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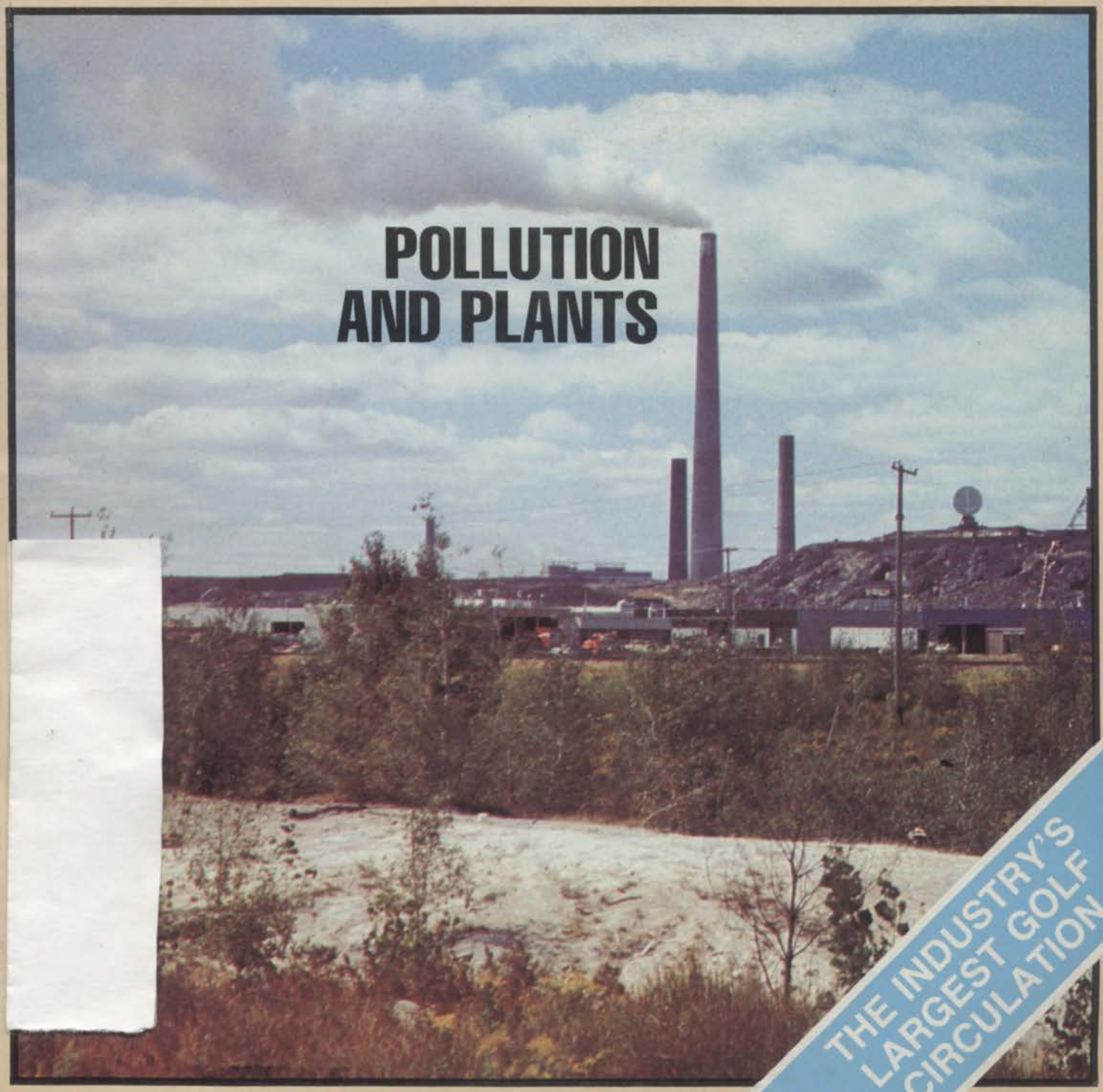


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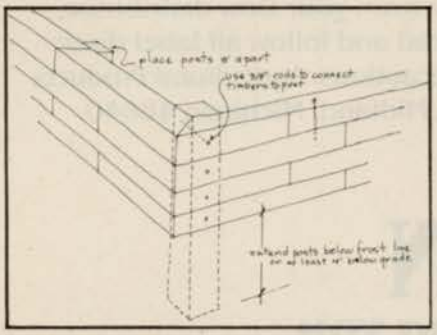
Cover: Air pollutants may be the cause of tree problems today. Arborists should know and understand the symptoms of pollution stress. Photo by David Karnosky.

FEBRUARY 1982/VOL. 21, NO. 2

Early turf equipment plant, page 18.

Overhead irrigation can be wasteful, page 24.



Tie wall design and construction, page 48.

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OUTLOOK

By Bruce F. Shank, Executive Editor

Leaders must agree on state of golf

Anyone who reads both the GCSAA State of the Association Message and the NGF Annual Report will see there is disagreement about the state of the golf industry. At the same time, the National Golf Foundation is pushing hard to unify industry associations for a national program to stimulate the growth of the game.

NGF Executive Director Don Rossi feels a two to three percent annual growth rate is unhealthy for all who depend on golf for a living. The label "mature" can cause industry suppliers to redirect growth efforts toward markets of greater growth potential. Rossi is very aware of this, since the organization he manages is basically funded by these suppliers. NGF Treasurer Bob MacNally constructed a report in 1981, "Growth of Golf", and NGF responded immediately with new committees, a total reorganization, and invitations to allied golf groups to join in the fight.

The most sensitive part of NGF's plan is funding of more than $3 million per year to promote golf. Much of this will have to come from allied associations and other beneficiaries of the game, such as media, insurance companies, and airlines.

The GCSAA is also taking a hard look at the future of golf to determine location and staffing goals. Long Range Planning sessions were held at the GCSAA Turf Show this month to acquaint the membership with some of the major decisions facing the organization in the next five years. GCSAA's attitude is somewhat more rosy than NGF's.

In its State of the Association Report, the GCSAA Executive Board admits there is pressure on the industry to react to harder economic times. Yet, the report states, "Surprisingly, the golf industry is still very early in its development stage." The report admits current conditions can discourage many who care about the welfare of the game and blames the media for focusing on the negative.

My opinion of the report is that the association is giving the "when the going gets tough, the tough get going" sermon. It suggests that modern pressures will force clubs to be more business-like and maintenance practices to become more efficient. No doubt, this will have to occur and GCSAA is on top of technology.

Both NGF and GCSAA are on the money. It is up to manufacturers to respond to market conditions or suffer the same fate of the automotive industry by resisting change with massive promotion. On the other hand, computerization of golf club management practices and higher education for all superintendents will not improve the growth rate of the game. They will make it more efficient, but you still need growth to keep suppliers in your corner.

I hope GCSAA will support the NGF golf promotion plan, and as a new member on the NGF Board, GCSAA can lobby for more recognition of the superintendent in the future of the game. This is not the time for associations to disagree on philosophy. It is time for them to join together and insure growth of the game and security of persons employed as a result of the game of golf.

Jim Wyllie, incoming president of GCSAA, is very aware of the challenges of the next two to three years. The association will be making decisions on whether to move its headquarters, directing training programs to reach more superintendents, and participation in the NGF promotional campaign. Wyllie seems open-minded and very capable of keeping small issues small so that the spotlight is on major issues. He seems friendly and approachable, which should dispel some of the high brow image GCSAA has developed over the years. What I like the most is he returns phone calls and openly and honestly discusses problems and solutions. Nothing is more irritating to members than an association staff that is too busy or too important to listen and discuss ideas. **WTT**

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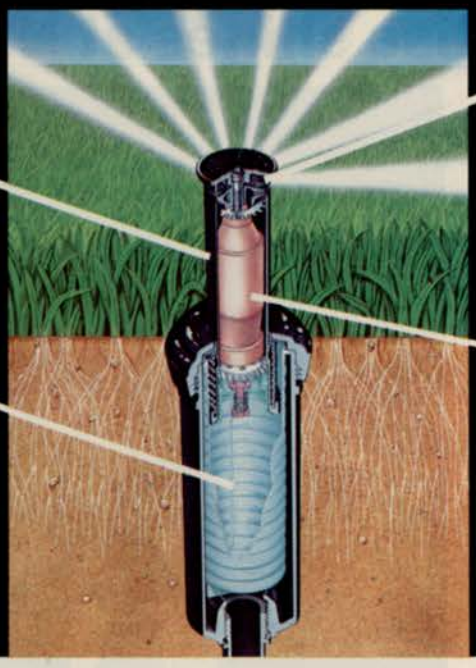

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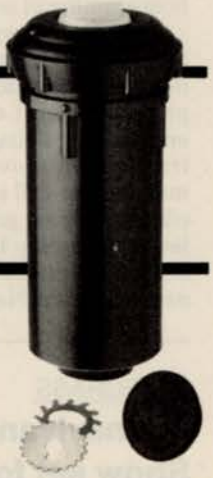

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GREEN INDUSTRY NEWS

TURF

In-state expertise shines at NJ Expo

Many states have turf conferences, but few can provide the collection of expertise within the state as New Jersey can.

This is most evident at the VIP luncheon held during the Expo each year. New Jersey representatives included Reed Funk, the dean of improved turfgrasses; Peter Loft of Loft Seed Company; Henry Indyk and Ralph Engel of Rutgers; Al Radko, recently retired director of the USGA Green Section; Spencer Davis, retired New Jersey extension turf pathologist; and Eb Steineger of Pine Valley Golf Club. Add to this list out of staters such as Jim Watson of Toro; Rich Valentine of Merion Country Club; Bill Meyer of Turf Seed Inc. (one of Reed Funk's graduates); John Hall of VPI; and Geoffrey Cornish, the famous golf course architect; and you have a turf homecoming of sorts.

The New Jersey Expo carefully protects all turf specialties and resists devoting too much to lawn care. Sod producers, golf course superintendents, estate managers, landscape contractors and government landscape managers are all served by the two specialty sessions, golf and fine turf and lawn and utility turf. Lawn care firms are not forgotten, but lawn care is not a new thing to New Jersey, the state where the market became a specialty.

Peter Loft received New Jersey Turfgrass Hall of Fame Award.

The educational program began with two-hour concurrent workshop sessions on diesel engines (Duncan Macrae, Toro) irrigation pumps (Jerry Pettengill, Pumping Systems) and weed identification (Barbara Emerson, Union Carbide Agricultural Products). The sessions were all well-attended and informative. Macrae's workshop on diesel engines was a virtual primer

Continues on page 11

TURFGRASS

Pennsylvania Turf Show set for March 1-4

The 1982 Pennsylvania Turfgrass Conference and Trade Show will be held at the Hershey Lodge and Convention Center, Hershey, PA, March 1-4.

This year's educational sessions will concentrate on golf course management and lawn care and grounds maintenance. The general sessions Monday afternoon and Tuesday will include discussions on the gypsy moth, water management, natural versus artificial turf, varietal resistance to insect attack, the effect of herbicide use on disease occurrence and the preparation of Merion Golf Club for the 1981 U.S. Open.

Wednesday and Thursday will offer separate sessions for golf turf and lawn care and grounds maintenance. The golf turf sessions will have presentations of Poa annua-bentgrass competition, disease control, solutions to drainage problems, difficulties associated with highly modified greens, winter injury to perennial ryegrass, new insecticide results, goose grass control and colonial bentgrass development.

The lawn care and grounds maintenance sessions will feature presentations on handling customer complaints, applicator training, customer communications, fertilizer programs, species selection and management in the shade, high school athletic field maintenance, managing for better wear tolerance, growth retardants, insecticides renovations, and diagnosing turf problems.

The list of scheduled speakers includes: Dr. James Watson, The Toro Co.; Dr. Robert Shearman, University of Nebraska; Dr. Clinton Hodges, Iowa State University; Dr. Keith Karnok, Ohio State University; Dr. Richard Ratcliffe, USDA, Beltsville; Jim Samis, Monsanto Corp.; and Ken Hinson, Sears Lawn Care.

PENNEAGLE Creeping Bentgrass

The grass that re-greened Butler National

A devastating grass disease virtually destroyed the greens at Butler National Golf Club, Oak Brook, Illinois, home of the *Western Open*, shortly before the 1980 tournament. The Butler Board of Directors decided to replace the grass on all greens and after viewing several varieties of bentgrass in the Chicago area, they selected Penneagle Creeping Bentgrass for the restoration program.

Dr. Joseph M. Duich, professor of Turf Science, Penn State University, and developer of Penneagle bent was called in as a consultant. Working closely with Oscar Miles, Course Superintendent, the reseeding of Butler National was begun in mid-August 1980. Before the project was completed, the entire course was seeded to Penneagle Bentgrass.

By November the course was pronounced in excellent condition and by the 1981 Western Open the course drew raves from players and spectators alike.

The TEE-2-GREEN CORP., marketers of Penneagle and Penncross bentgrass has published a booklet complete with photos of the Butler restoration program. The step by step program at Butler is available free of charge.

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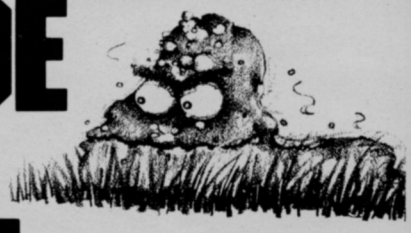

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on the subject. He went over the basic differences between diesel and gasoline engines, including the benefits and drawbacks of each. In reference to diesel engine maintenance, Macrae stressed filtration. "You should perform recommended maintenance at or before the manufacturer's specified intervals," noted Macrae. "Keeping dirt and water out of the injection system is the number one priority." In terms of cost efficiency, on the positive side the diesel is fuel efficient, requires less maintenance, is very reliable and produces increased power; while on the negative side it has a high purchase price, Macrae added.

Dr. John Hall III, extension turf agronomist at VPI, Blacksburg VA, delivered the keynote address, "Looking Ahead In Turf." Hall noted that these are "exciting times" due to advances in chemicals and genetics. He warned the that the 1974 oil embargo showed that the green industry was on the bottom of the energy totem pole and it has to compete with other areas for the population's disposable income. With the number of new golf courses increasing at a decreasing rate, Hall predicted a trend to multiple uses of courses and an increase in maintenance efficiency. He added that the rapid expansion of the lawn care industry could lead to price wars, expansion into smaller towns and a decrease in operator turnover.

