WEEDS TREES and TURF

FEBRUARY 1973

IRRIGATION ISSUE

WTT Renewal Notice—Page 27

TOTAL TURF CARE IS HERE!

Get a full course of protection against weeds and disease.

Dacthal®

Start your Total Turf Care this year with Dacthal W-75 herbicide. Or use the convenient 5 percent granular form if you like.

Dacthal gets the jump on most annual grasses and broadleaf weeds. This preemergence herbicide prevents weeds as they germinate. Crabgrass and *Poa annua* don't have a chance. Yet, Dacthal is a truly selective herbicide that will not affect established grass. It's even safe for new grass when used according to label directions.

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Dacamine is a special form of 2,4-D, non-volatile, yet very effective. It combines the weed-killing power of an ester with the safety of an amine. So Dacamine stays put—kills the weeds you spray it on but won't vaporize and damage valuable plants nearby.

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Daconil 2787 has performed well on over 25 grass species and varieties. Excellent turf tolerance allows you to use it even in hot, humid weather.

Just mix Daconil 2787 with water and spray. You don't need a surfactant. It's compatible with many commonly-used pesticides. Follow label directions for exact usage.

Daconate®

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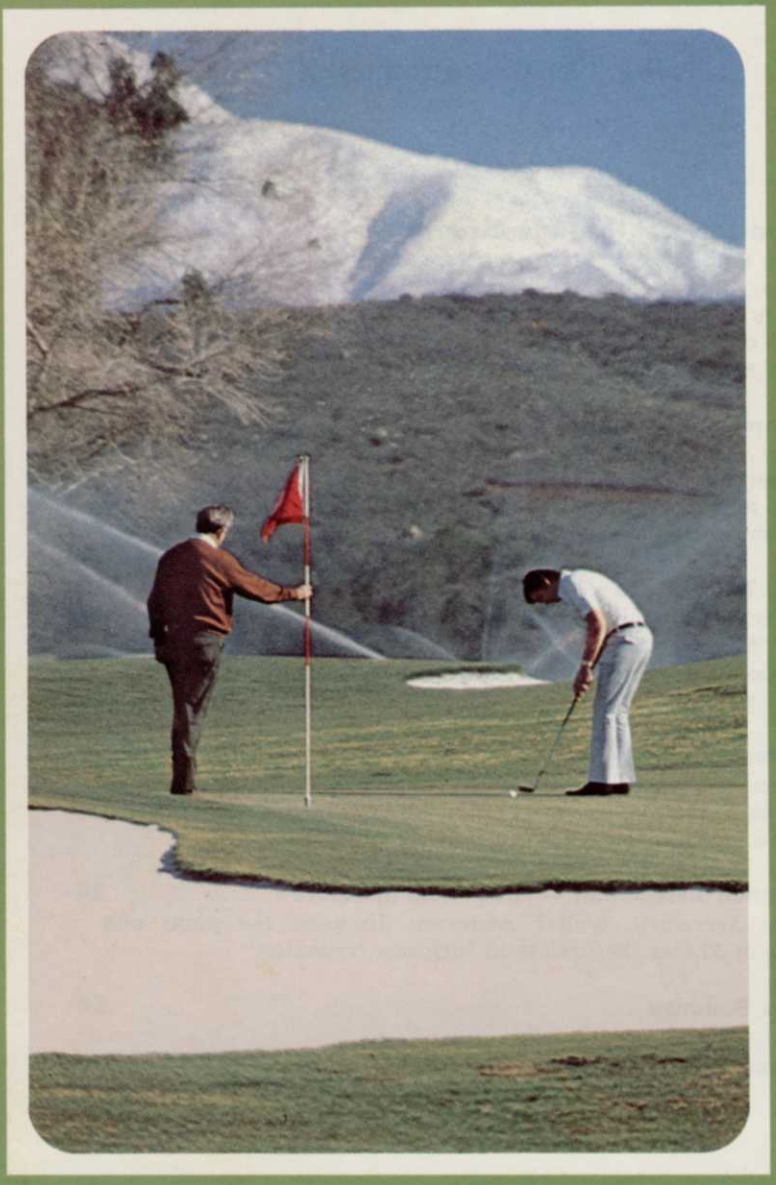

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WEEDS TREES and TURF®

"Serving The Green Industry"

Volume 12, No. 2 February, 1973

The Cover

Few of us take the opportunity to view irrigation sprinklers at close range. Yet, at eye level, modern sprinklers represent Green Industry engineering at its best. Our cover catches sprinkler design, the power of water and the colors of morning sun dancing on this scene.

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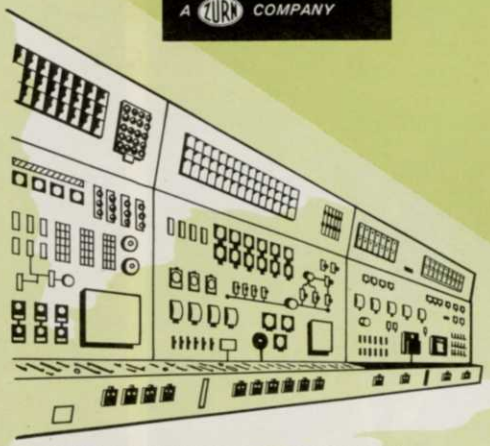

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Editorial An Industry Challenge

The Green Industry is sitting on the threshold of one of the greatest recycling ventures ever conceived by man. New developments in solid waste disposal now make it possible to spray human sewage effluent on turfgrass with no odor, no muss and no fuss.

The technique, already in operation is some parts of the country, is essentially giving back to Mother Nature that which was rightfully hers. But in a larger sense, spray irrigation, as it is called, reunites man and his environment as never before. We would predict that in the next few years major metropolitan cities will undergo massive changes in municipal sewage disposal.

Currently, a bill is in Congress that calls for zero effluent discharge into any stream, river, lake or ocean in the U.S. by 1985. If passed, the dependence of mankind on the Green Industry will be brought into focus acutely.

Recycling human wastes is not new. We've been doing that for some time. The problem is that as cities grow larger, disposal systems become overburdened and fresh water supplies are endangered.

Spray irrigation provides and alternative solution to the problem. It makes use of land area as a living filter. We in the Green Industry already know the environmental benefits of turfgrass. The new system makes use of these benefits. Effluent is flushed to a storage lagoon where it is aerated allowing natural biochemical breakdown to take place. It is then pumped to an irrigation system like that on a golf course. Sprinklers distribute the material uniformly throughout the area. From here on, Mother Nature does the work. Organic matter is decomposed by soil bacteria. Nutrients are taken up by plants. And that foursome can play a round later in the day with no lingering odor.

Currently, Disney World's new waste treatment plant is processing about a million gallons of waste water a day. Effluent is pumped to the northwest edge of the property and sprayed on turfgrass and cropland. The city of Muskegon, Michigan utilizes 6,000 acres of land as a living filter. Several golf courses on the west coast are irrigating with waste water. In this issue of WEEDS TREES AND TURF, you will read about the spray irrigation system of St. Charles, Maryland.

We believe that the Green Industry is a natural to accept the concept of spray irrigation. The demonstrated expertise in system irrigation, the fact that commercial turfgrass is an environmental filter, the convenient location of golf courses, parks and grounds to metropolitan areas — all make for compatability that is hard to beat.

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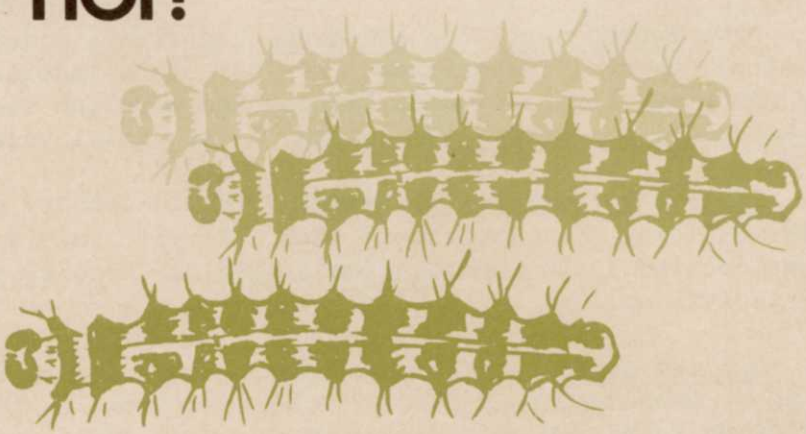
--ready or not!



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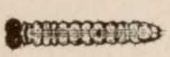

CANKERWORM (Inchworm)
U.S./trees & shrubs

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Government News / Business

Five Banvel herbicide pre-mixes constitute a new line of products from Velsicol Chemical Corporation. All have been Federally registered by EPA for use along utility, railroad, highway and pipeline rights-of-ways, according to Dick Fields, manager of the company's industrial vegetation control department.

Ciba-Geigy Corporation revealed in mid-January plans to construct a multi-level building near Greensboro, N.C. It will supplement the present five structures located in the corporation's complex, soon to be the home of the agricultural division.

William Erwin, an Indiana farmer who served on President Nixon's Task Force on Rural Development in 1970-71, has been named to the newly-created post of Assistant Secretary of Agriculture for Rural Development. The assignment comes when USDA chief Earl L. Butz reorganized the department's organizational chart. Erwin will have the agencies of the Farmers Home Administration, Rural Electrification Administration and Rural Development Service under his control.

Check your First Aid facilities. It amounts to a black mark on an OSHA checklist if you haven't. The Occupational Safety and Health Administration says that if your place of business is not "in near proximity" to a hospital, clinic or infirmary, you are required to have a First-Aid kit approved by a consulting physician and an employee who is trained to render first aid. A member of your work force who has received special first aid instruction will qualify for the latter requirement.

Johnson Hydraulic Equipment Company of Minneapolis has become Johnson Hydraulics Division of Arps Corporation. Duane Solem becomes General Manager of the Division. All present relationships will continue as in the past.

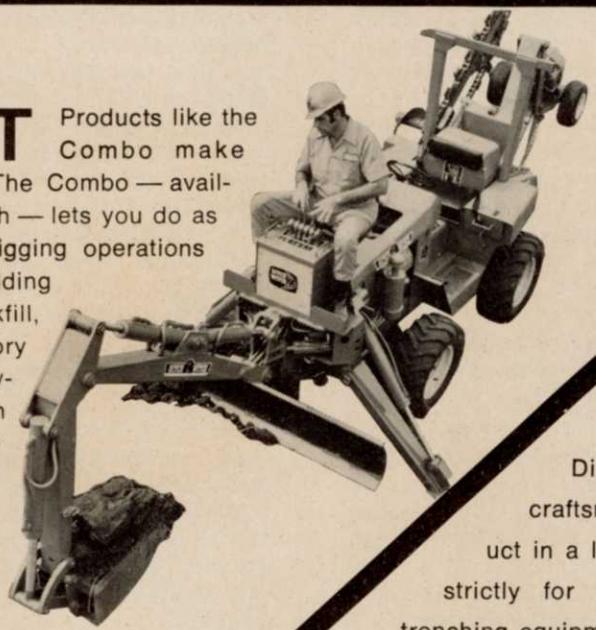
William D. Ruckelshaus, the Environmental Protection Agency's conductor, will continue to lead the band for four more years. A White House statement in late December said that Nixon considers EPA "one of the most important new agencies in government" and that Ruckelshaus will "continue to be a strong force in environmental protection."

Since its inception two years ago, EPA has been playing Tempest and Fugit in whipping together legislation surrounding environmental issues. The crescendo came with the passage of the Federal Noise Control and Abatement Act, the Federal Water Pollution Control Act Amendments and the Federal Environmental Pesticide Control Act -- all in 1972. Although cleaning up the environment is similar in scope to learning to breathe under water, the Administrator's score calls for action and his baton is the cudgel on environmental violators. Currently the orchrestra is tooting and bowing in the areas of air and water pollution. But only a phrase or two away the tuba section will strengthen the underpinning on noise, pesticides and other targeted areas. You can bet that this ditty will continue until the last stanza.

WHAT MAKES DITCH WITCH THE LEADER?

PRODUCT

Products like the Combo make Ditch Witch the leader. The Combo — available only from Ditch Witch — lets you do as many as five different digging operations without changing or adding attachments. Trench, backfill, do backhoe and vibratory plowing operations or hydraulic boring — all with the same machine. The Combo is available in 30-HP, 37-HP and 65-HP models. All its components are tried and proven and each incorporates design superiority which enables Ditch Witch to outsell all its competition combined. The Combo lets you keep equipment costs down by doing more jobs with one machine. Let us show you what a Combo can do on your job site. There's no better way to see why Ditch Witch is the leader.



PEOPLE

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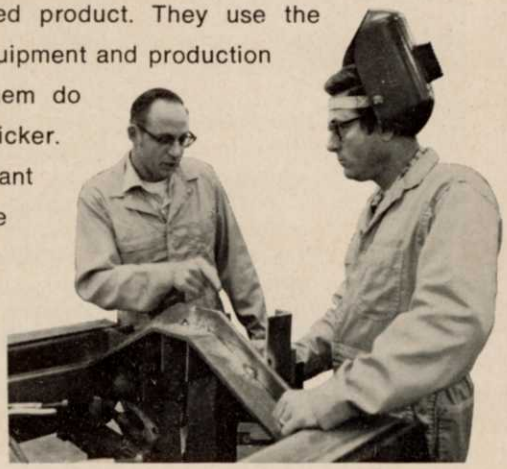

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How Much Must Be Spent For Turfgrass Irrigation?

By DR. WILLIAM W. WOOD
Economist, Agricultural Extension
And Associate, Giannini Foundation
University of California, Riverside

Editor's Note: As an economist, Dr. Wood views the commercial turfgrass industry in different terms than to what we are generally accustomed. Economics is a study of the factors affecting production, distribution and the return on investment for a given endeavor. Thus, in terms of irrigation, he attaches relative cost figures to determine the relationship between the golfer and better quality turf. By substituting your own figures it is possible to develop a better insight to irrigation on your course before the system goes in. *JAS.*

AS has been frequently noted, commercial turf managers do not have an easily identifiable product nor a market susceptible to traditional demand analysis. The superintendent produces a product that is measured in terms of satisfaction, a difficult standard to measure. The result, in terms of specifying appropriate costs levels, is either to do the "best" job with whatever funds are budgeted or to do the "best" job and see how much it costs.

The problem focuses on determining this range; to establish a reasonable budget level, determine how to allocate among cultural operations, and then produce the "best" job.

Basic to this problem is some viable definition of what the accumulated cultural operations are to produce. What turf condition is either optimal or at least minimum for the purpose of those with power to reject?

In this context, perhaps the first decision to be made is a specific identification of who must be satisfied. It may be a greens committee, a city council, a single individual who has the power to reject the turf condition, or it may be defined in terms of avoiding a certain number of complaints per time period.

Having decided who it is that must be satisfied, the very difficult task of specifying what will satisfy the individual or group must be accomplished. Unfortunately, many people react only in a negative manner. They can frequently state when quality or condition is not acceptable but cannot specify in a positive manner what the goal should be.

As a result, turf management seems to have been historically faced with trying to provide that quality turf which can be achieved with a minimum cost and yet provoke a minimum of complaint.

Three Approaches

In terms of irrigation, sufficient water must be applied to replace evapo-transpiration plus provide for inefficiencies in distribution with respect to both time and space. *This minimum relates to simply keeping the turf alive. Beyond this point, both quality preferences and intensity and/or frequency of use may necessitate additional cost.* To accomplish identification of additional costs, the turf industry must begin to quantify these variables and relate them to irrigation and other cultural operations.

For a starting point, one approach to this problem is to determine a turf management system that will have the capacity to provide the very best turf quality attainable.

Let us assume, for irrigation, this is a solid-set stationary sprinkler system that is fully automatic and of sufficient capacity to provide peak water demand in 28 hours a week or 4 hours per day. Note that by the above assumption, we also have identified certain characteristics of soil, terrain, and turf with respect to absorption capacity.

To specify numbers, assume an installation cost of $5,000 per acre for 120 acres (18 hole golf course) or total capital investment of $600,000. With an average life expectancy of 20 years, the annual fixed cost (depreciation and interest) would be

(continued on page 42)

No wilt.

No clog.

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WILT PRUF Formula NCF gives you more effective, economical protection against transplant shock, winter kill, summer scald and air pollution. You'll find WILT PRUF NCF makes a dependable sticker. And it eliminates problems you've had with other anti-desiccants.

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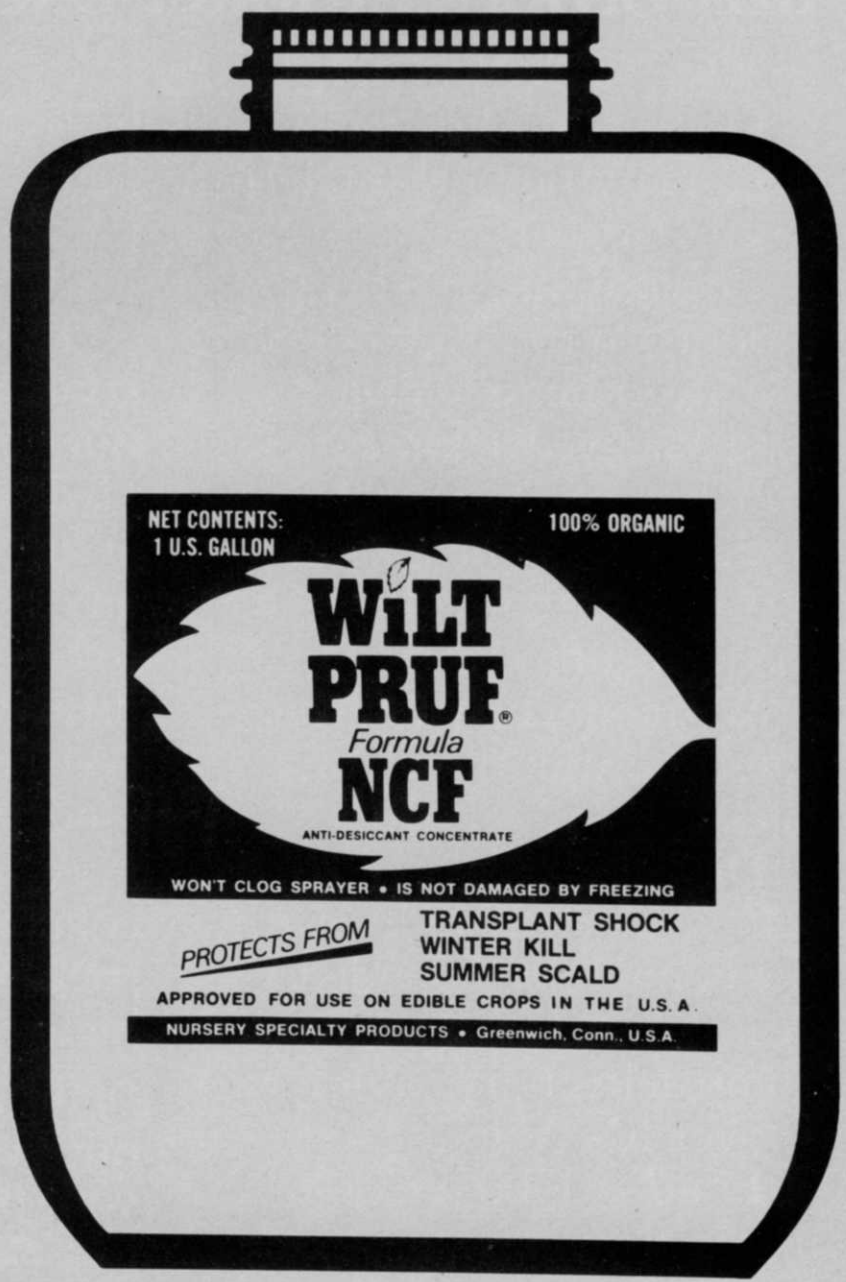

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Dig... down to eight feet. Lift capacity: 1000 lbs. with the boom fully extended. A 15.5 GPM hydraulic pump delivers a pryout force of over 10,000 lbs.

