In keeping with our policy of offering the most advanced and most dependable in chain saws—we have incorporated solid state ignition into the STIHL 041 AV Electronic Saw. Other than eliminating the need for points and providing a molded circuit that is impervious to moisture, dirt, and temperature extremes—this model offers big horsepower performance coupled with a light 12 1/2" pound weight and the fabulous new vibration absorbing AV handle.

first and only lightweight chain saw with built-in shock absorbers plus solid state ignition

*Less bar & chain

STIHL American, Inc.

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

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

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

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

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

RYAN EQUIPMENT COMPANY
2055 White Bear Avenue
St. Paul, Minnesota 55109
Telephone 612-777-7461
SUBSIDIARY OF OUTBOARD MARINE CORP.

RYAN SULKY ROLLER ATTACHMENT
Converts the Ryan HD Sod Cutter into a one-man “sod harvester”. It’s available with conversion kit for your present Ryan cutter or can be purchased with a new one. It’ll quickly pay for itself!
New DuPont HYVAR® X-L
Now you can have the performance of "Hyvar" in an easy to use liquid

Remember how "Hyvar" X and "Hyvar" X-WS performed for you in the past? How annual weeds were controlled at low rates of application, and perennial weeds and grasses were cleaned up at higher rates? Thorough and long-lasting, wasn't it? You can get this same dependable performance with "Hyvar" X-L bromacil weed killer.

This new liquid can be purchased in 1, 5 or 30 gallon containers. All you do is add water and spray. No special preparation, nothing to add, nothing messy to handle or harm equipment or clothing.

"Hyvar" X-L makes it tough on weeds, easier on you. Order some easier-to-use "Hyvar" today. Or, for more information, fill in and send us the coupon today.

With any chemical, follow labeling instructions and warnings carefully.

NAME: ____________________________  TITLE: ____________________________

FIRM: ____________________________  ADDRESS: ____________________________

CITY: ____________________________  STATE: ____________________________ ZIP: __________

For More Details Circle (132) on Reply Card
Special for This Issue

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Sprinkler Irrigation Association's specifications subcommittee has compiled a 41-point check list to help you obtain proper irrigation installations.

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Eight Good Ideas for Golf Course Irrigation .......................... 20
Austin Miller, Miller Sprinkling Systems, offers tips for trouble-free operation of irrigation systems.

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A Florida rig called the Hydro-Turbine provides 24-hour unattended operation. It’s in use on sod farms.

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California report indicates wood and grass burning is highly criticized, though photochemical pollution is relatively low. Tips are given on how to burn with least offense to the public and least contribution to air pollution.

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The Cover

A turf irrigation system is a pleasing sight, on or off. It's pleasing when it's off because of the green “residue” it leaves—healthy green grass. It's pretty when it's working, particularly when the spray creates a rainbow. The system on the cover is on the grounds of Turf Irrigation Corporation, Commack, N.Y. The rotary popups cover an acre. A. Brown, vice-president, sales, talks about the mushrooming demand for turf irrigation on commercial grounds. His article is on page 26.
Take the trouble

Diamond Shamrock gives you The System of weed and disease control.

With the 1-2-3 punch that knocks out weeds and diseases before they can give you trouble.

1. Dacthal kills crabgrass and other undesirable weeds and grasses before they come up.
2. Dacamine effectively eradicates growing broadleaf weeds.
3. Daconil 2787, the ONE fungicide, controls a broad spectrum of turf disease organisms. Try these three great ways to take trouble out of turf.
Dacthal® 1.

Controls crabgrass, Poa annua, and 14 other undesirable weeds and grasses. One application lasts all season. For Poa annua control follow label directions.

Dacamine® 2.

Herbicide controls broadleaf weeds such as dandelion and plantain without hurting your grass. Kills deep—down to the root tips—for complete weed eradication. But only where you spray it—non-volatile Dacamine won’t vaporize to injure desirable plants.

Daconil 2787® 3.

The ONE fungicide—handles a broad spectrum of disease organisms not just one or two. And it does it right through the time you need it most. Turf grasses have exceptional tolerance to Daconil 2787, even in hot, wet weather. So you can maintain lush, deeper green turf all season.
Pesticides or Suicide?
Perhaps, the Way We Talk

Two efforts to give a positive swing to the pendulum of public opinion about chemicals are worth reporting.

If anything needs to be banned right now, says Dr. E. P. Sylvester of Iowa State University, it's "pesticides" — the word, that is. The term has acquired an undeserved shady reputation, as have a number of other good English words, for one reason or another.

It is time, he believes, to "accentuate the positive and eliminate the negative," to borrow a phrase from a song popular during World War II.

How does Dr. Sylvester speak of ridding farm fields of weeds and insects? He advises using "Crop Protection" chemicals.

Now why didn’t we think of that approach before?

Environmental purification is the national hang-up at the moment. Yet the makers and users of chemicals have thought that’s what they were trying to do all along — preserve and improve that which is desired and beneficial; eliminate that which is noxious or unwanted. How then did the chemical image get on the dirty side of the fence?

Publicity of damage from chemical misuse was a big factor, to be sure. But perhaps an unconscious factor was terminology.

Classification names of chemicals focus on the negative means rather than on the constructive end results. To wit: herbicide, pesticide, fungicide, insecticide, rodenticide, and endlessly on . . . a language syndrome of kill, kill, kill.

The industry has done a better job of brand-naming specific compounds. For the most part, the names have tended to be brief to aid recall, yet they carry a hint of something scientific. Is there room for improvement?

One chemical compound comes to mind that seems to be named perfectly for the times. It’s benefin. Note that the word connotation is good.

Perhaps it would be worth thinking public relations twice as environmental chemicals are named and talked about.

A second effort to publicize the contributions of chemicals is contained in a non-commercial film put together by the Du Pont Company. It tells the weed control story on Washington state highways.
It's an excellent film. Scenes show how beauty is achieved, how safety is increased through reduced driving hazards from fire and smoke, how crews are trained and operate, how maintenance costs are reduced.

The film is keyed to the interests of civic groups, conservationists, agricultural students, or really most anyone.

Copies will be made available on an extended loan basis to weed specialists, agriculture instructors, highway maintenance engineers, and film libraries. Requests should be addressed to Public Relations Department, d-5082, Du Pont Company, Wilmington, Del. 19898.

More films like this one are needed — with one added ingredient: drama, to arouse emotion favorable to chemicals. Scenes are needed to counter the shock of seeing hundreds of dead fish, or the grotesque forms of dead birds, or the "terrifying cloud of death" spewing from a spray plane.

What the public needs to see is a malaria-stricken child, a pest-riddled crop field, the tragedy of a refinery or warehouse fire that started in dry weeds, the agony of an automobile accident caused by an obstructed crossroad, some of the innumerable crises that could develop with a power failure caused by trees breaking power lines, the disaster of a train wreck from a weed-infested and weakened roadbed or a burned-out trestle. Then there are always the rats.

Overly dramatic? Perhaps. But this is the very technique a Montreal television station, CTV, used recently to substantiate its show title, "Pesticides or Suicide." Facts were exaggerated, some claims completely false, projections absurd, but the emotional impact contrived against pesticides was superb.

Ironically, the film was shown the second night of a gathering in that city of the best minds of two countries on the subjects of pesticides and herbicides — some 600 members of the Weed Science Society of America. Though the meeting site had been selected two years in advance, the television station somehow missed the opportunity to find out the real story about pesticides. It didn't even send a reporter to cover the meeting.

What's worse, perhaps, is that this editor asked at least a dozen WSSA members if they had seen the TV report. Only one had . . . and that may indicate another problem in itself.
Two men can plug or sprig three acres a day of Zoysia, Bermuda, Centipede, or St. Augustine grass. The self-propelled Lawn-O-Matic automatically digs three furrows, cuts 1½” x 2” plugs from 1’ x 2’ sod blocks, inserts them in the furrow, and then closes the soil around the planted grass with the heavy duty roller.

The three-row Lawn-O-Matic places the grass plugs or springs 8” apart in rows 7½” apart.

Planting grass at the rate of 300 square feet per minute, five average lawns, front and back, can be planted in one day with two men.

Your first ten days of full operation will pay for the Lawn-O-Matic; labor-saving is over 90%.

The Lawn-O-Matic creates profits for you whether you offer a lawn plugged or sprigged, or whether you rent the Lawn-O-Matic to “Do-it-yourselfers”.

The versatile Lawn-O-Matic serves as a sod carrier and easily moves five square yards.

The U.S. Patented Lawn-O-Matic is available in 1, 2, or 3 row machines and is priced at only $895.00. This machine was developed by Alabama’s largest grower of sod.

Write Box 752, Auburn, Alabama for more information.

Inquiries from manufacturers representatives and distributors invited.
BECK MANUFACTURING CO. • Box 752 • Auburn, Alabama 36830
Phone 205/887-3730 — 821-0969

For More Details Circle (120) on Reply Card
Spray-paint TRE-HOLD® after your 1970 pruning and cut trimming costs in 1971!

TRE-HOLD Spray Paint is really a money-saver. One utility reported that they saved $200,000 on their annual trimming budget and another company estimated a $60,000 savings. You simply spray it on the freshly cut wood. TRE-HOLD is also available as a paint in gallon cans for application by brush. Ask your Amchem representative for further information.

First name in herbicide research.

Amchem Products, Inc.
Ambler, Pennsylvania

For More Details Circle (128) on Reply Card
Is grass your heaven,

Think BANVEL®

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.

BANVEL is not a soil sterilant. Its selective action against a broad spectrum of broadleaf weeds and brush encourages the growth of grass and establishment of sod. This helps avoid costly and unsightly erosional problems associated with unprotected soil surfaces.

This modern herbicide fits every common method of liquid application, including aerial, mist, and hydraulic. Its granular form is ideal for broadcast or spot applications, particularly where older weed brush and weed trees have become established.

BANVEL translocates through leaves, stems and roots to kill many of the most stubborn and economically significant weed and brush pests. Under certain conditions BANVEL works beautifully with other herbicides to widen control and to lower costs.

We are ready to work with you to determine exact rates and most effective and economical methods of application for your specific conditions.

Write or call collect, the regional office (listed below) most convenient to you. You will receive immediate cooperation.
Partial list of broadleaf weeds, weed brush, weed trees controlled by BANVEL, BANVEL/combinations

<table>
<thead>
<tr>
<th>Ash</th>
<th>Mouse-eared Chickweed</th>
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<tbody>
<tr>
<td>Aspen</td>
<td>Oak</td>
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<tr>
<td>Basswood</td>
<td>Persimmon</td>
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<td>Cedar</td>
<td>Pine</td>
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<tr>
<td>Cherry</td>
<td>Poplar</td>
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<tr>
<td>Clover</td>
<td>Sassafras</td>
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<tr>
<td>Common</td>
<td>Service berry</td>
</tr>
<tr>
<td>chickweed</td>
<td>Sheep (red) sorrel</td>
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<tr>
<td>Curly dock</td>
<td>Sourwood</td>
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<tr>
<td>Dog fennel</td>
<td>Sumac</td>
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<tr>
<td>(mayweed)</td>
<td>Sycamore</td>
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<tr>
<td>Elm</td>
<td>Thorn apple</td>
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<tr>
<td>Hickory</td>
<td>Thornberry</td>
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<tr>
<td>Hornbeam</td>
<td>Willow</td>
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<tr>
<td>Knotweed</td>
<td>Witch hazel</td>
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<tr>
<td>Locust</td>
<td>Yaupon</td>
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</tbody>
</table>

Mesquite
Cottonwood
Stinging nettle
Smartweed
Dog fennel
Corn cockle
Cow cockle
Knapweed
Fiddleneck
Canada thistle
Field bindweed
Pepperweed
Tansy ragwort
Purslane
Sunflower
Careless weed

Velsicol Regional Offices


Velsicol® Banvel
Velsicol Chemical Corporation, 341 E. Ohio St. Chicago, Illinois 60611
Minimum Installation Specifications for Turf

EDITOR'S NOTE: This issue emphasizes irrigation. It seemed appropriate, therefore, that we publish a guide of things to watch for when installing a system. One of the best check lists we've seen has been compiled by the National Sprinkler Irrigation Association, Washington, D.C. We publish it with special permission from SIA. Note that this guide is for installation only; a design and material specification should also be prepared.

1. Scope of Work
   The work under this specification includes all labor, materials, taxes, tools and equipment necessary to furnish and install a sprinkler irrigation system as specified and shown on the drawings for the named location.

2. Plans and Contract Documents
   The Contract Documents shall consist of Plan and Specification, Pages properly executed contract, together with the

3. Time of Completion
   The Contractor shall commence work within fifteen calendar days of receipt of written notice to proceed and shall complete the work within working days, weather permitting. The intended starting date of this work is.

4. Bonds
   Labor, material and performance bonds shall be furnished to the Owner by the Contractor, when requested by the Owner. The Owner shall reimburse the Contractor for the cost of the bonds.

5. Codes and Permits
   The Contractor shall apply and pay for all necessary permits and fees required in the pursuit of his work as required by the governing codes. The Owner shall furnish and install the utilities necessary according to plan, at no cost to the Contractor, unless otherwise specified. All further site connections for Contractor's use shall be made by Contractor.

6. Insurance
   The Contractor shall furnish to the Owner certificates of insurance in an "admitted carrier," evidencing coverage of:
   1) Workmen's compensation and employer's liability insurance, and
   These minimum limits should be raised when greater exposure to loss exists.

7. Errors or Conflicts in Drawings and Specifications
   The Contractor shall immediately notify the Owner's representative should he find any errors or conflicts in the drawings and/or specifications. The Owner's representative will render his interpretation or instructions on the items submitted as soon as practicable.

8. Substitution of Material
   The Contractor shall use materials as specified. Materials other than that specified will be permitted only after written application by the Contractor and written approval by the Owner.

9. Protection of Utilities and Other Work
   Any and all damage to utilities, or other properties, caused by the Contractor shall be immediately repaired by the Contractor, at no additional to the contract price. The Owner shall make available to the Contractor the location of existing utilities.