Hall's observations on the future of the green industry included a trend towards higher mowing heights, less fertilizer usage, the use of low pressure heads in irrigation, an increase in diesel equipment, a trend towards grasses with low nitrogen requirements and high drought tolerance, and an increase in the use of effluent water.

Turf Seed Company's Bill Meyer and Toro's Jim Watson share prespeech jitters during New Jersey Expo.

Other noteworthy educational sessions included C. Reed Funk on turf-type ryegrasses, Toro's Jim Watson on adjusting the water system, Turf-Seed's William Meyer on athletic field grasses and Henry Indyk on athletic field construction. Indyk educated the audience on the problem of contractors who purposely bid low and then cut specifications. He advocated the use of resident managers to keep the job to

Contiues on page 12

GOLF UPDATE

Four receive Distinguished Service award

Superintendents Sherwood Moore and Milton Bauman, USGA Green Section National Director Alexander Radko and turf nurseryman Ben Warren received Distinguished Service awards at the Golf Course Superintendents Association of America Show in New Orleans, LA. The award denotes "outstanding service to the golf course superintendent's profession."

Milton Bauman is superintendent of the Seattle Golf Club. He was instrumental in the founding of the Northwest Turfgrass Association. Bauman served as NTA president for three terms and has been on the board of directors for over 20 years. Since coming to the Seattle Golf Club in 1970, Bauman has worked with Washington State University researchers on using sulfur to control soil pH and inhibit Poa annua growth.

Al Radko has spent the last 34 years with the USGA Green Section spanning the positions of research assistant, agronomist, eastern regional director and national director. Additionally, Radko was involve in research studies that developed Merion Kentucky bluegrass, Meyer zoysiagrass, U-3 bermudagrass, C-strain creeping bluegrass, and Touchdown, RAM I and Bellevue Kentucky bluegrass. He was also editor of the USGA Green Section Record.

Sherwood Moore is currently superintendent of Winged Foot Golf Club, Mamaroneck, NY. A golf course superintendent since 1939, Moore has worked at various clubs in New York, New Jersey and Connecticut. He has also been president of the New Jersey GCSA and the Metropolitan GCSA.

Ben Warren founded Warren's Turf Nurseries in 1938 and it grew to become one of the largest of its kind in the world. Warren's turf is grown and sold in five midwest states, New York and California. He has been instrumental in the founding of the Sod Growers of Illinois, the Midwest Regional Turf Foundation, and Illinois Turf Foundation and the American Sod Producers Association. Additionally, Warren is well known for the innovations (both mechanical and research) that he has contributed to the green industry.

GCSAA consolidates committee functions

The Golf Course Superintendents Association of America have consolidated their 19 standing committees into nine. In the process committee functions were merged to make the association's administrative duties more workable.

The nominating and election committees and the President's Council were left unchanged by the redistribution. The nine new committees will be chaired by executive committee members. The consolidation was structured so that subcommittees could be established under the new committees but no committee vice chairmen will be appointed.

Fream Group to design three new courses

The Ronald Fream Design Group, Santa Rosa, CA, have been awarded three new contracts. The golf course architect/resort master planning consulting firm will design and prepare working drawings for the 27-hole Chaguaramas Public Golf Course to be constructed near Port of Spain, Trinidad, West Indies. A 36-hole resort course is being master planned for Nongsa Beach, offshore from Singapore. Preparation of a master plan for the remodeling of the Jockey Club Golf Course in Buenos Aires, Argentina is also underway.

The Fream Group is currently involved in three other projects under construction. They are the Genting Highlands Golf Course in Malaysia, the Pantai Mentiri Golf Club in Brunei and The Serapong Course in Singapore. At the Serapong site over one-half of the course is being built on land dredged from the sea which involves more than two million cubic yards of earthmoving.

specifications and having each phase of construction approved before the start of the next phase. Indyk cautioned the listeners about "file-dipping" architects. He noted the some architects use standard specifications for many different sites in an effort to cut costs.

One session which seemed to sparkle, although the topic could have appeared weak, was a two-hour session on bunkers. Golf course architect Geoffrey Cornish, USGA Green Section's Carl Schwartzkopf, Rich Valentine of Merion Country Club, Stan Helstowski of Wheatley Hills Country Club, Dave Canavan of Moore Golf Inc., and Byron Phoebus of Farmstead Golf and Country Club gave all sides of the bunker issue. The benefits have too often been overlooked for maintenance considerations. Bunkers can and do help golfers and the course. They have special problems such as drainage, an sand composition, and improper location, but they also save the golfer from worse hazards and add challenge to the course.

One of the highlights of the show was the annual banquet. Peter Loft of Lofts Seed Co., Bound Brook, NJ, was the recipient of the New Jersey Turfgrass Hall of Fame Award for 1981.

LAWN CARE

PLCAA elects 1982 slate of officers

At the annual business meeting of the Professional Lawn Care Association of America in Louisville, KY, the following officers and directors were elected to serve during the coming year.

For the office of president, J. Martin Erbaugh, Lawnmark, Division, Erbaugh Corporation, Peninsula, OH; vice president, Ronnie L. Zwiebel, Green Care Lawn Service (formerly Chem-Care Lawn Service of Alabama, Inc.) Birmingham, AL; and secretary-treasurer. Donald Burton, Lawn Medic, Inc., Rochester, NY. These newly elected officers will serve one-year terms.

New directors are Paul Bizon, Pro-Grass Lawn Service, Inc., Hubbard, OR; Des Rice, the Weed Man Ltd., Mississauga, Ontario; William Fischer, Spring Green Lawn Care Corp., Plainfield, IL; and John Kenny, Turf Doctor, Framingham, MA. All will serve a three-year term.

Remaining on the board to complete their terms are: Richard L. White, Village Green Ltd., West Chicago, IL; John A. Latting, Lawn Groomer, Normal, IL; Douglas Baker, Leisure Lawn, Inc.,

Continues on page 14

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*Trench width and depth depends on boom and chain set up.

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News *from page 12*

LANDSCAPE UPDATE

ASLA annual meeting posts record

More than 2300 landscape architects traveled to Washington, DC to participate in the 1981 Annual Meeting of the American Society of Landscape Architects.

Under the theme, "Action by Design," delegates witnessed four major presentations and more than twenty specialized education sessions geared to help make them active participants in society's decision-making process. The expanded educational exhibit was sold out with over 100 exhibitors participating. Ambassador Elliot Richardson delivered the keynote address on becoming active societal participants at the global level. Other speakers included former Secretary of the Interior Stewart Udall, Executive Director of the Greater Cleveland Roundtable Sarah Short Austin, and Charleston, SC Mayor Joseph Riley Jr.

At the meeting, Calvin Bishop, Bishop & Walker, Houston, TX, was installed as president. Other officers installed include· Theodore Wirth, president-elect; Cameron Man, vice president; and Donald Fox and Brian Kubota, vice presidents (continuation of their two-year terms). Past President William Behnke will continue on the ASLA Executive Committee for one year.

Sir Geoffrey Jellicoe, a British landscape architect, was awarded the ASLA Medal, the society's highest and most prestigious award. Past President Lane Marshall, head of Texas A&M University's department of landscape architecture, was awarded the ASLA President's Medal. This award is offered in recognition of unselfish and devoted service to the Society at the national level over a period of five years or more. The 1982 Annual Meeting will be held in Honolulu, Hawaii in November.

AAN publishes computer guide

The *AAN Computer Directory*, published by the American Association of Nurserymen, was conceived and designed to assist nursery business firms contemplating installation of a computer.

The 28-page directory lists 153 firms—retail, landscape, mailorder and grower—which have computers plus eight others which use service or accounting firms or which use time-sharing. The directory gives complete name, address and phone number of the nursery firm by state; business classification (i.e. retail, etc.); manufacturer, model and language of the computer and what type programs are being handled (i.e. personnel, payroll, inventory, billing receivables, payables, general ledger, bookings, other).

Many of the firms in this directory have indicated they are willing to share their experiences and/or information about their computer operations. In addition, many firms are willing to sell and/or rent their company-owned programs.

A single free copy is available to AAN members on receipt of a self-addressed business size envelope. Non-members may obtain a copy for $3 each. Send pre-paid order to American Association of Nurserymen, 230 Southern Building, Washington, D.C. 20005.

NMC to publish landscaping research

The Nursery Marketing Council is compiling statistics on landscaping that it has isolated from consumer research within its all-industry marketing program. A detailed analysis of the home building industry and related landscape services will be the subject of an NMC "white paper" due out in the next few months. A few preliminary details currently available are: 70.5% of all homeowners strongly agree that you plant to increase property value; 50.7% strongly agree that the main reason to plant is to help sell house at the asking price; and 43.9% strongly agree that one of the main reasons to plant is to sell a house faster.

Dayton, OH; Larry Brandt, Spray-A-Lawn, Cincinnati, OH; Gordon Ober, Davey Lawnscape, Kent, OH; and Robert W. Miller, ChemLawn Corporation, Columbus, OH. Jerome R. Faulring, Professional Turf Corp./Hydro Lawn, Gaithersburg, MD, remains on the Board as immediate past president.

Serving as the associate member representative for the year 1982 is William Stinson III, O.M. Scott & Sons, Marysville, OH.

GYPSY MOTH

Gypsy moth spreading out of Northeast

Gypsy moth caterpillars, which defoliated about 13 million acres of trees during 1981, appear to be hitchhiking out of the Northeast, according to the U.S. Department of Agriculture.

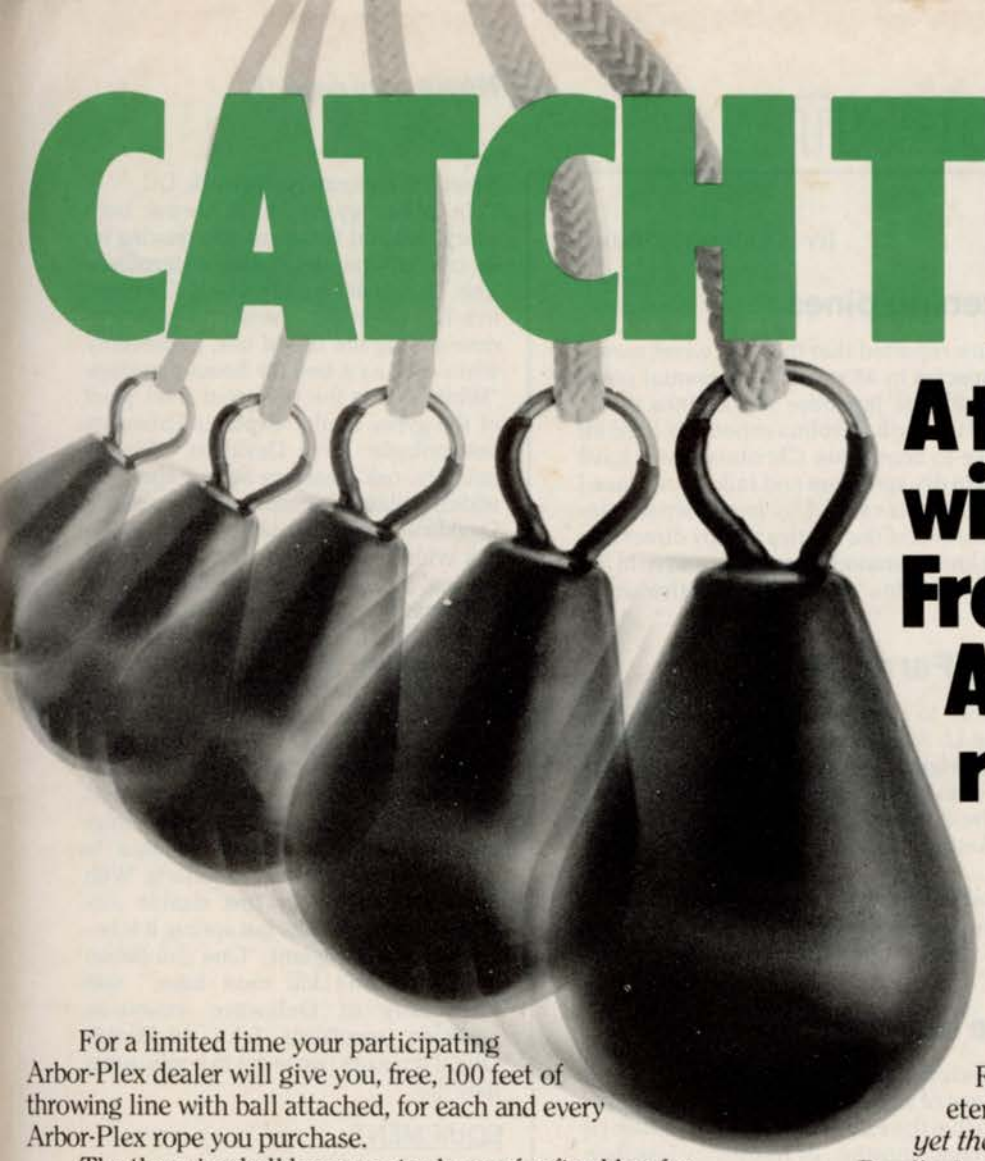
In 1981, traps turned up new infestations of gypsy moths in Arkansas, California, North Carolina, Oregon, Virginia, West Virginia and Wisconsin. "We're also concerned about small concentrations of male gypsy moths that were trapped in Alabama, Indiana, Minnesota, Ohio and South Carolina," said Harvey Ford, deputy administrator of the USDA's Animal and Plant Health Inspection Service. "These moths had human help in traveling so far from home. The female moths lay eggs in any protected spot out-of-doors, and some of the favorite spots are on vehicles, lawn furniture and camping gear."

Ford said several hundred moths were trapped in Florida campgrounds, possibly the result of northeastern campers who vacationed there during Easter, when gypsy moth egg masses on their camping equipment were hatching.