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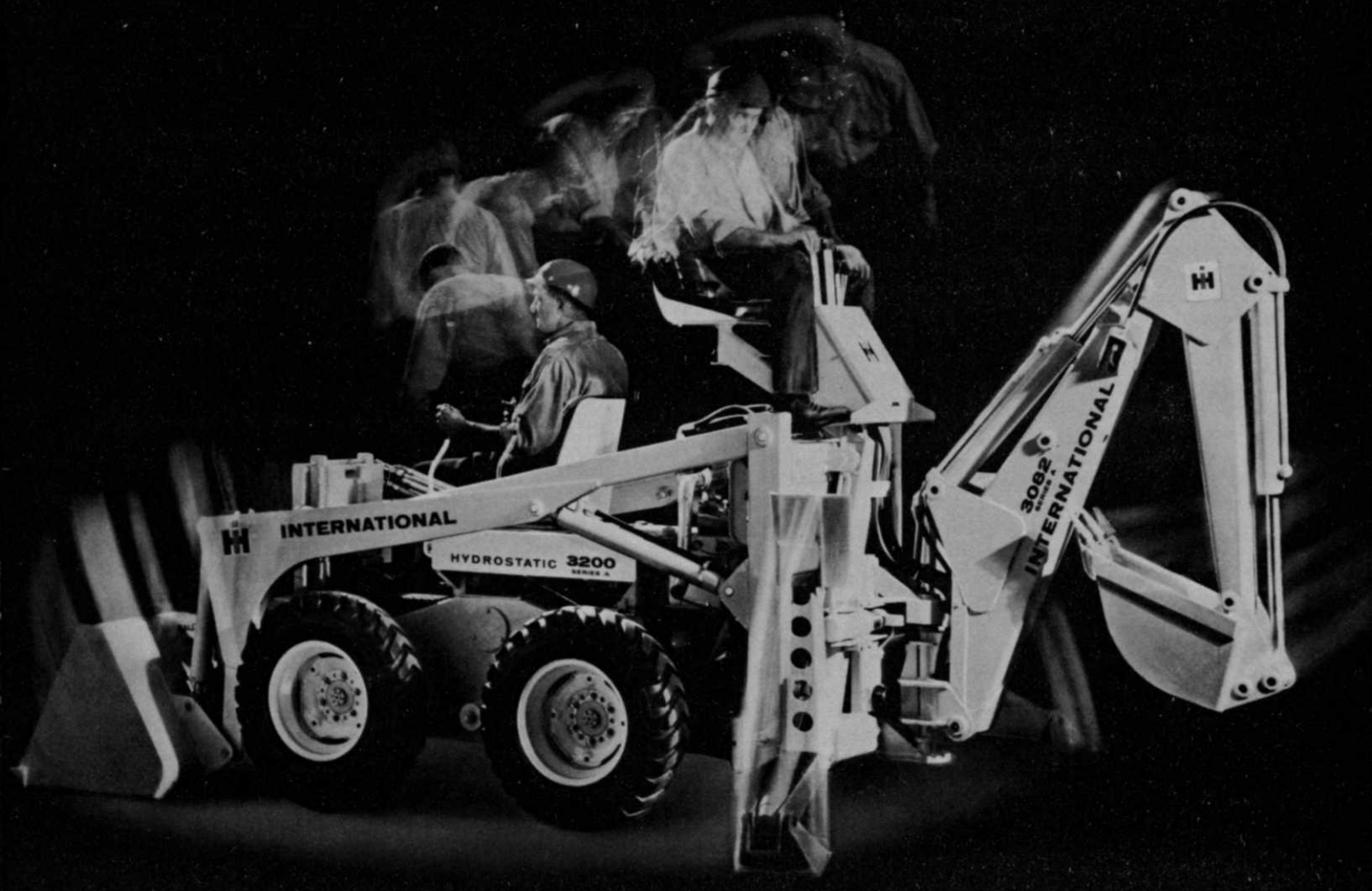


The 3200A compact backhoe-loader.

Industrial Equipment
International Harvester, Chicago, Ill. 60611

Irrigation Pumps

The Heart Of The System

By JOHN P. DUNLAP
Irrigation Consultant
Lakeshore Equipment & Supply Co.
Cleveland, Ohio

THE HUMAN BODY and an irrigation system are somewhat alike in that they both depend upon a pump in order to function properly.

Fortunately for most people the human heart is a very good pump and supplies the body with the needed blood to maintain life.

Unfortunately, not all irrigation systems have good pumps and therefore many of these systems do not perform up to their capabilities.

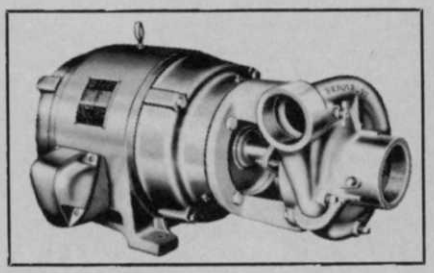
The pumping plant is one subject that is often times lightly passed over when discussing a new water system. A great deal has been written about automatic water systems. But seldom is the pumping plant mentioned, so let's look into the heart of the matter.

In order for a pumping plant to be designed properly we must know: (a) source of water, (b) type of power available, (c) the gallons and pressure required to operate the particular system, (d) pump location and total elevation (either gain or loss) from pump to outer extremities of the system.

Let's look at the several different items needed to make up a good pumping system.

Pumps: This is the most important part of the system since it does the work. Pumps come in all sizes, shapes, and types.

Centrifugal pumps are the most popular and the most economical pump used on irrigation systems today. They can be driven by gasoline engines, electric motors, or PTO drives. They are relatively cheap upon initial investment. They have



Centrifugal Pump

few moving parts and are economical to maintain. Centrifugal pumps are available in a wide range of volumes and pressures. Studying data on pump performance will enable nearly anyone to select the pump to give maximum efficiency.

Their one disadvantage is they require an intake line which must be kept primed. But this can be easily solved if you keep your system under constant pressure. They also require a footvalve on the end of the intake line which should be inspected yearly and kept in top condition. If you have city water and are using the pumps as boosters only, then your priming problem is solved and a foot valve is not needed.

Vertical turbine pumps are the next most popular in use today. They are more costly to buy. And their design is more complex. Thus, these pumps are more costly to repair if anything goes wrong.

But there are instances where centrifugal pumps will not work and a turbine must be used. If your water source is a well or you must lift the water more than 15 feet to the pump, then a turbine is for you. They are also available in a variety of horsepowers, volumes, and pressures, so select the proper pump to do the job required.

Specialty valves: These are special application valves that are used to control flow—reduce pressure—sustain pressure—start and stop pumps and also act as check valves if the check feature is wanted. They are usually fully adjustable and can be set to precisely control pressure and flow on your system by sensing the amount of water required.

It is beyond the scope of this article to dwell into the workings of these valves but almost any flow or pressure problem can be solved by selecting the proper valve. It would be smart to contact someone knowledgeable in these valves before deciding which valve to buy.

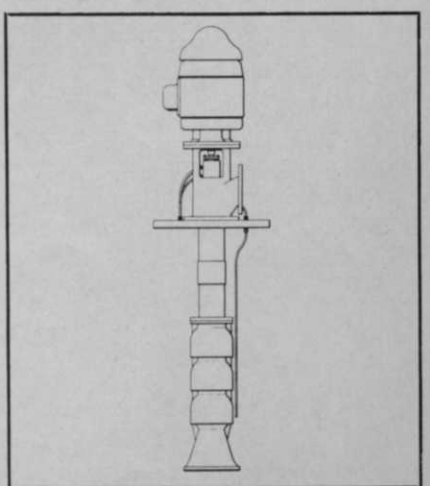
Check valves: Check valves are used to stop the back flow of water.

In every instance where system pressure is to be maintained you must have a check valve on each pump. Check valves are available in several different styles and for our purposes the no-slam or slow closing check valve should be used. Regular check valves close much too fast and can set up tremendous vibrations and noises when they close.

Pressure Tank: The pressure tank serves a couple of purposes in a water system but its main purpose is to provide an air cushion for more stable pressurization of the system. Since water cannot be compressed we use the air chamber to give us the expansion needed when water is demanded on the system.

Pressure tanks which have no membrane between the air and water tend to become waterlogged (loss of all air in tank) and cease to function a an expansion chamber. The last few years has seen

Vertical Turbine Pump



the development of the bladder type tank where a rubber diaphragm keeps the air chamber free of water. Once this type of tank is pressurized in the spring no further attention is needed until the fall draining. Even-though these tanks are higher priced the reliability will more than offset this added cost.

The above are some of the major components needed for a pumping plant.

Now let's set up a typical pumping plant that a golf course might need. The club which we are going to design a system for has just installed a new irrigation system with automatic green and tees and manual fairways. The total system demand is about 1000 G.P.M. and the water source is a lake.

Electrical power (440 volts) is available. We will choose 3 centrifugal pumps for our installation.

Our system is to be fully pressurized at all times so we can fill sprayers or hand syringe during the day. Thus, we will include a 5 Hp—90 gpm at 90 psi jockey pump for this purpose.

We also know, by adding up our sprinkler requirements, that for green and tee watering a second pump rated at 250 gpm at 110 psi with a 25 Hp motor will be needed.

In order to get our fairways watered manually, in a reasonable length of time, we will need the third pump, a 40 Hp unit rated at 600 gpm at 110 psi.

While we are at this point in our discussion lets look at a typical pump curve chart and see how we arrived at our Hp requirements for pump #2. (See Figure 1)

The gallons per minute (gpm) is across the bottom and total dynamic head (TDH) in feet is listed on the vertical left side. To convert total dynamic head to pressure per square

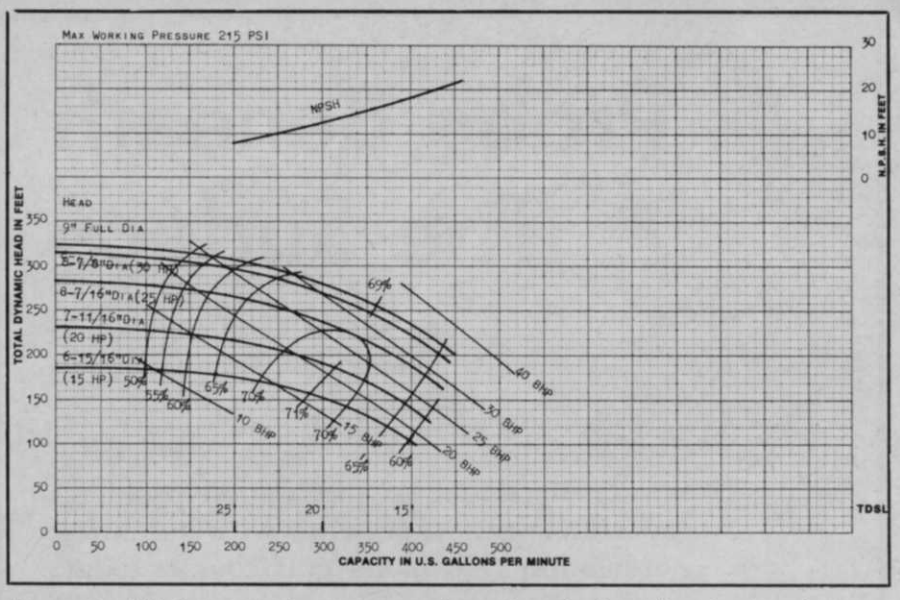


Figure 1. This is a typical pump curve chart. Capacity in gallons is plotted on one axis and dynamic head in feet on another axis.

inch (psi), multiply by the factor of .43. We need 250 gpm at 110 psi.

We now convert 110 psi to TDH (divide 110 by .43 which equals 255 TDH). Then on the chart we find where the lines of 250 gpm and 250 TDH intersect.This indicates that a 25 Hp motor is needed to give us this performance. All pump manufacturers have pump curves available so you can choose the right pump for your own particular needs.

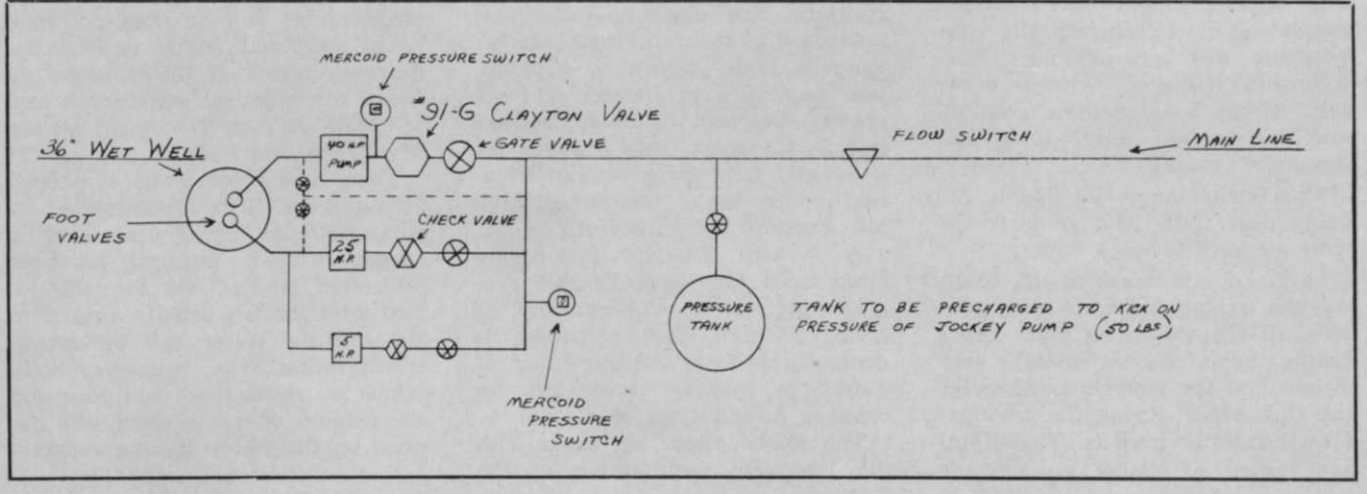
Now let's take a look at Figure 2. Here is a schematic of a typical 3-pump installation and how the components should be laid out. The concrete pad to which they are affixed should be about 12' x 16' so as to give ample working room. Whether a structure is erected around the pumps is up to the owner but it is highly recommended to reduce vandalism, and to keep the automatic pump controls clean and dry.

The piping in the pump house should be laid out so as to give maximum efficiency of flow. The use of flanged fittings or dresser couplings is recommended so any component can easily be removed without disturbing the rest of the piping system. Also, the use of long radius cast iron flanged fittings is highly recommended for the pump house piping—particularly on the larger pumps to reduce pressure loss.

The pumps are automatically controlled by a series of pressure and flow switches and the entire pumping plant is fully responsive to the demands of the irrigation system.

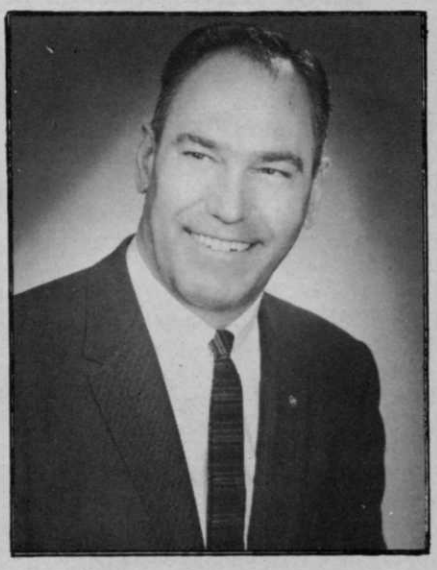
One final note. Each pumping plant is an individual system. Good pumping plants don't just happen; they are carefully designed and engineered to do a particular job and it is well worth your time to contact competent help when planning a new pumping plant. □

Each pumping plant is an individual system. The plant design below was developed after all the input factors were known. This typical design features three pumps for added flexibility in the system.



Probe Beneath The Surface

By **AUSTIN J. MILLER, President**
A. J. Miller, Inc., Royal Oak, Mich.



Overwatering is one of the biggest problems superintendents experience with automatic irrigation systems on golf courses today.

AFTER spending the day on the course, the golf course superintendent returns to his office, twists a few dials, sets several switches and leaves for the night knowing that his irrigation system will operate on schedule and without anyone in attendance.

This is a very common occurrence in the midwest and confidence in the automatic system is no longer difficult to establish.

This doesn't mean that problems are non-existent. What I would like to suggest is that we haven't recognized and addressed ourselves to the real problems. The superintendent with the new fully automatic system finds it is quite easy to get himself in deep trouble by *overwatering*.

This past season parts of the midwest and east were plagued by heavy rains. Many courses in these areas are built on relatively heavy soils. Overwatering in previous years left them with full soil reservoirs and no place for the water to go. The superintendent on a sandy course was more fortunate. His overwatering was less obvious. Overwatering, however, wastes water and leaches out nutrients, possibly into the ground water table and should be avoided.

This is the theme I'd like to develop. But first, let's go over the tools we have to work with.

In the humid areas of the country, the irrigation system must provide all the water turfgrass needs during the infrequent drought conditions and the supplemental water the turf needs during the frequent erratic rainfall periods. The drainage system, of course, services the course during periods of heavy rainfall.

Designing the irrigation system for drought conditions requires a good, even pattern of water distribution. Relative timing between the various areas is important but not critical. If a close watch is kept on the turf and an area shows signs of moisture stress, the interval of time can be increased for that night and the water deficiency made up. Economics (systems seldom have excess capacity) and the high and steady evapotranspiration rate during drought conditions keep superintendents from overwatering during these times. Evapotranspiration is the loss of water from the soil by evaporation and by transpiration from the plants growing in the soil.

Designing for humid conditions present a different set of problems. Generally, the grass has a low drought tolerance. The evapotranspiration rate varies to a greater degree and the amount and frequency of rainfall cannot be predicted accurately. The designer must now provide the operator with an extremely even pattern of distribution because excess water will not readily be lost by evapotranspiration. He must also provide for automatic shut down of the irrigation system due to rain and/or high soil moisture measurement.

A system designed for humid areas must also have flexible programming for a wide variety of areas. Rainfall over a course is generally uniform, but the water requirement varies according to changes in soil type, slope, etc.

The above discussion deals with the irrigation requirement of the grass plant for it's day to day water needs. A short range, but extremely important problem. is satisfying the plant's need for water when the evapotranspiration rate exceeds the uptake ability of the roots to supply water. A very short cycle of the sprinklers, 2-5 minutes, will raise the relative humidty in the micro-climate area and reduce the temperature of the plant and it's evapotranspiration rate. This is called syringing. It is valuable as a dew and frost removal tool.

Central programmers to provide steady irrigation during a drought, flexible irrigation during periods of rainfall, syringe cycles for influencing the micro climate and emergency shut down during rainfall or high soil moisture are being installed today and can be relied upon by the turf area superintendent.

So, doesn't that solve the problem?

Not really, because the superintendent has to set the amount and frequency of the irrigation and syringe cycles and he does not now have measured input of the required information. His decisions are based too much on experience and too little on fact. The result all too often is overwatering.

