. J. Campana; Special award made "only every 30 years" ac-

ording to Dr. Campana who made presentation to Dr. and Mrs. L. C. Chadwick "in grateful appreciation for 30 years of dedicated service to ISTC, 1937-1967;" and a portable TV set for tree identification contest, Herman Porter, Bartlett Tree Expert Co., N.J.

The NAA awarded honorary memberships to Paul Tilford, Wooster, O., and to Russell Whitten, Delaware, O. Safety awards went to Blume System Tree Experts, Houston, Tex., accepted by Lynn Partee, for Class I (100 employees or more), and to Irish Co., Inc., Warren, Mich., accepted by Ed Irish, for Class II (25-100 employees). This was the 7th consecutive year the award has been made to Blume and the 4th year to Irish.

Ortho Paraquat Now OK for Non-Crop Use

Paraquat, a liquid contact herbicide, now has federal registration for use on noncrop areas such as roadsides, highway margins, or around buildings and commercial facilities, its developers, Ortho Division, Chevron Chemical Co., report.

Paraquat controls a variety of annual weeds including Bur-clover, Chickweed, Filaree, Groundsel, Knotweed, Lambs-quarters, Mallow, Nettle, Pigweed, Plantain, Puncturevine, Purslane, Red Clover, Shepherdspurse, Thistle, Wild Mustard, Wild Radish, Wild Oats, Bluegrass, Cheatgrass, and Crabgrass. It also is effective for suppression of perennial weeds such as Bermudagrass, Johnsongrass, and Morning-glory, Ortho claims.

Recommendations are to apply 1 to 2 qts. per acre (50 to 100 gals. dilute spray per acre.) The product is said to be most effective on succulent young weeds and grasses. It is reported to be completely water-soluble, non-volatile, nonexplosive, and non-flammable in aqueous solution.

More information on Paraquat is available from Ortho Division, Chevron Chemical Co., 7524-42 Hickman Rd., Des Moines, Iowa 50303.

Trimmings

Early Sod Producer. Charley Capozello, longtime sod producer at Capozello Turf Farms, Hightstown, N. J., says he may retire next year. Charley told us his father was one of the earliest sod producers in the nation, having started in business shortly after the turn of the century. We found sod producers in this area happy with the 1967 rainy season, after suffering with drought last year.

* * *

Fairmount Park Is Unique. We enjoyed a visit last month with Harold Schick, director of Fairmount Park, a 4000-acre complex in the heart of Metropolitan Philadelphia. Schick who hosted the ISTC and NAA members during the recent Conference field demonstration is making great strides in maintaining and up grading Philadelphia's already impressive arboriculture program. Schick asked for 10 copies each month of WEEDS TREES AND TURF magazine. He reports his supervisor and foremen constantly have to improve their knowledge of new technical methods.

* * *

South Dakota Growers Form Association. South Dakota bluegrass seed has been harvested and processing is well underway. We learned in a conversation with C. J. Wilber that a group of producers have formed the South Dakota Kentucky Bluegrass Association. Wilber is serving as secretary-treasurer. Headquarters for the group is P.O. Box 823, Huron.

* * *


Plaudits To Michalko. John G. Michalko, Cleveland, O., commissioner of shade trees believes a city should take the lead in civic beautification. His record bears out this thinking. Cleveland regularly plants 4000 trees each year. Michalko says that during his 37 years with the City, more than 150,000 trees have been established for the public. He started as a tree trimmer with the city in 1929, later becoming assistant horticulturist and then commissioner.

* * *

Bartlett To Study Capitol Trees. The F. A. Bartlett Tree Expert Company of Stamford, Conn., has been hired as the consulting agency to study the 300,000 street trees in Washington, D. C. During the coming year, Bartlett will determine the status of the Capitol tree population, recommend any remedial programs needed, and map procedures for future programs.

* * *

Landscape Contractors "Cleared." Michigan landscape contractors are smiling again. Big death losses along highways of Pinus Strobus, Malus and Crataegus had them puzzled. Investigation showed losses last winter due to rabbits and salt. Michigan's big snowfall shut off the normal food supply of the rabbits and they turned to the bark of roadside plantings. Salt spray whipped up by traffic also helped kill those plantings within the salt pattern of the highway. Henceforth, the highway department will drop these more susceptible species from specifications.



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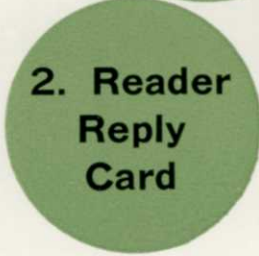
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LISTED in the 1968 WEEDS TREES AND TURF Suppliers Guide, readers will find all chemicals and equipment used for weed and brush control, turf management, and tree maintenance. Included are such chemicals as herbicides, insecticides for turf and trees, fungicides, and fertilizers, among others. Equipment listings include such items as power sprayers, vertical mowers, trimming and pruning tools, chippers, and many others. This is the only Suppliers Guide compiled annually for the entire vegetation maintenance and control industry in America.

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