USDA researchers have been making progress in their studies of natural enemies of the gypsy moth. In laboratory tests two species of parasitic wasps brought by U.S. scientists from India attacked and destroyed the gypsy moth caterpillars. The researchers now plan field tests to determine the overall effectiveness of the wasps as biological controls to help curb gypsy moth infestations. According to Joan Wallace, administrator of the USDA's Office of International Cooperation and Development, the wasps will cause no disruption to the U.S. environment and pose no threat to other animal species or to humans. Research on the two species of wasp, *Apanteles flavicoxis* and *Apanteles indiensis*, is being conducted at the USDA's Beneficial Insects

Continues on page 16

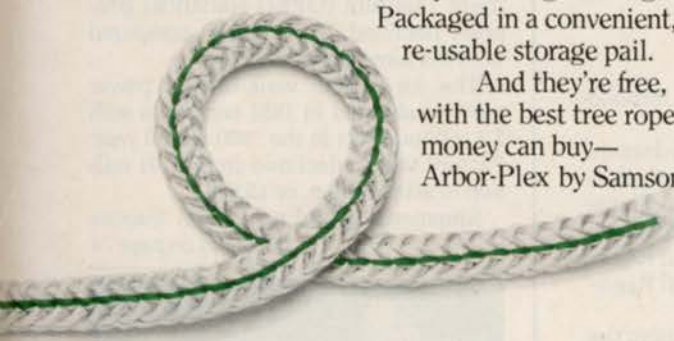
CATCH THIS.



A throwing line with ball... Free with every Arbor-Plex™ rope you buy.

For a limited time your participating Arbor-Plex dealer will give you, free, 100 feet of throwing line with ball attached, for each and every Arbor-Plex rope you purchase.

The throwing ball has an outer layer of soft rubber for a firm and comfortable grip. It throws easily because it's perfectly sized, weighted and balanced. The braided line won't rotate or hockle when thrown. So getting into valuable or difficult access trees is as easy as falling off a log.



Packaged in a convenient, re-usable storage pail.

And they're free, with the best tree rope money can buy—Arbor-Plex by Samson.

Arbor-Plex rope is available in the following sizes:

Climbing Rope	Bull Rope
1/2" x 100 FT. (Bucket)	5/8" x 100 FT. (Bucket)
1/2" x 120 FT. (Bucket)	5/8" x 120 FT. (Bucket)
1/2" x 600 FT. (Reel)	5/8" x 150 FT. (Bucket)
9/16" x 100 FT. (Bucket)	5/8" x 600 FT. (Reel)
9/16" x 120 FT. (Bucket)	3/4" x 100 FT. (Bucket)
9/16" x 600 FT. (Reel)	3/4" x 120 FT. (Bucket)
	3/4" x 150 FT. (Bucket)
	3/4" x 600 FT. (Reel)
	7/8" x 600 FT. (Reel)

Arbor-Plex Bull and Climbing Ropes weigh less than equivalent diameter 3-strand manila or polyester ropes... *yet they are stronger.*

Parallay® parallel orientation of polyester and polyolefin fibers and our unique "Dura Tite" construction technique result in unsurpassed performance characteristics: • Excellent knot holding ability • Non-hockling, flexible, easy to rig • Excellent resistance to abrasion, snagging, and sudden loading • High strength to weight ratio • Rot and mildew resistant.

Look for this display at your local Arbor-Plex dealer, or contact Samson for his name and address. Samson Braided Ropes, Industrial Division, 99 High Street, Boston, Massachusetts 02110, Telephone (617) 426-6550.

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DEALER INQUIRIES INVITED. Although we've been supplying braided rope to the utility industry for over 20 years, we're relatively new in the arborist field. And we're looking for some new qualified distributors.

If you'd like to sell the best arborist's rope money can buy call Dick Hildebrand, collect, at (617) 426-6550.

GOVERNMENT UPDATE

BY WILLIAM HOFFMAN

New nematode threatening pines

The U. S. Department of Agriculture reported that the pine wood nematode has been identified in pine species in 38 states. Ornamental pines seem to be the most susceptible with the Japanese black pines in the ocean beach areas from Long Island to North Carolina especially hard hit in the last two years. Some damage to Scots pine Christmas trees have been found especially in areas where dry summers and falls have placed added stress on the trees. The nematode is carried by long-horned beetles. Pest management is based on control of the beetles and by direct tree injection of a nematicide. The pine knot nematode, probably native to the United States, was first identified with pine tree deaths in Missouri in 1979.

Floraboard attached to Farm Bill

Proponents of Floraboard were able to add the "Floral Research and Consumer Information Act" to the U. S. Senate Farm bill. The Senate version differs slightly from the bill originally introduced in the House in that the Floraboard shall convene an advisory panel drawn from the wholesale and retail segments of the flower and plant industry and shall consult it frequently on all marketing, promotion and research programs.

This new legislation was adopted by the Farm Bill conferees with no serious adverse comments since the costs to the Federal government will be minimal. Floraboard came into effect when President Reagan signed the 1981 Farm bill.

EPA relaxes pesticide advertising

The 1978 amendments to the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) defined "use of a registered pesticide in a manner inconsistent with its labeling' so that the following are not misuses: (1) applying a pesticide at any dosage, concentration, or frequency less than specified on the label; (2) applying a pesticide against any target pest not specified on the labeling if the application is to the site named on the labeling and not specifically forbidden by the labeling; (3) using any method of application not prohibited by the labeling and (4) mixing a pesticide or pesticides with a fertilizer unless labeling prohibits such mixtures.

Not All MH Products Cancelled

Government Update in *Weeds, Trees & Turf*, December, 1981, implied that all MH registrations were suspended. This is not the case.

On August 14, 1980, EPA issued a 3 (c) (2) (B) notice to maleic hydrazide (MH) registrants requesting them to arrange for the submission of additional data. Registrants who did not respond to that notice would have both their diethanolamine (DEA) and potassium salt (K) registrations suspended. EPA issued their follow up notice of an Intent to Suspend Registrations on September 16, 1981. (Please find a copy of the Federal Register notice attached to this letter.)

Since one company has made a commitment to produce and submit the necessary toxicological studies on the potassium salt formulation of MH, that formulation *will not be suspended.* (Only those companies who did not respond in any way to EPA's notice will have their potassium salt formulations suspended.)

Since no registrant agreed to initiate studies for the DEA salt, all registrations were suspended. Registrants, however, will be allowed to sell or distribute existing stocks until they are exhausted.

Willard Cummings
Product Registration Specialist
Uniroyal Chemical
Bethany, CN

News *from page 14*

Research Laboratory, Newark, DE.

In other gypsy moth news, both Maryland and Delaware are gearing up to combat the defoliating caterpillars. The University of Maryland Cooperative Extension Service is no longer recommending the use of oak, particularly white oak, as a tree for home plantings. "White oak is the preferred food plant of the gypsy moth," explains Extension entomologist John Davidson. "Unfortunately, oak trees are among the most widely planted ornamental species." Davidson suggests planting tree varieties which gypsy moth caterpillars will not eat. He lists tulip poplar, sycamore, ash, catalpa, dogwood, hackberry, honey locust, horse chestnut, persimmon, walnut, osage orange and mulberry (all deciduous); and holly, arborvitae and juniper (evergreen) as food plants the insects avoid.

The Delaware Cooperative Extension Service and Department of Agriculture is currently planning meetings in New Castle and Kent counties to coordinate its 1982 control efforts. With Delaware having its first sizable outbreak of gypsy moths last spring, it is being especially vigilant. "One defoliation usually doesn't kill most trees," said University of Delaware extension pesticide specialists John McDaniel. "But if it occurs two years in a row, some may die."

EQUIPMENT

Lawn and garden shipments show decline

Twelve-month shipments by reporting members of the Outdoor Power Equipment Institute (OPEI) statistical program declined 20.6% when compared with the same period in 1980.

The 4.6 million walk-behind power mowers shipped in 1981 compares with 5.7 million units in the 1980 model year. Factory values declined from $701 million to $606 million, or 13.6%.

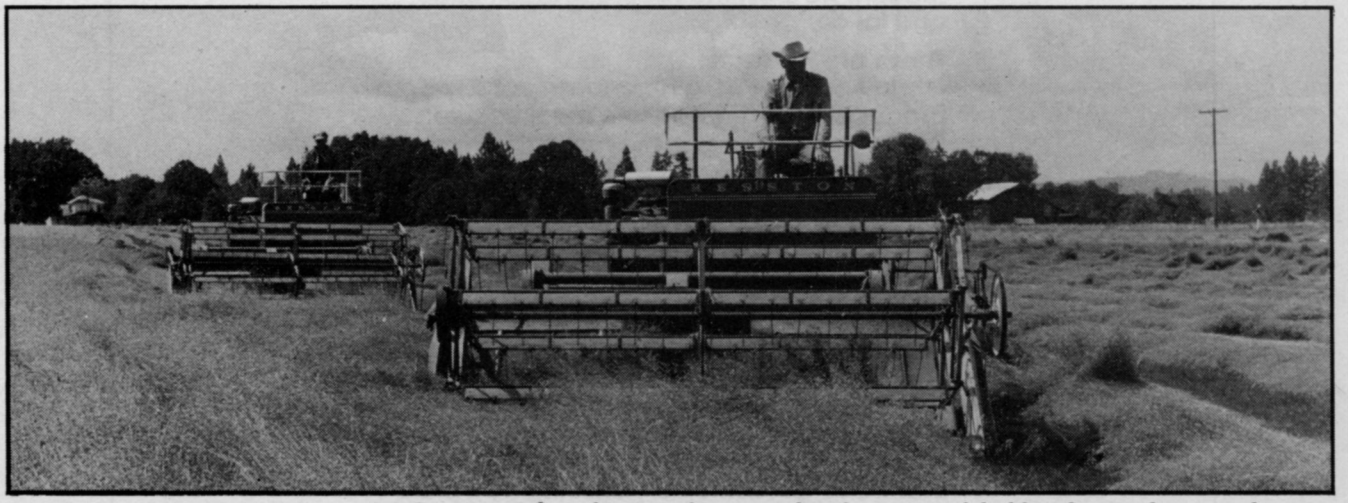
Shipments of riding garden tractors

Continues on page 74

Incoming ASLA President Calvin Bishop (left) is congratulated by outgoing President William Behnke at the ASLA Annual Meeting in Washington, DC. (For information on the meeting turn to this issue's Landscape Update column.)

20th ANNIVERSARY

The first location of K&N Machine works, later to be Ryan, of OMC Lincoln.



Commercial production of improved turfgrasses took hold in the Northwest in the 60's.

RECOGNIZING A MARKET READY TO BOOM

By BRUCE F. SHANK, executive editor

While the golf market in the United States first boomed between 1920 and 1930, the other markets composing the Green Industry didn't really begin to boom until the late 50's. Postwar industrialization, chemical progress during the war, and the baby boom provided the impetus for the landscape nurseryman, sod grower, and commercial arborist, as well as the magazine publisher to create a magazine to cover all aspects of landscape management.

Continues on page 23

Anniversary *from page 18*

The original concept of *Weeds Trees & Turf*, however, was a magazine for contract applicators, those persons who applied chemicals for non-agricultural purposes outdoors. This concept was quickly broadened as the importance of the sod producer, arborist, and landscape nurseryman was recognized. This "horizontal concept" remains the philosophy of the magazine 20 years later.

Consider what landscape problem solving was like 60 years ago. Diseases of turf were not really considered significant until Piper and Oakly, USDA scientists in Arlington, VA, identified a severe epidemic of "Brown Patch" in turf and recommended use of an agricultural fungicide developed in the late 1800's called Bordeaux mixture. Newer fungicides did not really appear until the late 20's and early 30's when cadmium compounds and thiram were developed.

Developments in slow-release fertilizers and selective herbicides did not really surface until the 40's when ureaformaldehyde and 2,4-D were discovered. Also at this time, the first growth regulators and synthetic insecticides were created. The foundation for continued chemical development was built in the late 30's and 40's.

Turf equipment companies first surfaced in the 20's with the golf boom. It was not until the late 30's and 40's that small machine shops began to produce specialty equipment for the Green Industries, such as sod cutters, aerifiers, stump grinders, and trenchers. This grass roots type of specialty equipment production continued into the 60's. The results are evident today in established corporations like Ryan, Vermeer, and Ditch Witch (Charles Machine Works). The sod harvester, which revolutionized the sod industry, was first exhibited in the late 60's.

In the late 40's the American Society of Agronomy establiZshed a turf section which gave formal recognition to state extension turf research. Nursery research had already gained recognition as an important part of agriculture.

By the early 60's, it was clear that the landscape market was very promising. Not only were chemical and equipment segments in production, but the turf seed market was gaining momentum from the first improved turfgrasses, such as Merion (1951) and Penncross (1954), and NK-100 (1962). Improved vegetative turfgrasses were also released, such as Glen Burton's first improved bermudagrass (Tiflawn) and Meyer zoysiagrass.

Lady Bird Johnson as First Lady gave the market a boost by making environmental improvement her pet project. The exposure she gave various aspects of the Green Industry had much today with serious recognition of the market.

Weeds Trees & Turf would spend the next 20 years chronicling the creation and growth of old and new market segments. In March, some of these chronicles will be reexamined. **WTT**

GUIDE TO IRRIGATION DESIGN UNDER DROUGHT CONDITIONS

BY WILLIAM REINECKE

Replacing overhead systems with drip systems can cut water usage in half in areas of ground cover or ornamental plantings. Weed growth caused by airborne seed is also not germinated by overhead watering.

In the past decade many regions throughout the United States have suddenly been required to curtail water usage for non-essential needs. These non-essential needs, in general, have been limited to the washing of automobiles, washing down of sidewalks, children playing in garden hose sprinklers, wetting down of roofs and walls of homes (during summer's heat), and other sundry acts of minimal water usage not considered as necessary to the health or welfare of the public in those communities most heavily stricken by these droughts.