Then, how much water is needed by turfgrass? This is determined by solar radiation, wind, grass species, length of day, cultural practices and other inputs. Over the long period of time we usually return to the soil the water lost by evapotranspiration. The frequency with which we make these additions and the amount of water added will depend on the water holding capacity

(continued on page 38)

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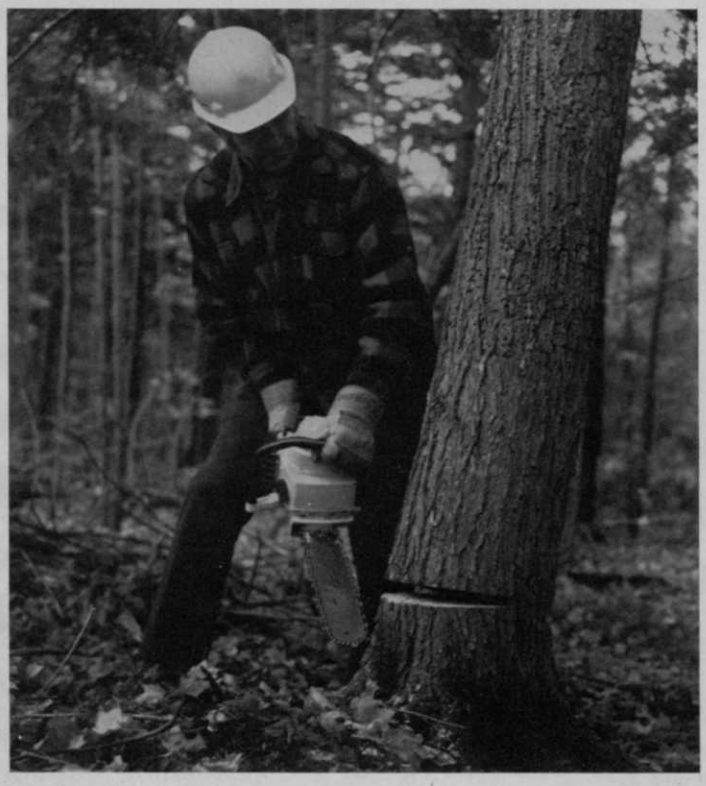

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Man And Nature Working Together

"Spray irrigation" is one of the most unique developments in sewage disposal yet. Combining sprinklers and sewage effluent, this new technique is a solution to pollution that today has application in our forests — tomorrow on turf, maybe your turf.

IN AN AGE of increasing public alarm over the harmful effects which domestic and industrial pollution are leaving behind us, a group of ecology minded developers and engineers have teamed up with industry, science and Mother Nature to employ a unique sewage disposal system which currently serves 1500 homes at St. Charles without polluting either the waterways, the land or the air around the community.

One of the nation's latest new communities, St. Charles is located only 20 miles from Washington, D. C. on an 8,000-acre tract in Charles county, Maryland. This new concept in community living, has been developed to provide better living conditions by master planning the residential, commercial, recreational, industrial, educational and governmental areas and locations in advance. In a nutshell, St. Charles is a community designed for superior living through superior planning. Its system of domestic sewage treatment is only one example of how superior planning can pay off.

St. Charles already has 1500 residential units in existence and is designed to grow over the next 20 years into a bustling community of 75,000 residents. Its effluent will ultimately go into a major interceptor sewer and treatment plant to be built by the county under a Housing and Urban Development grant. To meet the interim needs, it was decided six years ago to seek a method of sewage treatment which would meet present and future health standards—the sewage lagoon system.

The system of pollution-free sewage disposal being used by St. Charles, termed "spray irrigation," is unique in Maryland, and is one of only a handful like it in the entire nation. It employs nature's own methods, which are probably the oldest, least expensive, and still the most effective known to man, along with considerable assistance from scientific know-how. Interstate General Corporation, the developers of St. Charles, have succeeded in a way which undoubtedly will be copied by other communities looking for pollution-free interim solutions to the ever-growing sewage problem.

The sewage lagoon system was created by a team of scientists from

(continued on page 36)

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SPRINKLER IRRIGATION ASSOCIATION

PAST PRESENT FUTURE

By WALTER D. ANDERSON
Executive Secretary

FOR THE FIRST TWENTY YEARS after its founding in 1949, the Sprinkler Irrigation Association became recognized for its leadership in the agricultural markets of the vast irrigation industry. Now, however, with a concerted change of programming and direction, the SIA is moving into an equally strong position in representing turf interests within the industry.

Similarly, the organization, which was founded as a manufacturers group, is increasingly placing major emphasis in the areas of irrigation distribution and contracting, those industry segments which the Association feels can most benefit from the services provided by a national trade group.

The combination of these two policies established by its board of directors is producing dramatic results within the organization that are working towards the direct benefit of all those in the turf irrigation industry.

TURF INTERESTS COMMITTEE BEGUN

Changes began to take shape with the establishment in 1970 of a national Turf Interests Committee to develop turf-oriented programs and to design the part that turf irrigation would play in the SIA. Under the chairmanship of A. C. (Chet) Sarsfield, owner of Irrigation Technical Services, Lafayette, California, and with a membership representing all turf interests from throughout the country, the committee has moved quickly to become one of the best-functioning committees within the SIA.

Since its inception, the committee has worked on many major projects of significant value to the turf industry. These includue: (1) publication in 1972 of a complete listing of turf courses and sources of information in schools at all levels throughout the country; (2) working in cooperation with the Golf Course Superintendents Association of America, the SIA has designed a multi-year irrigation seminar which will be held as part of the program each year at the International Turfgrass Conference and Exposition to bring golf course superintendents up to date on the latest technical developments, trends and needs of the industry; and (3) preparation of material for a large section on turf irrigation to be published in 1973 as part of the first supplement to the Association's text, "Sprinkler Irrigation" which is now in its Third Edition and is recognized throughout the world as the authoritative source of information in the field.

In addition to these specific projects carried out by the Committee, all programming at the SIA's National Sprinkler Irrigation Technical Conference (Feb. 19-20, Fairmont Hotel, Dallas, Tex.) has been redesigned to present equal time for both agricultural and turf interests. Conference themes over the past three years, such as "Building Professionalism Through the SIA," "Automation: Whether or Not?" and the 1973 theme of "Our Industry in the Next 20 Years" have served as the focal point for important presentations on turf irrigation.

Similarly, Association publications have taken on a new tone with the regular publication of articles of a technical nature in the turf field.

Equally important changes have taken place at the Association's annual convention, held each Fall. Serving as an integral part of the Convention's program is the "Business Management Seminar" which is designed specifically with the irrigation distributor and contractor in mind. With a primary purpose of assisting the small and medium-sized businessman in the day-to-day operation of his business, the seminar regularly deals with a variety of subjects ranging from data processing for the small business, personnel management philosophy and policies, product liability, union and open shop matters to problems of warranties, sales financing, credit collection and inventory control.

LOOKING AHEAD

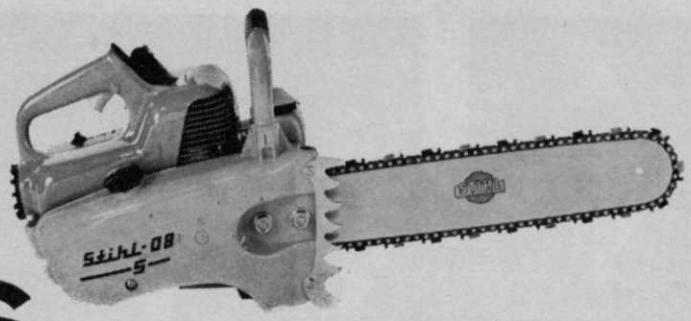
While the SIA's turf interests committee has already completed some of its initial projects, its major efforts are still under way and many of them will see completion during 1973. These projects, affecting every aspect of the turf irrigation industry, reflect both the role that the SIA feels it can play in the industry in the years ahead and recognition of a variety of needs existing in the industry. The projects include:

(1) Development of a licensing and contractor qualification system which would establish standards of activities within the landscape/irrigation field. It would be based primarily upon the health, safety and general welfare of the public and could conceivably draw up model licensing legislation for adoption in all jurisdictional levels in the United States. A rating system, administered within the SIA, to rate contractors on the basis of performance, knowledge operation and other important factors could be developed.

(2) Establishment of turf educational programs, in addition to that developed with the GCSAA, to include publication of a turf irrigation bibliography listing all available publications on the subject and to study the feasibility of establishing an SIA Turf Irrigation Speakers and Teachers Bureau;

(3) Publication of a new and updated "Minimum Recommended Specifications for Turf Irrigation" detailing standards for equipment, materials and techniques in the field.

These are but the major highlights in the development of the SIA's turf-oriented programming that has been initiated in the last two years. With this change of direction for the twenty-four year old organization, membership from within the turf field has increased rapidly, a significant recognition of the commitment made by the board of directors to this growing and changing segment of the multi-million dollar sprinkler irrigation industry. □



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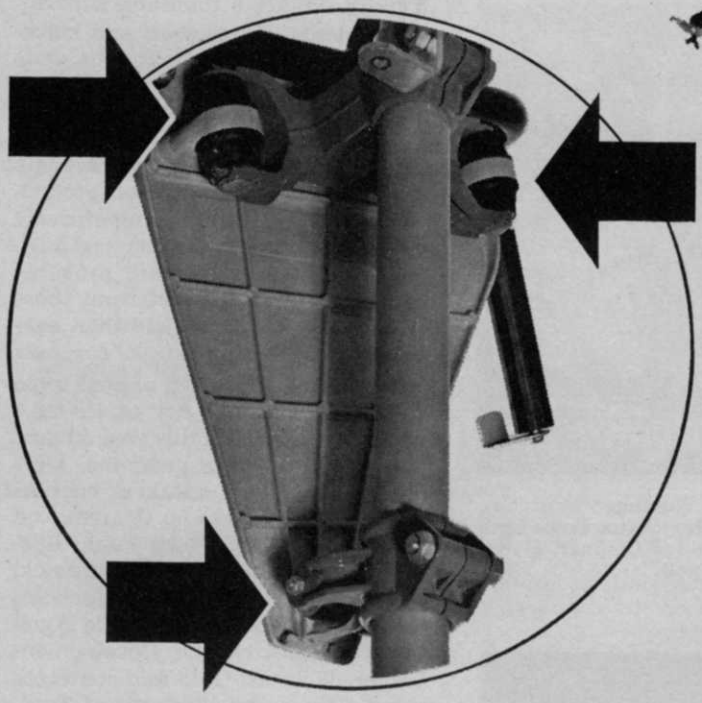

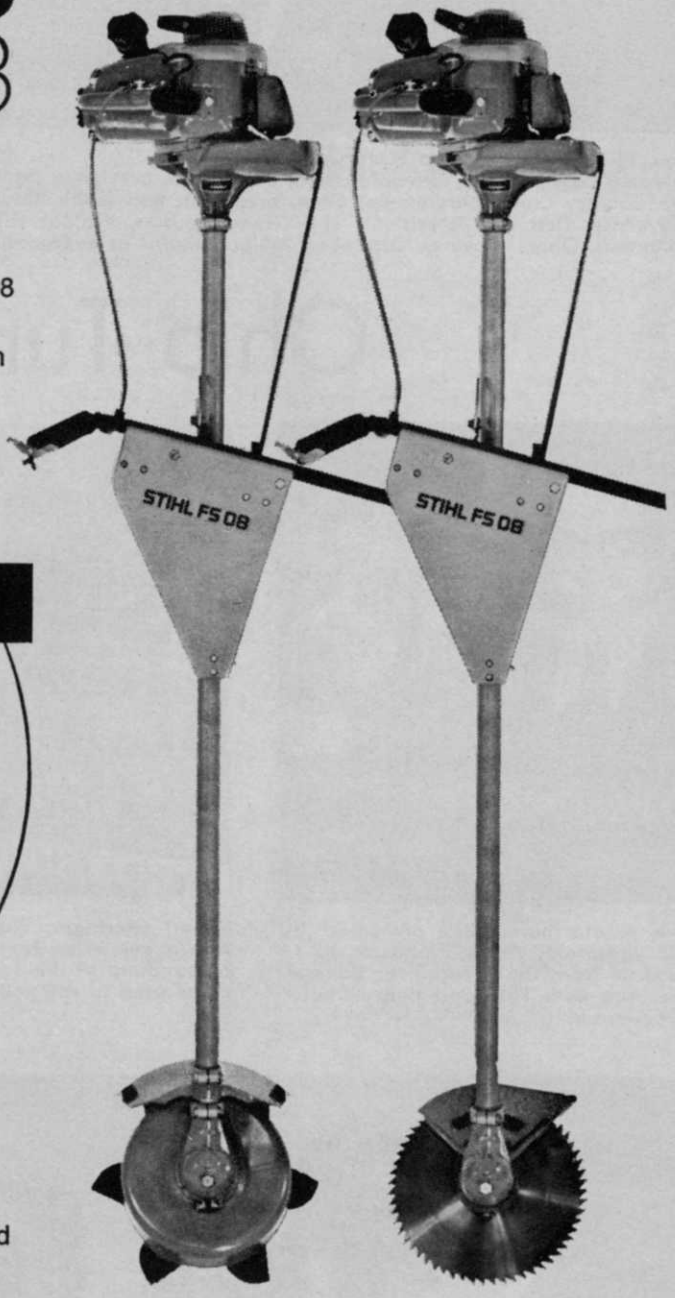

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New officers for the Ohio Turfgrass Foundation for 1973 are: (l-r) Paul Mechling, Sylvania Country Club, Sylvania, Ohio, second vice president; Paul Morgan, Browns Run Country Club, Middletown, Ohio, president; Ron Smith, Bowling Green State University, first vice president; and Glenn Hudson, Walnut Hills Country Club, Columbus, Ohio, treasurer. Dr. Robert Miller remains as executive secretary.

The eye of the "O" on the big Toro Company sign focuses on the attention getting equipment in the display. Delegates saw the latest in equipment designed to make the job easier.

Ohio Turfgrass Bonanza

Two scholarships were presented by OTF president, Gene Probasco, (l) to students from Clark Technical College. They are Beth Pohl and Henry Chafin (not present).

Robert Gieringer, Gieringer Mfg. Co., Milwaukee, Wisc. demonstrates the ease of handling of the Sod-Cropper, a machine used to roll sod.

The OTF Man of the Year Award went to two persons this year. Malcolm McLaren (l) and Colin Smith (r) are the first to receive dual recognition for their outstanding contributions. Gene Probasco, OTF president (c) made the presentation.

MORE THAN a thousand superintendents, sod growers and industry men gathered in Columbus, Ohio in mid-December for the biggest and most elaborate Ohio Turfgrass Conference and Show yet. The pre-Christmas event suggested strongly that commercial turfgrass production in Ohio rates competitively with agriculture and other big business. This year's meeting probably generated more interest from those outside the turfgrass field than ever before.

Theme for the sixth annual expo was "Grass in the Art of Living." An effort was made this year to provide something for everyone. During the first day, speakers concentrated their remarks on Grasses And Their Uses. Dr. C. Reed Funk, Rutgers University, New Brunswick, N.J., spoke on New Grass Varieties while Merle H. Niehaus, Ohio Agricultural Research and Development Center, Wooster, Ohio told conferees about Blends and Mixtures of Turfgrasses.

Additionally, Dale Kern, Seed Technology, Inc., Marysville, Ohio outlined the steps taken in the purchase of grass seed. Dr. Robert W. Miller, Ohio State University, tied all of the remarks together in a presentation of Grass Use in Relation to Management.

The following morning Bob O'Brien, immediate past president of OTF, chaired a session on Safety and Personnel Management. Included in this session was a speech by James A. Napolene, Compliance

(continued on page 28)

A Turfgrass Ecology and Management Short Course was held on the Virginia Tech campus in Blacksburg, Virginia in December for golf course superintendents. Those attending included: Front row, (l-r): Dr. A. J. Powell, extension turf specialist at Tech; Joseph L. Green, Altavista Country Club, Hurt; Peter J. Richard, Waynesboro Country Club, Waynesboro; John Alden, Forest Edge Cluster Association, Reston; Buddy Lee Rife, Happy Valley Recreation Corporation, Clintwood; and W. L. Middleton, W. B. Middleton, Inc., Norfolk. Second Row, (l-r): Bill Keehne, Mil-Chem Turf Division, Roanoke; John A. Gray, Cooperative Extension Service, Newport News; C. S. Moss, Kidwell Turf Farms, Midlothian; Robert Blosser, Kidwell Landscape, Culpeper; and Bill Rondeau, Ronco Enterprises, Poquoson. Third row, (l-r): Walter Huffman, Berry Hills Country Club, Charleston, West Virginia; Garrett E. Miller, Miller Chemical and Fertilizer Corporation, Richmond; William T. Robertson, Jr., Langley Air Force Base, Hampton; and Chester M. Beahm, Centreville Sod Growers, Nokesville. Top row, (l-r): John E. Mann, Warrenton Training Center, Warrenton; Kenneth P. Giedd, Blacksburg Country Club, Christiansburg; Mike Duncan, Ivy Hill Golf Club, Lynchburg; E. F. Grimm, Miller Chemical Company, Roanoke; and David E. Tellin, Golf Course Specialists, Inc., Wheaton, Maryland.

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Thank you,
Arthur V. Edwards, Publisher

(This renewal notice is a requirement of our national auditing service to verify that you are a member of the industry and that you wish to receive the magazine).

Each year the Ohio Turfgrass Foundation grants scholarships to students at Ohio State University studying turfgrass science. This year's winners are: (l-r) William Job, Nevin Vandergrift, John Zimmerman, Mark Yoder, Clifton Pohling, and Robert Harper. Gene Probasco, 1972 OTF president (r) makes the presentation.

The Ohio Turfgrass Foundation student leadership award was presented to Col. Gale Love (Ret.). Here, Dr. Robert Miller, Ohio State University, (l) presents the plaque to Colonel and Mrs. Love.

OHIO TURFGRASS BONANZA

(from page 26)

Officer, OSHA, who pointed out that the golf superintendent is not exempt from the rules and regulations of the Occupational Safety and Health Act. More inspections will be made of facilities this year, he said, and it is in the interest of each superintendent to keep the necessary safety records up to date.

The Ohio Sod Producers Association held their second annual meeting during the Conference and Show. Featured speaker for the business luncheon was James A. Sample, editor, WEEDS TREES AND TURF Magazine. He told members that sod producers must become ambassadors of the Green Industry. "Growth of sod in this commercial turfgrass industry has been phenomenal. Single family dwellings, mobile home communities, shopping centers, malls—all are demanding sod for instant beautification," Sample said. "It is time we as an industry stand up and be recognized for the accomplishments we have made. Sod is basic. And turfgrass is second only to the necessities of life." The editor said that more consumer oriented articles in consumer media are needed to tell the story of the Green Industry.

New officers for the Ohio Sod Producers Association are: Chet Augspurger, Cincinnati Turfgrass Nurssery, president; Don Figurella, Besturf Sod Farm, North Canton, vice president; Woodrow Wilson, Eastside Nurseries, Canal Winchester, treasurer, and Dr. Robert W. Miller, secretary.

The last day of the session offered a "cafeteria approach" to turfgrass production to delegates. Four sessions were conducted simultaneously.

There are five kinds of weeds that can be present in a water storage facility. Dr. A. J. Turgeon, department of horticulture, University of Illinois, told an audience of superintendents. Above surface, submerged, floating, free floating (not attached) and algae all have a marked affect on storage water. He said that care must be taken in applying aquatic herbicides or algaecides to control these weeds.

"We must remember that this water will be used to irrigate turfgrass," he cautioned. "Water containing too much of a herbicide may injure or destroy turfgrass plantings."

He said that many aquatic herbicides are rated in parts per million concentration. Generally, one part per million is the equivalent of 2.7 pounds of active ingredient per acre foot.

Four men were awarded the OTF Professional Excellence Award. They are: (l-r) Paul Mechling, Sylvania Country Club; Dick Craig, Camango Country Club; John Fitzgerald, Century Toro Distributors, Inc.; and Dalton Dean, Clark Technical College.

In the session for landscape contractors and home lawn maintenance personnel, Dr. Robert W. Miller said that a soil test is the first step of a fertility program. A soil test can determine what nutrients are needed. Then fertilizer can be added to correct the deficiency, he said.