10. Working Area
    The Contractor shall confine his operations to the areas to be improved, and to the areas allotted to him by the Owner for his operation, and for material and equipment storage.

11. Supervision by Contractor and Owner
    The Contractor shall maintain continuously a competent superintendent satisfactory to the Owner, on the work during progress, with authority to act for him in all matters pertaining to the work. The Owner shall designate a representative with authority to act for him in all matters pertaining to the work.

12. Subletting and Assignment
    The Contractor shall not assign or sublet any portion of this work without written approval of the Owner of the specific sub-contractor.

13. Payments, Partial and Final
    On or about the first of each calendar month, a payment equal to ninety (90) percent of the work performed during the calendar month will be made to the Contractor. Payment of the ten (10) percent withheld from these monthly payments will be made to the Contractor upon completion and acceptance by the Owner, of all work called for under the original contract, regardless of any addition to the contract or any extension of completion time.

14. Claims for Extra Work
    No claim by the Contractor for increased compensation for alterations or additions, except when done in pursuance of a written authorization from the Owner, will be considered unless written notice of claim is made to the Owner before the commencement of such work.

15. Layout of Work
    The Owner shall furnish all surveys covering property lines and easements. The Contractor shall lay out all sprinkler work and be responsible for its location.

16. Progress of Work
    The work shall be carried to completion with utmost speed, since time is of the essence.

17. Overtime
    Overtime work will be at the Contractor's option unless required, in writing by the Owner, in which case the overtime premium will be paid by the Owner.

18. Sod Lifting and Replacing
    Where piping is to be installed in areas containing established turf, the sod shall be removed from the trench line in the necessary width and to a suitable depth. The backfill shall be brought to grade by tamping before replacing the sod. Only light tamping will be permitted on the sod. The trench area shall then be cleared of all deleterious matter. The Contractor shall be responsible for maintaining removed sod and shall furnish replacement sod if existing sod fails to survive. As soon as the replacement sod has "knitted" the Contractor's responsibility for sod maintenance will terminate.

19. Excavation
    The Contractor shall do all necessary excavation for the proper installation of his work. Over-excavation shall be backfilled and hand tamped prior to installing pipe. Any pumping, shoring or bracing will be done by the Contractor. If the Owner suspects rock conditions and/or the Con-
Sprinkler Irrigation Systems

tractor and Owner shall negotiate the extra compensation to be paid the Contractor. The Contractor shall barricade and/or light the excavation to prevent undue hazard to the public.

20. Pipe Installation
In general, when a manufacturer's specification exists covering installation of its material underground, it shall be followed. This shall apply to thrust blocking, handling, storage, minimum depth of cover, cathodic protection, coating protection and testing.

Underground lines up to 2' inclusive shall have a minimum horizontal clearance of four inches of each other. All other lines shall have a minimum horizontal clearance of 12" of each other. All lines shall have a minimum horizontal clearance of 12" from the lines of other trades. This requirement does not apply to lines crossing one another at angles of 45 to 90 degrees. A minimum 1" vertical clearance shall be maintained between lines which cross between these angles. Minimum depth of cover over piping 1½" and smaller shall be 10"; 1½" to 2" inclusive shall be 14"; and 2½" and larger shall be 18", or at a sufficient depth to accommodate valves and other equipment, whichever is greater. Where pipe laying is not in progress, or at the end of each day, the pipe ends shall be closed by means of a tight plug, or cap. All work shall be performed in accordance with good practices prevailing in the piping trades.

21. Drainage
When the piping system is installed in a freezing climate, it shall be equipped with automatic ball check drains on the zone lines and manual drain valves on the main lines. These shall be installed a suitable porous material sump. Minimum pitch at the low points of the system and discharged into of piping to drains shall be 3" per 100 ft.

22. Backfill
The Contractor shall do all necessary backfilling and compaction required for complete installation of the system. Compaction shall be such that the original density of the material is obtained. Backfill material shall be free from rocks, large stones or other unsuitable substances. In the spring following the year of installation, this Contractor shall repair any settlement of the trenches by bringing the backfill and seed to grade. Watering and maintenance of the repaired areas shall be the Owner's responsibility. Backfilling of trenches containing plastic pipe and copper pipe shall be done when the pipe is cool to avoid excessive contraction in cold weather.

23. Sprinklers and Quick Coupling Valves
Sprinklers and quick coupling valves shall be set plumb and level with the turf at locations called for on the drawings. Heads in lawn or turf areas, where grass has not been established, shall be installed on temporary risers extending at least 3" above grade.

After the lawn or turf is established and the ground has settled, the Contractor shall, within ten (10) days of notification, lower heads to finish grade. Where heads are installed along walk, roads, etc., they shall be permanently positioned. Sprinkler piping shall be thoroughly flushed before the installation of the sprinkler heads.

Elevation of the sprinkler heads and quick coupling valves is critical and the Contractor shall exercise care and set them exactly at or slightly above grade.

24. Manual Valves
Manually operated control valves shall be installed in locations as shown on plans and shall be accessible for proper use. Valves shall be installed with enough clearance for proper maintenance. Valves shall be installed with a minimum of 4" cover from finish grade, and shall be provided with a proper valve sleeve and cover extending from grade to the body of the valve.

25. Automatic Valves
Automatic control valves shall be installed at sufficient depth to provide not less than 4" cover from the very top of the valve to finish grade. Valves shall be installed in a plumb position with enough clearance from other pipes for proper maintenance. Valves shall be provided with a valve sleeve and cover extending from grade to the body of the valves. Where an automatic valve is installed under each sprinkler head, the valve box and cover may be omitted.

26. Pipe Sleeves, Augering and Boring
Where pipes are installed under roads or walks by jacking, augering, boring or open cut, the excavated material shall be replaced around the pipe to provide original density so no settlement will result. Where possible, the pipe shall be installed around the pipe line. Where control wires or tubing pass beneath planting beds, sidewalks, roads or drives, they shall be installed in their own suitable sleeve. In other locations they shall be installed in the pipe trench and protected by the pipe where possible.

27. Control Wire or Control Tube
Control lines shall be at least the minimum size recommended by the Automatic Equipment Manufacturer and shall be a product approved for underground direct burial use. The connections at joints shall be by an approved method for underground use. Allowance shall be made for thermal contraction of the control lines. Control tubing shall be flushed prior to connection to the valve and/or controller. Control wire shall have an 18" loop at the valve to facilitate servicing.

28. Automatic Controller
The automatic controller shall be mounted in a manner recommended by the manufacturer and at the location called for on the plans and approved by the Owner. The Owner will provide electrical power to the controller location in accordance with the manufacturer's specifications unless noted otherwise on the plans.

29. Pumping Plant and Pump House
Motors, pumps, piping and all mechanical work shall be installed by this Contractor for a complete and operating pumping plant. Pump house, floor and footings will be installed by this Contractor unless noted otherwise on plans.

The electrical service to the pumping plant shall be provided by the Owner. All other electrical wiring and equipment shall be provided by the Contractor.

30. Backflow Prevention and Connection to Main
Where applicable, the connection to the main shall be made by this Contractor and will include a master control valve. An Approved backflow prevention assembly shall be provided and, unless the governing code specifies otherwise, shall consist of a line size check valve downstream of the master control valve.

31. Electrical Wiring and Controls
All electrical equipment and wiring shall comply with local and state codes and be installed by those skilled and licensed in the trade. Unless the governing code specifies otherwise, low voltage control wire may be installed by the Sprinkler Irrigation Contractor.
TURN ON WITH FEBCO

For in-close, small areas or large open turf areas — lawns, flowers, shrubs, bulbs — Febco has the right head models.

And to make watering completely painless, install Febco automatic controllers. Commercial or home systems, Febco gives perfect control, automatically.

Febco valves, couplers and vacuum breakers are out of sight, out of mind, yet always on the alert.

Febco, the complete line of quality-constructed irrigation equipment — sprinklers, valves, couplers, controllers and vacuum breakers. When you install Febco......

all you add is water!

32. Concrete and Asphalt Repair
Any concrete or asphalt pavement cut or damaged by the Contractor will be repaired by the Contractor. Where pipes are installed through walls below grade, the repaired wall shall be suitably waterproofed.

33. Clean Up of Area
The entire area shall be left clean and in the condition that the Contractor received the area.

34. Testing and Flushing
All main lines and lines having continuously applied pressure shall be tested at a pressure of 100 p.s.i. or at the rated pressure of the pipe, whichever is lower, and upon visual inspection of the ground, should any leak be found, it shall be repaired. The line shall then be retested until satisfactory.

Zone lines shall be tested at the operating pressure of the zone and, should any leak be found, it shall be repaired and the zone retested. After testing, the system shall be thoroughly flushed with a minimum of 150% of the operating flow passing through each pipe, beginning with the larger mains and continuing through the smaller mains in sequence. When the testing and flushing is complete, the Contractor, in the presence of the Owner, will demonstrate the sprinkling system with particular attention to coverage and method of operation.

35. Adjusting of System
Adjustment of the sprinkler heads and automatic equipment will be done by the Contractor, upon completion of installation, to provide optimum performance. Minor adjustments during the guarantee period will be made by the Owner.

36. Loose Equipment to Furnish
Loose sprinkling equipment, operating keys and spare parts will be furnished by the Contractor in quantities shown on the plans.

37. Instructions and Record Drawings
After completion of the piping installation, the Contractor shall furnish an “as-built” drawing showing all sprinkler heads, valves, drains and pipelines to scale with dimensions where required. Instruction sheets and parts lists covering all operating equipment will be bound into a folder and furnished to the Owner in two copies.

38. Owner’s Acceptance
Within ten days of the Contractor’s notification that the installation is complete, the Owner will inspect the installation and, if final acceptance is not given, will prepare a “punch list” which, upon completion by the Contractor, will signify final acceptance by the Owner.

39. Guarantee
For a period of one year from date of final acceptance of the Contract, the Contractor shall promptly furnish and install, without cost to the Owner, any and all parts which prove defective in material or workmanship. Draining of the system to prevent freezing in the fall following installation will be the Contractor’s responsibility.

40. Owner’s Responsibility for Maintenance
It will be the Owner’s responsibility to maintain the system in working order during the guarantee period, performing necessary minor maintenance, keeping grass from obstructing the sprinkler heads, protecting against vandalism and preventing damage during the landscape maintenance operation.

41. Service by Contractor
The Contractor shall service the system at the Owner’s request during the guarantee period and shall be paid for work performed which is not covered by the guarantee. If requested by the Owner, the Contractor will furnish the Owner with a schedule of service fees.

42. Addenda
McCoy's park department maintains 38 little league baseball diamonds. Anderson hosted the Babe Ruth League World Series in 1965.

McCoy puns: "Wheel Horse even helps our golf course stay out of the 'red' by keeping the fairways green."

McCoy added four new Wheel Horse tractors to his stable this year. Here he accepts delivery on a new GT-14 from John Newby, of Implement Service, Inc., in Anderson.

McCoy's park department maintains 38 little league baseball diamonds. Anderson hosted the Babe Ruth League World Series in 1965.

"Those Wheel Horse tractors really work hard keeping the fair grounds in shape for sulky racing and a nine-day county fair."

"I was put in office to keep our city well-groomed," says Ralph McCoy, Anderson, Indiana, park superintendent. "If my equipment breaks down, I've had it." McCoy depends on his Wheel Horse garden tractors to get the job done eight hours a day, April through November, "I have to get good service out of them because my job depends on it."

McCoy first heard about Wheel Horse from his brother, who had a dealership in Fort Wayne, Indiana. Now he uses six Wheel Horse tractors and a summer staff of ninety men to manicure 700 acres of parks, lawns and golf course. During the winter a Wheel Horse snow thrower attachment keeps the city skating rink clear of snow. "I can't afford equipment that winds up sitting all the time; I know for a fact that Wheel Horse is dependable."

McCoy also has charge of the grounds around the new city hall, the Center Services Building, and the million-dollar Eisenhower Memorial Bridge. "Our garden tractors play a major role in maintaining Anderson's image to the public," he concludes. If the lawns you look after are in the public eye, look to Wheel Horse for top professional help. It's the pick of the pros. Write: Professional Services, Wheel-Horse Products, Inc., 515 West Ireland Road, South Bend, Indiana 46614.

How one city manicures its fair grounds, golf course and 38 parks

ANOTHER WHEEL HORSE PROFESSIONAL
It is estimated that 90% of all irrigation engineers and golf course superintendents who ever lived are now alive. New ideas and inventions come nearly every day. By combining all that we know, we could create a "supermachine" of any kind within a given field.

The computer is an example of a supermachine. Look what it has done for the space program and for medicine.

In medicine, the computer aids in diagnosing what ails a patient. Why can't we use the computer to help us diagnose factors affecting our patient—the turf?

At present, we are our own computers. We are always taking into consideration the variables of the day or hour to determine what, when and how much to water, spray or fertilize.

We take into consideration the present weather conditions and tomorrow's forecast—temperature, humidity, wind velocity and direction, light intensity, cloudy or clear, chance of precipitation.

What is the long-range forecast? Weather forecasting at its best is weak, but improving. ESSA satellites help a great deal. Perhaps our own weather recording devices or stations would be an improvement.

Soil conditions have to be considered—soil temperature, moisture, compaction (which changes during the summer), and soil porosity.

We look at the turf. What is the height of cut, root depth, grass temperature, rate of growth (fertility and health are related to rate of growth), when was it last mowed, and when will it be mowed again?

One sensing device we could use to better judge soil and turf is the tensiometer. It determines evapotranspiration, the loss of water from the soil by evaporation and by transpiration from the plants growing from it.

Infrared photography, used to measure the heat or temperature released by the plant, could predict grass that is about to wilt.

A wilt-warning device could provide computer data by recording conditions when wilt last occurred. A computer programmed with this information and linked with the sensing device could then warn when these conditions, even though made up of different variables, was about to reoccur.