Unfortunately, in many of these communities, the sprinkling of lawns and ornamental plantings around private homes was also unlawful. In one town north of Los Angeles several years ago, the construction of new homes ground to a halt because the local water purveyor was unable to provide this essential commodity to any potential users with the limited source to which this agency was confined. At that time the limitation per subscriber was less than fifty gallons per day. Normal use for customers of the Metropolitan Water District, which serves the Los Angeles area, is close to two hundred gallons per day per person, under conditions of normal supply.

We are now being told drought is expected to become the norm. The great increase in the country's population must, by physical need, require more water than was needed just twenty-five years ago. And even though natural cycling of the waters from lakes, ponds, streams, and oceans does recirculate that which is available by nature, America's agricultural requirements for man-applied irrigation consumes approximately eighty-five percent of all available water. Industry, if my memory is correct, will take another nine to ten percent, leaving five or six percent remaining for domestic use. These figures will vary with different communities, but demonstrates a picture of stark reality for water consumers in times of severe drought. It must be finally realized that America can no longer be considered (in abundance) as the land of sky blue waters.

And, of course, the pollution of lakes, streams, rivers, and other waterways by industrial contamination should be no longer tolerated. According to the GNP, American industry is presently obsoleted by other nations with newer manufacturing facilities using modern disposal techniques. Now, then is the time for America to rebound and rebuild with an eye to more automated production and with preferential consideration to resubstantiating our natural resources, of which water is a prime concern.

The practice of competing for the lowest installed cost can cause severe wastage of water due to overspray and inefficient distribution patterns.

It can be expected, during a continued drought, that not only will residential plantings be restricted by law from irrigation, but also to be included will be limitations on parks, cemeteries, athletic fields, and, of course, golf courses, for human consumption will preclude all sorts of "non-essential" demands for this most precious resource, water.

The following pages are prepared to offer suggestions that, hopefully, will be beneficial to any of those agencies who have not yet experienced the trauma of being "caught in a drought."

Irrigation designers' responsibilities

It has been said that the irrigation designers who employ their services in the southwestern parts of this country have more lucidity than those designers in the balance of the nation. This statement may be fact or fiction. However, the independent, professional designers of this portion of the nation have, by need, become extremely knowledgeable in working to conditions of extreme heat, plant stress, limited water supply, excessive winds and the "Dries," that state of aridity that provokes the designer to overlook all spacing recommendations of heads as stipulated in the various equipment catalogues and to squeeze these outlets to proximities so close as to cause embarrassment to any respectable manufacturer. And yet, experience in the West has become the supreme dictator. And necessity has demanded that spacings of fifty percent of the diameter be established as the maximum norm.

Approximately six years ago my office had the opportunity of reviewing a set of irrigation drawings that had been prepared by a professional designer from the Midwest. When questioning why there were no part circle rotary heads used to protect the buildings, public walks and streets, the response was given that these surfaces are repeatedly wetted by summer rains so why protect them from artificial rain and it saves considerable amounts of money to eliminate the perimeter rows of heads.

This may be true but the prorated savings of both money and water, over the years, realized by only sprinkling in the planted areas will more than justify the initial cost of the additional heads and controls.

Further, in the Midwest and East and southern parts of the country, it is common practice that manufacturer's representatives, or distributors, act as irrigation designers supplying their drawings to the professional offices of architects, landscape architects, or engineers. With this concept in mind, each distributor/designer will attempt to make his "installed-cost" less than his competitor who may be also preparing drawings for the same site and to be delivered to the same professional office. As such, heads are spaced, or stretched, to their maximum or even beyond, part cir-

Continues on page 26

Bill Reinecke recently retired as a leading irrigation design consultant in California. His firm, Landscape Irrigation Services, continues to serve the West Coast as an independent irrigation consultant firm. This article represents his thoughts derived over a 30-year career in irrigation.

cle heads eliminated and systems too heavily loaded to conserve on the control system. These practices cause severe wastage of water due to overspray and unwanted runoff on paved or structural surfaces and, secondly, through inefficient uniformity of distribution patterns. The latter causes severe over watering of some portions of the wetted pattern in order to successfully apply the proper amount of daily required precipitation to the thinner areas of coverage. This action repeated throughout a season of irrigation can cause considerable wastage of water and money.

Further, the responsibility of the head manufacturers should be addressed here. Several brand names of heads manufactured today provide a balanced precipitation between full circle heads and all arcs of the part circle heads of the same model number. However, many manufacturers still do not engineer their products to perform in this manner. They should, for many designers prefer to connect fulls and parts on the same valve and if the heads are not balanced the part circle heads, in many cases, can be delivering twice the amount of water, over their area of throw, as do the full heads. Here, again, this overwatering must be performed just to apply the proper amounts of precipitation in the areas of thinner coverage to be attained by the full circle heads.

Design challenges

Flooding and overwatering should not be tolerated by any designer, contractor, or owner. And this condition exists in the design of stationary shrub heads, stationary pop-up heads, and intermediate throw heads as well as rotary heads. It will be better for all, when the manufacturers upgrade their standards of product design with an eye to potential drought conditions for the less water used is that same amount saved.

Runoff of excessively applied water on slopes is another fine example of poor design and/or lack of control on the part of the water manager of the site. This will be discussed later on in this article.

There are many authorities that advocate the shrinking of irrigated areas of existing sites, as golf courses and parks, in an effort to reduce water consumption. This includes additions, to these same sites, of hard surface areas by increasing sizes of parking lots and constructing tennis courts, handball courts, etc. Of course, the planted areas removed when using this water conservation method are so small that only a minimal savings could be effected in percentage to the whole. Others suggest cutting down great numbers of large trees to reduce their water consumption without realizing that mature trees take very little from surface water with the majority of their needs coming from deeper rootings into available ground water sources.

Great savings can be effected in many cases where shrubbery or ground covers blanket large areas of ornamental plantings. This can be realized by replacing existing overhead systems with drip (emitter) systems. It has been observed by some authorities that water usage by drip can be as low as forty percent of that delivered by conventional overhead systems. It must be noted, though, that emitter systems, unless totally buried, are extremely susceptible to destruction in public areas that are known to be vandal-prone. Drip systems also save on labor costs, as weed growth caused by airborne seed is not germinated by overhead watering.

> Many manufacturers do not design their heads to provide a balanced precipitation between full circle and part circle heads of the same model number.

The recommendation of some developers is that existing golf courses can save considerable water by reconstruction of the irrigation system to allow watering only on the "landing spots," greens, and tees. All fairways between the tee and the first landing spot or "target" would be left unwatered, but left in mowed native grasses or ground covers. Then again from that green target all would be unwatered until the next target area, etc.

This, possibly, is a solution for a Pro-Course or any course on which the players are reasonably proficient at their game. In such cases the irrigation water required would be minimal and a great conservation readily realized.

However, such a course could never be anticipated as a Public Course where players of varying degrees of expertise will be using the site. For play would be extremely slow due to hookers, slicers, and random searching for short balls. And so municipal courses must, by the very essence of their purpose, remain as wall-to-wall turfed areas so designed to allow play from novices to proficient non-professionals.

This criteria must, by necessity, result in development of an irrigation system of overall coverage, thus from its very beginning must be considered as one of the enemy in the battle of water conservation.

Design resolutions

Resolutions must then be considered that will, during the design stages, weaken the appetite of this thirsty giant.

Thought must be given to applying a planting that will, under the local environmental atmosphere of the site, generate a hardy, durable, drought tolerant cover that will be resistant to the known seemingly intolerable plagues of nature that usually destroy a fine turf. Many of the states' Universities now have fine experimental test stations that have, for a number of years, been exploring hybrid types of various stands of cold and warm season turf grasses. These agencies are a readily available source of invaluable information and are extremely cooperative and happy to relate the results of their explorations and in a totally non-biased manner. More professionals should take advantage of this service.

Public (municipal) parks must also fall under the criteria of design as the municipal golf courses de-

Continues on page 30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As turf professionals like you take a hard look at disease control and fungicide performance, a growing number are turning to BAYLETON 25% Wettable Powder fungicide.

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Knocks out more diseases: BAYLETON offers the broadest spectrum of disease control of any leading turf fungicide. This includes tough diseases like dollar spot, brown patch, Fusarium blight, red thread, striped smut, certain rusts and pink and gray snowmold.

Cost-efficient: Residual activity of BAYLETON is as much as 14 days longer than other fungicides, so fewer applications are required. Chemical costs can be significantly reduced.

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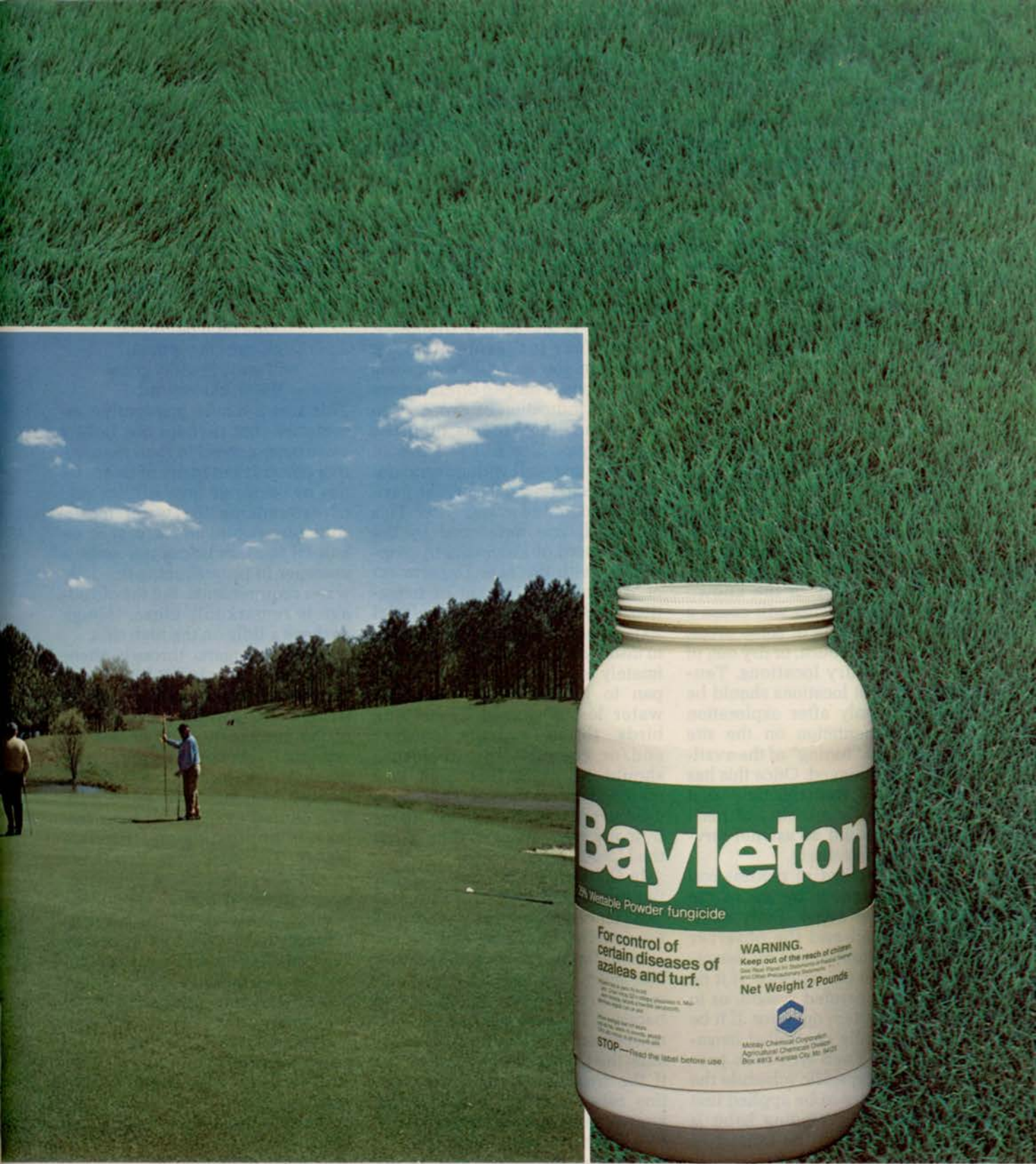

Fast-acting: Systemic activity provides rapid, uniform protection of the grass plant against disease organisms.

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scribed above.

Other measures that result in a substantial water conservation, of *any* site, are discussed further on under water management.

Tensionmeters are another means of restraining excess precipitation. But, like a computer, they are only as accurate and meaningful as the water manager allows them to be. Many consider that the additive costs of maintenance required for servicing negates the use of these instruments. But, overall, it will be found that dollar volume savings for water use more than compensates for the time given for maintenance—if maintenance procedures are properly ordered.

If one considers using tensionmeters to measure soil water balances, the devices need not be installed at every control system but randomly spotted throughout the site and precisely in the known dryest locations. This will cause a slight overwatering of some areas, but will prevent burn, or dry out, of those known dry locations. Tensionmeter spot locations should be pinpointed only after exploration and experimentation on the site before a final "tuning" of the available soil is achieved. Once this has been accepted, from that time on, it becomes merely a matter of periodic readings and occasional servicing of the instrument.

Another method of reading soil moisture content is by use of the soils probe, or auger. Daily readings are taken and the observer then must communicate his recommendations to the irrigator, if it be a manually operated system, or to the control system operator, if it be an automatically controlled irrigation system. Each will then program into his specific schedule the amount of water to be applied that night. This daily reading habit is finely attuned for the utmost in water savings.

The final method of calculating daily water needs that will be discussed is the pan evaporation method. The pan to be described is not to be confused with the U.S. Weather Bureau—Class A evaporation pan, though, if in the vicinity of the site, the Class A pan can be referred to as a general source of information. However, if the latter is to be used, adjustments must be made through experimentations of evapotransporation requirements at the actual field level. The Weather Bureau pan is installed with the bottom of the pan above grade. This differs from the evaporation pan used for irrigation evapotransporation rates. This pan is called the "Bureau of Plant Industry (BPI) Evaporation Pan." The BPI pan is six feet in diameter, twenty-four inches deep and is placed in the ground twenty-one inches deep. This pan offers a more accurate indication of evaporation at ground (turf) levels than the Class A pan. The BPI pan has an offset stilling well with integral device to accurately measure the periodical amount of evaporation. This pan (BPI) was developed by the Texas Board of Engineers in cooperation with the U.S. Department of Agriculture, Division of Irrigation, and the Texas Agricultural Experiment Station. It is advisable to install a chain link fence approximately ten feet square around the pan to prevent "unaccountable" water losses caused by bathing birds, thirsty rodents, cougars and/or coyotes. The enclosure should be eight feet high and screened across the top. This pan is used to determine irrigation needs by many agencies today throughout the U.S.A.