Miller said that many of our turfgrass areas are excavated areas. Fill dirt has been brought in. Often this dirt is nothing more than subsoil. A majority of the time subsoil materials are low in phosphorus but usually high in potassium. Thus, it is necessary to add phosphorus to the soil to raise the level of fertility. The agronomist pointed out that it takes 10 pounds of P_2O_5 to raise a soil test value one pound. He recommended that phosphorus should be worked into the top six inches of soil.

Dr. Miller said that a typical starter fertilizer would be 23 pounds per thousand square feet of 15-20-10 or equivalent worked into the top two inches.

Lee Record, USGA, Chicago, Ill. quickly zeroed in on the pros and cons of a golf course irrigation system. "Two questions are always raised," he said. "The golfer wants to know why the water system is on every time he wants to play golf. And the superintendent wants to know why he can't water when he wants to. The problem is communication—the least understood word between the superintendent and the member."

Record said that the manual irrigation system in the past didn't

(continued on page 32)

THE INNOVATORS FROM TORO PRESENT A NEW CENTRAL PROGRAMMER... THE YEARS AHEAD VARI-TIME 4000!

TORO®

Automatic irrigation of golf courses is not a new idea. But automatic control with almost unlimited flexibility located in one central place, plus on the spot field control, is only a recent idea which revolutionized golf course superintendent operations.

TORO has been innovating such ideas in turf care for over 50 years. And now it introduces the latest and newest concept in central controllers: the super Vari-Time 4000 Programmer.

No other master programmer offers the flexibility, versatility and efficiency afforded by the Vari-Time 4000. Watering of an entire golf course—all the tees, greens, fairways—can be done automatically from one single source.

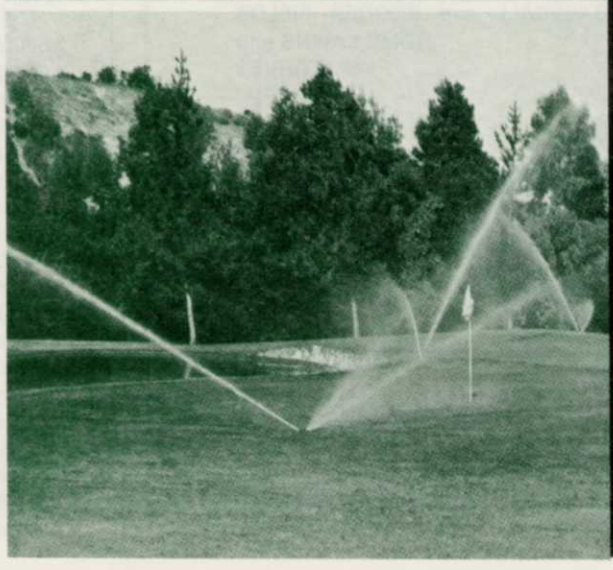
Up to six Vari-Time Central controls, each commanding up to 40 field Satellite controllers, can be housed in the master cabinet. Or, any possible combination of up to six Central and Syringe controls is available to satisfy any watering requirement.

The system is flexible to allow for in-the-field hot weather syringe of one or more greens when other areas may not need a syringe, or when player traffic is heavy, curtailing central syringe control.

The TORO Vari-Time 4000 is designed to function automatically; however, all Centrals have Manual Start, Cancel, and On-Off switches for instant manual control in any emergency.

The 14-day, 24-hour watering cycle can be set to operate in 15 minute increments and the Syringe cycle can be timed infinitely from 0 to 5 minutes. And whatever the weather or usage conditions on the course, immediate action can be taken to start or stop a cycle just by working the right controls on the Vari-Time 4000. Or the system can whir along automatically without any attention, operating either electric or hydraulic Valve-In-Head sprinklers.

Maximum flexibility in automatic watering, with minimum attention. That's the light-years ahead TORO Vari-Time 4000 super programmer. The ultimate in innovative technology from the company that is consistently the leader in the golf course turf irrigation market: TORO . . . The Innovators. Phone John Skidgel at (714) 688-9221 for more details.



The Toro Company
Irrigation Division
P.O. Box 489
Riverside, Ca. 92502

For More Details Circle (148) on Reply Card

Irrigation System Cools Prism Effect On Texas Turf

MODERN high rise structures may be just the ticket for business firms, but many are causing "planticide" to surrounding landscape plantings.

Take a hot, Texas summer. Add a modern structure with the new heat-reflective glass which bounces the sun's rays away from the exterior surface of the building. Turn on the afternoon sun and the result is cooking range temperatures capable of frying turf, shrubs and other vegetation all the way down to the root zone.

Case in point is the new Stemmons Empire Plaza in Dallas.

We discovered that the landscaping on the south side of the building would be most subject to reflected sun rays during the hottest part of the day," says John Heidman, Dallas Weather-matic president and irrigation contractor for the project.

"This area would require three to four times as much water as the north side. But two factors made it difficult to supply the extra water. Most of the turf areas sloped severely away from the building. And additional water could not be applied at mid-day because each drop of water would act as a miniature magnifying glass, further amplifying the reflected sun rays."

Using a Weather-matic SSR-10 Dual-Program control, the firm was able to achieve the scheduling flexibility required.

"The hot south area was zoned separately," Heidman explains, "and wired as stations 1 and 6 on the control." East and west areas were also separated from the north section.

"The dual program feature of the unit enables us to water the north area only three times weekly," he notes, "while watering all other areas daily.

Watering time for north, east and west areas is six minutes per section beginning at 4 a.m. and repeated on a second program cycle beginning at 7 a.m.

Watering time for the south area is also six minutes per cycle with three minutes applied on station 1 and the additional three minutes on the station 6 repeat.

This means that plantings in the hot south area will receive four separate three minute showers each morning. Excess runoff is minimized but adequate water is provided to offset the excessive heat.

Insurance Department.

You're looking at a happy Jacobsen Distributor standing in his parts department. To Paul Porter (he's with Porter Brothers, Inc., headquartered in Shelby, N.C.), having a fully stocked parts department is like being backed by good insurance. He knows he can take care of what you buy from him.

For one, he has a roomful of genuine Jacobsen parts designed just for Jacobsen equipment. No "will fit" stuff here. And chances are parts will be available right when you need them.

For another, he has Jacobsen factory-trained mechanics. Men who have been to the plant and learned all about the equipment inside and out, and can do everything from simply grinding reels to overhauling hydraulic systems.

Emergency field trips? You bet. When the need arises, he often goes to the equipment to fix or service it right on the spot.

Since all of us Jacobsen Distributors are independent businessmen, our livelihood depends on keeping you happy after the sale is made.

That's why we go out of our way to make sure our service is every bit as good as the Jacobsen equipment we sell in the first place.

We've found it's a very good policy.

Your Jacobsen Distributors.

Before we sell it, we buy it.

For the name of the distributor near you write: Jacobsen Turf Distributor Directory, 1721 Packard Avenue, Racine, Wisconsin 53403

Officers of the Ohio Sod Growers Assoc. are: (l-r) Woodrow Wilson, Eastside Nurseries, Inc., Canal Winchester, treasurer; Cecil Collings, Green Valley Turf Farm, Canfield, director; Paul Florence, Millcreek Sod Farm, Marysville, director; Jack Schiller, Haywood, Inc., Oak Harbor, director; Don Figurella, Best Turf Sod Farm, North Canton, vice president; Chet Augspurger, Cincinnati Turfgrass Nursery, Inc., president; and John R. Kramer, Kramer & Sons, Westlake, immediate past president. Dr. Robert Miller, remains as secretary.

OHIO TURFGRASS BONANZA

(from page 28)

present many problems for the superintendent. The night man usually knew when to turn on or off the water and this seldom interfered with the golfer.

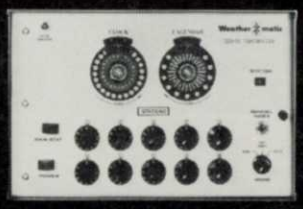
"With the automatic irrigation system, the responsibility is placed on the superintendent," he said. The manager travels the entire course every day. He must think of irrigation in terms of the needs of the turfgrass as well as the member. He must be careful of the use of water, when it is applied and how it is applied."

The Golf Association executive concluded his remarks by saying that no one can tell the superintendent how to apply water to the course. His advice was "Give the plant what it wants but not too much and give the member when he wants but not too much."

An annual highlight of the Conference was a reception by Lakeshore Equipment and Supply Co., Cleveland, followed by the Ohio Turfgrass Foundation banquet.

Many awards were presented during the banquet. The Ohio Turfgrass Foundation Professional Excellence Award went to Paul Mechling, Sylvania Country Club, Sylvania; Richard Craig, Camargo Club, Cincinnati; John Fitzgerald, Century Toro Distributors, Inc., Toledo and incinnati. Gale Love, a retired Army colonel was presented the OTF Student Leadership Award. Ohio State University scholarships were awarded to William Job, Nevin Vandergrift, John Zimmerman, Mark Yo-

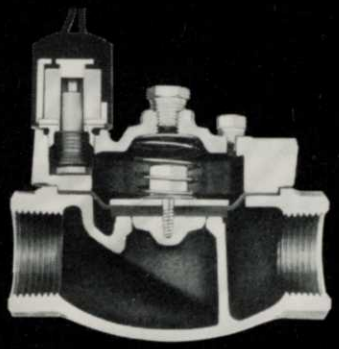
(continued on page 41)



Weather-matic turf irrigation components are higher quality and cost a little more.

Therefore, a Weather-matic System costs more than another system. Right?

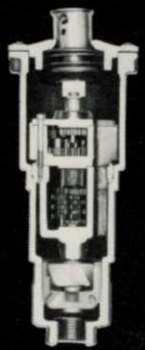
Not necessarily.



You see, in a commercial or industrial application, with Weather-matic's superior design capabilities, fewer components may be required for optimum performance. That means you get higher quality, a better functioning system — and a lower total cost.

So, you don't always get what you pay for. Sometimes you get more.

For additional information on Weather-matic irrigation systems, write or call:



Weather matic®

LAWN AND TURF SPRINKLER SYSTEMS

P. O. Box 18205 / Dallas, Texas 75218 / (214) 278-6131

"I've played this course for a year and I haven't seen a bad patch of turf yet."

"Funny, I was thinking the same thing!"

Compliments on the quality of your turf management are always nice to hear. They make all those long hours of challenging work seem even more rewarding.

Speaking of compliments, we have a way that can help you earn more of them: the Du Pont TERSAN® 1-2-3 Disease Control Program.

Kudos from the greens committee.
With TERSAN LSR applied in the spring, TERSAN 1991 in the summer and TERSAN SP in the fall, you control all major turf diseases on all common turf grasses all season long. Helps keep your turf lush, green and resilient from the day the course opens till the day it closes.

Applause from the finance committee.
Read the label on each bag of TERSAN and you'll be surprised at how little you have to use and how long the protection lasts. Take TERSAN 1991, for example: a systemic, curative (eradicant) and protective fungicide. Just 1 ounce per 1000 sq. ft. applied every 10 to 14 days controls dollar spot on tees.

The TERSAN 1-2-3 Program is also designed to stop costly disease problems before they have a chance to cause trouble. So you get fewer tie-ups of men and equipment, more budget dollars saved.

Praise from your toughest critic.
As a turf professional, the standards you set for yourself are the most demanding of all. With the TERSAN 1-2-3 Program, you can come closer to meeting these standards and win praise from your toughest critic—yourself.

For complete information on this program and a supply of TERSAN turf fungicides, contact your golf course supplier.

With any chemical, follow labeling instructions and warnings carefully.

DUPONT
REG. U.S. PAT. OFF.

TERSAN 1·2·3 DISEASE CONTROL PROGRAM

MAN AND NATURE WORKING TOGETHER

(from page 22)

the University of Pennsylvania nine years ago. They developed a workable system of sewage disposal which would help communities avoid having to build costly treatment systems and then still having to pollute rivers and streams with the effluent. The team decided to let Mother Nature help in their efforts by using the land disposal method of sewage treatment. With a few new twists, they finally settled on the method now being used so successfully by St. Charles. "This system can be built at one-fifth the cost of conventional sewage treatment plants," said IGC president James J. Wilson, "and it can be operated, along with the community water supply at St. Charles, by only four men."

Many experts from other areas interested in the field of waste treatment and disposal have already been to St. Charles to see how the sewage lagoon system works. Now that legislation concerning sewage and pollution problems is pending, Congress is leaning more and more to the safer, less polluting methods of waste disposal, namely, the use of land as the prime means of disposal rather than rivers and streams.

Under guidelines set up by the Environmental Protection Agency, the U. S. Army Corps of Engineers has been made responsible for policing the nation's waterways. For that reason, and to learn more about the land disposal method of spray irrigation, their representatives have seen the St. Charles lagoons in operation.

In addition, interested representatives from such diverse groups as the Maryland State Water Resources Administration; the Montgomery county (Maryland) Council; several consulting engineers and even the American Public Works Association Research Foundation have singled out the St. Charles sewage lagoon system as being typical of the most effective land disposal method of sewage disposal.

Sewage from the homes in St. Charles and its two schools flows through traditional sewer lines into a system of lagoons covering twenty acres near the eastern boundaries of St. Charles' 8,000 acres. The first two lagoons into which raw sewage flows are equipped with four large aeration devices which continually churn the sewage water, adding oxygen. The aeration provides the oxy-

(continued on page 57)

Get rid of unwanted green growth before it cuts into your profits.

The weed onslaught is just about universal.

An expensive headache.

For utilities, railroads, highway departments, the petroleum industry and industry in general.

But there is a way to control that costly green tide—with Tandex® herbicide.

It's a urea-carbamate compound that gives outstanding extended control over a range of weeds and grasses.

But it's more than weed control.

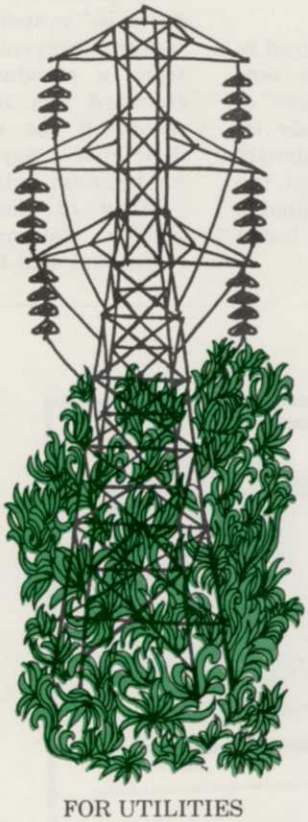
It's brush control, too. If you've got to get rid of really tough brush and woody vines, Tandex gets the job done.

You can spray Tandex or apply it in dry granular form.

Either way you use it, you'll control that costly green tide.

FOR INDUSTRY

FOR RAILROADS



FOR UTILITIES

FOR ROADS

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INDUSTRIAL CHEMICALS DEPT.
NIAGARA CHEMICAL DIVISION
MIDDLEPORT, NEW YORK

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PROBE BENEATH THE SURFACE

(from page 20)

of the soil reservior and the upper and lower limits we set on this reservoir. This is usually expressed as percent of field capacity.

The turf superintendent should determine the watering holding capacity of his various soil types by use or a tensiometer, irrometer or similar moisture sensing device. Install the tensiometer in a representative area at the bottom of root depth. After calibrating the tensiometer, let the soil in that area dry to the 50-60% field capacity point. Add a predetermined amount of water with a sprinkler, about one-third inch, and determine what the increase is in percent of field capacity.

Water applied can be measured in a pan set adjacent to the tensiometer. Compute the amount of water required to manage your irrigation between field capacity limits. A second tensiometer at the 12-inch or 18-inch depth is valuable to prevent overloading the lower soil profile with water.

If the tensiometer reading at these lower levels shows an increase in moisture, percolating is occurring past the root zone. This is water going to waste and is filling up your water reservoir leaving little capacity for the coming rains.

If the increase in soil moisture at lower levels is due to rainfall, then care must be exerted not to over irrigate and add more water to an already filling reservoir.

Another method of controlling irrigation is the water balance method. Here a balance sheet of credits and debits of water is kept. Rainfall and irrigation are the credits. The debits depend on the evapotranspiration of the turf plant. This is difficult to measure on the golf course but a lot of good approximation can be made by checking the evaporation from a free water surface. Research on grass type will show its' evapotranspiration rate to be some percent of the evaporation from a standard pan. Making a standard pan is not difficult and recording the evaporation can be done once a day or just before timing the next irrigation.

Many of the national weather service stations measure evaporation and will be glad to show you their equipment. With this method water lost from the soil reservior by evapotranspiration can be determined. And rainfall can be measured. The difference is made up by irrigation — hence the balance method. *A note of caution — the rainfall in excess of that necessary to bring the soil to 100% field capacity usually percolates to a lower profile and is lost and not available to the plant. Even in the water balance method, it's well to have a few tensiometers installed around the course so you can monitor your soil-water relationship.*

In addition to the tensiometer method of measuring soil moisture, you can use electrical conductivity of the soil as an indication of available water. This is usually done by measuring with metal probes. The varying level of salts in the soil may require recalibrating at various intervals.

There is a limited variety of equipment on the market. Development of accurate, permanently installed equipment is one of the great needs of our industry.

As a professional turf man you need to "look" under the surface and plan better management of the water in your soil reservoir.□

For selective service against crab-grass enlist the help of USS Vertagreen Weed & Feed with Balan®.

Two things that every professional turf manager in the country agree on is that Crabgrass can be a problem in the Spring, and Poa Annua can be a problem in the Fall.

Getting rid of these pesky weeds and feeding the turf used to be two separate operations... until VERTAGREEN Weed & Feed for Professional Turf solved the problem.

Weed & Feed contains famous BALAN®, the highly selective pre-emergence herbicide that kills Crabgrass and Poa Annua seeds as they germinate. You never see them. And, because BALAN® breaks down gradually, it leaves no harmful residue. Doesn't damage your established turf.

And, as BALAN® controls these weeds, VERTAGREEN's superior grass-growing nutrients (12-4-8) are hard at work providing quick and steady growth for healthy, professional turf.

Now's the time to stop Crabgrass before it starts. Call the VERTAGREEN Representative from USS Agri-Chemicals today. His Professional Turf Program includes a full line of dependable turf products and services. To make your turf a lot nicer and your job a little easier.

USS Vertagreen

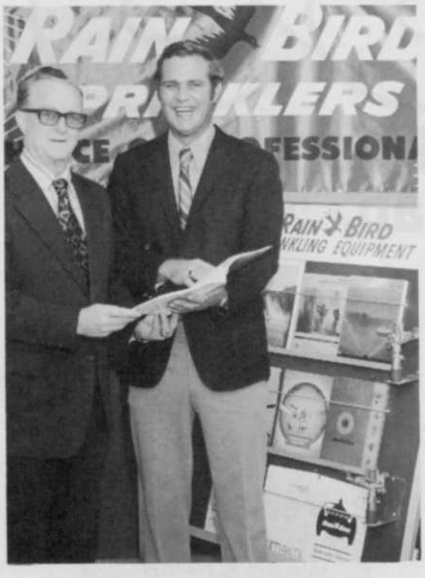
Professional Turf Program

BALAN® is the registered trademark for Benefin, Elanco Products Company, a Division of Eli Lilly and Company.

USS and VERTAGREEN are registered trademarks.

Acapulco Bound — Charles Putnam (c) national sales manager, Weather-matic Division, Telsco Ind. congratulates Dick Conradson (l) and Edron Schneider, Irrigation Industries, Inc., Concord, Calif. Triple-I is a member of Weather-matic's 1972 Distributor Golden Circle, a company program based on sales and marketing. The prize for top volume is an expense paid trip to Acapulco.

Chips As Mulch — Miami's Seaquarium landscaping superintendent, Willem Van der Laan uses this Wayne chipper about 16 days each month. The site was constructed on infertile land and mulch is needed to keep vegetation growing. He chips unwanted plants and mulches the chips around the desirables. Now there's vegetation recycling that keeps costs down to a minimum.