Some predetermined constants must be considered. These concern soil, turf and the physical layout and design of the system. Soil porosity can be determined mechanically in the laboratory. Percolation rate can be determined in the field, with variances noted between areas.

All USGA greens built with the same set of specifications should be similar enough to get by with the use of one tensiometer for the greens. Most courses would need more. The effect of diseases on the plant would have a direct bearing on the needs of irrigation. Now, the tendency is to over-water. A computer would lessen this tendency.

Some of the limiting factors such as amount of water, pipe and pump sizes, money available could be handled more efficiently by a computer.

Another variable to know is whether the soil can absorb the water as fast as it is being applied. Should we split or repeat our application, in other words recycle?

The more variables we encounter the more difficult it will be to program a computer.

Imagine reading your various sensing devices, taking the constants, then placing all this information into the computer at the day's end to obtain in a few seconds your instructions for watering that night. It may say something like this:

Water Numbers 9, 1 and 18 greens 1 1/2 hours in three split applications. The approach and the tee end of Number 5 needs an extra 20 minutes. The remainder of the greens and fairways need 45 minutes. One constant application will do. Start the program on the greens at 7:40 p.m. Do the fairway program after the greens. The tees should be started by 3:15 a.m. because you have a shotgun start at 6:30 tomorrow morning. This will still give you enough time to syringe all areas by 5:30 and begin mowing greens and fairways. Have a good night's sleep.

Until all this happens, we can cut a program on a card or tape and place it into the controller for the nights program which you would have to make up from information from our own computer (our head).

If the housewife can have 14 different selections on her modern washing machine, why can't we have a similar dial or programmer built into our controllers? Maybe one setting would be for tees and greens, another for just fairways, or another for greens and half the fairways.

Turf irrigation is full of magical things patiently waiting for someone to discover and apply them. We as superintendents must keep on top of the equipment available and apply them as we see fit. We and we alone can tell the designers and the installers what we need and what we want. They are capable of doing just about anything.
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Tandex can give you a more economical ground maintenance program. Tandex is a soil sterilant. And it's proven its weed-killing power for use around industrial plant sites, storage areas, lumberyards, tank farms and the like. Broadleaf weeds, grasses, even woody species die when Tandex is applied. And its power persists for a season or longer.

Spray wettable Tandex powder (WP 80) or use the granular form. The handy five-pound plastic container is especially convenient. Tandex can be combined with fortified oils and other herbicides for special control situations.

Write to Department A, Niagara Chemical Division, FMC Corporation, Middleport, N.Y. 14105.
EVERYONE these days is looking back at the 60s and reviewing the accomplishments in a particular field. Let's see how far we've come and what we have learned about golf course irrigation.

While industrial plants and home lawns were watered automatically in almost every instance, the spring of 1960 found the golf courses watering with quick coupling sprinklers if they had an up-to-date system and others using hundreds of feet of hose.

Cost of installation was of only relative importance. The real reason for so few automatics in the early 60s was the reluctance of the superintendent to trust his watering to anyone but faithful old Joe, the night watering man.

Well, old Joe is gone, wages are up, people don't want to work at night, so now the superintendent asks, "maybe I should look into automatic control of my watering program." In addition to replacing old Joe, he'll get variable timing over the whole course, multiple light waterings for the hard to penetrate areas, automatic or manual syringe cycles, automatic rain cut off and no more chance to blame some loss of turf on a poor irrigation system.

So, to sum up the 60s we have had some advances in the hardware of automatic control. The sprinklers have been improved, automatic valves are better, automatic controllers are so reliable that you can almost forget about maintenance. Engineering designs are really ahead of the equipment available. The end of the 60s saw central programming designed into almost every new installation. From the superintendent's office, he can handle the irrigation of the entire course. Really, what we accomplished in the 60s was the realization that a golf course can be watered using an automatic, easily adjusted program.

What lies ahead for the 70s? Plenty of research. We still don't know how often to water and how much to apply. Most superintendents are watering by using their judgment, based on experience and not supported by any technical input. Here we have $150,000 worth of sophisticated equipment and the superintendent still has to look at the turf, look at the sky and guess "it looks like 30 minutes per station would do the trick tonight."

Among other things, for any given course the amount and frequency of water required depends on soil moisture level, rate of evap-transpiration, wind speed and direction, length of day, amount of sunlight or cloud cover, relative humidity, soil and air temperature and weather forecast for next 24 hours.

Each time the superintendent decides to water, he has to evaluate all of these factors. Most superintendents are very capable but to analyze eight or more variables and remember the relationship of each variable to the water required for his grass, is too much to ask of anyone.

Why not have a digital computer receive the input of the various sensing instruments and then control the watering time based on the analysis of all variable factors. These computers are now leased by some clubs and, if not, are available on a time-sharing basis in most larger metropolitan centers.

Again, our hardware is ahead of our software, or program. Even if we know that the soil moisture is at the 47% level, wind 6 mph from s.w., 14 hours daylight with 60% sun, average 51% relative humidity, average temperature 76 degrees and forecast for tomorrow to be same with 10% chance of rain, the superintendent still can't say exactly how much water to apply, knowing his grass and soil type and management level desired.

For those superintendents who are the serious leaders, I suggest you start recording some or all of the data listed above and then record the response of your turf, together with the amount of water applied. You'll be assembling valuable data for later design of your automatic watering program, and in the meantime, will be giving your head a good workout while using it as a low-cost computer.
Three or four Rainmaster controllers—or similar products—will fit snugly inside the electrical cabinet shown at left. The system here has separate clocks for greens, tees and fairways. More than 65 wires are coming into this unit. Field controller installations can easily be blended in with the course through proper landscaping.

Bob-O-Link Country Club at Highland Park, Ill., is using this larger, more sophisticated field controller installation. This unit provides one program for fairways and approaches, four preset programs for greens, and four preset programs for tees. Bob-O-Link also has telephone contact between field stations and the superintendent’s office.

Robert Williams, superintendent at Bob-O-Link, points to the central program unit that operates his field controllers. This system provides automatic or manual start, individually, for greens, tees, fairways and approaches for both the irrigation and syringe cycles. The unit has a series of red alarms to indicate malfunctions.

This trench cleaner is a modified footing digger, made by Arps Mfg. Co., New Holstein, Wis. It prepares the trench with a one-inch depression to allow for the replacing of sod. Excess dirt is augered into the wagon. Used with a backhoe and tamping unit, the trencher enables replacement of sod in less than three hours.

Clean water at a constant pressure is a necessity for trouble-free golf course irrigation. Oak Hill Country Club, Rochester, N.Y., obtains these requirements with a pressure regulating valve (A) and a Y-type strainer (B). The strainer features an automatic blow-off to remove collected contaminants.

A field control house serves the double purpose of housing irrigation controllers and as a shelter for golfers. The house at Oak Hill Country Club features a rain gauge on the roof that operates an automatic shutoff (inset) for the sprinkler system. The unit is adjustable from .15 inch of rain. It shuts off system and returns controllers to start position.
As the water gun atop the Turbo-Rain unit revolves, it lays down as much as 500 gallons of water a minute. It will operate unattended for hours at a time, advancing across a field according to a preset speed.

Turbo-Rain Gives 24-Hour Unattended Large-Area Irrigation

By EDWARD G. DICKSON
Hialeah, Fla.

An irrigation device which literally walks itself across a field — unattended — while a water gun mounted atop it sprays up to 500 gallons of water a minute is being introduced to a variety of agricultural uses.

Turbo-Rain, built in Winter Haven, Fla., to help alleviate the critical manpower problem of the citrus industry, is being used, too, in other activities — to irrigate row crops of many kinds, and pastures. At least one unit has been sold for irrigating a sod farm. Conceivably, its builders say, it could be a water source for a variety of turf locations, including parts of golf courses.

Once harnessed by “mobile pipe” to a water pumping station and with its guide cable anchored in the ground ahead of it, the Turbo-Rain will operate without an attendant for hours at a time. Its forward speed and the amount of water it lays down can be determined at the outset by a valve adjustment. It will operate at night as well as during the day, the makers say.

Turbo-Rain is manufactured by Hydro Equipment Co., headed by Richard P. Georges. According to Sales Manager John W. Baker,

John W. Baker, sales manager, points to Turbo-Rain design features — a water turbine and gear box. The gears are driven by the turbine and pull the wheeled machine along a long steel cable.

Forward movement of the Turbo-Rain can be adjusted with this by-pass valve. The valve regulates the amount of water passing through the turbine, thus changing the “walking” speed of the machine.

The steel cable on which the Turbo-Rain “walks” itself is reeled in on this drum, at the forward end of the irrigation machine. The end of the cable is anchored in the ground.
about 200 units of the irrigation machine are in use. Some have been shipped as far away as Argentina.

The irrigation system, he said, is being used in the peanut fields in Georgia, on vegetables in California and Michigan, on grain fields in the Midwest, as well as in the Florida citrus groves. One sod farm in Georgia has purchased the equipment, Georges said. A Florida horse farm is using it for pasture.

There is a common denominator in all these uses—to provide irrigation without requiring a workman in constant attendance and without having to install a permanent system.

An ideal application, Baker said, would be a square 40-acre field of reasonably level ground and uninterrupted straightaway runs for the Turbo-Rain.

If this field were broken up into four areas, each 330 feet wide and 1,320 feet long, the Turbo-Rain could make a pass through one of these areas in 12 hours comfortably. For example, this strip could be watered during the night without any supervision except at the start. It would shut itself off at the end of the job.

Key feature of the machine is the water turbine. Water from the pump enters the turbine from the hose which connects the pump and the machine. The turbine action turns gears in an attached gear-box. These gears, in turn, pull the machine along a 1-4-inch galvanized cable, 1,400 feet long, which is anchored in the ground ahead of the Turbo-Rain.

A by-pass valve, which controls the amount of water going into the turbine, makes it possible to vary the forward movement of the machine from 5 to 60 inches a minute. The water gun has a 1½ nozzle and has maximum water coverage of

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Hypro announces a gear-driven PTO centrifugal sprayer pump for only $90

It's the 9100, Hypro's new PTO centrifugal pump that delivers 20 gpm at 50 psi. Compare it, feature for feature.

Totally enclosed gear drive eliminates belts, chains, and pulleys. With smooth-running gears, ball bearings, mechanical seal and precision molded impeller, it handles wettable powders and other abrasives with less wear.

The 9100 is compact, only 10½ high, 6⅛ from PTO center to bottom of pump. Mounts easily on the PTO and fits under the safety shield.

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GIERINGER MFG. CO. 6508 N. Sunnypoint Rd. Milwaukee, Wis. 53217

MARCH, 1970
500 feet diameter. The Turbo-Rain moves on four pneumatic implement tires.

Maintenance on the machine is slight, according to Baker. There are five grease fittings to service and the grease in the gear-box must be changed periodically.

The pumping equipment can be any standard type. The water flow must be reduced to four inches for the 630 feet of non-stretch 4-inch mobile hose, which reaches to the Turbo-Rain unit.

For handling the hose, the unit includes a two-wheeled hose reel, which can be pulled by a tractor or truck and is operated by power take-off. It can lay the hose in the center of the row or at the side of the row. Also for handling the mobile hose are two capstands, usually placed at the ends of the runs to guide the pipe on turns.

The company also makes a model of the Turbo-Rain for groves or orchards with tall trees. On that model the water gun is located much higher and the machine is equipped with counter-balancing tanks to compensate for the greater height of the unit.

Hydro Equipment Co., is a division of Superheater Sales Co., which produces a crop protection system.


Tree Odor May Help Solve Air Pollution

Strange as it may sound, the taste and smell of trees may provide the key to solving many of the problems man faces today.

James Hanover, associate professor of forestry at Michigan State University, says that leaves and stems of trees give off vapors which often result in a unique odor associated with individual trees, species and large forests.

Only recently, the potential significance of these vapors for problems of insect attraction, human allergy, atmospheric contamination and ecological regulation has been realized.

An instrument called the gas chromatograph, which is far more sensitive than the human nose, is being used to measure tree odors and determine their chemical composition. Further study of the different odors given off by different trees will give insight into specific ecological problems.

"Corresponding measurements of the 'taste' of internal chemicals of tree tissues are also being conducted," says Hanover. "Eventually, the chemical codes which determine whether certain trees are resistant or susceptible to damaging diseases or insects may be unraveled and used to improve the environment."

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Or step up to our Matador® sprayers. Choice of 3 or 5 gpm positive piston pump. Four tank sizes: 15, 30, 50, 100 gallons.

For really big jobs, choose from our Peerless™ line on wheels or skids—with tanks sizes up to 300 gallons. Can cover turf at 10 acres an hour with 20-ft boom. Or reach up high with telescopic gun mast. Models available with rugged Ten-O-Matic® 10-gpm pump, stainless steel tank for trouble-free service.

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If you are spending too much time in pre-mixing your herbicides, or in refilling your tanks, and you end up with a lot of wasted material and money...
Or, if you've sprayed, and the broad-leaved weeds and brush still abound...
Then, you should have done it right the first time with Visko-Rhap* invert emulsion herbicides.
Visko-Rhap, in special formulations of 2,4-D, 2,4,5-T, and Silvex, from Hercules.

*TRADEMARK OF HERCULES INCORPORATED
Beauty, Upkeep, Status
Push Turf Irrigation

By A. BROWN, Vice-president of Sales,
Turf Irrigation Corporation
Commack, N. Y.

Underground sprinkler systems are becoming more popular with commercial and industrial firms whose buildings are surrounded by large turf areas. Pride seems to be the foremost factor contributing to the trend.

This desire for appearance perfection is becoming a must in the industrial parks that are springing up throughout the country. Wide acceptance and usage of underground sprinkler systems for commercial grounds is yet to come. Therefore, phenomenal growth is ahead, with these factors bringing on the expansion:

—labor savings for turf maintenance;
—recognition that well-groomed and landscaped grounds project the image of an affluent company; and
—the emergence of beautification as a popular status symbol.