In California it can be taken that the number of inches of evaporation can be multiplied by a factor of seventy-five (percent), and the resultant figure is the precipitation that must be applied by artificial means to replace the soil water lost between the past reading and the most recent reading. This, then dictates the timing of irrigation cycles if the irrigation system precipitation rate, in inches per hour, be known. And it must be known if one is to properly manage the amounts of water delivered as related to the actual amounts required.

Other multipliers are given for other types of grasses being supplied with water. There have been a number of excellent, and authoritative papers prepared on the fine tuning of daily irrigation needs by the research teams at the experimental test stations previously mentioned. Copies of these papers are usually provided free of charge to anyone asking. The Department of Plant Science, University of California, has on file a variety of these papers available to the public. Some especially prepared to assist turf owners in preparing for drought.

It was said, forty-five to fifty years ago,

"One inch per week
all over the ground
will grow healthy grass
the world around."

This was a totally unscientific assumption, but perhaps our fathers were more correct in their assumptive powers than many of us are today by using our "eyeball" method of determining the water needs. And fifty-two inches a year is an annual total and does not assist a manager in programming the daily water requirements. But the old adage is remarkably close, though perhaps a little on the high side.

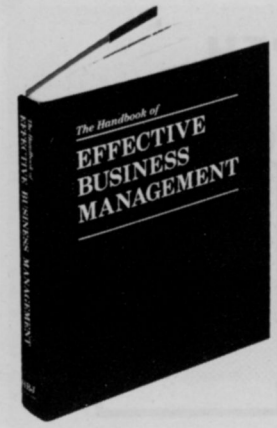
Most managers, through attentive monitoring, can cut fifteen percent from their peak demand watering periods without altering any of the equipment in their present systems. Tests have proven this in Southern California on a park site located near a rather large lake. The annual evaporation near this lake is approximately fifty-two inches. The park managers have recorded application of irrigation, over a five year period, at approximately a thirty-eight inch per year average. Lake evaporation cannot be equated to the BPI pan evap but can be, generally, a good starting point if the pan installation is not available.

Other measures that can be taken are such things as:

1. Only water where and when needed.
2. Improvement of existing irrigation efficiencies.
3. Control of thatch.
4. Prevention of runoff during irrigation cycles.
5. Aeration.
6. Mowing heights.
7. Vertimowing.
8. Lessening of fertilizer applications.
9. Removal of weeds.
10. Application of soil

Continues on page 32

During the next 12 months will you...



- **Struggle to develop a realistic budget? If so, see page 88.**
- **Hire or fire an executive? Then see page 279.**
- **Attempt to boost productivity while lowering energy consumption? See page 343.**
- **Use breakeven analysis as a competitive weapon? See page 239.**
- **Seek professional advice from an accountant, lawyer, banker or outside consultant? See page 14.**
- **Weigh foreign exchange risks before conducting business abroad? See page 40.**
- **Find your company caught in a product liability crisis? See page 370.**
- **Research the goals and needs of your customers? See page 228.**
- **Initiate an effective production inspection system program? See page 339.**
- **Try to market yourself for a new job? See page 151.**
- **Be called upon to make a formal presentation? See page 95.**

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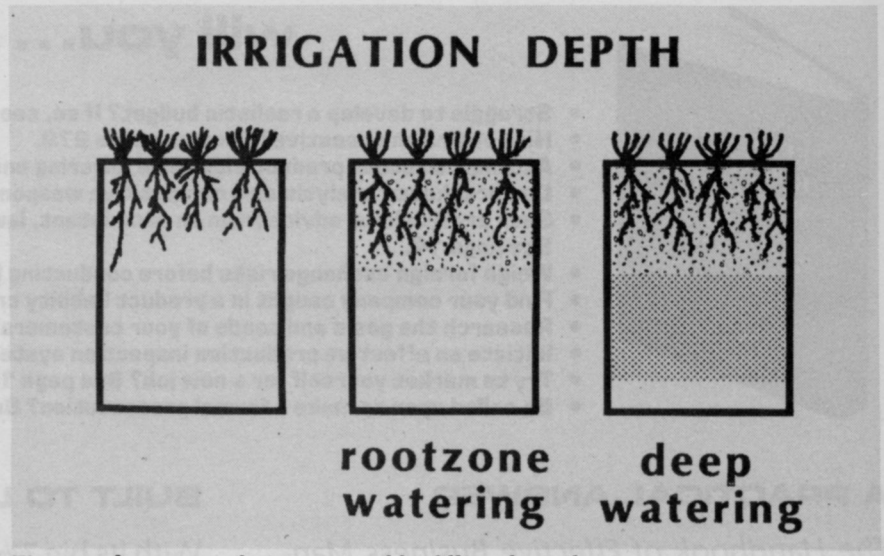
amendments or wetting agents.
11. Eliminate wash down of hard (paved) surfaces.
12. Mulching to provide greater water holding capacity of soils.
13. Installation of check valves to prevent low head drainage of pipes.
14. Any others of sound logic and peculiar to the individual site.

Reclaimed sewage water is probably the ultimate goal for all large site irrigation installations but has its own inherent problems yet to be overcome. This source, on all sites of which I am acquainted, is tertiary treated thus eliminating most of the problems. However, one in considering its use must study carefully the chemical analysis available through the supplying agency. Application of too heavy a solution of nitrogen should be avoided as nitrogen causes plant growth and particularly algae growth. Further, inspect for heavy metals, boron, phosphates, and bacterial and virus concentrations.

Reclaimed sewage water should be studied carefully by a water/soil scientist prior to any consideration for use. This is a complex specialty of which this author is not infinitely knowledgeable. Consult with a specialist for your requirements. There is a quantity of technical papers that have been written on this subject that are available to those interested. The Irrigation Association 1981 Technical Conference Proceedings is one such publication.

Lastly, water conservation must begin with proper water management and maintenance. And the only way to reduce maintenance costs of an efficiently designed and operated system is to reduce the size of the irrigated area of the site. A well maintained system must be inspected periodically (once every week or two) under flow conditions and any malfunctions immediately corrected to maintain the high efficiency the system had when first installed. Faulty equipment must be replaced with like kind only to keep the system in balance. Low head drainage should be prevented by installation of check valves of the spring-loaded poppet type under each of the low heads. Monitoring stations of tensionmeters must be checked periodically, as recommended by the manufacturer, and serviced when needed. Auger samplings should be taken prior to every irrigation on manually controlled systems. Tensionmeters can be installed at every valved section on automatically controlled systems. It is advisable to set the automatic controllers to operate at the timing required for the precipitation required during the summer's peak demand loads. Rather than applying one cycle per night, the sequence should be divided into several watering periods per night and repeated the correct number of times each night to accumulate the whole. For instance, a system requiring thirty minutes of watering per night would be timed to a ten minute watering period and repeated three times at equal intervals throughout the allowed hours available for watering to provide the required total of thirty minutes. This prevents runoff and, in most cases, puddling. However, under most conditions, no less than two-tenths of an inch should be applied for any one night. As the droplets cling to the blades of grass, a quantity of the water applied never reaches the soil and is lost by evaporation the next day.



Fine results are now being attained by filling the soil to its optimum moisture capacity and to the depth of the root structure of the grasses, and then replacing the daily losses nightly.

This author does not agree with the older watering concept of waiting until the turf shows stress and then deep watering. Fine results are now being attained by filling the soil to its optimum moisture capacity and to the depth of the root structure of the grasses being used, and then maintaining that fine balance of soil, air, and water by replacing the daily losses every night, or every other night, however the observed dictates may demand. To reiterate, this is evaluated by the evaporation pan, the tensionmeter, or the soil auger. And this is only the responsibility of the site water manager.

An independent Irrigation Consultant, and member of the American Society of Irrigation Consultants, has made available, for modest cost, a "Sprinkler System Operation Guide" which should be found useful by most water managers of turfed fields. The address for Lee E. Bean is given under "Cited References" at the end of this article.

Due to limited space, no mention has been made of a recent development in irrigation form. This novel approach supplies irrigation water from below the turfed surface and is drawn directly into the root zone of the turf. The plots are sealed approximately two feet deep with a waterproof membrane. It is reported that this method has been successful in over seven hundred installations on athletic fields and golf course greens. The inventor is Dr. Willaim Dainel of Purdue University. He has available literature

Continues on page 34

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for any interested parties. This system uses only water for plant transpiration, eliminating most of the moisture losses usually realized through soil surface evaporation.

There is much yet to be learned about proper and efficient irrigation practices. Much has been written on many facets of this nebulous art. One day it will become a controlled, predictable science. Until that day arrives, those who practice this art must experiment and test and reveal to others their results so that comparisons and contrasts may be examined.

The state universities must continue to advance their explorations of hybrid grasses to develop drought resistant, weather and disease resistant stands. Their experiments on moisture requirements for turf grasses has already advanced this industry many fold.

The American Society of Irrigation Consultants is presently conferring with the California University System to establish a formal curriculum in Irrigation Design for Ornamental Turfs and Plants. Hopefully this will be followed by other university systems in the U.S.A. There has never been, to my knowledge, a degree offered for this discipline.

The practice of irrigation design is approximately sixty years old. It has developed tremendously in the past quarter century only through the dedicated indulgence of those engaged.

It is a most needed science. As formal education becomes available, it will become more respected for what it is.

CITED LITERATURE

1. **Department of Plant Sciences**
   University of California
   Riverside, California 92502

2. **The Irrigation Association**
   13975 Connecticut Avenue
   Silver Springs, Maryland 20906

3. **Lee E. Bean, Irrigation Specialist**
   110 West 31st Street
   Boise, Idaho 83704

4. **Dr. William H. Daniel, Turfgrass Specialist**
   643 Sharon Chapel Road
   West Lafayette, Indiana 47906


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POLLUTION: NEW FACTOR IN DIAGNOSIS OF TREE DAMAGE

BY DAVID F. KARNOSKY AND TED R. MYERS

Air pollution is one of the many unnatural stress factors affecting the growth and survival of shade trees in and around urban areas. Concentrations of ozone, sulfur dioxide, and suspended particulates frequently exceed federal air quality standards throughout much of the United States.

The problem's complexity is demonstrated by the fact that urban and rural areas alike, commonly have high air pollution levels.

What effects do air pollutants have on shade trees? What are the most damaging pollutants? How can pollutant injury symptoms be positively diagnosed? These are a few of the questions that will be addressed in this article which is aimed at providing practicing arborists with a better understanding of the air pollution problems they may encounter. In the second article in this series, we'll examine differences in responses of trees to air polution and describe which shade trees can best tolerate pollution problems.

Injury to green ash caused by ambient ozone pollution.

Major air pollutants

While there are many different types of air pollutants, arborists are unlikely to encounter tree problems from most of them. Some pollutants which commonly cause tree injury are ozone, sulfur dioxide, herbicide drift, and deicing salt spray.

Ozone—Ozone is probably the most widely occurring and most damaging air pollutant in the United States. It is generated in the atmosphere from reactions of oxygen and auto exhaust products (nitrogen oxides and hydrocarbons) in the presence of sunlight. While there is also much natural ozone, especially in the upper atmosphere, the majority of that causing problems to trees is related to man's activities.

Early realization that ozone could cause the death and decline of trees occurred in the western United States when large acreages of mixed conifers in the San Bernardino Mountains in southern California were found to be suffering from ozone pollution. More recently, elevated ozone levels have been commonly recorded across

Continues on page 40

Dr. Dave Karnosky is a forest geneticist of the New York Botanical Garden's Cary Arboretum in Millbrook, NY. Ted Myers is director of research and development for Cottage Gardens, Inc., Lansing, Michigan.

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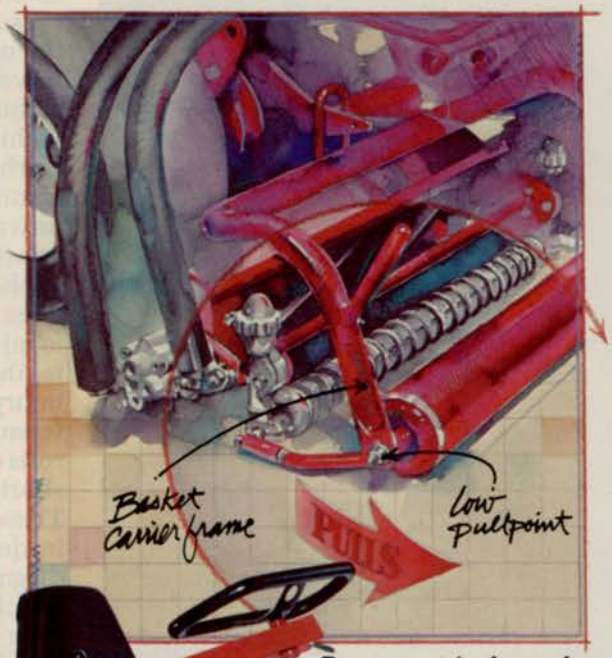

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Sulfur dioxide injury to white ash following a fumigation with one ppm for 7½ hours.

much of the eastern half of the United States. From the authors' experience in the Midwest and Northeast, the most common air pollution injury to shade trees during the past five years has been caused by ozone.

Sulfur dioxide—Sulfur dioxide is emitted when fossil fuels are burned for processes such as the generation of electricity, home heating oil refinement, and ore smelting. Unlike the situation with ozone, sulfur dioxide problems on trees (which have been recognized since the early 1900's) are usually localized around point sources such as power plants or ore smelters. The burning of lower sulfur level fuels, the construction of tall smoke stacks which widely disperse sulfur dioxide pollution, and the use of stack scrubbers have all served to decrease the number of sulfur dioxide problems on trees within the past 10 years.

Salt spray damage to eastern hemlock growing near highway.