New Distributor — Roy Garrett, district manager for Rain Bird Eastern Sales, Dallas congratulates Dale Ousley (r) president of Hydrotex Irrigation Supply, Inc. as a new Rain Bird turf distributor.

Green Industry Newsmakers

PEOPLE PLACES EVENTS

What's It All About — That's what Bill Westerhold asked when he was recently appointed advertising supervisor for Shell. Dennis G. Meyer (l) newly promoted Atlanta district supervisor, fills in the details of the job.

Ernest A. Tosovsky, Jr., vice-president of Home Nursery Greenhouses, Inc., Edwardsville, Ill. becomes new board member of the American Association of Nurserymen.

On-The-Job-Training — Indianapolis Summer Intern Program students report the program a success. Standing (l-r) are: Vern Hartenburg Intern Coordinator; Michael LaFave, Michigan State University; Mark Ackelson, Iowa State University; Tom Vaughn, Texas Tech University; Ron Journay, Purdue University; Rick Lendrum, California State Polytech. College — Pomona; Lee Roberts, Texas A&M University; Jack Duncan, Indianapolis assistant superintendent of parks, Seated (l-r) are: Richard Helman, North Carolina State University; William Martin, West Virginia State University; John Gall, Purdue University; Gary Bellamy, Texas Tech University.

OHIO TURFGRASS BONANZA

(from page 32)

der, Clifton Pohling, and Robert Harper. Additionally, Clark Technical College awarded scholarships to Beth Pohl and Henry Chafin.

Scholarships awarded by the Golf Course Superintendents Association of America went to Steve Scott, Steve Early and Robert Cochran.

For the first time in OTF history, the Man of the Year award was presented to two individuals. Malcolm McLaren and Colin Smith were joint recipients of this honor.

New officers for 1973 are: Paul Morgan, Browns Run Country Club,

Robert V. Mitchell, president, GCSAA, (r) presents association scholarships to Steve Scott and Steve Early of Ohio State University. Robert Cochran (not present) also received a scholarship.

Middletown, Ohio, president; Ron Smith, Bowling Green State University, first vice president; Paul Mechling, Sylvania Country Club, Sylvania, Ohio, second vice president; and Glenn Hudson, Walnut Hills Country Club, Columbus, Ohio, treasurer.

Trustees are: John Fitzgerald, Century Toro Distributors, Inc., Toledo and Cincinnati; John Laake, Crest Hills Country Club, Cincinnati; Lou Greco, Squaw Creek Country Club, Vienna, Ohio; Bill King, Great Oaks Joint Vocational Schools, Cincinnati; Don Collins, Upper Landsdowne Golf Links, Ashville, Ohio; Bill Eble, Ohio Toro, Cleveland; Jim Seigfried, Losantiville Country Club, Cincinnati; and, Fred Buscher, area extension agent, horticulture, Ohio cooperative extension service. □

HOW MUCH TO SPEND ON IRRIGATION?

(from page 14)

$54,000 total or $450 per acre.

There is no irrigation labor cost but there is an additional cost for repair, maintenance, and inspection of $6,000 per year or $50 per acre. Thus, we have a bench mark figure of $500 per acre, plus water cost annually, to do the ideal irrigation job.

At the other extreme, assume an irrigation system capable of supplying the minimum amount of water to keep the turf alive without regard to timing. The system will make no distinction between greens, fairways, or rough, and will seldom contribute to anything vaguely resembling playing the quality of the turf. The system may, in fact, preclude use of the turf during certain hot spells or specific playing times. However, the system is a minimum cost distribution system and may contribute to lower mowing and fertilization costs.

This system may have costs of $50 mixed, $20 labor and $30 repairs and maintenance for a total annual cost of $100 per acre plus water. We now have a cost range against which turf quality differentials can be compared.

A second approach to this problem is to rate turf quality acceptability against an artificial turf to determine comparative costs. Assuming artificial turf will range in cost, installed, between $110,000 and $440,000 per acre, with a life expectancy of 10 years, the annual cost per acre will range from $15,400 to $61,600.

Obviously the entire acreage for a golf course does not need to be in artificial turf so some portion (perhaps other than green and/or fairways) of this cost will be deleted. However, for other types of turf area this begins to give another bench mark since irrigation and other cultural operations are eliminated. Rather than in terms of what must be spent, this second approach tends to establish an upper limit of costs.

The third approach to determining the relationship between optimum turf quality and minimum cost is to examine what the preference system of potential users may be. This approach attempts to relate expected revenue to costs.

Although the usual product demand analysis may not be appropriate, some approximation seems necessary to provide any answer to the basic question of how much must be spent for turf maintenance. By no means do I have the answer. However, perhaps by suggesting a methodology, sufficient discussion can be prompted to direct attention toward a solution. Let us again use the golf course as an illustration.

There is theoretically a demand function for the service called a round of golf. For the individual this demand is a function of many variables including: price, playing quality, distance from residence (or office), aesthetics, difficulty, time, and turf quality. The aggregate demand is a summation of the individual demand functions plus other aggregate variables including population and income.

Golf courses tend not to be homogenous because of differences in physical layout, landscaping, location and, of course, turf quality.

The problem is to determine the relationship among the many variables as they relate to the number of rounds of golf the individual wants to play. This may be expressed in terms of a mathematical equation. Anything that is not a fixed factor could be inserted as a variable to

Rounds of golf and price are easily quantified. Turf quality is not, as yet. However, an index system ranking qualities from 0 to 10 (0 = unmake the determination more meaningful.

acceptable and 10 = ideal) can be arbitrarily developed. For each number rank there would be a corre-

(continued on page 49)

Table 1. Turf Quality Index (0 = unacceptable, 10 = ideal)

Rank	Description
0	Natural grass, no mowing, irrigation to keep grass alive.
1	Greens mowed every two weeks, irrigation to maintain essentially green color.
2	Fairways mowed occasionally.
3	Differential treatment of greens and fairways.
4	Roughs trimmed and greened.
5	Present turf quality.
6	Night irrigation every other day.
7	Greens maintained in uniform springy condition.
8	Fairways mowed and irrigated twice weekly.
9	Irrigated and mowed every other day.
10	Irrigated and mowed nightly, turf always green and uniform. Constant maintenance crew.

—insect report—

INSECTS OF ORNAMENTALS

MEALYBUG
(Conchaspis angraeci)

FLORIDA: Adults collected from umbrella tree *(Grassaia actinophylla)* at nursery in Gainesville, Alachua County, September 18. This is a new county record.

GEOMETRID MOTH
(Thysanopyga intractata)

VIRGINIA: Larvae heavily damaged American holly in four counties, Northumberland, Prince George, Hanover, and Westmorland. These are new county records.

OAK LEAFTIER
(Croesia albicomana)

WEST VIRGINIA: Egg survey for 1972 showed decrease since previous years. Expect 300,000 acres will sustain negligible to moderate defoliation in Pocahontas and Greenbrier County area.

ARMORED SCALE
(Lecanodiaspis pruninosa)

NEBRASKA: Survey of 5 Lincoln area (Lancaster County) parks indicated light to severe infestations on honey locust, hackberry, and American elm.

TREE INSECTS

NANTUCKET PINE TIP MOTH
(Rhyacionia frustrana)

VIRGINIA: Unusually severe damage reported to pine plantations and yard trees in Portsmouth area, Nansemond County during week of November 24. FLORIDA: Pupae heavy on 132 loblolly pine trees, *Pinus taeda*, at Gainesville, Alachua County November 10.

ORANGESTRIPED OAKWORM
(Anisota senatoria)

NEW JERSEY: Larvae completely defoliated several thousand acres of oaks in southern Ocean County. Present each summer in small scattered spots, this is largest single infestation ever noted in State.

OBSCURE SCALE
(Melanaspis obscura)

KANSAS: Heavy on bur oaks near Wichita, Sedgwick County. Overwintering nymphs averaged 400+ per square inch, many twigs and branches dead.

FALL WEBWORM
(Hyphantria cunea)

NEW MEXICO: Damage heavy on many shade trees in most of state. Larvae, a nuisance around households.

FOREST TENT CATERPILLAR
(Malacosoma disstria)

KENTUCKY: Larval defoliation 100 percent on some oak trees in Hopkins and McLean Counties. Increased defoliation expected. PENNSYLVANIA: Egg mass and first instar larvae found on sugar maple in Somerset County. Many sugar maples showing dead branches and limbs due to damage of past two years.

BENEFICIAL INSECTS

HONEY BEE
(Apis mellifera)

NORTH DAKOTA: Honey production by commercial apiaries (300 or more colonies) totaled 7,192,000 pounds in 1972; a 70-percent increase from 1971. This represents increase in number of colonies and yield per colony. Colonies totaled 58,000, five percent above 1971; an average yield of 124 pounds per colony is 61 percent above the average yield in 1971. Late summer rains resulted in good honey flow from sunflower and other late blooms.

Maryland Sod Production Costs The Key To Business Success

By BILLY V. LESSLEY and
FRED T. ARNOLD
Professor and Research Assistant, respectively
Dept. of Agricultural and Resource Economics
University of Maryland

Editor's Note: Getting a fix on production costs of sod has been a primary goal of the sod industry. But, the industry as a whole is too diverse to make broad generalizations. Economists have thus tended to concentrate on costs of production within a given state. The following article was prepared from questionnaires answered by 90 percent of the Maryland producers who grew and/or sold sod in 1968 and 1969. In future issues WEEDS TREES and TURF will be publishing cost of producing sod in other states.

THE TURFGRASS INDUSTRY is a rapidly expanding segment of Maryland's agricultural economy. In fact, it demonstrates the interdependence between the state's agricultural and non-agricultural sectors.

In recent years, growth in the turfgrass industry has exceeded overall agricultural expansion. Reliabable estimates show a 70 percent increase in cultivated turfgrass acreage over the five-year period of 1963-1968. During this period, acreage increased from 7,000 to 11,590 acres. Of the 11,590 acres in 1968, 3,739 acres were harvested.

The revenue generated from this harvest contributed $3.0 million to Maryland's farm income and $10.9 million to other sectors of the state's economy from transportation and installation of turfgrass. During 1969, cultivation increased to 12,732 acres with an accompanying increase in farm-level income to $3.3 million.

The cost estimates derived from detailed interviews with turfgrass producers were divided into variable and fixed costs. Variable costs are the expenses incurred for employing variable inputs whose quantity increases or decreases with the level of output. Fixed costs refer to the expense incurred by a firm for employing fixed resources.

Table 1. Average Variable Cost of Production for Alternative Sizes of Turf Farms, Maryland, 1968

Item	Producer Size Group: Less than 100 Acres	100-150 Acres	151-300 Acres	Greater than 300 Acres	All Growers
	—Dollars Per Acre, Two-Year Production Period—				
Seed	29.00	22.40	22.10	29.00	26.69
Fertilizer	18.45	16.71	19.11	18.51	17.76
Top-dressing	24.08	25.37	25.90	32.81	26.73
Herbicides	6.36	8.56	6.49	10.69	7.32
Lime	10.64	10.33	9.76	8.42	9.76
Fuel and oil	7.03	7.74	5.09	7.97	6.81
Production labor	34.02	35.62	32.66	31.36	33.47
Interest on variable capital	17.68	17.18	16.56	18.86	17.60
Average variable cost	147.26	143.91	137.67	157.62	146.14

Supply expenditures included the value of all variable inputs whose quantity could be altered within the production period to effect a change in output. For turfgrass production, variable cost is comprised of expenditures for seed, fertilizer, herbicides, insecticides, lime, fuel and oil, production labor (labor expended for field operations) and interest (eight percent) on variable capital. Variable costs for alternative sizes of farms are reported in Table 1.

The largest single component of average variable cost was the expense incurred for production labor. Because labor accounted for such a large proportion of variable cost, 23 percent on average, the data dealing with labor requirements were subjected to statistical analysis in an attempt to discover possible sources of labor economies. Analysis of variance and sequential testing were used to identify which of the cultural practices reported in Table 2 would lead to significant labor reductions as farm size increased.

Labor reductions, significant at

(continued on page 46)

Table 2. Average Labor Requirements for Turfgrass Production[a]

Cultural Practice	Farm Size: Less than 100 Acres	100-150 Acres	151-300 Acres	Greater than 300 Acres	All Growers
	—Hours Per Acre, Two-Year Production Period—				
Seedbed preparation	3.55	2.37	1.99	2.50	2.64
Stone removal	3.33	3.15	0	0	3.26
Seeding	0.86	0.87	0.51	0.40	0.67
Top dressing	0.79	0.88	1.17	0.43	0.80
Spraying	0.65	0.53	0.50	0.61	0.57
Mowing	8.18	10.03	10.26	6.76	8.96
Total	16.09	17.14	13.69	10.61	14.62

[a]Simple summation by cultural practices will not yield the reported total labor requirement for each size of farm. Each estimate of the labor requirement by cultural practice was computed from only those growers in each farm category who actually performed that practice. Total labor for each size of farm is therefore a weighted summation of the labor requirement by cultural practice.

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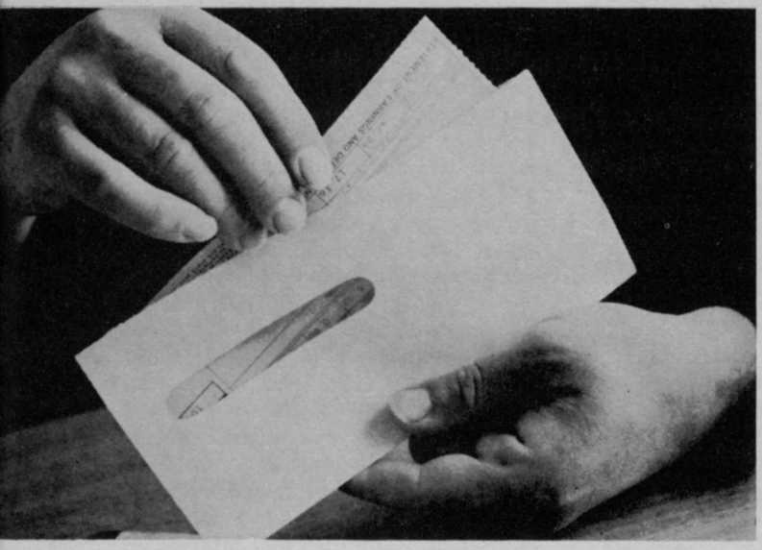

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Table 3. Average Fixed Cost of Production for Alternative Sizes of Turf Farms, Maryland, 1968

Item	Producer Size Group				
	Less than 100 Acres	100-150 Acres	151-300 Acres	Greater than 300 Acres	All Growers
	—Dollars Per Acre, Two-Year Production Period—				
Machinery and equipment					
Depreciation	36.16	24.48	20.10	13.58	25.24
Repairs	20.88	14.16	11.62	7.86	14.60
Insurance	3.76	3.54	2.10	1.42	2.62
Permanent structures					
Depreciation	8.12	7.56	7.36	5.66	7.08
Repairs	2.66	2.48	2.42	1.86	2.32
Insurance	2.40	2.24	2.18	1.68	2.10
Supervisory services	3.42	7.31	9.09	28.56	10.04
Real estate tax	8.31	7.95	8.98	8.70	8.17
Interest on fixed capital	27.36	21.58	19.48	17.10	21.78
Land rental rate	34.00	34.00	34.00	34.00	34.00
Average fixed cost	147.07	125.30	117.33	120.42	127.95

SOD PRODUCTION COSTS

(from page 44)

the 95 percent level, were observed for seedbed preparation, seeding and stone removal. In general, it was found that the largest farms were somewhat more efficient in their use of labor than the smallest farms and that some opportunities did exists for decreasing production labor requirements by increasing cultivated acreage from less than 150 to more than 150 acres.[2] However, the decrease in production labor did not lead to a reduction in production labor expense.

Wage rates, which averaged 40 percent more on the largest farms (as opposed to the smallest farms), resulted in almost constant production labor expense for all sizes of farms.

The cost of variable supply inputs (seed, fertilizer, top-dressing, herbicides, lime and interest on variable capital) declined gradually from $106.21 per acre on farms with less than 100 acres to $99.92 on farms with 151 to 300 acres, and increased to $118.29 on farms with more than 300 acres.

Farms with more than 300 acres typically employed more variable capital inputs in their production process in an attempt to produce a better quality grass than was produced on the less intensive operations of competing growers.

The majority of growers with more than 300 acres harvested a portion of their acreage and realized that the better quality grass was easier to harvest, easier to market and could command a premium price.

Expenses for fixed cost of production included expenditures for land, buildings or permanent structures, large equipment or machinery and supervisory services

Fixed costs reported in Table 3 were computed on an assumed machinery and equipment life of eight years with 20 percent salvage value. Fixed costs for permanent structures assumed a 20-year life with zero salvage value. The resulting annual cost for depreciation, repairs and insurance was 14.55 percent value of machinery and equipment complements and 4.95 percent of the new value of permanent structures.[3] Interest on fixed capital was charged at an annual rate of seven percent on the average value of fixed investment. The land rental rate of $34.00 per acre ($17.00 per annum) was chosen as the most accurate measurement of the opportunity cost of land used for turfgrass production.

The cost of supervisory services, labor other than required for field operations, increased steadily from the smallest to the largest farms. This was due to the prevalence of hired foremen on large turf farms, separation of turf fields, and the more sophisticated, time-consuming sales techniques which were necessary to assure a market for a much greater volume of turfgrass.

The absolute cost of machinery, equipment, buildings and interest on fixed capital declined as farm size increased (Table 4). However, the general decline in average fixed cost of production was offset bv increases in the cost of supervisory services when farm size exceeded 300 acres (Table 4). As a percent of average total cost, the cost of supervisory services increased steadily from 1.17 percent on the smallest farms to 10.27 percent on the largest farms.

Another factor which contributed to the cost structures in Table 4 can be seen by examining variable costs. The inputs of variable capital in the form of seed, fertilizer, herbicides and top-dressing differed with each size of farm (Table 4).

As a group, producers with the largest farms employed the greatest amount of variable capital inputs in their production process. They

Table 4. Average Per Acre Production Costs, Maryland Turf Farms, 1968

Item	Producer Size Group				
	Less than 100 Acres	100-150 Acres	151-300 Acres	Greater than 300 Acres	All Growers
	—Dollars Per Acre, Two-Year Production Period—				
Fixed Cost					
Machinery and equipment					
Depreciation	36.16	24.48	20.10	13.58	25.24
Repairs	20.88	14.16	11.62	7.86	14.60
Insurance	3.76	3.54	2.10	1.42	2.62
Permanent structures					
Depreciation	8.12	7.56	7.36	5.66	7.08
Repairs	2.66	2.48	2.42	1.86	2.32
Insurance	2.40	2.24	2.18	1.68	2.10
Supervisory services	3.42	7.31	9.09	28.56	10.04
Real estate tax	8.31	7.95	8.98	8.70	8.17
Interest on fixed capital	27.36	21.58	19.48	17.10	21.78
Land rental rate	34.00	34.00	34.00	34.00	34.00
Average fixed cost	147.07	125.30	117.33	120.42	127.95
Variable cost					
Seed	29.00	22.40	22.10	29.00	26.69
Fertilizer	18.45	16.71	19.11	18.51	17.76
Top-dressing	24.08	25.37	25.90	32.81	26.73
Herbicides	6.36	8.56	6.49	10.69	7.32
Lime	10.64	10.33	9.76	8.42	9.76
Fuel and oil	7.03	7.74	5.09	7.97	6.81
Production labor	34.02	35.62	32.66	31.36	33.47
Interest on variable capital	17.68	17.18	16.56	18.86	17.60
Average variable cost	147.26	143.91	137.67	157.62	146.14
Average total cost	294.33	269.21	255.00	278.04	274.09

spent 23 percent more for top-dressing fertilizers and 46 percent more for herbicide applications than the average for all growers in Maryland. The cost of employing these inputs was not a function of the size of farm, rather it was a function of management decisions. These more intensive applications of variable capital were an attempt to produce a higher quality, more uniform product which could be marketed with greater ease than turfgrass produced by the less intensive operations of competing producers.