Commercial site irrigation will experience the same type of success as has been achieved by color television. One commercial firm installing a system will inevitably motivate others to do the same. The trend can then snowball.

A large number of commercial installations have come as the result of the beautifying effects of systems for private homes of business and professional people.

Proper installation is an excellent entree for subsequent jobs.

It is important for the installer to visit the job site in order to design the sprinkler system effectively around the present or proposed landscaping.

Catalog specifications for sprinkler heads should be followed closely. For example: Turf Irrigation sprinkler heads are equally spaced 24 feet apart; and rotary heads are equally spaced 36 feet apart to allow for proper water overlay.

Installation is quite simple. Introduction of trenching machines and sod cutters has practically eliminated menial labor.

Complete automatic electric systems are set for proper watering in the spring and aren't touched again until fall.

After a system is shut down, it is imperative to blow out the lines to prevent ice damage to valves, lines and heads during winter.

To insure that a system is maintained properly, it is important to discuss the system in detail with the man charged with its maintenance. He should know, for example, how and why the electric valves and controller operate. This effort will eliminate a large percentage of callbacks.

Turf Irrigation Corporation has arranged a school and field trip program to orient purchasers of its products.

Selling cost for installing a commercial job, in round numbers, is about $2,000 per acre for rotary pop-up heads and $3,000 per acre for automatic pop-up heads. This is based on one- to ten-acre plots. The estimate includes the electric valves, electric controller, poly pipe, pipe fittings, etc., predicated from existing water service.

Evidence of this expanding industry of commercial turf irrigation has come through our experience with several relatively new sprinkler installers. With a year's concerted effort, they have seen business increase within a short period to a full-time endeavor.

Turf Irrigation Corporation's growth also reflects the trend. Consolidated sales of all our divisions for 1968 showed a 60% growth over the previous year. Backlog orders going into 1969 were about 200% greater over a year ago, attributable in part to 35 new items added to our product line in 1969.
for turf like this from tee to green
follow the

**TUCO** Acti-dione®

fairway spray program

The same antibiotic fungicide proven for years on golf greens at *hundreds* of courses now provides a program for economical treatment of fairways.

NOTE: The cover photo, the untreated fairway at left and the closeups below were all taken the same day in August, 1968, at courses less than 40 miles apart. All are unretouched. Below left is bluegrass; right is bent grass.
why a fairway disease control program?

1. Golf course superintendents set increasingly demanding standards for themselves to provide superbly conditioned courses regardless of weather and other obstacles.

2. Demand by golfers for high-quality turf at all times. They want the good lie for fairway woods and iron shots.

3. Growing numbers of golfers increase this pressure, and increased traffic is too much of a challenge for anything less than healthy turf.

why Acti-dione® for a fairway spray program?

The use of Acti-dione Ferrated or Acti-dione RZ has demonstrated effective, economical control of many turf diseases when combined with good management practices.

Acti-dione Ferrated is a formulation of the antibiotic Actidione and Ferrous Sulfate designed for the control of specific turfgrass diseases. Acti-dione RZ is a broad spectrum turf fungicide formulation containing the antibiotic Actidione in combination with PCNB. Both products are used in a preventive and eradicative treatment program for:

Kentucky Bluegrass—leafspot, going-out, and melting out

Mediterranean Bluegrass—rust, fading-out and powdery mildew

Bentgrass—dollarspot, melting-out and fading out.

how to use Acti-dione® in a fairway spray program

Acti-dione may be applied as a spray with a conventional boom sprayer or with a broadcast boom jet spray nozzle. The Acti-dione spray should be allowed to dry in the grass—do not water in.

Your fungicide program should begin in the spring as soon as possible after the first mowing. Succeeding applications should be made as often as necessary throughout the growing season. Usually an interval of 21-30 days between applications will maintain satisfactory control. The recommended rate of Acti-dione Ferrated for fairway disease control is one package per acre; the recommended rate of Acti-dione RZ is 1.5 pound per acre.

Prepare a fresh solution each day spraying is done; use at least 30 to 40 gallons of water per acre. For severe disease infestations, increase dosage rate of Acti-dione Ferrated to two packages per acre. If you are using Acti-dione RZ, one package of Acti-dione Ferrated per acre may be added as a tank mixture to increase effectiveness.

When mixing Acti-dione for fairway spraying:

1. Fill the spray tank ½ full with clean water
2. Start agitator and add the recommended amount of Acti-dione for the number of acres you plan to spray
3. Add remaining water while agitator is running

For sprayer calibration, request our Acti-dione sprayer calibration guide.
Stanley Caplan has a B.S. in agriculture from Delaware Valley College of Science and Agriculture in Doylestown, Pennsylvania. Stan has had several years of experience as a manager and buyer of nursery and garden supplies for a large company in California prior to joining TUCO in 1965.

Henry Lyon graduated from Cornell University with a major in ornamental horticulture. He has a broad agricultural background which includes wholesale sales and garden store management. Henry has been with TUCO since 1964.

Carmen Boone is a native of Arkansas and studied at Arkansas A & M College. He has a broad agricultural background and has had experience in the agricultural equipment field. Carmen joined TUCO in 1968.

TUCO realizes maintaining healthy, top quality fairways, tees and greens is far from easy. That's why this outstanding team is available to help you with your turf growing problems. Just a call will put one of these highly trained and experienced men to work for you. TUCO has the products and the personnel to do the job.

Stanley Caplan

Henry Lyon

Carmen Boone

TUCO

Robert Scobee

Carmen Boone

TUCO

Division of the Upjohn Company, Kalamazoo, Michigan 49001

Printed in U.S.A. C-1521
Environmental Industries, Inc., Encino, Calif., has appointed Don Stockard to manage its planned garden center operations. EII owns Valley Crest Landscape, Inc., Curtis V/C Corporation, and Valley Crest Tree Company. Its retail garden center business arm is to be called “The Arboretum, Inc.” Operation will be statewide from headquarters in Van Nuys.

Valley Crest Landscape, Inc., a division of Environmental Industries, Inc., Van Nuys, Calif., has named A. J. Lastuck, vice-president, as the Los Angeles divisional manager. Valley Crest is a state-wide landscaping, irrigation, and engineering contracting firm.

Amchem Products, Inc., Ambler, Pa., has appointed two sales representatives. Donald D. Richardson of Chesterfield County, Virginia, has been assigned to the state of Virginia and portions of North Carolina. Thomas J. Zielinski of Bay City is the new sales representative for Michigan.

Alco Chemical Co., Artesia, Calif., has appointed Philip Dellner as a technical sales representative for Orange, San Bernardino and parts of Los Angeles and Riverside counties.

Ian M. Wedderspoon, native of Scotland and a graduate assistant in the University of Maryland's Department of Agronomy since 1968, has been appointed supervisor of weed control inspection for the State Board of Agriculture. He is completing his master's degree in weed control and plant physiology.

Missouri Botanical Garden Board of Trustees has announced these officers for 1970: President — C. Powell Whitehead, chairman of the Arts and Education Council of Greater St. Louis; first vice-president — Tom K. Smith, Jr., group vice-president, Monsanto Company; second vice-president — Samuel C. Davis, retired senior vice-president, St. Louis Union Trust Company.

Toro Manufacturing Corporation, Minneapolis, has appointed P. Robert Scagnetti as institutional mower sales manager for the turf products division.

Heath International, Richmond, Mich., has selected Kenneth W. McCoy to head its newly formed industrial sales division. McCoy comes from Velox Chemical Corporation, where he was corporate manager of sales information.

Midwest Association of Golf Course Superintendents has selected Mrs. Dorothy H. Carey as executive secretary. Mrs. Carey has similar responsibilities for the Chicago Golf Association, the Sod Growers Association of Mid-America, the Southwest Golf Association and the Illinois Turfgrass Foundation.

Nutro Turf and Garden Products, Columbus, Ohio, has appointed Harry F. Podvia as a territory manager to establish and supervise sales in western Pennsylvania.
While wood and field burning in general is not a major contributor to photochemical air pollution, uses of some fuels in those fires can be. This Californian is creating a smoke plume that is visible for miles. He's trying to keep the fire hot enough to burn some orchard trees. Discarded auto tires, used for years to keep fires hot, are going to be outlawed. Authorities say there are other ways to keep fires hot without causing obnoxious pollution.

Research into the pollution consequences of agricultural burning may offer some solace, if not some solutions, to city officials and others who must dispose of diseased street and ornamental trees.

The fact is, clean burning of woody materials may not be as much a contributor to dangerous types of air pollution as has been assumed.

For some areas, such as those where trees afflicted with Dutch elm disease must be destroyed, the only sure method of eradication is burning. Yet, states and the federal government are moving rapidly toward the elimination of open burning as an air pollution control measure.

Several points with respect to burning wood wastes are worth remembering by city street tree maintenance men and others who have burning to do but hope to avoid the wrath of air pollution control authorities.

—Burning should be done on a somewhat breezy day when there is no inversion layer to keep smoke from dispersing.

—Fires should be kept as hot as possible, but without using such controversial measures as throwing rubber tires or smoky fuels into the fire.

—Fuel should be as dry as possible before the fires are lighted.

If these rules are followed, a strong case can be made that such fires do not contribute appreciably to the air pollution problem.

To understand why, it first is important to know the difference between particulate air pollution and photochemical air pollution.

Briefly defined, photochemical air pollution is the chemical product of the mixture of some pollutants, mainly hydrocarbons, and sunlight. The common term for the resultant material is smog, and even a small amount of smog can be harmful to humans and plants. A level of .15 parts per million will cause eye irritation.

Causes More Barking Than Bite

Particulate air pollution, on the other hand, often causes more public outcry and anguish than does actual smog. In many areas, particulate air pollution is severe and dangerous, especially when emissions fail to disperse or where they affect urban populations. In the great Central Valley of California, farmers are faced with learning to conduct necessary burning while not causing visible or harmful particulate pollution, and they are having some success.

"As far as particulate matter is concerned, as far as aesthetic values and their impairment and the effects on visibility, no one I know of, who is a responsible person, will deny that agricultural burning doesn't contribute," admits Victor P. Osterli, a researcher with the University of California extension service who has done substantial work on air pollution and farm burning.
"But from the standpoint of gaseous emissions, of hydrocarbons particularly, when you consider quantitative emissions from a given volume of plant wastes, smog generation is small by comparison with the internal combustion engine source," he said. "Likewise, smog production gets smaller yet when compared with the total volume of gasoline usage in a metropolitan area and its surroundings."

Osterli's office at the university's Davis campus is in the center of the rice producing area of the Central Valley, and rice stubble burning often has been an acute problem for farmers and their city neighbors. Other farmers must annually burn orchard prunings and there is a continuing need to burn entire orchards which have been removed to make way for new crops.

Thus far, neither the state nor counties in the valley have seen fit to abolish rice field or other agricultural burning. Instead, some effective voluntary controls have been devised with the help of the weatherman.

**Ventilation Index Established**

A ventilation index for each day is published by the US Weather Bureau, based on the height of the mixing layer of the atmosphere plus wind velocity, as predicted for mid-afternoon. Values range from zero to 2,000, with the higher numbers representing the best weather for burning. Compliance with the index is voluntary, but well over half the farmers heed it and the results, in terms of air pollution incidents, have been encouraging.

Osterli said in the San Francisco Bay area, the Bay Area Pollution Control District relies on the ventilation index to outlaw all open burning when conditions are unfavorable.

Agricultural burning, of course, involves thousands of acres and often is an annual occurrence. Sometimes the burning must occur in the same months when air pollution is greatest from other sources. In part, controls on farm burning have proved one point: air pollution continues anyway.

A city fire to remove bark beetles which spread Dutch elm disease, by comparison, would never approach the aggravating smoke levels found in Oregon's Willamette Valley last year, for instance. Grass seed harvesters there burned off some 240,000 acres of stubble last summer when conditions were bad and the smoke drifted over the city of Eugene. On Aug. 12, conditions became so poor...

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Vermeer's new "reach out" models cut wider, closer and faster. Low silhouette design for "tight spots." Cuts 24" deep, with 36 or 60 hp engine.

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the day was labeled Black Tuesday and the Lane County Air Pollution Control Authority received 2,000 protesting telephone calls. Finally, Gov. Tom McCall declared a health and safety emergency until atmospheric conditions improved.

Burning Tower Tests

Dr. Ellis Darley of the Statewide Air Pollution Research Center, University of California at Riverside, has investigated both rice and grass stubble fires, and other agricultural fires, for several years. Darley and his associates use a burning tower which permits them to measure the smoke ingredients from sample fires. The fires are laboratory versions of those which burn the same ingredients on farms.

Scores of such fires have been tried in the burning tower, and the results show conclusively that agricultural burning is a negligible source of particulate air pollution when compared with the emissions of the internal combustion engine.

Darley hesitates to apply his findings directly to the type of burning which might be conducted by a nurseryman in destroying a city tree — he never has tested the pollution output of any fuel more than two inches in diameter. He is certain that the thicker the fuel, the longer the fire will burn and the more pollutants will be created, though how much more is in doubt.

While the State Air Resources Board continues to rely on estimates of such pollutant levels compiled prior to Darley's work, Darley is convinced the estimates are high, even for heavier materials such as orchard trees. "Their estimates don't come out with our measured figures," he said.

Ideal: Hot Fire, Dry Fuel

In general, Darley said the hotter the fire and drier the fuel, the less the pollution. The cooler the fire and wetter the fuel, the greater the pollution. If a fire merely smoulders, particulate air pollution can become highly significant.

Fruit prunings, he found, yielded 13.9 pounds of hydrocarbons per ton of fuel burned, barley straw yielded 18.2 pounds per ton burned and native brush yielded 6.7 pounds per ton burned. By comparison, the gasoline engine yields 130 pounds of hydrocarbons per ton of fuel burned, he reported.