Herbicide drift—Herbicides are commonly used for controlling unwanted weeds, brush, or tree growth. Unfortunately, herbicides applied as aerial sprays or from large mist blowers often drift over to injure trees and shrubs adjacent to the area being sprayed. This injury can occur in many different forms including foliar chlorosis or necrosis, abnormal foliar or short growth, and/or mortality. These symptoms will be described in detail in the section on injury diagnosis.

Deicing salt spray—Salt spray from roads covered with deicing salts is a common cause of tree and shrub injury in the northern United States and Canada. Damage to sensitive trees such as eastern white pine and eastern hemlock occurs at distances of up to several hundred feet from high-speed roadways. The amounts of salts used have risen steadily in the past 40 years. A hundred tons of salt or more may be applied annually per mile on heavily travelled highways.

Other pollutants—Other air pollutant problems of trees that the arborist may encounter include injury from particulates and hydrogen fluoride.

Particulate pollution is generally caused by the burning of coal or refuse or by wind-blown dust as occurs around cement factories. While usually not injuring the foliage directly, as occurs with the gaseous pollutants, particulates cover leaves and reduce their capacity for photosynthesis and block gas exchange by plugging stomata, thereby reducing tree growth and vigor.

Hydrogen fluoride is a pollutant of localized nature, primarily

Continues on page 42

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TABLE 1

Typical symptoms from air pollution injury on hardwoods and conifers.

Pollutant	Hardwood Symptoms	Conifer Symptoms	Indicator Plants
Ozone	Upper leaf surface stipple or fleck, often purple or black in color. Premature leaf drop.	Current-year needle tip necrosis (tipburn), shortened needles (chlorotic dwarf), needle mottling. Premature needle drop.	Bel W-3 tobacco, Milkweed, Green ash, Eastern white pine.
Sulfur dioxide	Bifacial, interveinal tan or brown necrosis.	Current-year needle tip necrosis (extending toward base when severe). Yellowing of older needles.	Alfalfa, Blackberry, Birch, Eastern white pine.
Herbicides	Necrotic spotting, leaf curling, twisting, or bleaching.	Needle chlorosis, needle necrosis and twisting (necrosis worst at needle base).	Grapes, Tomato, Boxelder.
Deicing salts	Leaf margin chlorosis or necrosis, premature fall coloring, dieback, witches'-brooming.	Needle tip chlorosis or necrosis for one-half needle length or more (visible in late winter or spring). Premature needle drop.	Eastern white pine, Hemlock.
Hydrogen fluoride	Leaf tip or margin chlorosis or necrosis.	Current-year needle-tip necrosis (extending toward needle base when fumigation is severe).	Gladioli, European larch.

around aluminum, brick, cement, glass, steel, and phosphate processing plants.

Acid Rain

The acidification of precipitation, related to man's increased burning of fossil fuels, has received considerable attention in the past few years, especially with regard to the dramatic effects on Adirondack lakes. There is no evidence, however, of any adverse effects of ambient rainfall on shade trees. For instance, no one has documented visible foliar symptoms caused by natural rain water. If the pH of rainfall continues to decrease, then acid precipitation may become an important problem on shade trees in the future.

Diagnosing pollutant injury

Diagnosing air pollution injury to trees is not easy because the injury can occur in many different forms depending on the pollutant, the tree species, and the environmental conditions under which the trees are growing. However, there are types of visible symptoms that are associated with specific air pollutants (see Table 1). These symptoms, along with a number of other factors described below, enable the arborist to make an accurate diagnosis of most air pollution problems on trees.

Diagnostic procedures—The Environmental Protection Agency's manual on diagnosing vegetation injury caused by air pollution (Applied Science Associates, 1978) lists six questions that are useful in attempting to diagnose air pollution injury:

1. What plant species are injured?
2. What are the injury symptoms and what plant parts are affected?
3. Is there a pollution source nearby capable of causing injury?
4. What is the distribution of affected plants?
5. Are biological agents (insects, diseases, nematodes) present?
6. What is the recent history of the affected area?

In contrast to insects or diseases which often are quite selective in the species they affect, air pollution often injures a wide range of plants, especially if the fumigation is severe. Knowing what plant species are injured also is useful because some plants are especially sensitive to certain pollutants and so make good bioindicators of the presence of that pollutant. Some common bioindicators are shown in Table 1.

Examining the types of symptoms present will also help in diagnosing air pollution injury. The color of the foliage injured, the pattern of injury on the leaves, the leaf surface affected, the state of maturity of the injured leaves, and the location of the plant where the injury occurred are all useful information to note.

If the injury symptoms appear to be caused by air pollution, then a source of the pollution problem must be identified. With the exception of long-distance transport of ozone, most pollutant injury to trees occurs within close proximity to the pollution sources. Air monitoring data from various local, state, or federal agencies can sometimes be found to verify the presence of a pollutant fumigation episode in an area with suspected air pollution injury.

The distribution of suspected pollutant injury on trees is another important diagnostic tool, especially when point sources of pollution are involved. Damage is usually most severe downwind from point sources. The distribution of injury can also be used to distinguish air pollution problems from those caused by insects or disease which often have distinct patterns of spread.

Any plants showing suspected pollutant injury should be examined carefully for biological agents that may have caused symptoms that mimic air pollution injury. Spider mites and leafhopper insects, for example, can cause upper leaf surface stipple on hardwood trees

Continues on page 46

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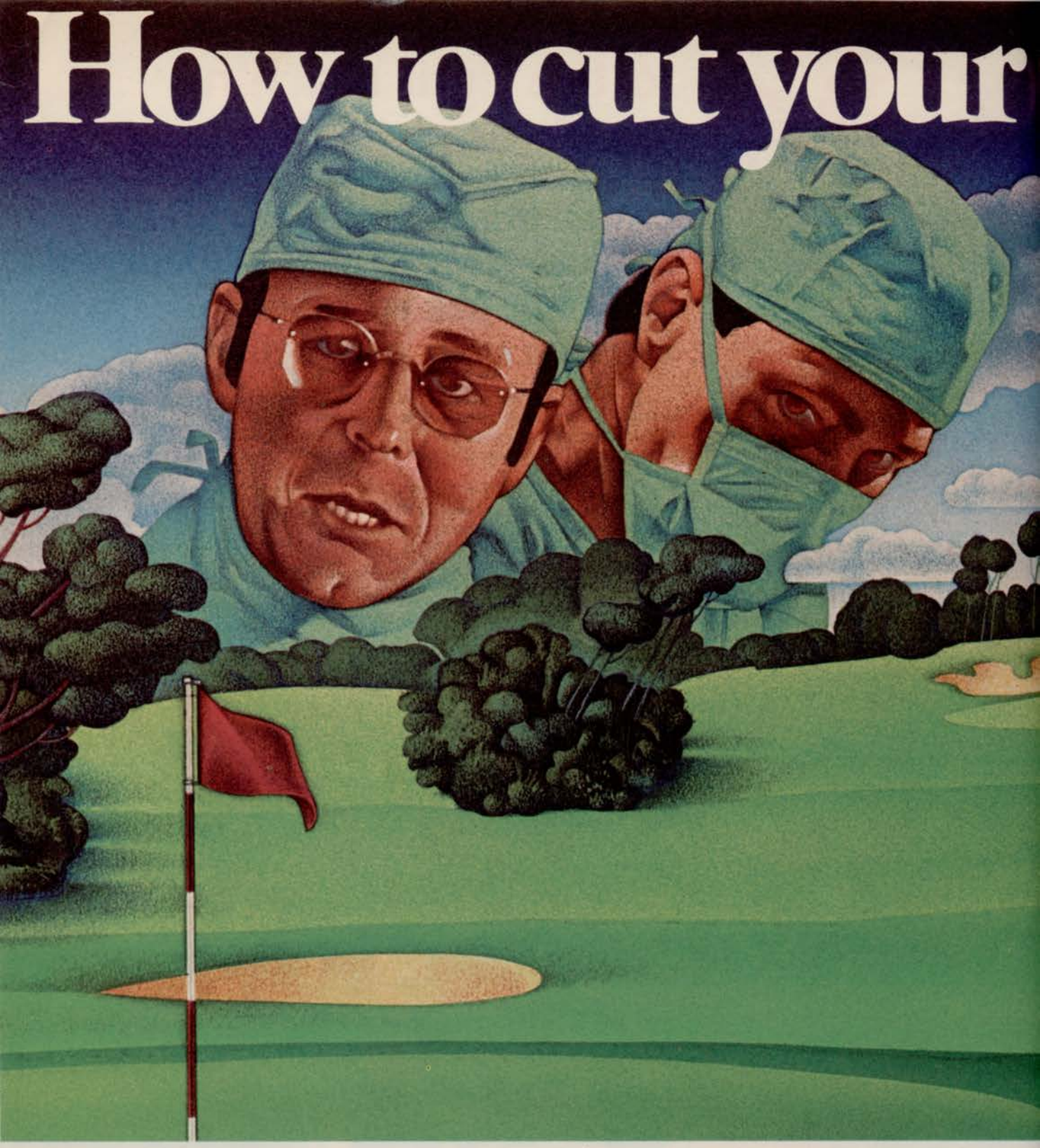

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Pollution *from page 42*

similar to ozone injury.

It is also important to be aware of any abiotic stresses such as water stress, frost, and nutrient deficiency that may be present at the site and may also cause symptoms similar to those caused by air pollution.

Obtaining information on the recent history of the affected area can sometimes help in making the diagnosis. In this way, information on factors such as soil fertility levels, pesticide applications, drought stress, or changes in drainage patterns can be obtained.

In addition to the above-mentioned diagnostic procedures, it is often advisable to solicit the advice of trained forest pathologists or entomologists before making judgments on the cases that are more difficult to diagnose. It is often useful to have foliar analyses run to test for elevated levels of pollutants such as deicing salts, sulfur dioxide and hydrogen fluoride.

Field evaluations—In responding to requests to evaluate suspected air pollution problems on trees, the senior author has found it advisable to be properly equipped so the field time is spent most efficiently.

Some useful items that can be taken along in a pick-up truck, van, or station wagon include a field notebook (preferably with some preprinted data evaluation sheets showing the information you wish to collect), a camera (with closeup and telephoto lens), a book to press plant leaves for eventual preparation as herbarium specimens; plastic bags; ice cooler; hand lens; binoculars; pole pruners; soil sampling auger; books with good descriptions and photos of common insect, disease, and air pollution problems; and backpack.

It is especially useful to document suspected air pollution injury by taking extensive field notes and photographs and by collecting some foliar samples for herbarium mounting and others for preservation by freezing in plastic bags. Field notes, color photographs, and foliar samples are especially useful in discussing your findings with experts in tree problems diagnosis and also in serving as evidence in any possible litigation that might result.

To ensure that good herbarium specimens are prepared, leaves should be pressed flat as soon as possible after they are collected. Plastic bags are useful in collecting leaf samples but also for taking samples of insects or disease that might be found on the affected trees. A pole pruner is essential for collecting foliar samples from the upper or middle crowns of trees where air pollution injury is likely to occur, especially if the trees are growing close to one another. A good field guide to carry for diagnosing air pollution injury is Jacobson and Hill's (1970) book entitled "Recognition of air pollution injury to vegetation: A pictorial atlas."

Correcting air pollution problems

In the companion article, the authors will discuss ways to reduce air pollution injury to trees such as cleaning up the source of air pollution and planting pollution-tolerant trees. Some corrective measures such as adding gypsum to reduce toxic effects of deicing salts and fertilizing eastern white pine to reduce ozone and/or sulfur dioxide injury will be discussed.

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CONSTRUCTION

RESIST TEMPTATION TO CUT CORNERS WITH TIE WALLS

BY JOHN ALEXOPOULOS

Railroad ties have been utilized for many years in landscape design. Their popularity has been particularly great in comparison to other materials due to a variety of reasons, but primarily for their low cost and desired "old and weathered look".

The genuine railroad tie also has been treated through and through with preservative, seeming to last forever. In addition, the ties are easily transported, easily handled by two workers and can be cut to various lengths. Ties have therefore been used as curbing, walls, steps or planters.

This versatility in use has been a notable characteristic, and combined with the usual very low price, presented contractors and homeowners with a cheap and effective way out of using more expensive materials. In recent years, however, this surplus railroad material has become scarce and the prices for them has risen tremendously.

Timber selection

The timbers utilized for railbeds are generally pressure treated and vary in their dimensions. A typical tie might be considered as six inches by eight inches thick and eight feet long.

There are, however, numerous exceptions to these dimensions, with larger thicknesses, and lengths as long as thirteen feet being found. The type of wood used is often a hardwood and primarily oak. In any event, all the timbers are pressure treated with creosote. This treatment usually preserves the ties for many years though they may be greatly affected by weathering, wear, wood quality and by the material surrounding the wood.

In any batch of used railroad ties the quality varies widely as some pieces are found in very poor condition. Ties with wide cracks, splits made by spikes, internal decay, deformed or rounded edges are inadequate for landscape use. These defects are especially a problem where ties are used for steps in which case a very smooth tread and sharp edges are a necessity. The price for old ties is quite high, and wasted pieces become costly.

> The temptation to use less expensive and rapidly constructed material for railroad tie walls is always great. Concern must be given not only to strength and durability, but to appropriate use as well.

As a result of the need for top quality timbers and the scarcity of old and usable ties, new ones have become the predominantly available material. These new timbers vary in dimensions much as the older ones do, but usually are sold six inches by eight inches by eight feet. Most recently, landscape timbers have become available at garden centers and lumber yards which are even smaller in dimension. The new landscape timbers or new railroad ties also consist of various kinds of wood, both hardwood and softwood.

In selecting new landscape timbers, the designer or contractor must keep in mind the use for the timbers. In stair construction for instance, a sharp edge must be present for safety and appearance. Softwood timbers, such as cedar, hemlock or pine, should not be used for they wear too easily, creating a rounded and dangerous step. A better choice would be a well cut oak timber. Softwood timbers, on the other hand, if properly preserved, will serve well for walls and posts. Their light weight makes wall making all the easier and makes drilling for pin placement much easier than in hardwoods.