In any examination dealing exclusively with costs, there is an inherent danger of excluding the critical economic variable which ultimately determines the success or failure of a business enterprise, profit or return to management. From the productive process, each of the four factors of production earns a return. Land earns rent, labor receives wages, capital earns its return as interest and management receives profit.

Returns to land, labor and capital have been incorporated into the cost of producing turfgrass by the inclusion of rent, wages and interest charges into the statement of average total cost. Any residual which remains between total cost and total revenue, whether positive or negative, must therefore revert to management.

Receipts for one acre of unharvested Common Ky. Bluegrass or a mixture of Bluegrasses and Red Fescue averaged $316.77 in 1968 (Table 5). Growers with the largest farms, typically producers of the best quality sod, received the highest price, averaging $340.25 per acre.

Often, turfgrass producers who incurred higher costs while attempting to improve the quality and appearance of their product earned a greater net return than growers who produced at a lower cost.

For example, farms with more than 300 acres received the highest price for unharvested turfgrass in 1968, while farms with between 151 and 300 acres averaged only $311.60 for grass of the same variety. The end result was a return to management of $62.21 per acre (two-year production period) on the largest farms and $56.63 on farms with 151-300 acres, the latter being farms which had the lowest average total cost of production (Table 5). Again, this can be explained by the different levels of costs and returns associated with the respective size of farm.

Net return to management for other sizes of farm are also shown in Table 5.

Table 5. Return to Management from Sale of Turfgrass by the Acre, Maryland, 1968

Item	Farm Size				
	Less than 100 Acres	100-150 Acres	151-300 Acres	Greater than 300 Acres	All Growers
	$ Per Acre	$ Per Acre	$ Per Acre	$ Per Acre	$ Per Acre
Gross receipts per acre	304.16	333.33	311.60	340.25	316.77
Less variable cost per acre including hired or operator labor equals	147.26	143.91	137.67	157.62	146.14
Return to land, fixed capital and management	156.90	189.42	173.93	182.63	170.63
Less fixed costs including seven percent on fixed capital and $34.00 land rental rate equals	147.07	125.30	117.30	120.42	127.95
Return to management	9.83	64.12	56.63	62.21	42.68

Larger farms, through their ability to spread fixed costs over more acres, were able to produce turfgrass at a lower cost than farms with less than 100 acres. However, a portion of the cost savings on larger farms was offset by increasing supervisory expenses. The net result was a higher average total cost on farms with more than 300 acres than on farms with either 100-150 or 151-300 acres.

Four factors can be credited with explaining the observable changes in cost which accompanied increases in size from the smallest farm to the largest producing unit:

1. Declining average fixed costs of machinery, equipment and buildings throughout.
2. Increasing supervisory expense throughout.
3. Higher wage rates on larger farms which offset physical labor economies.

(continued on page 54)

industry people on the move

Dr. Kenneth L. Parks, appointed director of research and development for Agrico Chemical Company. **Harold W. Long, Jr.,** named director of environmental control for the company's Pierce, Fla. phosphate operation.

* * *

Charles L. Morse, Jr., an investment banker, and **Lee Hazen,** attorney, both of New York City, named to the board of directors of Michigan General Corporation.

* * *

Roger Anderson, appointed sales manager for Wylie Manufacturing. He was formerly area manager for Delavan Manufacturing Company.

* * *

Robert N. Shreve, elected vice president of Conwed Corporation.

* * *

Wayne C. Machado and **Robert T. Morgan,** promoted to sales supervisor of the southern district and midwest district, respectively, for American Cyanamid Company.

* * *

Campbell P. Ridley, appointed technical supervisor—herbicide marketing, for Monsanto Company's agricultural division. He will have responsibility for application equipment technology as related to Monsanto herbicide use and performance.

* * *

Robert E. Weber, becomes vice president of Diamond Shamrock Chemical Company. He will continue as general manager of the Nopco Chemical Division.

* * *

T. Greg Friss and **Jack K. Harms,** joined the marketing management team at Yard-Man, Inc. Friss becomes the company's national sales manager. Harms will be responsible for developing and implementing marketing programs for branded products.

* * *

Eldon C. Davis, to manager of the Chicago regional office of Hercules, Inc. He will replace **Elmer Sayers, Jr.,** who will retire in April.

* * *

Charles W. Middleton, becomes industrial vegetation control specialist for Velsicol Chemical Corporation. He is responsible for marketing and sales of industrial brush and weed control chemicals in the central U.S. Before joining Velsicol, he was chemical department manager for Asplundh Tree Expert Company.

* * *

James A. Fischer, promoted to director of sales and service for The Toro Company. He replaces **P. Robert Scagnetti** who resigned to become head of The Clapper Company.

* * *

Robert J. Sutton, appointed area sales supervisor in the northeast region for the agricultural chemical division of Stauffer Chemical Company.

* * *

Robert F. Perkins, joined Thompson-Hayward Chemical Company as agricultural sales representative. He will be working in parts of Indiana, central Ohio and northern Kentucky.

* * *

Willard Lighty, appointed sales and field representative for Redeturf, Inc. He will also be in charge of the company's research program on turf varieties, new materials and materials handling methods.

HOW MUCH TO SPEND ON IRRIGATION

(from page 42)

sponding total operational cost. Since data are not readily available, a joint effort between the greens committee and the superintendent might do this on a questionnaire basis. Figures I and II are two examples of how to develop a turf quality index Table I. is an example of an index.

In the final analysis, the answer to the question, "What must be spent for irrigation or other operations?" is simply "Whatever is necessary to satisfy turf use customers."

This in turn, centers on a determination of what they, the customers, are willing to pay for various types of turf quality. Although the turf industry deals in a service, that service has utility for all present and potential customers — even in the case of local government where the customers may simply be the taxpayer.

Therefore, the quality of turf necessary to provide that service function must relate to revenue — either in terms of dues and greens fees or in governmental budgets from tax dollars.

Until this is specified we remain in the archaic position of guessing how to manage turf. Least cost may not provide an optimum solution. In fact, least cost may be a losing proposition.

As a final comment, many people play golf or use other turf areas. However, we really don't know what factors are involved in either deciding to use a turf area or not, or in selecting among alternatives similar areas.

The turf industry is becoming sufficiently sophisticated that it should devote more effort toward this unknown facet of turf — the user, his motivation, and willingness to pay. □

Figure I. How many rounds of golf would you play at the following prices and qualities of turf?

Turf Quality	Price/round	No. of Rounds weekly	No. of Rounds annually
10	$10.00		
10	9.00		
10	8.00		
10	7.00		
9	10.00		
9	9.00		
9	8.00		
.			
.			
5	8.00		
5	7.00		
5	6.00		
5	5.00		
5	4.00		
.			
.			
1	2.00		
1	1.00		
0	1.00		

Figure II. In order to provide different qualities of turf, costs are incurred which must be covered by greens fees or other money sources. Please indicate your preferences as to quality and fees by indicating number of rounds you would play at each level.

Turf Quality	Green Fee	No. of Rounds weekly	No. of Rounds annually
10	$12.00		
9	10.00		
8	9.00		
7	8.00		
6	6.00		
5	4.00		
4	4.00		
3	3.00		
2	1.00		
1	1.00		

—meeting dates—

Garden Center Symposium, 9th annual, Park Motor Inn, Madison, Wisc., Feb. 6-7.

Midwestern Chapter, International Shade Tree Conference, annual meeting, Holiday Inn, 1926 W. Wisconsin Ave., Milwaukee, Wisc., Feb. 6-8.

Weed Science Society of America, Regency Hyatt House, Atlanta, Ga., Feb. 6-8.

Northern California Turfgrass & Environmental Landscape Exposition, 9th annual, Hall of Flowers, San Mateo County Fairgrounds, San Mateo, Calif., Feb. 7-8.

New England Chapter, International Shade Tree Conference, annual meeting, Kings Grant Inn, Danvers, Mass., Feb. 8-9.

Golf Course Superintendents, Mid-Atlantic Association, annual conference, Lord Baltimore Hotel, Baltimore, Md., Feb. 12-13.

American Society of Consulting Arborists, 6th annual meeting, Mountain Shadows Inn, Scottsdale, Ariz., Feb. 15-18.

Professionals Turf & Plant Conference, 5th annual, Holiday Inn, 80 Clinton Street, Hemptead, L. I., N. Y., Feb. 16.

National Arborist Association, annual meeting, Mountain Shadows Resort, Scottsdale, Ariz., Feb. 18-22.

Sprinkler Irrigation Technical Conference, Fairmont Hotel, Dallas, Tex., Feb. 19-20.

Georgia Weed Control Society, annual meeting, Macon Hilton Hotel, Macon, Ga., Feb. 20-21.

Iowa Shade Tree Disease and Insect Short Course, Iowa State University, Ames, Iowa, Feb. 21-23.

Southern Chapter, International Shade Tree Conference, annual meeting, Sheraton Motor Inn, Fredericksburg, Va., Feb. 25-28.

Northeastern Forest Pest Council, Sheraton Plaza Hotel, Boston, Mass., Mar. 5-6.

Midwest Regional Turf Foundation Turf Conference, Purdue University, West Lafayette, Ind., Mar. 5-7.

Grounds Maintenance Conference, 3rd annual, Waverly Inn, Cheshire, Conn., Mar. 7.

Maryland Sod Conference, 8th annual, Adult Education Center, University of Maryland, College Park, Md., Mar. 8.

Turf Conference, Iowa Golf Course Superintendents Association, 39th annual, Ramada Inn, Waterloo, Iowa, Mar. 12-14.

Western Society of Weed Science, annual meeting, Ridpath Hotel, Spokane, Wash., Mar. 13-15.

Florida Nurserymen and Growers Association, The Breakers Hotel, Palm Beach, Fla., May 17-19.

Western Chapter, International Shade Tree Conference, annual meeting, Hotel Utah, Salt Lake City, Utah, June 17-20.

American Sod Producers Association, annual meeting, Denver, Colo., July 16-19.

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DRAINAGE TUBING: Hancor Inc., Div. of Hancock Brick & Tile Co., Findlay, Ohio

Easy installation and multi-system adaptability are just two of the features of this turf-flow, flexible drainage tubing. Outside diameter is only two and three-eights inches and the tubing weighs 68 pounds per 500 foot coil. All this permits installations with smaller trenches, less fill, and greater time and labor savings. The corrugated construction of the tubing allows the use of screw-type fittings for added reinforcement. Protected by corrugations, .008 inch by ⅜ inch slits let the tubing "breathe" easily when installed in any direction, even in medium sand. Tubing is acid, alkali and frost-resistant. For more details, circle (705) on the reply card.

STUMP GRINDER: Levco Manufacturers, Inc., Wynne, Ark.

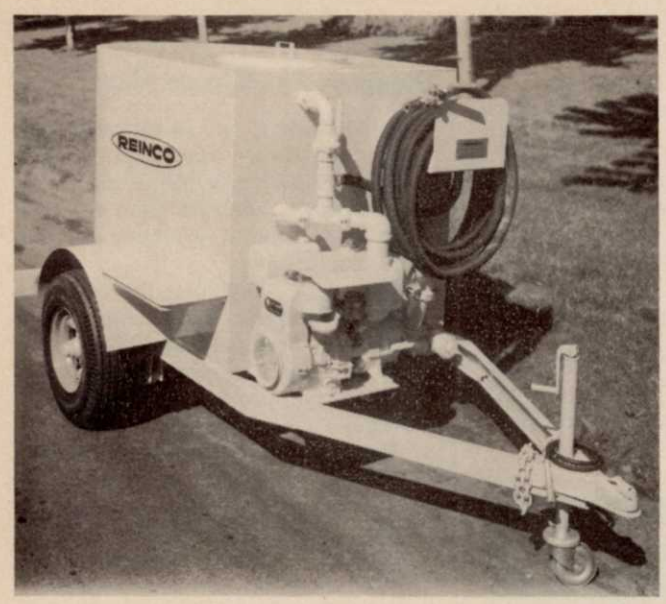
Here's a new model stump grinder for use by park superintendents, contractors, cemetery superintendents, golf courses and others. Model HD-50 has a 60 HP water cooled engine which drives the cutter drum and provides power for the hydraulic system. Accurate positioning of the cutting head is accomplished by using the built-in hydraulic system. Chips and debris are contained under the machine so that it may be operated close to buildings and streets. Machine operates in a height range from four feet above grade to two feet below. Cutting area, without moving the towing vehicle, is six feet by 31 feet. For more details, circle (706) on the reply card.

CUP CUTTER: Container Development Corporation, Watertown, Wisc.

Model GF 20 Turfmaster precision cup cutter offers a new concept in hole cutting to the superintendent. The simple design yet heavy-duty construction permits the operator to cut only one-half of a new hole at a time, if desired. The cutter can be set to cut every hole the same depth. Plugs as large as seven inches may be removed from the hole or replaced when desired. The plug is not compacted against an ejector because there is no ejector. The plug fits the hole perfectly every time. No scalping nor dead plugs. Thin cutter blades quickly cut the plug from the sod. Cutter is turned one inch to cut seam and then slowly rotated to remove the full plug. For more details, circle (707) on the reply card.

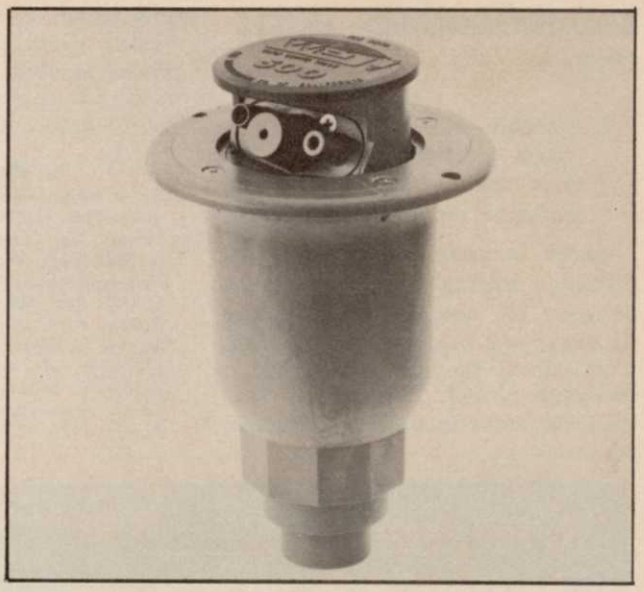
SELF-PROPELLED TRENCHER: Ground Hog, Inc., San Bernardino, Calif.

Model T3 Trencher is self-propelled and digs a 3½ inch wide trench up to 12 inches deep. Just the item to have when you need to lay new irrigation pipe or lay cable for a tournament. Unit is powered by a five horsepower gasoline engine that is equipped with an automatic clutch. Can be operated without power to the wheels if necessary. Carbide tipped blades can be replaced quickly and easily with dismantling the chain links. Screw conveyor side delivery deposits all loose dirt uniformly on one side of the trench. Makes backfilling easier. For more details, circle (703) on the reply card.



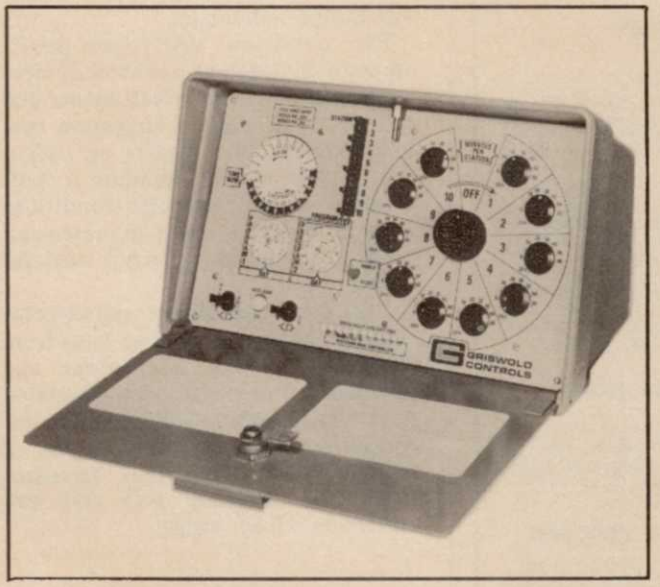
ECONOMY HYDROGRASSER: Reinco, Incorporated, Plainfield, N.J.

All the features of the larger models are available on this hydrograsser without tying up a truck. Here's a trailer unit that is easy to transport. Model PP250 can be dropped off when the job is complete. Any operator can seed, fertilize and mulch in one operation. Up to two acres per day can be covered by this compact unit. For more details, circle (709) on the reply card.



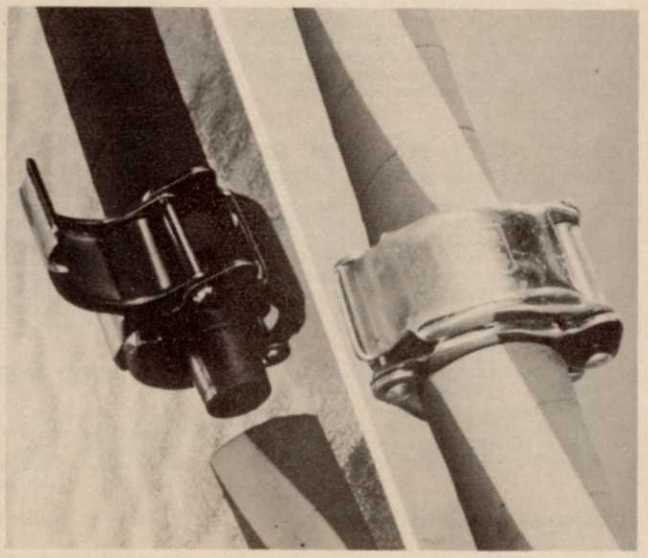
ROTARY POP-UP SPRINKLER: Wet Manufacturing Co., Inc., Orange, Calif.

The casing on this new rotary pop-up sprinkler provides all the advantages of a metal casing at far less cost. It is made of Lexan, a highly durable and long lasting space age material. The WET 500 Rotor Gear Driven sprinkler is engineered to water large lawn and turf areas where complete coverage including borders is essential. Its high rise 1½ inch pop-up with a long, medium and short nozzle delivers precise, uniform coverage. Eight nozzle cartridges permit a variety of spacing and gallonage to meet conversion and replacement needs. Rotation adjustments of a minimum of 4 degrees of the full or part circle heads are easily made when sprinkler is in operation. Maximum arc is 345 degrees. For more details, circle (710) on the reply card.



DUAL-PROGRAM CONTROLER: Griswold Controls, Santa Ana, Calif.

This controller has been designed specifically for the small to medium sized landscape. Model GC-10 has a number of performance features available only with larger, more expensive controllers. Up to ten valve stations (with up to four valves per station) may be connected to the controller. These may be assigned to either one of two 14-day watering programs. The dual program feature allows certain portions of the landscape to be watered every day while others are watered once a week. During rainy weather, all stations may be switched off without affecting the daily or weekly program clocks. Separate dials are provided to control the duration of watering for each station. For more details, circle (702) on the reply card.



ONE-PIECE SAFETY COUPLING: Emaco, Inc., East Paterson, N.J.

A single piece coupling makes an instant hose connection within a few seconds without washers. Bare hose ends slide over a sleeve and a built-in snap clamp secures a connection. Sleeve permits a full flow of air, water and low pressure steam. Coupling is re-usable. Product is available in hose to hose, NPT male and female ends. For more details, circle (712) on the reply card.

SOD PRODUCTION COSTS

(from page 47)

4. Variable supply expenditures which declined through the three smallest size groups and increased on the largest farms.