For one hydrocarbon, the photochemically active ethane, Darley found the value differences less diverse: 2.7 pounds per ton of ethane were produced in the fruit prunings fire against about 7.8 pounds from auto exhausts. Estimating some 151,000 tons of fruit prunings, barley straw and native brush are burned per year in the San Francisco Bay area, Darley estimated some 950 tons of hydrocarbon effluent would be generated per year, an average of 2.6 tons per day. Automobile emissions greatly exceed that figure in the same area on a per day basis.

Withall, the indisputable fact remains that agricultural burning causes substantial amounts of particulate air pollution. Those who light such fires are creating a conspicuous source of pollution, and the finger of blame is easily pointed toward them. The fact that particulate pollution is less dangerous, in many instances, than automobile-caused smog, often makes little impression on the general public.

To continue burning diseased trees, regardless of how necessary the burning may be to eradication of a disease, nurserymen and tree crewmen will have to carefully marshal facts, arguments and burning procedures which are as pollution-free as possible.

Fast-Growing, Salt-Tolerant Pine Shows Promise at MSU

Michigan foresters and commercial landscapers may soon have a new pine tree.

According to J. W. Wright, Michigan State University forestry professor, the new hybrid cross between Austrian pine and Japanese red pine shows promise for use in pulpwood operations and in roadside plantings.

The hybrid was first discovered in 1961 by MSU foresters at the W. K. Kellogg Forest near Battle Creek. Hybrid trees were growing naturally in an open area between mature stands of Japanese red pine and Austrian pine.

"These hybrids show excellent growth," says Wright, "growing faster than either parental species." Other characteristics which make the hybrid potentially useful include earlier reproduction, good recovery from transplanting shock and the possibility of tolerance to salt.
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Disease, Thatch, Pelletized Clippings, Sod Covers
Cicada Wasp, Sod Strength, European Turf . . .

At Michigan's 40th Turf

These gentlemen, part of the 450 persons attending the 40th Michigan Turfgrass Conference, are listening to a report on European turfgrass culture.

Of course, Clarence Wolfrom was there...

EMPHASIS on beautification may be new on the national scene, but it's at least a 40-year-old idea in Michigan.

That's how long the Michigan Turfgrass Conference has been convening. Only Massachusetts can claim seniority, of about a year.

"We saw a need for research and education," recalled Clarence Wolfrom. Fulfilling these original objectives, he continued, "have been the greatest contributions of the conference over the years . . . this plus the experience exchange that goes on."

Wolfrom, superintendent of the Maple Lane Golf Club, Warren, attended the first conference, helped form the Michigan Turfgrass Foundation. He was the first vice-president and served as the second president. He received the Meritorious Service Award last year.

Clarence Wolfrom has attended all 40 of the turfgrass conferences.

He contributed ideas for a course of study for students interested in a career in turfgrass management. A two-year program is now offered that includes both classroom study and on-job experience. Currently, the course has 24 first-year students, 23 second-year students, and more than 30 are expected to enroll this fall.

With encouragement backed by financial support (another $7,200 was voted this year) from the Michigan Turfgrass Foundation, the University has developed one of the best turfgrass research programs in the country. About three dozen major studies are under way.

A steady flow of reports on research progress comes through the University information offices, but the big events are the summer field days and the winter conference.

Some 450 persons came to the 40th conference at East Lansing, Jan. 27-28. Sessions dealt with research reports, sports turf, sod production, pest control, and pesticide usage.

Special reports in this issue on irrigation from Carl Miller of Miller Sprinkling Systems, and Ted Woehrle, Oakland Hills superintendent, were a part of the conference
Conference

... As were about 50 students from the turfgrass program.

agenda. Following are glimpses of what else was reported.

Fusarium Blight Increasing

A fungicide to control Fusarium blight still defies discovery. The problem, since it appeared in Michigan six years ago, is increasing on sod farms and home lawns. The disease is associated with compaction and drought stress on lawns, said Dr. Joseph Vargas.

Circular rings of dead grass indicate the presence of the disease, which apparently affects root growth. Vargas said shorter roots have been noted in the diseased grass. In dry weather and as the ground dries beyond these affected roots, the plant's leaves wither and turn brown. Surrounding grass continues green with moisture supplied from a greater depth by longer, healthy root systems.

In the absence of a disease treatment, Dr. Vargas recommended fertilization and daily watering to ease the drought stress.

Dr. Vargas discussed other turfgrass diseases and gave his recommendations of curative chemicals and cultural practices (Table 1).

But chemical companies need to be more specific in pinpointing what diseases their products will cure, stated Dr. Malcolm Shurtleff, plant pathologist from the University of Illinois.

"For which Helminthosporium leaf spot" is a chemical effective? he asked. "There are 26 kinds. Which rust? Which smut?"

New Facts on Thatch

A cultural management program to determine how to reduce thatch, after eight years, has resulted in "no observable thatch accumulation," reported David P. Martin.

"Contrary to what has been believed, clippings contribute very little to the thatch layer," he said. Instead, stems and roots are the major contributors.

Up to now, Martin continued, mechanical removal of thatch was the only method known. But research is in progress to determine if thatch can be reduced by increasing the number of microorganisms that bring about thatch decay, or to increase the activity of existing microorganisms.

So far, Martin said, "use of sucrose and ferulic acid has almost doubled activity."

Martin hastened to add that "po-
TABLE I. Turf Diseases — Chemicals to use; cultural practices to employ.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Chemicals</th>
<th>Cultural Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOLLAR SPOT</td>
<td>Daconil 2787, Dyrene</td>
<td>Maintain fertility, Remove dew early</td>
</tr>
<tr>
<td>BROWN PATCH</td>
<td>Daconil 2787, Dyrene, Fore, Dyrene</td>
<td>Avoid high N fertility, Increase air circulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(trim trees, for example)</td>
</tr>
<tr>
<td>LEAF SPOT</td>
<td>Fore, Daconil 2787, Acti-dione Thiram</td>
<td>Remove clippings, Raise cutting height, Fertilize</td>
</tr>
<tr>
<td>FUSARUIM BLIGHT</td>
<td></td>
<td>Fertilize adequately, Water daily in hot weather</td>
</tr>
<tr>
<td>FAIRY RING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>POWDERY MILDEW</td>
<td>Karathane, Acti-dione Thiram, Sulfur</td>
<td>Reduce shade</td>
</tr>
<tr>
<td>SNOW MOLD</td>
<td>Calo-gran, Calo-Clor, Demosan</td>
<td>Avoid fertilizing after Sept. 15</td>
</tr>
<tr>
<td>LEAF SMUT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STEM RUST</td>
<td>PCNB, Benlate</td>
<td>Fertilize</td>
</tr>
</tbody>
</table>

Awards included three scholarships from the Golf Course Superintendents Association of America. Recipients are above, from the left, Tony Tredente, Duane Ziemert and Mark Fields. John King (far left) is coordinator of MSU’s two-year turfgrass management course. Norman Kramer (far right), GCSA president, presented the awards. Dr. Kenyon T. Payne received the Michigan Turfgrass Foundation’s Meritorious Service Award and Mike Donahue was named “Outstanding Student.”

tential use of stimulators is under further investigation, and the use of these materials is in no way a recommendation at this time.”

**Sod Clippings Pelletized**

Because mowing is necessary to maintain sod quality, work is under way to see if clippings can be utilized in new ways. Dr. M. B. Tesar reported that two tons of pelletized clippings have been obtained. The pellets will be analyzed for total digestible nutrients, essential element content, protein content, and rate of digestibility.

Results to date indicate, he said, that pelletized sod clippings have considerable promise for use in specialized markets and could mean additional revenue for the commercial sod producer.

**Coverings Reduce Winterkill**

Dr. James Beard reported that his studies of winter protection covers indicate that both dessication and low-temperature kill can be prevented. He has determined that follow-up field testing confirms that cold-chamber techniques are valid in evaluating covers.

Of 16 types of coverings studied, the three best were a viscose-rayon fiber cover, a viscose-rayon-polyester cover, and an excelsior blanket. Some covers brought green-up three weeks earlier, he said.

Again, cultural practices can reduce winter-kill problems, he contended. Choose the proper variety. Seaside, for example, is definitely superior in resistance to dessication, he said. High rates of nitrogen applied just before winter sets in increase the chance of both dessication and low-temperature kill.

**Beware the Cicada Wasp**

This is the year to watch for the cicada wasp around golf courses, warned Dr. William E. Wallner. The 14-year locust cycle is at hand, and the killer wasps should be unusually active.

The wasps are large, having a wing span of about 1½ inches. And they're capable of a serious sting, said Dr. Wallner.

Broadcast spraying isn’t advised. Rather, he said, look for the burrows — the sand traps are a likely place — and apply a diazinon paste to the edges.

**Sod Strength Evaluated**

Sod heating and sod strength evaluations proved to be of considerable interest in the sod production session.

Dr. James Beard reviewed findings regarding sod strength that were demonstrated at the field day this summer.

The study is based upon only one year’s results and final conclusions can’t be reached until several more seasons, he said. Nevertheless, these findings have come to light:

- Most cutting height (one-half to 2½ inches) and frequencies (one and two times per week) resulted in an acceptable level of sod strength.
- The best strength was achieved by mowing at the 2.5-inch height once a week.
- Different varieties produced sod strength from 35 pounds required to tear (South Dakota Common) to 168 pounds (Nuggett), with 75 pounds considered as adequate to permit harvesting, handling and laying
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without problems. The top five varieties, including pounds to tear were: Nugget, 168; Pennstar, 167; Fylking, 158; Pp-1, 155; and A-34, 146. Belturf, Merion, Captain, PSU k-107 and Jamestown Red Fescue all rated 140 or above.

— Most sod varieties exhibited an increase in sod strength between June and August.

— In a mixture study of six varieties — Fylking, Merion, Newport, Park, Prato and Windsor in 11 different combinations — those blends containing Fylking tended to rank higher in sod strength.

— An evaluation of sod strength for 11 mixtures of Merion and Pennlawn Red Fescue (a sod mixture in demand for areas having both sunlight and shade) disclosed that mixtures containing as little as 30% Merion on a seed number basis gave comparable sod strength to the five highest ranking variety mixtures.

Studies of sod heating since 1966 indicate that:

— Mowing at 0.75 inch and removing the clippings are the most effective ways to reduce sod-heating injury.

— A high nitrogen rate (5 lb. N/1,000 sq. ft.) applied five days before harvest was detrimental to the sod. Respiration rate and percent kill were significantly increased; root production was significantly decreased.

Reports From Europe Trip

Dr. Beard and Dr. Paul E. Rieke reported on their trip to the International Turfgrass Society in Harrogate, England, and a subsequent inspection of turfgrass areas in a number of European countries.

Some general conclusions, they reported, were that the British are considerably behind the U.S. in turfgrass culture and maintenance, that Sweden, in some respects, is ahead of the U.S., particularly in the area of sports turf maintenance.

Solna Stadium in Stockholm, they reported, exhibited excellent grass, despite the fact that 90 games of soccer are played on the field a year. At Soderstadium, also in Stockholm, the field is in use 260 days of the year, to include flooding and freezing it for winter sport games.

At least a couple dozen stadiums were equipped with underground heating systems. Dr. Beard could think of only two or three in this country, one being at Green Bay, Wis., home field of the Green Bay Packers.

Your Reputation as Grower Goes With Handler of Sod

A wise sod producer may conclude that his responsibilities don't necessarily end when he delivers the sod to the purchaser. What happens in the next few hours, days or months could very well damage his reputation through no fault of his own.

These inferences come from the remarks of Ben Warren, president of Warren's Turf Nurseries, Palos Park, Ill., during the recent turf courses at Rutgers University.

There is considerable difference in sod handling, Warren said, depending on who handles the sod between grower and ultimate buyer. Sometimes sod isn't stored properly and deterioration results.

He has noted that some merchants have no provisions for rolling out sod, but move large volumes quickly. These largest and "better organized" dealers plan that any surplus can be used on landscape jobs by their own landscape department or local contractors.

"Vacuum cooling has been a great aid to this type of merchandising, so sod can be kept three or four days in stacks before damage occurs," he said.

Some dealers, he continued, may stock sod for short periods but have no provision for rolling out surplus on pavement or polyethylene sheets.

And there are merchants that stock no sod, but maintain an attractive plot of grass from which orders are taken.

The large volume that goes through the landscape contractor isn't endangered unless unfavorable weather occurs, he said, for the sod generally is planted immediately.

Again, he added, vacuum cooling has been a boon on occasions when unexpected rain delayed installation for several days.

"A high percentage of this grass is well-planted by competent workmen, Warren believes, "but that small part that is poorly handled is provoking and makes an unfavorable and lasting impression."

Warren has observed these bad practices:

1. Failure to recognize and correct contaminates that exist in the soil can lead to dissatisfaction. The two most noxious problems are quackgrass and bentgrass. Eliminate these before laying sod.

2. Poor grading resulting in water-holding depressions or a surface too rough for satisfactory mowing creates conditions that are almost impossible to correct after grass is established.

3. A not uncommon problem is the misuse of varieties. The outstanding abuse is the planting of Merion bluegrass in too much shade.

4. Lack of use or misuse of fertilizer is encountered.

5. Careless or ill-advised use of herbicides has caused from minor damage to complete kill.

6. Probably the most frequently encountered abuse of sod is seen in the management of water. This type of mishandling can be briefly described as ranging from too little, too late, too much, and too often.

In conclusion, Warren said, "properly advising the new owner in the care of his new grass is often neglected or overlooked. We suggest that written suggestions on the care of grass be placed in the hands of the owner upon completion of every job." (And that seconds the motion, we offered in the February issue about a turf owners' manual.)
Southern Weed Science Society Report:

Look at Weeds As Pest Haven

They may be talking business or just visiting. Chances are the subject is contract applicating in the left picture. From the left are Emery McEithen of Amchem, Ambler, Pa.; Frank Cady, contract applicator and owner of Rowco, Inc., San Antonio, Tex.; and John Kirch, also of Amchem. In the right picture are Jay D. Wright, left, Stauffer Chemical Co., Orlando, Fla., and Will Waters, University of Florida, Apoka.