In selection of the kind of wood used, the designer should attempt to obtain the most naturally decay resistant species available. This is particularly important in wall construction where posts and wall courses are in constant contact with the soil. A problem exists here in that these wood species are no longer readily available and are more costly than the less resistant species.

The best naturally resistant woods are red cedar, redwood, cypress and black locust. The least resistant ones are primarily softwood species such as pine, spruce and hemlock.

No tree species, however, can be relied upon to last for many years if not treated with preservative. Even the best species, if available, will eventually decay especially if the wood is in direct contact with moist soil.

Preservatives

Preservatives must be utilized in order to extend the life of the railroad tie. It must be also kept in

Continues on page 49

John Alexopoulos is Assistant Professor of Landscape Architecture, University of Connecticut, Storrs.

mind that most wooden walls, in contact with the soil, will not be permanent, lasting for far less time than masonry or concrete ones.

The best preservative treatment by far is pressure treatment. In this process the chemical is driven into every part of the timber. This complete dispersal throughout the timber prevents decay which occurs within the wood when it splits or within the holes drilled to receive joining spikes or rods. Creosoting is by far the most popular treatment, adding many years to the life of any wood species used. A drawback to the use of creosote treated timber is that the creosote tars can ooze from the wood and can therefore be messy in appearance and sticky to the touch. Designed areas such as playgrounds utilizing these timbers should be planned so as to avoid placing them where contact by people might occur. Creosoted ties are best used as underground posts in areas where contact with the timber would not be a problem.

Pentachlorophenol, or Penta, is another fine, long lasting preservative and one which is not liable to be sticky to the touch. A real problem with this chemical and with creosote as well, is the toxic effect their fumes have on plants. New, fresh timbers should be allowed time to weather before placement to minimize damage to nearby plants. If, however, the plantings are open to breezes in a well exposed area, then the problem of damage will be lessened. The designer or contractor should use proper judgement as to the use of these kinds of treated timbers.

A preservative which is relatively safe near plantings and which is also an effective decay retardant is copper naphthenate. It generally is of a green color, but is now found in numerous colors from clear to dark brown.

A second treatment for preserving landscape timbers is the soaking method. The timbers are soaked in the preservative from a few hours to a few days. However, the chemical will penetrate only one eighth to one quarter of an inch into most woods. This is fine for the outer surface of the timber, but has no effect on decay organisms which will invade the interior of the timber, especially when it splits.

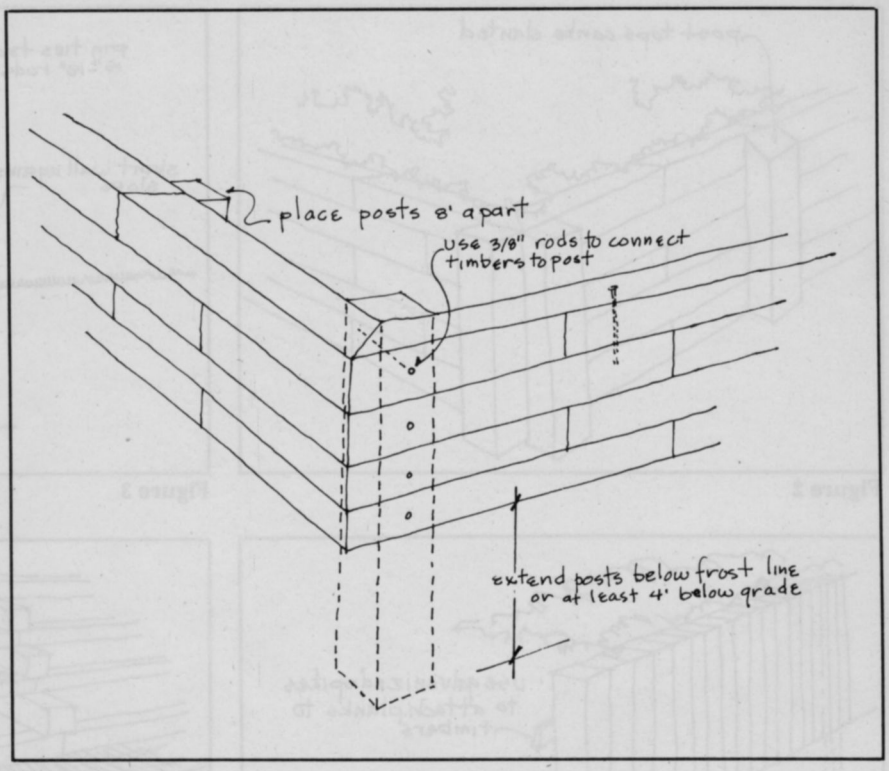

Figure 1

A final method of application of preservative is by brush application. Brushing on the chemical is generally done on the site and is applied after all cuts are made. The problem with this method is simply that the chemical penetrates so little into the timber. Annual painting can help in extending the life of the wood, with care taken to allow the preservative to flow into cracks.

Construction design

The design of railroad tie retaining walls must be done with consideration of the factors which affect all retaining walls.

The particular factor which is by far the most important one is the pressure exerted on the wall by the soil behind it. Tremendous and steady pressures constantly push against the back of a retaining wall and can topple it if the wall isn't designed correctly.

A primary error in design which leads to wall failure is that too often supporting posts, or "deadmen", are not employed. All the courses of a railroad tie wall should be tied together and attached to posts that not only hold each tie, but extends below the wall into the ground. The extension of the posts into the ground counteracts the natural tendency of a wall to topple and eliminates the effects of frost heaving. The depth of the post below the lowest grade should always extend below the frost depth in the particular region of the country (Fig. 1). The higher the wall is to be, the deeper the post must be placed.

A designer should consult an engineer for walls exceeding five or six feet high, because the higher the wall, the greater is the need for support. In a four or five foot high wall the posts should extend below the bottom wall course at least four feet and should be anchored in concrete. The use of a concrete footing should not be omitted, especially where the ground continues to slope above the top of the wall.

A batter or receding upward slope in the wall should be used in these situations so that the wall resists the pressures of the slope. If posts are omitted where the soil is not stable or is newly filled the danger of the wall sliding out from its bottom is increased.

Galvanized spikes should be used to pin individual wall courses

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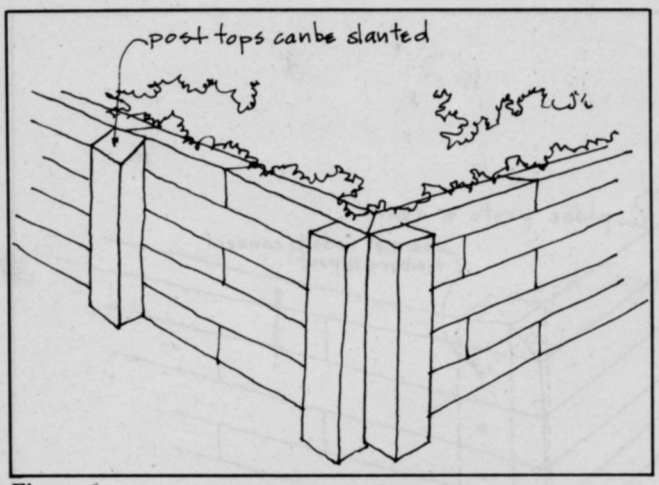

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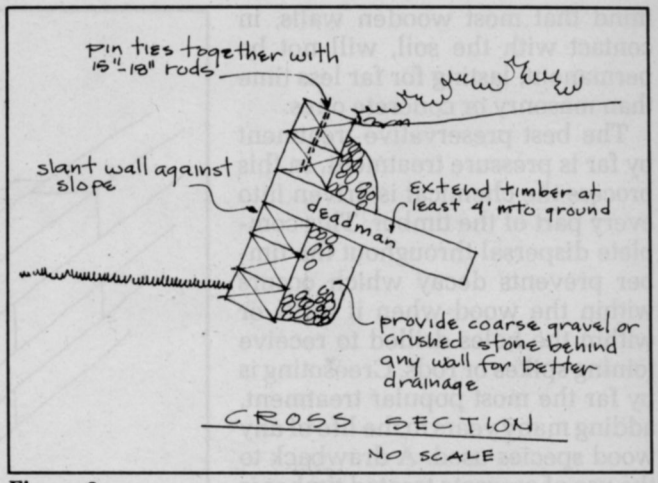

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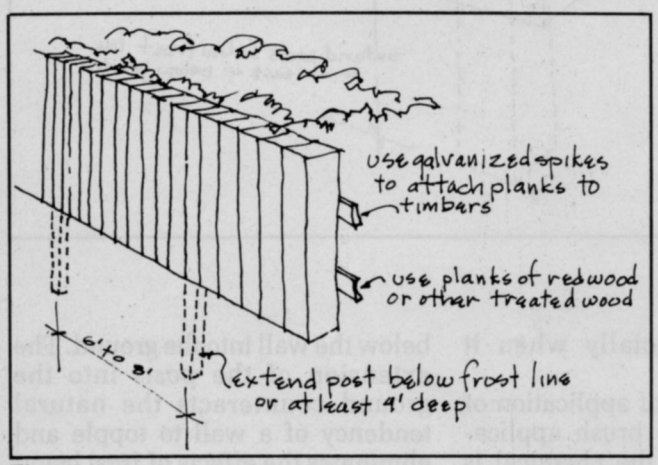

Figure 4

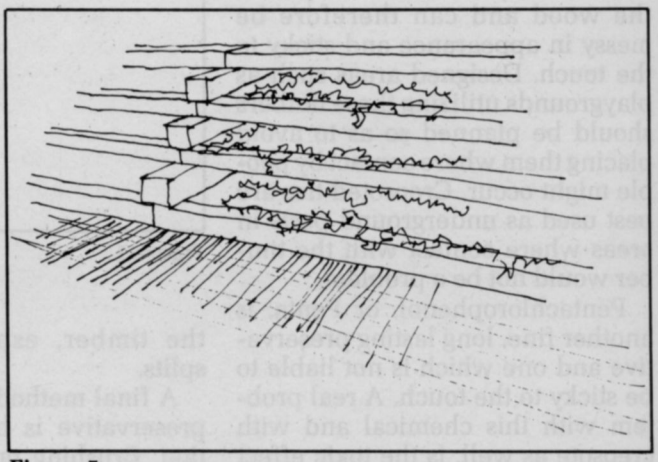

Figure 5

together or for joining the wall to posts. Rods of three-eighth-inch diameter by fifteen inches long can be used also. A galvanized coating will prevent rusting and subsequent failure where moisture is present. Metal straps or angle iron should be avoided as well and can be substituted with strips of redwood or pressure treated woods.

In considering the appearance of retaining walls, the designer can utilize the supporting posts by introducing them as part of the design (Fig. 2). Posts can be placed in front of the wall at intervals of from six to eight feet. The post edges can be cut at angles (champfered) for appearance and the post top cut at angles. The wall courses should alternate so that no joint is above another. The butt end of a tie can be placed between horizontal ties for added interest as well.

In short walls or in walls that are in front of stable soil the posts can be eliminated (Fig. 3). Where this is done, the use of "deadmen" or ties which extend perpendicularly into the slope should be utilized. These timbers will serve as counter drags to the natural pressures behind the wall. These "deadmen" can be located in patterns to create a better designed wall and should be extended at least four feet into the soil.

Another wall design is created by placing the ties vertically instead of horizontally. This style reveals no posts for support as the post found every six feet in wall length are extended into the ground for support (Fig. 4). The timbers are all joined together with a treated plank or redwood strip behind the wall.

Another design style for railroad tie walls is one which is most suitable for utilitarian purposes. This wall allows for spaces in which plants can be grown. Every other course of timbers is eliminated (Fig. 5). The "deadmen" serve not only as support for this wall but also serve as the points to which all the timbers are connected. The pressures caused by water behind walls is not as great in this type as others because excess soil water merely flows through the spaces. These walls are especially appropriate for garden use.

In conclusion, in the design of retaining walls, concern should be given not only to strength and durability, but to appropriate use as well. Landscape timbers or used railroad ties simply don't belong in some design situations while fitting perfectly into others. In general they are best used in residential and utilitarian situations, lacking the appearance of permanence and grandeur often necessary in most commercial or institutional landscapes. The temptation to use this less expensive and rapidly constructed material is always great, so the designer must consider these walls carefully. **WTT**