Under industry conditions which prevailed during 1968, farms with between 100 and 150 acres earned the maximum return to management from sale by the acre, $64.12 over a two-year period. Farms with less than 100 acres incurred the highest production costs and received the lowest price per acre which combined to yield the lowest per acre return to management, $9.83, for a two-year period. □

References

[2]For a more complete analysis of labor requirements, see Fred T. Arnold and Billy V. Lessley, **The Commercial Turfgrass Industry in Maryland: Structure, Costs and Returns,** Maryland Agricultural Experiment Station Bulletin No. 488, University of Maryland, College Park, Maryland, 1972.

[3]George A. Stevens, **Farm Data Manual,** Department of Agricultural and Resource Economics Information Series No. 6, University of Maryland, College Park, Maryland, August 1970, p. 154.

Toro's Irrigation Division Releases 12-Minute Film

Brushstrokes, a 12-minute film that tells how automatic underground irrigation is enhancing man's environment, has just been released by the Irrigation Division of the Toro Company.

Filmed in California, the film is a dialogue between Courtland Paul, a landscape architect and Edwin J. Hunter, vice president and general manager of Toro's Irrigation Division.

Paul points out in the narrative that it has long been a tendency of man to waste or abuse nature's resources but that tendency now is opposed by growing forces demanding conservation and preservation.

Irrigation, he says, not only aids conservation but actually is capable of generating new resources by nurturing and sustaining plant life on once-barren land and in "jungles of asphalt, concrete and structure."

Advantages gained by advances in irrigation components and systems technology are described in the film. Extensive use of plastics, it is pointed out, eliminated unsightly and hazardous above-ground piping and led to such development as pop-up, pop-down valve-in-head sprinklers which facilitate mowing and discourage vandalism.

Paul points out that recent developments in automatic control devices have improved the effectiveness and efficiency of modern irrigation systems. Ideally, he suggests, an irrigation system should simulate a "soft rainfall" under controlled conditions in order to apply water to match soil conditions and prevent wasteful runoff.

Prints of the 16mm sound/color film are available on free loan from Toro to teaching institutions and professional organizations associated with the irrigation industry. For information concerning availability of prints, write: Irrigation Division, The Toro Company, P.O. Box 489, Riverside, Calif. 92502.

Int. Erosion Control Assn. Names George Harrison Pres.

George Harrison, Erosion Control Superintendent of Washington Tree Service, Seattle was recently named president of the International Erosion Control Association. The association objectives are to encourage research into new and more efficient methods of stabilizing soils and preventing erosion loss.

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TURFGRASS: Science and Culture, by James B. Beard, Associate Professor of Turfgrass, Physiology & Culture, Michigan State University, East Lansing, Michigan.

The Green Industry finally has a text written by a professor of turfgrass. Dr. James Beard has provided the students (as all of us are) of the commercial turfgrass industry with a text that updates and includes new information pertinent to the turfgrass field.

As a whole, TURFGRASS: Science and Culture is excellent. Admittedly, the book tends to concentrate on the production and culture of turfgrass on golf courses, but the turf manager in other Green Industry areas need only adapt this information to his own situation.

The text is divided into three parts: (1) The Turfgrasses; (2) The Turfgrass Environment; and, (3) Turfgrass Cultural Practices. Each part is subdivided into sections.

The sections on Irrigation, Traffic and Turfgrass Pests need further comment. As ecological demands become more evident, the areas of traffic and irrigation become increasingly important. Dr. Beard points out that walks and roads must be designed into the landscape not only to meet the beauty desired but also fit the traffic of pedestrians and vehicles. What he doesn't point out is the action needed to correct traffic problems. Modern course design involves more than the superintendent, greens committee and golf architect in a round-table discussion. It could and should include the technical services of other professionals such as psychologists.

He mentions sewage effluent and industrial waste water as water sources in the future. This is happening now. More and more courses are switching to this water source.

The chapter on Turfgrass Pests is presented slightly differently than most turf managers are used to. Professor Beard places emphasis on environmental, soil and cultural conditions that affect occurrence of turfgrass pests rather than on the chemical control of these pests. In this context, the chapter heading, Turfgrass Pests, covers the vast multitude of insect, weed, disease and other problems related to turfgrass production. In this age of environmental emotionalism about turf protection chemicals, he submits to the industry that cultural and sanitary practices can play an important role in controlling turfgrass pests. His tables on chemicals to control pests are not too helpful. The turf man has been schooled in trade named products and the tables list these chemicals by common name.

This text fills a need in the industry. It is well written and easy to understand. It is a good guide on the growth and development of turfgrasses. It provides excellent information on the turfgrass environment: light, temperature, water, air, etc.

Perhaps most noteworthy of all is the tremendous list of references throughout the book. It could be assumed that no where else has anyone compiled such a compendium. It in itself is worth the price of the book, which is $17.95. Published by Prentice-Hall Inc., Englewood Cliffs, N. J. 658 pages.

MAN AND NATURE WORKING TOGETHER

(from page 36)

gen needed by tiny organisms which literally eat and dissolve the sludge. St. Charles Utilities officials state that in six years of lagoon operation, less than three inches of sludge has accumulated on the bottom.

From the aeration lagoons, five feet deep, the waste water is pumped to other lagoons where further cleaning takes place. There, assisted by sunlight and air, the bacteria, ever present in ground and water, take over. In a matter of days, the water quality is markedly improved.

By this time the water Biochemical Oxygen Demand (BOD) content is reduced to about 25 percent of influent and the percent of dissolved oxygen has increased from zero to about 60 to 80 percent. The treatment process takes about 40 days after which time the water is drawn off by pumps and sprayed into the nearby woods in much the same way that nearby golf courses are irrigated.

Pumped 20 to 30 feet into the air, the water falls like a gentle rain over the woods, thus further aerating the effluent. The 50 acres of woodland used for spraying has a sandy-porous soil and a leaf mulch cover which acts as a living filter. Earth bacteria work on the water exactly as they do on rain. Needless to say, the woods thrive on this watering process. By the time the waste water has been sprayed and passed through this living filter all BOD and suspended solids have been removed. Waste water quality approximates drinking water.

Interstate General Corporation (IGC) officials advise that the St. Charles lagoon spray system now uses 40 acres of land for the storage treatment process an increase of 20 acres over the original design. Additionally, portions of 100 acres of surrounding forests utilize about 750,000 gallons of effluent a day from St. Charles.

The City of Muskegon, Michigan considers the system so effective that they will soon initiate a new sewage lagoon system to provide for the entire population of their city, handling a load of over 45 million gallons per day.

Tests by the Maryland State Health Department and by a firm of chemists employed by St. Charles Utilities to keep a constant watch on the system's operation, show absolutely no signs of run-off into nearby streams nor any pollution whatsoever, even odor, from the system.

According to James J. Wilson, president of IGC, "The system now being used at St. Charles has proved itself beyond all expectations. Twice the current sewage level could be absorbed by the system, but we plan to double the size of a nearby system for expanded treatment and storage as the community grows larger."

Wilson regards the system as semi-permanent—at least until the major treatment plant has been built, since it is adequate for the community's needs.

Do the lagoons have any other use except as waste treatment facilities? The answer is a decided "Yes." A family of swans took up residence on the lagoons at St. Charles several months ago. The lagoons also have a migrating colony of ducks who apparently find the wetlands of the South no more comfortable in the winter than the man-made lakes of St. Charles. In addition to this wildlife, classes in water pollution abatement technology at the Charles County Community College use the lagoons as a laboratory and conduct tests which St. Charles engineers study in operating the system. □

ARBORIST SHOP TALK

By Hank Harvey Jr.
Rutledge, Pennsylvania

Your Friend The Phone

Your phone and how you use it can make the difference between having an ever growing business and a stagnant one. Here are specific ways you can make your phone do it's job more effectively for your business!

ANSWERING YOUR CALLS

Every call you get could mean money to you. Therefore every one is important. If you are paying to advertise your services, every "lead" or prospective customer that calls has already cost you money. That's why it's important to have your phone "covered" as much as possible. But you're not always home right? And of course you don't want to be a slave to your phone.

What about an answering service or phone answering machine? An answering service could possibly do you more harm than good! "Projects a professional image," you say? Today's American customer couldn't care less about a company "image." They want service! Prompt, friendly, personal attention.

Here's an alternative which has proven successful for many businessmen. Get an "Off-Premise Extension" phone installed at the home of a friend or relative, (perhaps an invalid) who is usually home. (It only costs a couple of dollars a month plus a "mileage" charge if it is distant from your home phone.) Pay your messenger a monthly or per call rate. They can answer the phone at your request or automatically, after so many rings—before you would answer.

MESSAGES

Many people are reluctant to leave messages if the party they want is not there. They usually say I'll call back later." Too often they **don't** call back! They'll call your competitor. So have your messengers get a name and phone number the **first** time.

SOLICITING MORE JOBS

The phone can be a vital tool for drumming up more business, especially on bad weather days that might otherwise be wasted. You could call customers in the vicinity of your next few jobs and say "We'll be working in your area next week and I wanted to let you know in case you had work you wanted me to do while we're there." (It is important that you project over the phone a genuine concern for their trees or grounds, not just a I-want-more-work attitude.)

You can use your phone regularly to sell seasonal services which your customers might want but often just forget about. Heavy pruning is a good example. Same idea holds true for tree feeding, dead wood clean-outs etc. Many of your customers will buy more if you offer suggestions, with some personal attention. Via the phone, of course.

BILL COLLECTING

Ugh—that sometimes unpleasant task. But lots easier to do by phone than in person or by mail. Call to remind them of some seasonal service or that you'd be working in the area etc. and invariably they will volunteer, "Oh, I'll send you that check for the last month's job," without any prodding. Even if they don't, you still have an opportunity to remind them tactfully.

COMMUNICATION

You can use your phone to smooth over problems with dissatisfied customers before they start or while they are still small ones. If you are delayed getting to a job, it's a customary courtesy to let your customer know that. Phone him, not only will you keep him satisfied you may save yourself the grief of arriving on the job only to find it has already been done by the competition.

INFORMATION

Information which you can get instantly over the phone can make your business life easier and more profitable. Weather information, job orders, materials, consultation, or a number of other timely aids can all be effectively handled by picking up the phone.

No this writer does not work for the phone company. But this much I must admit. The telephone has got to be one of the most useful tools you own . . . if you know how to use it.

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Proper Watering Key To Bluegrass Disease Control

Kentucky bluegrass has a built-in potential for good biological control of some fungal diseases that attack it, according to a plant pathologist at the University of California, Riverside.

Dr. R. M. Endo says that what turfgrass needs to provide this disease control is proper watering. Reseach conducted by P. F. Colbaugh, a graduate student working with Dr. Endo, shows that a damaging disease of bluegrass caused by a fungus called *Helminthosporium sativum* can be controlled if turfgrass litter is kept moist.

Turfgrass litter that accumulates on the soil surface supports thousands of different kinds of microorganisms, which not only decompose the litter but also suppress fungal parasites, reasons Endo. "The trick is to keep the litter moist so that the competing microorganisms are kept active. This doesn't mean that bluegrass should be kept sopping wet, for this would favor the fungal parasites."

For an area with a dense canopy, once-a-week deep watering may be sufficient to keep both the soil and litter moist. For a turfgrass that is thinned out, several short morning waterings may be necessary, in addition to the weekly deep watering, to maintain both the litter and soil in a moist condition.

Researchers have relied on natural disease development for evaluating the effectiveness of chemical fungicides, as most attempts to create a fungal disease artificially in the field have failed.

"The factors responsible for this failure and the erratic development of disease are probably biological in nature," Dr. Endo said.

Earlier findings by other researchers have shown that low soil moisture may increase certain turfgrass diseases. Following in this research, Colbaugh has been studying the effects of drought stress on turfgrass and has found that disease activity of *Helminthosporium savitum*, the fungus that causes leafspot and foot rot of Kentucky bluegrass, is increased in dried-out areas.

"Severe foot rot and spore production by the fungus on lawn litter and on infected plants were observed in drought-stressed turf," Colbaugh said, "but not in areas receiving adequate water; only occasional leafspots were found there. It is the foot rot stage of the disease which is lethal."

Earlier research by other scientists has shown the fungus to be a very weak competitor in the presence of other microorganisms. Colbaugh's investigation has produced evidence which strongly supports the idea that microbial activity is involved in suppressing the ability of the fungus to develop on the moist litter.

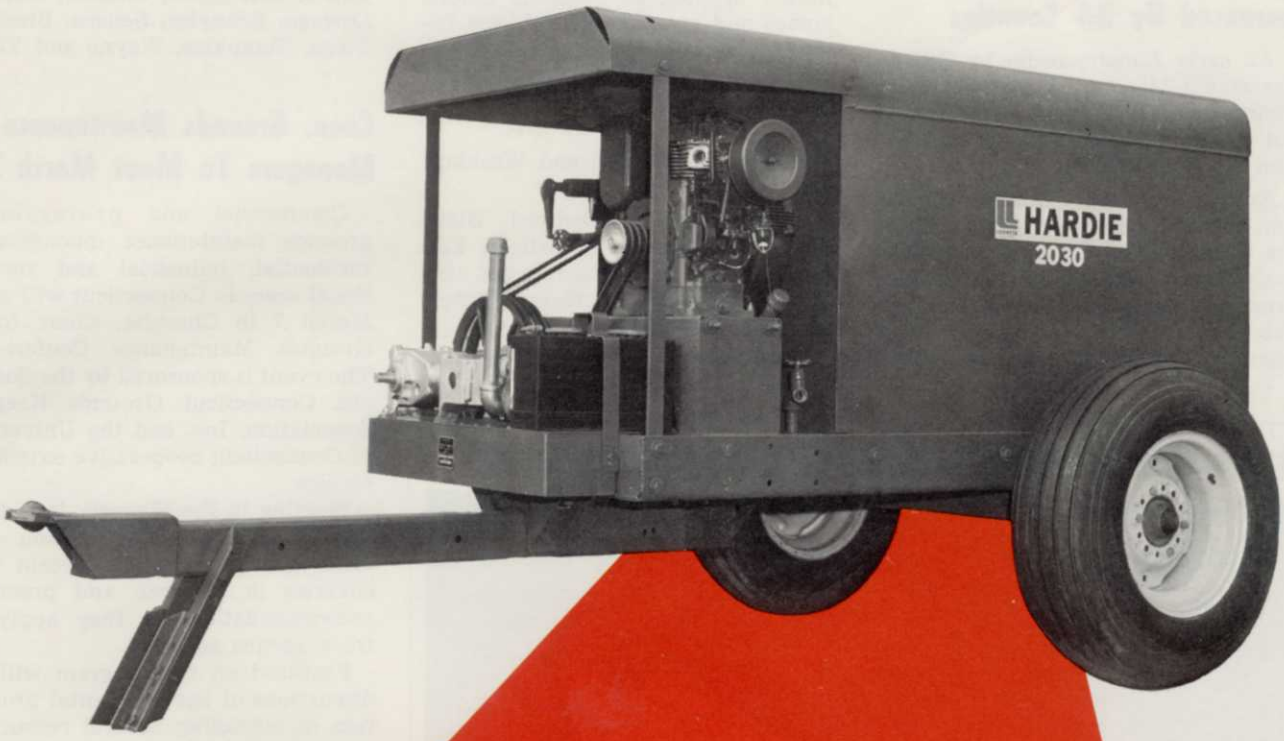
"It appears," Dr. Endo said, "that the inhibitory property on turfgrass litter is active only when the litter is moist and when microorganisms are present and active. Colbaugh has shown that drought lowers both microbial numbers and their activities and that upon rewetting the dried litter it releases abundant food in the form of sugars and proteins. The parasite is greatly favored during the initial rewetting period because of the absence of inhibitory factors and the presence of abundant food."

Drought stress also stops plant growth. "When growth stops," Dr. Endo explained, "infections starting from the leaf sheath of the bluegrass plant tend to spread rapidly and develop into the lethal foot-rot stage. However, if growth is continuous, as in the presence of moisture, such infections tend to develop into harmless leaf blade infections.

"The goal of our investigations," Dr. Endo and Colbaugh said, "is to understand the nature of fungal parasites and all the factors that influence their growth and activity."

The UCR scientists plan to study the influences of temporary drought on other fungal parasites affecting turfgrass, because they believe that drought serves as a trigger which frees some fungal parasites from the restraining influence of the microorganisms in the soil and litter.

Both Endo and Colbaugh emphasized, however, that biological control may fail when any factor suppresses the activity of competing microorganisms more than it suppresses the activity of the parasites. For example, low and high temperatures, below 50 degrees and above 100 degrees Fahrenheit, also may exert this same effect. These studies will allow them to propose meaningful control programs based on an understanding of the factors responsible for "triggering" turfgrass fungi into activity.



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Gypsy Moth Restricted List Increased By 34 Counties

An early January order by USDA has added 34 counties in Maryland, Pennsylvania and New York to the list of those under Federal regulation for Gypsy Moth.

Animal and Plant Health Inspection Service (APHIS) officials said the action resulted from a thorough evaluation of an intensive trapping program conducted last year. Restrictions cover the movement from regulated areas of nursery stock, stone and quarry products and wood timber articles. In addition, mobile homes and recreational vehicles being moved from campgrounds designated as "hazardous" for Gypsy Moth are also restricted.

The counties involved are:

Maryland—Harford and Washington.

Pennsylvania — Bedford, Blair, Cambria, Cameron, Clearfield, Elk, Franklin, Fulton, Huntingdon, Indiana, Jefferson, McKean, Potter, Somerset and Tioga.

New York — Allegany, Cayuga, Ghemung, Cortland, Jefferson, Lewis, Livingston, Monroe, Ontario, Oswego, Schuyler, Seneca, Steuben, Tioga, Tompkins, Wayne and Yates.

Conn. Grounds Maintenance Managers To Meet March 7

Commercial and professional grounds maintenance managers of residential, industrial and recreational areas in Connecticut will meet March 7 in Cheshire, Conn. for a Grounds Maintenance Conference. The event is sponsored by the Southern Connecticut Grounds Keepers Association, Inc. and the University of Connecticut cooperative extension service.

Meeting in the Waverly Inn, delegates to the one day session will learn about new ideas, recent discoveries in research and practical recommendations as they apply to trees, shrubs and turf.

Featured on the program will be discussions of environmental protection in managing natural resources, care and maintenance of shrubs, cutting costs in turfgrass management and others.

Persons interested in attending the conference are required to preregister by February 26. Checks for $10 per person should be sent to Mrs. John V. Angelone, Secretary, 930 Peck Lane, Cheshire, Conn. 06410.

Melnor Industries Names Rawitscher Sales Manager

Stuart Rawitscher, formerly district manager, Rain Bird National Sales Corporation, has been named national sales manager of Melnor Industries, Turf Irrigation Division.

Rawitscher will operate from Turf Irrigation Division main manufacturing facility and administrative headquarters in Moonachie, New Jersey.

Md. Nurseryman Day Slated February 14

The annual Maryland Nurserymen's Day will be held at the University of Maryland, College Park, Md. on Wednesday, February 14, 1973.

This meeting is sponsored jointly by the Maryland Nurserymen's Association and the Department of Horticulture of the University and will be held in the Center of Adult Education on the College Park, Campus. Registration $8.00 (Lunch included).

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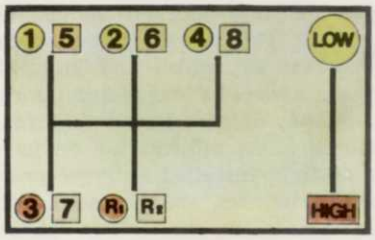

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Follow the contour. Optional rocker arm—flexible hitch linkage—lets mounted mowers follow changing ground contour. This prevents scalping.