MEMBERS of the Southern Weed Science Society — 900 strong — held their 23rd annual meeting Jan. 20-21 at Atlanta, Ga. This weed science group continues to stage a program noted for its practical approach to weed control via new technology.

This year, more than 140 papers were delivered. Nine different sections were required to accommodate the many types of weed control under study. These consisted of weed control in agronomic crops, horticultural crops, forests and rangelands, rights-of-way and industrial sites, and aquatic areas. Other sections consisted of the ecological, physiological and edaphic aspects of weed control, teaching and research, developments from industry, and application of herbicides.

Common to this Society’s sessions is the great involvement of top commercial company personnel along with researchers.

Dr. William R. Furtick, director of the International Plant Protection Center at Oregon State University, Corvallis, raised some interesting questions regarding the change in weed problems which occurs as the environment changes.

Frequently, he said, we may consider plants to be weeds but their presence may not have any detrimental effect on man’s desires and they cannot be considered a weed problem. On the other hand, there is increasing evidence that plants growing in or adjacent to agricultural land, which have been considered unimportant in the past, may have major significance as weed problems in the future.

The plants Furtick referred to are those species that host important insects or disease pests. The study of weeds as intermediate hosts of other pests is perhaps the most neglected area of weed control, he said, particularly in recent years during which modern pest control has received major research attention.

The importance of weed control as a major element of integrated pest control, Furtick stated, has been frequently overlooked. Integrated control involves designing pest control programs that utilize all the control means to the best possible degree.

These would include cultural practices that minimize the potential for the pest or enhance ease of control, such as favoring natural predators, use of highly favored plant species as trap crops at intervals to concentrate insects for destruction without spraying a whole field, and the elimination of weeds that act as the breeding ground where insects or

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In most areas of the world, there has been a rapid trend toward urbanization. This is often creating decreased labor availability on the farm. The rapidly increasing use of fertilizer is changing the kinds of weeds that dominate the rapidity of their development and their aggressiveness in relation to the crops. Often adequate control requires a substantial increase in weeding labor at a time the supply is dwindling.

This problem has been solved in the United States by rapid introduction and use of pre-emergence and other herbicides and high levels of mechanization. The heavy use of herbicides as a substitute for hand labor and some of the traditional cultivation practices is already giving evidence of causing rapid shifts in the primary species of importance in our fields. This is another good example of dynamic weed ecology. The shift that is occurring is away from the annual species such as Digitaria, Setaria, Echinochloa, Elytrigia, Amaranthus, etc., with a take over of the more difficult perennial species such as Cypresus, Sorghum, Convolvulus, and perennial Panicum. The problems being created may be much more costly to handle than those originally solved.

New officers of the Southern Weed Science Society are, seated, from the left: President-elect—J. N. Orsenigo, Belle Glade Experiment Station, Belle Glade, Fla.; president—D. D. Boatright, Horne-Boatright Chemical Co., Birmingham, Ala.; and vice-president—T. J. Hernandez, Du Pont Company, Houston. Standing: Past president—J. B. Baker, Louisiana State University, Baton Rouge; executive board member—W. L. Lett, Colloid Products Corporation, Memphis, Tenn.; executive board member—W. D. Hogan, Chevron Chemical Company, Orlando, Fla.; secretary-treasurer—P. W. Santelmann, Oklahoma State University, Stillwater; and editor—A. D. Worsham, North Carolina State University, Raleigh. Also named to the executive board, but not pictured, were James F. Miller, University of Georgia Cooperative Extension Service, Athens, G. A. Buchanan, Auburn University, Auburn, Ala.; and J. S. Baker, Delta Experiment Station, Greenville, Miss.

ARE THEY PLANTING GRASS ON THE MOON? Not at all — but this spray-planting Bowie Hydro-Mulcher is typical of the modern NASA equipment used in turfing and maintaining the grounds including the slope shown left, which borders the edge of the acreage devoted to the simulated lunar surface.

The Bowie Hydro-Mulcher gives what many call "instant green." Actually, the Hydro-Mulcher sprays a combination of seed (or sprigs), fiber mulch, fertilizer, color additive, and water simultaneously, so as to cover barren ground on steep slope, rolling or flat surfaces and provides what agronomists call excellent conditions for fast healthy turf growth.

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The Leisure Group, Inc., Pasadena, Calif., has added to its Thompson line for 1970 six Rain Pulse impulse sprinklers with coverage up to 80 feet in diameter. Made of die-cast metal for long life, the sprinklers are available on horseshoe bases, spikes or without bases. All have rugged brass heads. Rain Pulse No. 800 (lower left) is fully adjustable to water any portion of a circle. The same head is available in other models on an 8-inch spike, or without any base as a replacement on existing sprinkler or undergrooved systems. Rain Pulse No. 802 (lower right) provides full-circle coverage only. Rain Pulse No. 820 (upper left) and Model No. 822 (upper right) are shown mounted on the 8-inch spike. In addition to the Thompson sprinklers, The Leisure Group, Inc., manufactures Hayes spray guns, Rain Spray sprinkler systems and Black Magic house plant products. For more details, circle (701) on the reply card.

Rain Jet Corporation, Burbank, Calif., is now distributing a new Condensed Catalog and Price List. It gives specifications, engineering data, ordering information and prices on its line of Rain Jet underground sprinkler system materials. The eight-page Catalog and Price List is divided into six sections. Section 1 gives all necessary facts on Rain Jet brass sprinklers with castings. Section 2 covers Rain Jet sprinkler nozzle units without castings, and also shows accessories. Section 3 lists Rain Jet adjustable polypropylene sprinklers with castings. Section 4 groups information on Rain Jet flexible pipe, fittings, valves and sediment separators. Section 5 shows the line of Rain Jet'er portable sprinklers on stands. Section 6 gives general information on terms, freight allowances, and other conditions of sale. For more details, circle (702) on the reply card.

American Granby Co., Milford, Conn., has disclosed deluxe features of its Harvard 700 Series H2O Irrigation Controllers. A timer dial permits the user to select day or night programming. A re-set button protects system from overload. Normal cycle or new lawn cycle may be dialed by the cycle selector switch. The user may omit half-days or entire days from the watering cycle by programming the calendar wheel. Individual zone switches permit selection of zone to be watered and whether the zone should be watered automatically, manually, or not at all. Individual zone lights indicate zone being watered. A rain switch may be activated to stop controller from watering automatically. Duration of watering can be controlled by the time selector switch. For more details, circle (703) on the reply card.

Maxey Manufacturing Co., Fort Collins, Colo., announces a circular central pivot model sprinkler for sod farm acreages. The unit is in use in the Rocky Mountain region. The machine is low to the ground and pivots around a central point, covering 40 to 60 acres, depending on size. It can make a complete circle in 2½ to 3 hours, or be slowed to make a complete circle in 12 hours or longer. For more details, circle (707) on the reply card.

Buckner Sprinkler Co., Fresno, Calif., announces a new central programmer. The Model CP-2, giving complete control of watering from a single location, can be installed for manual, automatic or semi-automatic operation. It has a 14-day programmed irrigation cycle. The unit features independent dual control panels, each capable of operating up to 30 field controllers. Each field controller may have up to 11 sprinkler stations or more. For more details, circle (708) on the reply card.
Columbine Products Co., Longmont, Colo., offers a device to tell when and how much to water. Sprink-L-Guide is a small portable soil moisture tester that uses a nine-volt transistor radio battery for power. The complete unit weighs 1½ pounds, including battery. It will measure moisture to 10 inches below the surface. When the probes are pushed into the soil, a small current flows between the probes and is registered instantly on the meter. The more moisture present, the higher the reading. The instrument dial is graduated from one to ten. A needle reading up to six indicates water is needed. The case measures 3½x6½x2 inches. The unit is $13.95 postpaid, including battery and instructions. User may return within 10 days for complete refund if dissatisfied. For more details, circle (704) on the reply card.

Toro Manufacturing Corporation, Minneapolis, Minn., has announced two new irrigation controllers. Its Monitor II electric controller (above) is designed to handle total residential or industrial landscapes irrigation. The new controller features dual control, meaning shrubbery and flower beds can be put on a different watering schedule than the lawn. The Monitor II has a 14-day calendar programmer. Monitor II is available in 11- and 23-station models and features variable time settings from 0-60 minutes for each station. An eight-station electric controller (below) is available for residential and small commercial installations. It has variable timing from 0 to 30 minutes for each station, making possible a complete watering cycle of up to four hours. For more details, circle (705) on the reply card.

Ross Daniels, Inc., West Des Moines, la., offers a new model Ross Root Feeder that makes it easier to get plant food, or systemic insecticide cartridges to the roots of trees, roses and shrubs. The larger chamber that holds four or five cartridges at one time, and the fact that refilling the chamber does not require disassembling, enables heavier feeding and faster feeding. Other new features include a double hand grip for easier insertion into the soil; a hand knob for control of water flow; and faster solution of cartridges. The built-in, anti-siphon check valve will be included to prevent any of the solution from possible back-up into the water supply line. The unit, including plant food and insecticide cartridges with complete instruction manual sells for $9.95. For more details, circle (706) on the reply card.

Arps Corporation, New Holstein, Wis., has added a 6 hp self-contained, portable trencher to its line of Trench Devils. The Model 750 digs trenches for a number of purposes, including sprinkler systems. It digs to a depth of 18-24 inches in widths of 2½-8½ inches. Chain teeth are carbide-tipped. A self-locking boom maintains constant digging depth. Operated by one man. Can be transported in back of station wagon. For more details, circle (709) on reply card.

S. L. Enterprises, Penfield, N.Y., offers a protector for irrigation heads. SAVTRIM heads are safe from mower damage, prevent grass encroachment, have phosphorescent coating for night location. Installed with standard 8" sod cutter. Comes in various sizes, for both fairway heads and tee heads. For more details, circle (710) on the reply card.
To Pacify 'Naturalists,' WSSA President Says

Weed Science Needs More Researchers, Better Data Evaluation

CURRENT ATTACKS on chemicals are just another outburst in the long and unending war that "naturalists" have waged against technology, believes Glenn G. Klingman, director of plant science, Eli Lilly and Company.

Klingman, outgoing president of the Weed Science Society of America, said in his presidential address that "many of these same people were opposed to fluoridation of public water and to vaccinations."

But do not take their attack lightly, he cautioned, for they are being heard via newspaper, radio, television, and "uncertain government edicts."

The danger that has developed, he said, is that constant reports of this nature are no longer taken seriously.

"Wolf has been cried so often that if a real wolf were to appear, we might pay no attention until it was too late.

"In some manner, we must learn to separate the important problems from those of little or no consequence."

It is good that we have all sorts of scientists and research centers, he continued, "however, the real problem exists in properly interpreting their results, as they relate to the prediction of hazard to humans and to their environment.

There are no real naturalists, contends Klingman. Some claim to want "natural foods" produced by "nature's wisdom" in a "balanced
nature” and an environment “free of technology,” he said.

Yet they do “unnatural things” such as getting up at seven in the morning, driving a car to work, earning and saving money to buy food that is preserved by cooking or refrigeration.

“They have no interest,” charged Klingman, “in returning to a nature balanced by hunger, malnutrition, diseases, insects, vermin and a forbidding and often hostile environment.

“When the naturalist goes to the doctor, he hopes the doctor’s technology can shift the balance of nature in his favor.”

Klingman admitted there were problems of pollution and scars of technology. But the answer isn’t to diminish technology; rather, it is through further application of technology.

Better Training and Evaluation

“My plea is for greater training of scientists, who are capable of undertaking the needed research and of making appropriate interpretations and judgments of relevance to man.”

The world-wide detrimental effects of weeds of all kinds are well-documented and recognized, he said. But apparently the need for in-depth and well-rounded weed control education and research is not recognized by our educational system.

“For years, I have not understood, nor do I now understand the lack of enthusiasm for weed science on the part of College of Agriculture administrators,” he stated. “There is not a single Weed Science Department at a Land Grant College.”

Klingman issued the challenge to his listeners to read the Biblical parable of the talents, Matthew 25:15-30. “Professional talent in weed science has been ‘hid in the earth’ about long enough,” he asserted.

“There is nothing to indicate that the public needs protection from herbicides as they are labeled and used. There is evidence of a positive and unmistakable interest in the proper development and proper use of herbicides as a part of a total weed control program.’

Nature’s Herbicide

But the naturalists could claim a moral victory as the nearly 600 weed scientists gathered in Montreal, Feb. 2-5. As they discussed weed control problems and achievements from every aspect in the warmth of the Hotel Queen Elizabeth, undoubtedly the most effective herbicide raged outside—the work of Nature—a blinding blizzard and frigid 15-degree-below-zero temperature.

Nevertheless, WSSA members asked, through resolutions, that scientific data rather than whims of nature or politicians be the basis for making decisions regarding pesticides and herbicides.

Members asked that all levels of government first collect data from government, industry and educational institutions and evaluate it thoroughly before publicly announcing restrictions.

The Secretary of Agriculture was asked to add a weed specialist to his staff for advice on policy-making.

The legislative committee recommended that WSSA establish active liaison with the legislatures of each state.

Officers and Awards


Other officers are: President-elect—D. L. Klingman, Plant Industry Station, Beltsville, Md.; Vice-president—R. P. Upchurch, Monsanto Company, St. Louis; Secretary—Arnold P. Appleby, Department of Farm Crops, Oregon State University; treasurer and business manager—F. W. Slife, Department of Agronomy, University of Illinois; Editor of Weed Science—E. G. Rogers, Department of Agronomy, University of Florida.

Honorary Fellows, a new award this year to recognize outstanding contributions to weed science, were presented to Dr. Warren C. Shaw and Dr. Fred W. Slife. The award for the outstanding paper went to Dr. J. D. Weber of North Carolina State, for his paper, “Adsorption of Triazine Components on Organic Soils.”

Papers and addresses at this 10th WSSA meeting approached the 200-mark. Most were related to the agricultural crop field, but a significant portion dealt with non-crop vegetation, principally rights-of-way maintenance and aquatic weed control. Sketches of some papers follow, while others will be presented in greater detail in later issues.

Aquatic Herbicide Data Lags

Industry is running the risk of losing these herbicides for aquatic use, warned Charles R. Walker of the Interior Department’s fisheries.
Look Mom... One Hand

THE ACKLEY HYDRAULIC PISTOL GRIP CHAIN SAW
gets the trimming job done faster and easier.

So light, so well balanced, so easy to maneuver... every trimming job goes faster with the Ackley Pistol Grip Hydraulic Chain Saw. Powered by the HYREVZ hydraulic motor it zips through limbs and trees big and small hour after hour with never a miss or sputter. Quiet too... much, much quieter.

Requires only 1000 to 2000 psi and 5 to 8 GPM. Variety of saws... 9″ to 21″.

Fully insulated handle.

Also available in a long handle (up to 5′) model with hi-dielectric epoxy.

Write for Free literature on all Ackley tools, air and hydraulic, that can help you get the job done with less cost at every turn.

ACKLEY MANUFACTURING COMPANY
13770 S.E. Ambler Road
Clackamas, Oregon 97015
Phone 503/659-5660

For More Details Circle (101) on Reply Card

Hydraulic Pistol Grip

THE ACKLEY

So light, so well balanced, so trimming job goes faster with with never a miss or sputter. Chain Saw. Powered by the CHAIN SAW the Ackley Pistol Grip Hydraulic zips through limbs and trees easy to maneuver... every much, much quieter. HYREVZ hydraulic motor it gets the trimming and 5 to 8 GPIVL Variety of jobs done

13770 S.E. Ambler Road
Clackamas, Oregon 97015
Phone 503/659-5660

For More Details Circle (101) on Reply Card

Mr. Ivy Wile would be delighted to chat with you—about the "Ecology of Vascular Aquatic Plants in Small Lakes and Ponds in Southern Ontario." That's the paper she presented at the WSSA aquatics division. She works for Ontario's Water Resources Commission and Department of Lands and Forests.

ceous fish and insects, herbicide-impregnated plastic pellets and laser beams. Here are some findings:

—3,4-D impregnated polyvinyl chloride pellets (2,4-D n-butyl ester) was tried as a control of Eurasian Watermilfoil. Laboratory tests indicate that the controlled-release method of dispersing herbicides was effective at low dose rates. Dosages as low as 3 ppm, based on 100% immediate release, produced toxic effects in 48 hours. All test plants were dead within two weeks. M. A. Lawson, U. S. Army, Edgewood Arsenal Md.;

—Helicopter applications of granular 2,4-D at 20 lbs./acre were effective in killing milfoil in Currituck Sound. W. E. Chappell, Aerial Enterprises, Inc., Roanoke, Va.;

—Larvae of the moth Parapoynx stratitata (L) feed on the submerged foliage of milfoil while the curculionid beetle L. todactylus leucogaster attacks the emergence stems and flower buds. In an aquarium situation, larvae of the moth were able to destroy all exposed plants. R. I. Sailer, ARS, USDA, Beltsville, Maryland;

—Use of the laser beam has produced “delayed kill” in laboratory tests. The beam sears the leaf tissue, apparently disrupting photosynthesis. Plant growth stops, and in about five to six weeks exposed plants die.

“Natural Look” Right-of-Way

Public pressure has brought on the “natural look” trend in right-of-way maintenance. The clearing practice is changing from the straight swath to that of removing only vegetation which could interfere with lines, reported Hyland
WSSA officers for 1970 are, right to left: President—L. L. Danielson, Weed Investigations, Horticultural Crops, USDA's Agricultural Research Service, Beltsville, Md.; president-elect—D. L. Klingman, Plant Industry Station, Beltsville; vice-president—R. P. Upchurch, Monsanto Company, St. Louis; secretary—Arnold P. Appleby, Department of Farm Crops, Oregon State University, Corvallis; treasurer and business manager—F. W. Slife, Department of Agronomy, University of Illinois, Urbana; editor of Weed Science—E. G. Rogers, Department of Agronomy, University of Florida, Gainesville; and past president—G. C. Klingman, Eli Lilly & Company, Greenfield, Ind.

Johns, Asplundh Tree Expert Company. Trees are left in low areas where enough clearance exists. Access roads are being built diagonal to highways.

In some instances, as many as 30 to 50 trees have been planted to screen the right-of-way from the highway, said J. B. Middleton of Pennsylvania Electric Company. To Please the Public

Anything—within reason—to please the public is the goal. And W. D. Ditman of Appalachian Power Company, Roanoke, Va., had some prescriptions for dealing with people.

Obviously, people are becoming collectively concerned, judging from the number of bills at all levels of government, he said.

Tell people what materials you are using and what effect they will have on the environment, he advised.

“We put a lawyer on our staff, then sent him to Amchem to become familiar with the legal aspects of herbicides.

“We have a veterinarian on a retainer basis. We sent him to Dow Chemical. When a complaint comes in, he can tell the farmer what’s really wrong, rather than ‘We didn’t do it.’ On occasion, the farmer gets his livestock examined at our expense.

“We support research with money, not lip service.”

Ditman added that it was highly important to react to every complaint. “Big problems often come from minor accidents.”

He hopes the next step will be to get a doctor specially trained to answer people’s concern about herbicidal effect on human health. Just finding a way to neutralize herbicide odors would be a big help, said Ditman.

The Nunes Mechanical Sod Harvester and 3 men can lift, roll or slab and palletize up to 1000 sq. yds. of sod per hour. Field conditions, terrain, soil, sod, are easily and quickly adjusted for, while in operation, with hydraulic controls.

Write for detailed brochure.

Orders now taken for spring delivery.

PATENT APPLIED FOR

The Nunes Mechanical Sod Harvester and 3 men can lift, roll or slab and palletize up to 1000 sq. yds. of sod per hour. Field conditions, terrain, soil, sod, are easily and quickly adjusted for, while in operation, with hydraulic controls.

Write for detailed brochure.

Orders now taken for spring delivery.

THE JOHN NUNES MECHANICAL HARVESTING CO. 2006 Loquot Ave., Patterson, California 95363, Phone (209) 892-8776
Nurseryman Digs Trench With Power Saw

Dig a 30-ft. ditch in 60 seconds? Bernard Wherry claims he can do it with his saw. Actually, it's a Homelite chain saw — modified. Wherry had been working on a chain-driven trenching tool for 3½ years. He needed one for fast digging around trees and shrubs. He's owner of Wherry Nurseries, St. Marys, W. Va.

His idea took practical shape when he modified an XP-1130 Homelite head. Instead of saw teeth, the chain mechanism contains a series of canted cutting heads. It will cut a ditch from two to six inches wide and 2½ feet deep, says Wherry. "It's geared down and will last for ages," he said. "Works any-
where, any position, by simply guiding it with one hand. Digs around 2,000 feet of ditch per 1½ pints of gasoline. "We even use it for draining swamps, water holes and digging fence post holes." Considering that the base unit was made by Homelite, a division of Textron, Wherry figured the company would be interested. It was. Thomas Hunter, new products manager, and Bill Boracheck, project engineer, visited Wherry. Hunter tried the saw . . . uh . . . trencher. He claims a 10-foot ditch in 28 seconds.

Production plans aren't completely worked out yet, but if you want more information, circle (711) on the reply card. No doubt, sample lots will be undertaken before full production begins. But Homelite knows it has at least 100 units sold. Wherry wants 'em.

Midwest Sod Growers Set Soil and Seed Specifications

With the introduction of specifications for soil preparation and sodding, the Midwest Turfgrass Growers Association has reported that an increasing number of landscapers, architects and builders are meeting with sod producers to discuss turfgrass and sodding.

The Midwest group shared experiences at its annual meeting recently in Lincoln, Neb.

Members also discussed a committee study and recommendation for turfgrowers' seed specifications. A resolution was passed that declared Association members would use only seed that met the specifications. These specifications are being published and will be distributed to members.

Growers discussed the possibility of the Midwest group becoming affiliated with the American Sod Producers Association and of individual state associations becoming a part of the Midwest group.

Joe McDermott, Loveland Lawns, Omaha, Neb., was re-elected president; Ed Keeven, Emerald View Sod Farms, Inc., O'Fallon, Mo., as vice-president; and William Latta, Latta-Scholes, Inc., Kansas City, as secretary-treasurer.

New board members elected to two-year terms are: Jack Meyers, Stilwell, Kan.; Bruce Huffaker, Hastings, Neb.; and Duane Thompson, Arlington, Neb.

**Insect Report**

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

<table>
<thead>
<tr>
<th>TURF INSECTS</th>
<th>FIRE ANT</th>
<th>(Solenopsis geminata)</th>
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<tbody>
<tr>
<td></td>
<td>TEXAS: Heavy along highway roadside near Clay in Burleson County and south of Navatota in Grimes County, also near College Station in Brazos County.</td>
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<tr>
<th>A HARVESTER ANT</th>
<th>(Pogonomyrme longicornis)</th>
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<tr>
<td>UTAH: Collected at St. George, Washington County. This is a new county record.</td>
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<tr>
<th>INSECTS OF ORNAMENTALS</th>
<th>A SOFT SCALE</th>
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<tbody>
<tr>
<td>(Ceroplastes ceriferus)</td>
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| FLORIDA: Adults infested stems of 10% of 11,300 plants of Podocarpus sp. in nursery at Lake Monroe, Seminole County. |

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<thead>
<tr>
<th>TREE INSECTS</th>
<th>PINE NEEDLE SCALE</th>
<th>(Phenacaspis pinifolius)</th>
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<tbody>
<tr>
<td>CALIFORNIA: Eggs and adults heavy on Monterey pine at Yuba City, Sutter County.</td>
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<tr>
<th>OYSTERSHELL SCALE</th>
<th>(Lepidosaphes ulmi)</th>
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<tr>
<td>CALIFORNIA: Heavy on maple tree nursery stock at San Jose, Santa Clara County.</td>
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<tr>
<th>TWIG GIRDLER</th>
<th>(Oncideres sp.)</th>
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<td>TEXAS: Heavy damage on oaks 3 to 8 feet tall in Sam Houston National Forest in Montgomery County.</td>
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<tr>
<th>A CLEARWING MOTH</th>
<th>(Paranthrene robiniae)</th>
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<tr>
<td>CALIFORNIA: Larvae medium on cottonwoods at Solvay, Santa Barbara County.</td>
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<tr>
<th>OBSCURE SCALE</th>
<th>(Melanaspis obscura)</th>
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<tr>
<td>ALABAMA: Medium to heavy on many oaks along streets and walks at Auburn, Lee County. Many small to larger lower limbs dead; others weakened.</td>
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WEEDS, TREES and TURF
A-C Announces Expansion

Henry Corporation, subsidiary of Allis-Chalmers, announces it will double production capacity of its Topeka, Kan., plant with an $800,000 expansion.

Topeka is headquarters for AC's industrial tractor and equipment division. Henry Corp. produces attachments, including backhoes, loaders, fork lifts, and logging equipment for the division's line of industrial tractors.

Aquatic Weed Researcher
Dr. Lyle Weldon Drowns

Dr. Lyle Weldon, 35, one of the nation's foremost aquatic weed researchers, is dead as the result of accidental drowning.

Dr. Weldon died Feb. 1 while scuba diving in Lake Susannah on the Naval Training Base at Orlando, Fla. He was trying to find suitable sites to conduct submerged weed research, reported Robert D. Blackburn, of USDA's Agricultural Research Service.

Dr. Weldon was a certified and experienced diver, Blackburn said. The cause of the accident just isn't known.

He had been diving alone, but had a friend, Art Barrett, waiting on shore. He surfaced and called for help; but by the time Barrett was able to get a boat and reach him, it was too late.

Professional divers have retraced his diving pattern, Blackburn said, but have been unable to determine the cause of drowning.

Dr. Weldon had published some 90 articles, several of them authored with Blackburn. A number of his articles have been published in WEEDS TREES and TURF. The most recent three, co-authored with Blackburn, were on new methods for combating aquatic weeds, October, 1967; Eurasian Watermilfoil, November, 1967; and a report on controlling Hydrilla Verticillata, October, 1969.

Weldon, native of Oregon, had worked for USDA since 1955. He transferred to Fort Lauderdale in 1960 to work in aquatic weeds. He earned a bachelor's degree in farm crops from Oregon State University in 1955; a master's degree in agronomy with minor in botany from the University of Wyoming in 1956, and his doctorate in agronomy with minor in plant physiology and statistics also from Wyoming in 1959. He took additional graduate work at North Carolina State College and at Oak Ridge Institute of Nuclear Studies.

Weldon was active in several regional and national associations of weed scientists. He had acted as an aquatic weed control consultant to the governor of the Panama Canal Zone and to Suriname Aluminum Co., on aquatic weed problems in South America.

He is survived by his wife, Shirley; two daughters, Kara Lee, 12, and Katherine, 10; and one son, Lyle William Jr., 7.
National Lawn
And Garden Week:
March, April, May

National Lawn and Garden Week really was a week in 1969. In 1970, it's three months.

Maybe the decision for the longer period came about because of the theme, "Growing With America." After all, not much growing can be accomplished in a week.

So this year's observance has been broadened to include the spring months of March, April and May. The initial observance is in Washington, D.C., Mar. 20, the first day of spring.

March is "Plan to Grow Month; April, "Plant for Proper Growth;" and May, "Pick a Growing Project."

The objective of the national observance is to bring improvement in the appearance of homes, neighborhoods, business districts, and entire communities through the proper planting and maintenance of lawns, shrubs, flowers and trees — year around.

Hopefully, people who take an interest in beautifying things, will hardly be content with blight and ugliness elsewhere. Their efforts could bring changes and demands to preserve and purify other aspects of human environment, in the heart of big cities as well as in suburbs and small towns.