Get the real low-down with Ford LCG tractors in three power sizes: 31.9, 38.3 and 52 PTO horsepower. Gas or diesel. Your Ford industrial tractor and equipment dealer is listed in the Yellow Pages under "Tractors" or "Contractor's-Equipment." See him for information on how to buy, lease, rent or finance.

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—Advertiser's Index—

Urban Pesticide Clinics Scheduled In Illinois

A series of Urban Pesticide Clinics are scheduled at nine locations in Illinois. They are sponsored jointly by the University of Illinois cooperative extension service, the Natural History Survey and the Illinois department of agriculture.

The dates and locations are: Feb. 26, Rantoul, Redwood Inn; Feb. 27, Springfield, Heritage House, Rt. 66 South; Feb. 28, Belleville, Augistines, Rt. 460 and Rt. 158; March 1, Marion, Holiday Inn, I-57 and Rt. 13; March 5, Peoria, Heritage House, Rt. 88 North; March 6, Rock Island, Deere and Co., Admin. Center; March 7, LaSalle, Holiday Inn, I-80 and Rt. 51; March 8, Rockford, Holiday Inn, Rt. 51 South; and March 15, Arlington Heights, Arlington Towers.

Registration for each meeting will begin at 9:30 a.m. Meetings will adjourn about 3 p.m.

Advance enrollment is required for the March 15 clinic at Arlington Heights. Contact James Fizzell at the Cooperative Extension Service Office, Room 3, 662 Graceland Avenue, Des Plaines, by Feb. 23.

The 1973 clinics will be geared to "small package" and garden chemical dealers. The clinics will also include topics of interest to custom applicators who apply environmental protection chemicals to trees, shrubs and lawn areas.

Representatives of the Illinois Department of Agriculture, division of plant industry, will discuss the Illinois Custom Spray Applicators Licensing Law and administer examinations for custom spray operators licenses at the end of each meeting.

7 Year Service Parts Program Started By Toro Company

The Irrigation Division of The Toro Company has instituted a new, exclusive seven-year service parts program for major components of the valve-in-head rotary sprinklers used in its institutional irrigation systems.

The new program, which is in addition to Toro's regular one-year full replacement warranty on all other components, calls for a seven-year sliding scale coverage against defects in material or workmanship on the spring-retracted drive and valve assemblies of the 630, 650 and 690 series geared head sprinklers manufactured and dated after August 1, 1972.

The program provides for a prorata reduction in replacement cost, based upon the length of use and the suggested list price for the component to be replaced at time of replacement.

National Arborist Assn. To Meet In Scottsdale, Ariz.

Professional arborists will be gathering at the Mountain Shadows in Scottsdale, Arizona, for the thirty-fifth annual meeting of the National Arborists Association on February 18-22, 1973.

In addition to the education program, a specialized trade exhibit has been assembled for the review of this most specialized market of professional services. Meeting delegates will be able to view equipment and learn of new developments in the field of arboriculture all designed for the professional practitioner in the industry.

Telsco Weather-Matic Dealers Vie For Hawaiian Holiday

"Sell Away to Hawaii" is the theme of Telsco Weather-matic's 1974 National Sales Conference and Incentive Program.

According to Charles Putnam, national sales manager for the Dallas-based turf irrigation equipment manufacturer, the incentive program, will culminate in the National Sales Conference, to be held in Honolulu, Hawaii in February, 1974.

Dealers and distributors will participate in the program, which is designed to help them earn their trip expenses for the National Sales Conference, as well as to increase over-all sales volume for the company.

Specs At A Glance With New IH Folder

A new three-fold, pocket-size folder provides specifications at a glance on International industrial equipment. The folder includes specs on the crawler, wheel and integral tractors, hydraulic excavators, fork lifts and pay loggers. Safety features, including latest information on factory or field-installed rollover protective structures, are discussed. For more details on the folder, circle (720) on the reply card.

— classifieds —

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

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

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DISTRIBUTORS for D. J. Andrews, Inc. stump cutter teeth, pockets and bolts. Best wholesale and retail price in U.S.A. Add to this exclusive area, local advertising at our expense, etc., and you have our story. D. J. Andrews, Inc., 17 Silver St., Rochester, N.Y. 14611. Call 716 235-1230, or 716 436-1515.

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SOD NURSERY MANAGER. Young, married man for 400 acre operation serving Chicago metropolitan area. Send resume. Box 91, Weeds Trees & Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

SHADE TREE MAINTENANCE: Must be experienced climber; supervisory capability to manage tree crew. Please send resume to The Tree People, P.O. Box 10026, Honolulu, Hawaii 96816.

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CROWNVETCH SEED: Penngift and Chemung varieties. Direct all inquiries to: Walter C. Mehlenbacher, Castile, New York 14427. Phone 716 493-2553.

MISCELLANEOUS

TREE APPRAISALS, SURVEYS, loss evaluations and expert consultation services. For names of members of the American Society of Consulting Arborists, Inc., throughout the country, contact: Executive Director ASCA, 12 Lakeview Ave., Milltown, New Jersey 08850.

USED EQUIPMENT

FULL LINE OF USED TREE equipment for sale. We accept trade-ins and buy used tree equipment. New service available for northern Ohio. We now rent skyworkers, tree spades, brush grinders, 84' National crane, stump grinders and wood splitters. Edwards Tree Service, 3190 Cooper Foster Park Road, Vermilion, Ohio 44089. Phone: 216 967-6750 or 933-6750.

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

FOR SALE — Overstocked with 12" and 16" Brush chippers, powered by Ford Industrial engines. Save over $500.00 on each unit. Immediate free delivery within 300 miles of New York. Imperial 516 541-4868.

WANTED—Chipper, used. Send all information, size, manufacturer, year, condition and price to Mayo Motors, Trexlertown, Pa. 18087. Phone 215 395-0333.

TM-700 TREE MOVER, like new condition; manuals and extra parts. Parsons Tree Service, 5628 Maxine Court, Alexandria, Virginia 22310. Phone 703 971-3998.

FOR SALE

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

SOD FARM, 99 acres, all level muck, fully equipped, includes cutters, fork lift, wheel-roll irrigation, 3 Massey-Ferguson tractors, trucks and crop. Office, repair shop and storage buildings. 17 miles east of Cleveland. Priced to sell. Owner will help finance. Write Box 95, Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

THE GOLD ONES from D. J. Andrews, Inc., Stump cutter teeth, pockets, and bolts. Top quality and best price in the U.S.A. D. J. Andrews, Inc., 17 Silver St., Rochester, N.Y. 14611. Call 716 235-1230 or 716 436-1515.

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LEARN AUTOMATIC IRRIGATION —Complete self-taught course and textbook on fundamentals. Design, operation, maintenance, installation, pipe, equipment. Latest developments in automatic turf and landscape irrigation. New Edition now only $49.50 postpaid. California add tax. Send check, order or request for free outline. Larson Company, P.O. Box 4453, Santa Barbara, Calif. 93103.

BUSINESS OPPORTUNITIES

WANT TO SELL to arborists? Sell direct! Effective — economical. Zip-coded addresses on self adhesive labels only $75.00/thousand. Specialized categories $10.00/hundred. Product Development International, 200 Sylvan Ave., Rutledge, Pa. 19070.

trimmings

UNDERSTANDING PESTICIDES is a new brochure published by the National Agricultural Chemicals Association. Coming at a time when the nation has passed through several years of environmental debate on chemical protectants, the brochure quickly points to the new "common sense" approach now in vogue. It then reviews pesticide industry research. Other topics include pests and pesticides; how chemical protectants work; the government's role; food at acceptable prices; and, the future. Here's an interesting brochure that puts it all together for easy understanding. Write: National Agricultural Chemicals Association, 1155 Fifteenth Street, N.W., Washington, D. C. 20005.

SOME of THE TREES in Washington, D. C. will be without birds and bird residues for about four months. That's just the way the presidential inaugural committee wanted it. They hired Frank and Joseph Fink of National Bird Control Laboratories, Inc., Skokie, Ill. to make sure the parade route for the recent inauguration would be free of starlings for at least one day. Fink treated the trees with a repellent he developed. He said that it (repellent) gives the birds "a type of hot foot" when they land in the trees. The repellent is non-toxic.

SPEAKING OF TREATMENT, the U.S. Department of Agriculture now reports newly developed treatments to make mattress covers and fillers fire retardant. The methods used inhibit cigarettes from igniting mattresses. It's a violation to smoke in bed, anyway. One method involved coating the back of the mattress ticking with a polymer capable of dissipating heat. Another method involved treating the cotton batting mattress filler with boron or phosphorus containing compounds to make it flame and smolder resistant. The coating is designed to form a shield to prevent the batting from reaching 7500°—the temperature at which batting begins to smolder.

DON'T LET YOUR HIGH SCHOOL FOOTBALL HERO ON ARTIFICIAL TURF. That's the word from Karl Klein, University of Texas researcher. He's found that the younger player and his knee, in terms of strength and ligament, are "just not ready for the added traction and speed that can be produced on such surfaces." Klein compared the development of the high school athlete's knee with that of the average college player. He found that the strength relationship between the quadriceps (group of muscles in front of the leg responsible for knee joint support) and the hamstrings (on the back of the leg) is 2:1 in the high school athlete and 10:6 in the average college varsity player. This difference, although not large, is responsible for increased accidents in the younger player.

PINE TUSSOCK MOTH destruction on the west coast may be second only to Gypsy Moth on the east coast. Estimates of nearly 200 million board feet of fir lumber were ruined by this pest last year near La Grande, Oregon. Untold thousands of stately fir trees turned a rusty brown early in the summer. Like the pines in the eastern states, when the green needles go, you can kiss the fir tree goodbye.

"ALL OF US ARE FOR HEALTH AND SAFETY" says Congressman Wilmer Mizell (R-North Carolina), "but I think you can have health and safety without some of these ridiculous requirements which are coming down. I understand the regulations on the Occupational Safety and Health Act have grown to about 50 feet high right now. It always seems to happen when the I's aren't dotted and the T's not crossed in the regulations. It's the result of bureaucratic regulations that have been handed down and many times you have men writing them who have little practical experience in the field. Hopefully, the Congress will be looking at these regulations and try to offer guidance through legislation and restore some reason."

GENE FROSETH has turned to the Green Industry and the result is an increase in his custom application business. Previously he applied chemicals to cropland, only. Now he sprays 192 miles of roadside near Garretson, South Dakota for profit. His highway rights-of-way spraying fits nicely between early crop sprays and later post-sprays. Another benefit from roadside spraying is that farmers get to know you. It has opened up a lot of new business for us, says Froseth.

THE ACTION ARMY has invaded the Green Industry, or so it seems. Check the latest ad for the Army Reserve in the news media and it shows an infra-red aerial photo of elm trees in Denver, Colorado. The army is working to spot Dutch Elm Disease with modern photographic methods. If you want to stay in the Green Industry but have a military obligation, the Army can work out the details.

INNER CITY ENVIRONMENT IS AS TOUGH on trees as it is on people, according to Russell J. Seibert, director of Longwood Gardens, Kennett Square, Pa. He proposes that city trees should be selected from " . . . nurseries in the inner cities—not out in the country." The objective is to find out which plants do best under adverse conditions. Trees grown away from city pollutants are subjected to tremendous stresses when brought to the city. Many may not make it.

Natural Antibiotics Help Fight Tree Decay

Michigan State University plant doctors have been trying to find why some injured trees can resist diseases caused by invading germs while others are susceptible.

According to MSU plant pathologist Dr. John Hart, the nonliving wood (heartwood) in the center of the trunk and limbs often shows greater resistance to fungi and other wood-attacking organisms than does the living portion (sapwood). Also, some tree species show more resistance to sapwood injury than other species.

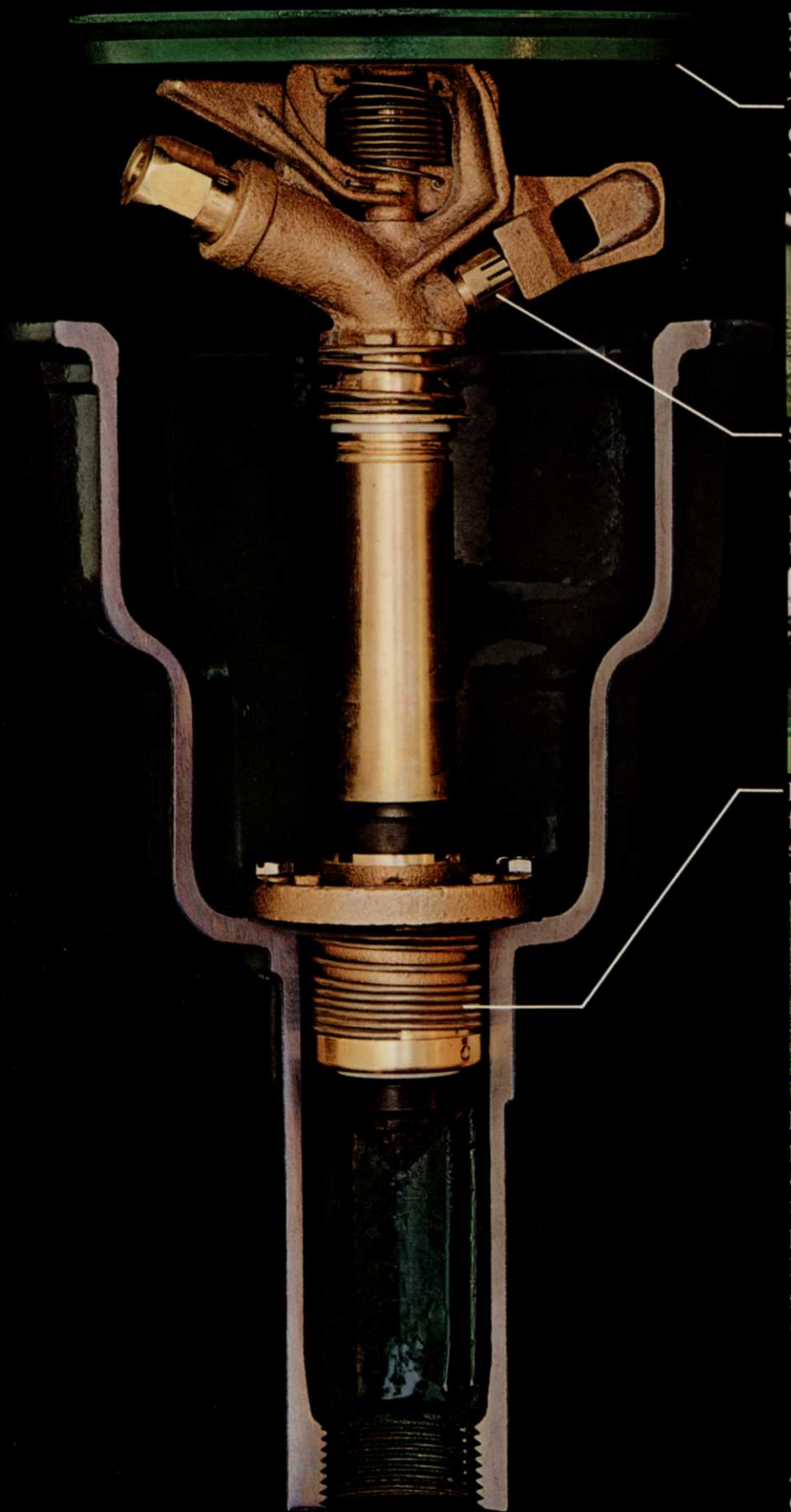
By locally injuring sapwood portions of trees, Hart has been able to compare decay resistance between different tree species and obtain a better understanding of the resistance mechanism. "These experiments showed that resistance to invasion by disease organisms is related to change in the sapwood cells located next to the injury," says Hart.

He and his colleagues also found that the changes occurring near an injury are similar to the events that occur during heartwood formation. "As the cells break down and die, certain chemicals are formed. Some of these chemicals act as antibiotics and prevent disease organisms from getting a foothold in the tree," says the plant pathologist.

"Now we would like to study how the living cells produce these natural antibiotics in response to injury, and to isolate the individual compounds for more study and comparison to similar compounds found in heartwood."

For more details on the following page circle (101) on reply card

And the green grass grows all around



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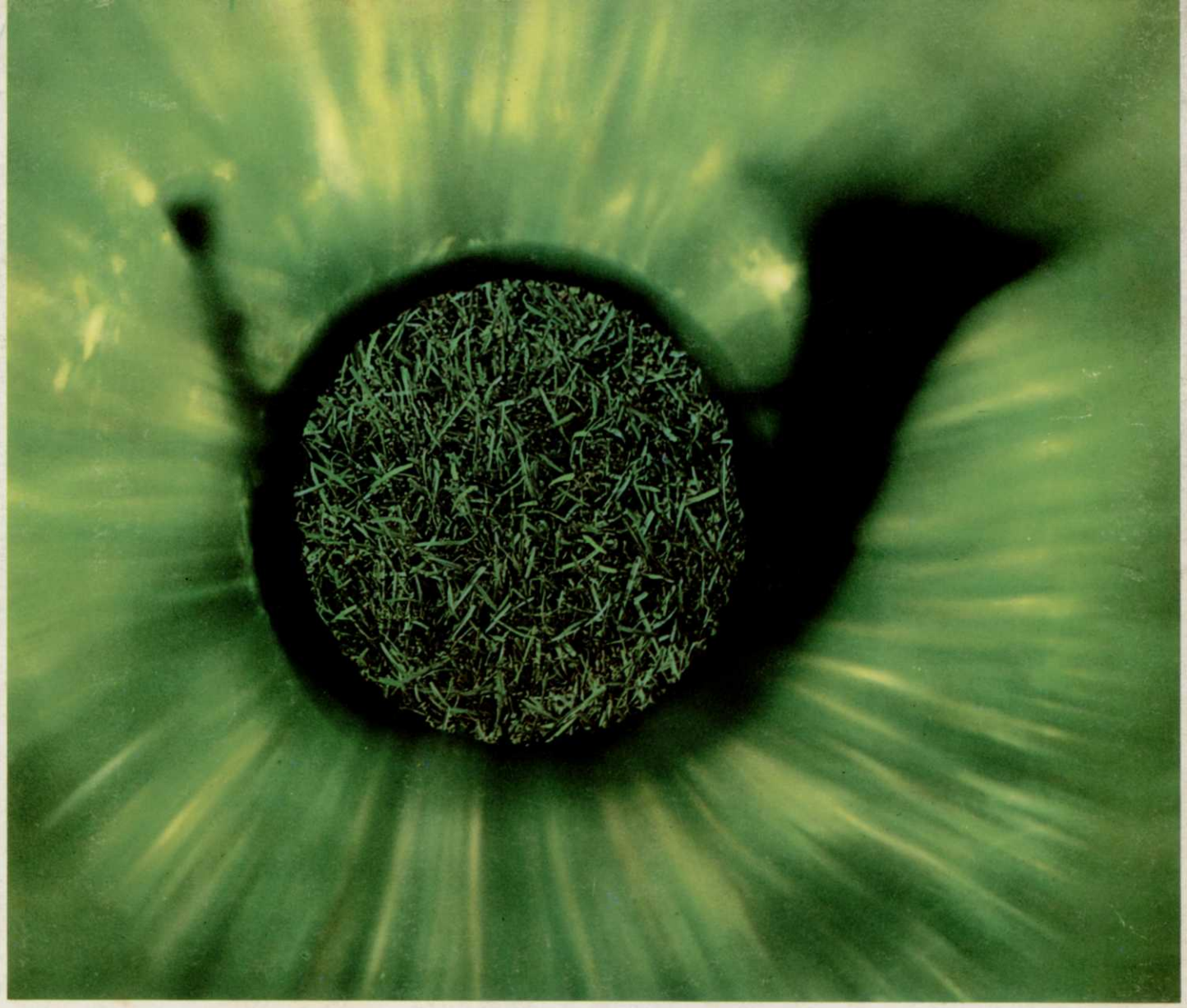

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