Co-chairman for the 1970 observance are W. Atlee Burpee III, Philadelphia, and Harold R. Lewis, director of information, USDA.

R. W. Ickes Elected President
Of Aerial Application Corp.

Raymond W. Ickes, son of Harold L. Ickes, the Secretary of the Interior under Presidents Roosevelt and Truman, has been elected president and a director of Aerial Application Corporation, the nation's largest agricultural aviation company engaged in insect and weed control, fertilizing and seeding. The firm also has plans well advanced to move into the fire fighting and forest fertilization fields in the near future.

The announcement was made by Stuart M. Speiser of New York, board chairman of the company which will have its principal executive and operating offices in the Russ Building, 235 Montgomery Street, San Francisco.

Ickes, who will make his headquarters at the Russ Building office, has been active in San Francisco business affairs for more than 20 years, having served successively as vice-president and general counsel of American Independent Oil Company; vice-president and director, Natomas Company; and more recently as president and director of Pacific Far East Line, Inc., and then of American President Lines, Ltd.

ALCA Announces '70 Officers:
Warren Purdy is President

Warren F. Purdy of San Diego, president of Purdy & Associates, is the new president of the Associated Landscape Contractors of America. He was named to succeed Thomas O. Lied of Milwaukee at ALCA's eighth annual meeting recently in Orlando, Fla.


Pacific Toro Schedules
Field Days in March

A series of field days to demonstrate Toro mowers and tractors, Ryan turf products, Moist O'Matic irrigation equipment, and Allied Turf products are set for March in California.

Hugh G. McKay, sales manager of the turf products division of Pacific Toro Company, Gardena, announces these dates and locations:


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**$600,000 Grant Awarded For Pesticide Research**

A joint project by four of the world's foremost centers for basic research on insecticides may open the way to development of practical new pesticides that will minimize environmental pollution.

Scientists at the centers officially began work in January on a project, the first cooperative venture of its kind, that is being supported for its initial three years by a $600,000 Rockefeller Foundation grant.

Most of the grant money will go toward traineeships in pesticide research and support for the promising young scientists who receive them.

The four laboratories collaborating on the project are at the University of California, Riverside, UC Berkeley, Cornell University of Illinois.

Each of the laboratories has made major contributions to the field of chemical pest control and will pursue its own special area of research during the project.

UCR's major research efforts will focus on the synthesis of novel, selectively toxic candidate compounds and on resistance development by pests to pesticides.

Heading UCR's part in the project is Dr. T. R. Fukuto. He'll personally be in charge of the work aimed at developing new candidate insecticide materials. Dr. Robert B. March will direct research on the development of resistance to toxic chemicals by insects. Both have played significant roles in past research at UCR that has led to the development of many insecticides in use today.

A former colleague of theirs at UCR, Dr. R. L. Metcalf, will head the project work at the University of Illinois. Dr. J. E. Casida will lead the project work at UC Berkeley and Drs. C. F. Wilkinson and R. D. O'Brien at Cornell University.

The project leaders are hopeful that their research findings will lead to development of insecticides with new modes of action, greatly enhanced selectivity, improved biodegradability, and more desirable persistence characteristics.

"Unfortunately," Dr. Fukuto said, "persistent pesticide chemicals in use today are, in some cases, the most effective or only practical and available means of controlling certain pests. Other materials are not as satisfactory in all cases.

"We need to develop practical substitutes for the objectionable chemicals now in use and to study alternative means of pest control."

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**Landscaper, Applicator Firms Merge in Tulsa, Okla.**

Carl R. Miller, president of T. Landscapers, Inc., Tulsa, Okla., has announced a merger with The Pied Pipers, Inc., also of Tulsa.

"With this merger, The Landscapers now offer the most complete landscaping service in the Southwest," Miller said.

Miller's company specializes in the design and creation of landscaping for both commercial and residential applications. It engineers and installs lawn sprinkler systems and establishes lawns from the company's own 10-acre turf nursery.

Pied Pipers, Inc., owned by Harold D. Stephens, specializes in chemical application to lawns, plants and trees for weed and pest control, fertilization and feeding, and industrial weed control.

**Niagara Chemical Forms Industrial Sales Department**

FMC Corporation's Niagara Chemical Division has organized a new marketing group to sell its proprietary chemicals in non-agricultural use areas. Called the Industrial Sales Department, it will be headed by Frank K. Chestnut, a 22-year employee and most recently manager of advertising and public relations.

Among the products the new department will be assuming sales responsibilities for are Tandex(R) soil sterilant, recently introduced for broad spectrum non-crop weed and brush control; Pyreneone(R) synergized pyrethrins, used in an estimated 85% of all household insecticidal aerosols and space sprays; and Drione(R) insecticide, an unusually effective control for roaches, ants, spiders, and many other insects.

---

**CONSIDER THESE ADVANTAGES:**

- Anon-creeping Bentgrass that's easy to care for.

---

**At last!**

**HOLFIOR Colonial Bentgrass**

**CONSIDER THESE ADVANTAGES:**

For More Details Circle (136) on Reply Card
Incriminating 2,4,5-T Test Is Invalid

Birth deformities in laboratory mice exposed to high dosages of 2,4,5-T may really have been caused by a toxic contaminator. The possibility is being investigated by the U.S. Department of Agriculture.

The same substance may be contaminating other chemicals, so USDA is reviewing or gathering new data for 17 other herbicides, fungicides and insecticides. All 17 compounds are polychlorophenolic pesticides.

Ned D. Bayley, director of Science and Education, said the inquiry was initiated after new data submitted to the Department of Health, Education, and Welfare, indicated that the 2,4,5-T in the study conducted by Bionetics Research Laboratories for HEW contained 27 parts per million of tetrachlorodibenzo-p-dioxin, compared with only about 1 ppm of this contaminator generally found in the herbicide.

New data show that preliminary tests of 2,4,5-T with 1 ppm of this contaminator give no indication of birth deformities, Bayley told Rep. Richard McCarthy of New York.

It was the Bionetics study of 2,4,5-T, along with other pesticides, cited last October when USDA announced it would cancel registration of this herbicide for use on food crops effective Jan. 1, 1970, unless FDA, the Food and Drug Administration, HEW, had established a safe legal tolerance for such use.

“We are awaiting advice from HEW as to whether it intends to establish tolerances for 2,4,5-T before we decide whether to cancel or extend uses of 2,4,5-T on food crops,” the letter said. “Our Jan. 1, 1970, date was based on HEW’s expectation that it would have reached a decision by that time. That agency believes the public interest would best be served by waiting for additional research data which will be available shortly. We concur in the judgment.”

EDITOR’S NOTE: As WTT went to press, it was further learned that the solvent, DSMO, also was used in the Bionetics test. This material has been known to cause cancerous tumors. DSMO is not used as the solvent for commercial applications of 2,4,5-T.
Robert Hector, right, chairman of the board of Hector Supply Company, with Tom Tabor, sales representative for Zonalite Division of W. R. Grace, stands before the Terra-Lite and Vermiculite display at the first annual Hector Turf & Garden Trade Exhibit and open house at the firm's new million-dollar warehouse in Miami. More than 25 manufacturers exhibited at the trade show, Jan. 15-18.

USDA Registers U.S. Borax Herbicide, Maintain CF 125

United States Borax & Chemical Corporation announces the registration of MAINTAIN CF 125 by the U. S. Department of Agriculture.

MAINTAIN CF 125 has proved to effectively retard many grasses and control broadleaved weeds and vines. MAINTAIN CF 125 acts systematically and is translocated from the leaves and/or the roots throughout the plant to meristematic tissues.

The chief ingredient of MAINTAIN CF 125, chlorfluorenol, is a product of E. Merck AG, Darmstadt, West Germany.

Extensive field and laboratory testing has been under way over the past three years by the U. S. Borax.

"Results have established that MAINTAIN CF 125 is the first new material which will economically and effectively control most turf grasses and further give season-long control of broadleaved weeds associated with turf," stated Dr. L. M. Stahler, manager of agricultural research and development.

Principal markets for MAINTAIN CF 125 include highways, golf courses, parks, airports, utilities, railroads, and military installations.

Iowa Aerial Applicators Elect Theobald President

Lester Theobald of Mapleton has been elected president of the Iowa Aerial Applicators Association. His selection came at the annual business meeting recently in Des Moines.

Other officers and committee chairmen are: Vice-president—Don Chase of Villisca; secretary-treasurer—Lowell Weir of Boone; public relations chairman—Vernon Orr of Whiting (members are Leo Sterk, O. B. Cox and Ray Breazeale); program chairman—Elmer Steier of Whittemore (members are Cecil Schenk and Paul Hursh); and safety chairman—Marvin Smith of Eldora.

Members selected past president Paul Hursh as the Iowa group's director member to the National Aerial Applicators Association.

let Mock help you

TURN ON THE GREEN

We'll confess that we’re one of those “over 30 squares”... we have difficulty communicating with the younger generation.

A good explanation for this might be that we’ve been busy helping folks like you with their turfgrass program or problems. For more than a quarter of a century we’ve been preoccupied with providing our customers with ideas for better turfgrass growth and management.

But just to prove that there’s no “generation gap” in our product line, we call your attention to these Mock specialties: Palo Perennial Ryegrass; Manhattan Perennial Ryegrass; Fylking Kentucky Bluegrass; and Prato Kentucky Bluegrass.

For ideas and service 1970 style, call on Mock—the grass specialists. Phone or write for special prices.

MOCK SEED CORPORATION
Pittsburgh, Pa. 15230 Area Code 412/281-3193
Trimmings —

THE POPULAR WAY to start the ball rolling toward banning a chemical these days apparently is to feed ridiculously high amounts to laboratory animals until they develop some scary ill effects.

Reader's Digest reports that it took cyclamate amounts equivalent to 10 times the established daily intake limit for humans to kill the fetus in mice; 15 to 30 times the recommended human limit to cause tissue changes in rats; and levels "well above the recommended human maximum" to affect rabbits.

But cyclamates fell.

Of course, DDT got the ax even without this kind of research basis.

A study of Arizona aerial applicators showed a build up of DDT five times greater than the national average, without detectable ill effects.

Twenty-year employees in a DDT factory showed no detectable ill effects.

Just recently, Michigan State researchers tried to prove conclusively — by a correlation between DDT content and death of Coho Salmon fry — they couldn't.

Apparently this type of research doesn't count.

Now 2,4,5-T is under fire because a laboratory test indicated the herbicide caused cancer in mice. It develops that the 2,4,5-T used contained a contaminate in amounts 27 times greater than can be expected normally.

Yet insiders predict the herbicide will be restricted.

**SUPPOSE WE APPLY** the same test criteria and reasoning, based on experimentation results, to another pesticide problem?

We suggest the writers of all information about pesticides, why don't you try

**HELP WANTED**

SOD FARM MANAGER — A degree in Agronomy preferred but not necessary. Must be able to handle men, coordinate all work and be familiar with sod farm operation; including weed control, grasses, etc. One of New York State's oldest, most modern sod farms, complete with latest harvesting and irrigation equipment.

Top wages paid, hospitalization, vacation, benefits, etc. Only experienced, qualified men need apply. Reply giving complete resume including past experience and refer-
EXCELLENT opportunity for experienced Landscape Foreman to supervise landscape crew in execution of planting from plans and sketches. Salary $7500-$9000. Write Box 20284, Billings, Montana 59102.

BEETLE-SHAPED GRADES

TWO spray men needed, Boise, Idaho area. Must have adequate knowledge of pesticides as well as being able to contact new accounts. Contact Idaho Pest Control, 100 N. Beach, Boise, Idaho 83704.

LANDSCAPE Architects

LANDSCAPE ARCHITECT — Degree in Landscape Architecture from accredited school with some experience. Salary open. Responsible for design plans, construction coordination, and long-range planning of rapidly growing park system. Contact: Karl Holzwarth, Park Director, Racine County Highway and Park Commission, Rte. 1, Box 226A, Sturtevant, Wis. 53177.

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

SUPERVISOR capable of taking charge of several crews doing residential and commercial grounds maintenance. Must be quality conscious and willing to work hard. Good pay and excellent future. Cut 'N Care, Inc., 2615 DeLeon St., Tampa, Fla. 33609. Attn. Mr. E. Berthe.

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BARTLETT TREE EXPERTS OFFER EXCEPTIONAL OPPORTUNITY

This nationally known tree service company, which operates from Maine to Florida, offers outstanding career opportunities in sales and management for men experienced in the tree field or college graduates in forestry, horticulture or agriculture. Ability to work with public and personnel is important. Attractive salary plus commission; protected territory; growth potential excellent. Intensive training course and benefits. Send resume of education or experience to William Eichardt, Bartlett Tree Experts, 2770 Summer Street, Stamford, Conn. 06905.

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COMPLEX is compatibility! COMPLEX dramatically improves the stability of fertilizer-pesticide mixtures, thus insuring their safe, effective, simultaneous application. COMPLEX is essential if the equipment used has poor or no agitation. It's often necessary with equipment having good agitation. For further information see your Ag Chem Supplier or write:

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50 Years of Agrichemical Adjuvant Research and Development
Introducing Maintain® CF 125. It will make your grass grow so slowly you’ll think it’s cutting itself.

Maintain is the latest improvement in vegetation control. An effective plant growth retardant that will make your grass grow lush and green and very very slowly.

Meanwhile, Maintain will be speeding up your maintenance program. It will save you time and money because it will save you mowings. You may not have to mow more than once or twice a season. If that.

Maintain won’t cost you more than it will save either. It will plug right into your present maintenance program. Only it’ll make everything run more smoothly and efficiently and economically.

For one thing, Maintain controls broadleaf weeds while it retards grass growth. And for another thing, it’s applied in solution. Which means your men will have an easy time spraying where machines have a tough time mowing.

That kind of convenience could cut costs in some instances by as much as 75%.

And who knows? Maybe next summer you can even plan on taking a vacation.