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Victa	3.5
Geronimo	4.0
Majestic	5.0
Bonnieblue	6.0
Adelphi	6.5
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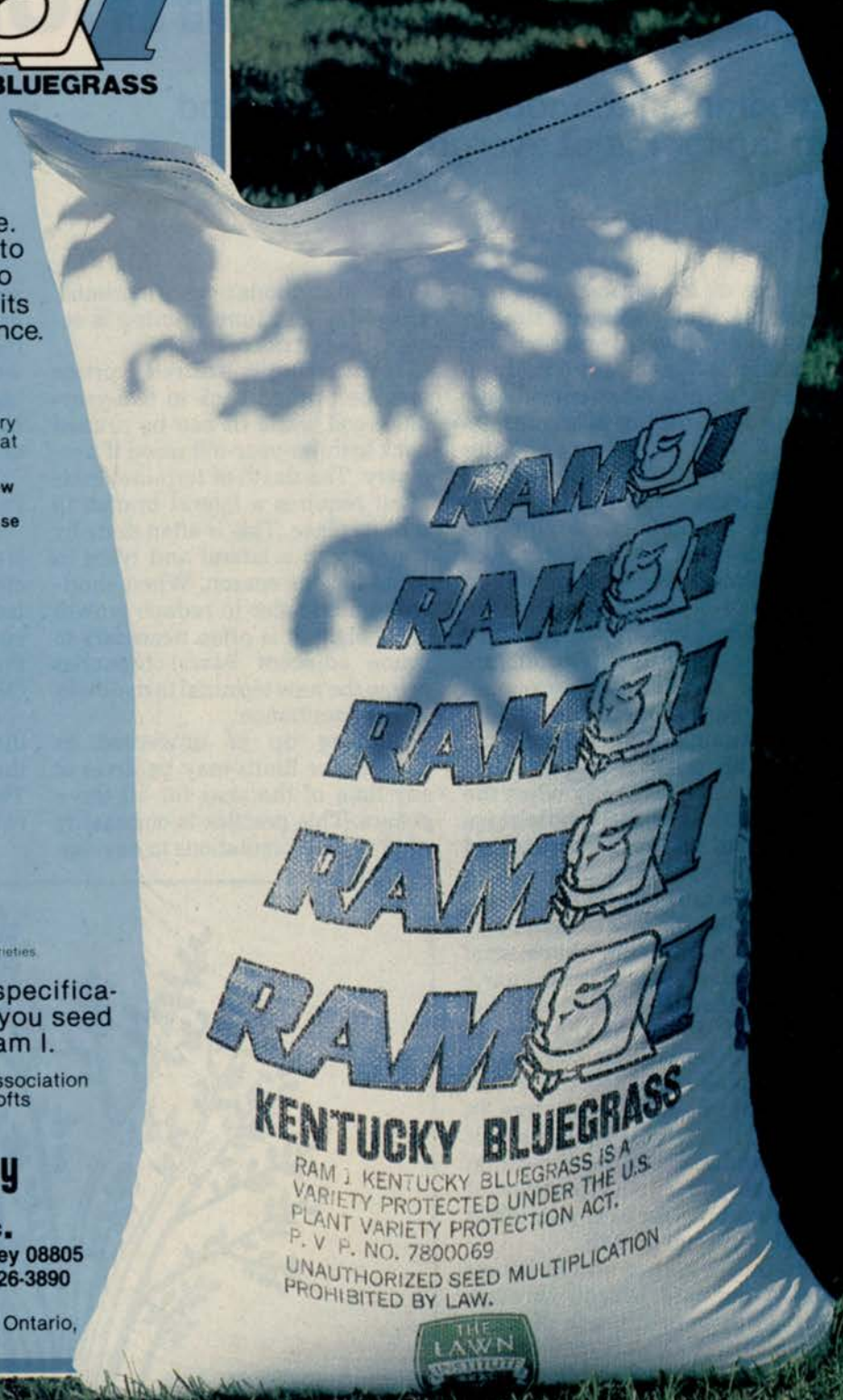

KEYS TO PRUNING EVERGREENS AND DECIDUOUS SHRUBS

Recommended tools, techniques, and timing for major evergreens

BY DOUGLAS J. CHAPMAN

Pruning of evergreen trees and shrubs is a management strategy that can effectively round out and enhance the year-round maintenance schedule. When considering timing for pruning of evergreen trees, it must be stressed that this process varies for the different genera and is dependent on the different type of pruning desired. Conifers, more specifically, pines, lack adventitious buds capable of generating suckers; therefore, removal of limbs and twigs, after they have taken on a woody or mature character results in a permanent loss of branches or foliage.

Top pruning of **pines** (shearing) is a specific practice accomplished in late June or early July when the new growth is in the candle stage prior to bud set. Unlike spruce and firs, pines form buds only once a year in the new candle (a meristematic area at the tips of branches); therefore, pruning for shape must be confined to current year's growth if the pine is to be dwarfed or shaped. Shearing the candle growth, a technique commonly used by pine Christmas tree growers, produces a thick-bushy tree. In practice, it is pruning off one-half of the candle during the elongation period, resulting in the formation of numerous buds for next year while reducing annual growth.

Pruning of **spruce and fir** is best done from late March through April to prevent dieback of stubs from freezing. Apical dominance is important when pruning spruce and fir and, therefore, one should prune just above a bud, similarly as to how deciduous trees are pruned. Late May and June pruning is acceptable but not optimal.

If dwarfing is desired, spruce may be pruned back to two-year-old wood while fir can be pruned back to three-year-old wood if necessary. The death of terminal buds often requires a lateral branch to take its place. This is often done by bending up a lateral and tying in place for one season. When shortening the leader to reduce growth and height, it is often necessary to prune adjacent lateral branches below the new terminal to maintain apical dominance.

Limbing up of unwanted or dead lower limbs may be done at any time of the year for all three genera. This practice is commonly used in pine plantations to develop knot-free timber. Pines have resin or a natural fungicide that inhibits the activity of decay fungi in the wounds. This natural wound dressing not only protects the heartwood but seems to encourage callusing or closure of the wound.

Pruning of deciduous shrubs

The pruning of pines and shrubs is easy yet rarely done correctly. Deciduous shrubs, such as forsythia, lilac, Redosier Dogwood, and honeysuckle, should be pruned annually; therefore, THEY REQUIRE A LOT OF MAINTENANCE.

One should remove dead and diseased wood as well as 10-20% of the older branches at ground level. This encourages the shrub's natural habit of growth while effec-

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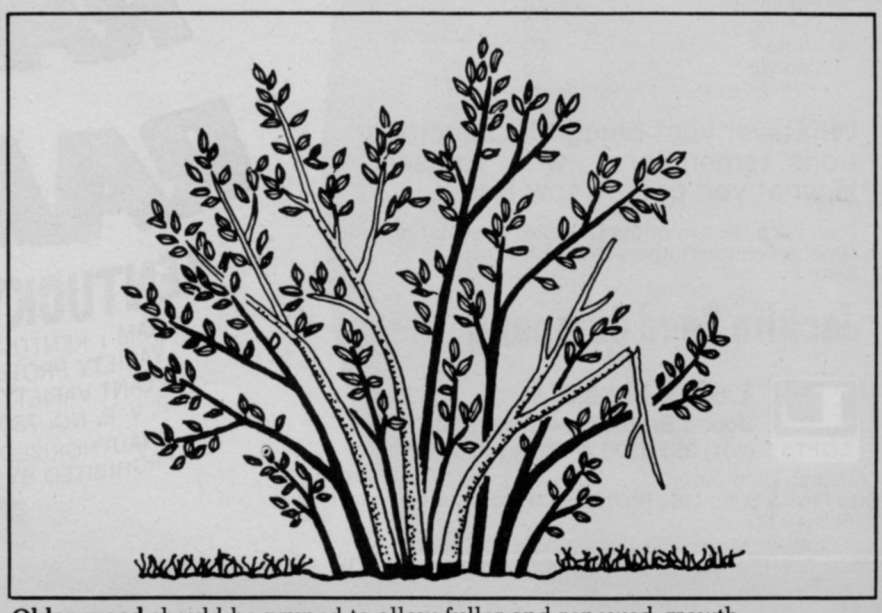

Older wood should be pruned to allow fuller and renewed growth.

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tively reducing the height of the shrub. This height modification is accomplished by how much annual pruning is done, e.g. 15% removal - 8′ lilac, 30% pruned - 5′ lilac.

The removing of oldest branches is the best way to continually renew the shrub. As one removes older branches, a corresponding number of young shoots or suckers should be left. These shoots or suckers will help fill in the plant while helping to remove older canes that often have the highest insect infestation. Plants to be pruned in this manner would have foliage from the ground to the top, not just a few limbs in the upper area. A brief list of plants to be pruned annually in the spring just after flowering include:

Cornus stolonifera/C. sericea in Hortus III (Redosier Dogwood)

C. s. 'Flaviramea' (Yellow Twig Dogwood)

Deutzia (Deutzia)

Forsythia intermedia (Forsythia)

Hypericum prolificum (St. Johnswort)

Philadelphus (Mock-Orange)

Prunus triloba (Flowering Almond)

Spiraea (Spirea)

Syringa vulgaris (Lilac)

Weigela florida (Weigela)

Some flowering shrubs which form flowers on current season's growth should be pruned early in the spring as one would prune deciduous trees. These shrubs include:

Buddleia davidi (Butterfly-Bush)

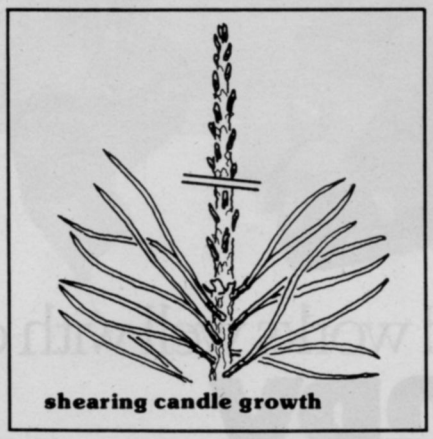
Clethra alnifolia (Summersweet)

Hibiscus syriacus (Rose of Sharon)

Viburnum opulus (European Cranberrybush)

Rhododendron should be pruned either as a deciduous shrub to be renovated or remove half of the *new growth* just as elongation of this growth is complete to dwarf or contain the plant.

Many times new and old landscapes need to be renovated, that is, deciduous flowering shrubs (lilac, forsythia) have not been pruned often enough. This can be accomplished by cutting the entire plant back to 6″ prior to commencement of growth in the spring. After the first season, the renewed shrub can be pruned as described above.



Candle growth can be pruned in half period results in numerous buds growth during the elongation and reduced annual.

Narrow-leaf evergreen shrubs, such as **yews** and **junipers,** fit the maintenance schedule well. They can be pruned during late June and July when the maintenance work load is slightly decreased. Either plant can be pruned into a formal hedge or informally to accent their habit of growth. It is important to remember though that yews should not be pruned after August 15 if winter injury is a problem in your locale.

Tools

Tool selection and proper use are important from the standpoint of minimizing injury to the plant while encouraging rapid callus formation. Four pruning tools provide the maximum flexibility needed to handle almost any pruning operation. These tools include: hand shears, lopping shears, hand saw, and pulling saw.

The most frequently used is a scissors-action hand pruning shears. This shears is desirable for removal of limbs and suckers up to ½″ in diameter. The scissors action is superior to the anvil type because it cuts through the twig without crushing tissue. Making cuts of branches or limbs over ½″ in diameter exceeds the design capacity, resulting in excessive damage to the shrub and pruning shears themselves while making the job tougher.

Lopping shears are useful for pruning branches up to ½″ in diameter. The same principal for selection of head-type, that is, the heavy cutting head consists of thick, bluntly beveled (parrot beak-like blades) and not the anvil type, is important. The length of the handle determines the leverage and, therefore, how easy the job can be done. When using either the hand or lopping shears, the position of the tool before cutting affects the quality of cut. Cuts where the blade is placed in the apex of the crotch usually result in splitting and bark tearing. The correct position of the scissors action tool places the blades perpendicular to the limb being removed. To facilitate the final "*flush cut,*" the tool should be placed with the beveled side or the cutting side nearest the stem.

Limbs over 1″ in diameter are best pruned with a pruning saw. The correct pruning saw is different from normal woodworking saws in two respects, the pruning saw has a curved blade and cuts (draw cut) only on the draw stroke, that is, the teeth are angled back towards the handle. Saws which cut on the pull stroke make the job easier. It is not recommended that one climb the trees or get the ladder unless absolutely necessary, thus poles make the job easy from the ground.

The handles for pole saws are made of fiberglass, aluminum, or wood. Although the fiberglass is heaviest, it is one of the safest materials near electrical wires. Of the wood types commonly used for handles, basswood, Sitka Spruce, and Western Hemlock are good with Sitka Spruce being best when considering light-weight and strength.

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Bill Brown, Director of Parks and Recreation, Manchester, Tennessee

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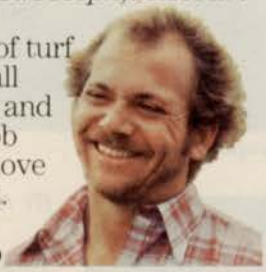
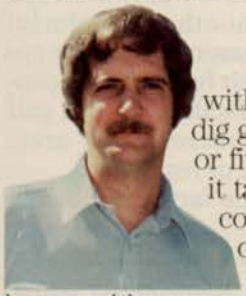
After comparing John Deere to other similar tractors, we all agreed they run farther on less fuel. They have plenty of power. They're easy to operate. And they're even comfortable to ride on. What more can you ask from a tractor?

Larry Foster, Director of Parks and Recreation, St. Joseph, Missouri



There's about 135 acres of turf to mow around here and it's all divided by curbs, parking lots and islands. It would be a tough job with a tractor that couldn't move around. But the 850 is perfect. It's got a lot of power and it's real maneuverable. And it's so easy to operate that I taught some of the college kids to use it over the summer. They kind of get a kick out of it.

Bruce Roberts, Grounds and Vehicle Maintenance Foreman, Illinois Central College, East Peoria, Illinois



We got a John Deere 850 with a backhoe on it to help us dig graves. It used to take us four or five hours to dig a grave. Now it takes about 20 minutes. Of course we looked at four or five different tractors, but we decided on the John Deere because it's so versatile, and if we ever have a problem, you can't beat John Deere service.

Steve Helton, Manager, Hope Funeral Home, Gallatin, Missouri

We use the John Deere 950 to maintain all the grounds here at the college. We have a front-end loader, a box scraper, a mower deck and a snowplow. We grade the football fields, and use the front-end loader to haul gravel to fill holes. The president of the college has a real steep lawn. The 950 climbs right up there to cut it. This tractor just doesn't get stuck. In the snow, we used it nonstop for at least five straight days. And it's reliable. When we hop up on it, we know it's going to start. It's about the best machine I've ever seen.

Rod May, Grounds Crewman, Otterbein College, Westerville, Ohio

We use our 950 to prepare sites after the building contractors get through. We do mostly landscaping, seeding and snow removal. Let me tell you, we've picked up some unbelievable rocks with that tractor and loader, and never had a problem.

It's pretty economical, too. In nine straight hours of loading rock, the 950 only used eight gallons of fuel.

Phil Arnett, Owner, Grow and Mow, Pomona, Kansas

We use our 850 with the 6-foot mower deck to groom all the grounds here at the cemetery. We have some pretty good hills, too, but they don't seem to bother this tractor. It has lots of power. When we bought it three years ago, the dealer told us how economical this diesel would be to operate, and how reliable it would be. Well, we have over 2,000 hours on it, and he was absolutely right. It performs like a much bigger tractor. It's easy to get in and out of places. And I can run 14 hours on a tank of fuel. As far as I'm concerned, nothing compares to a John Deere.

Al Opfer, Grounds Maintenance Foreman, Forest Lawn and Gardens Cemetery, McMurray, Pennsylvania

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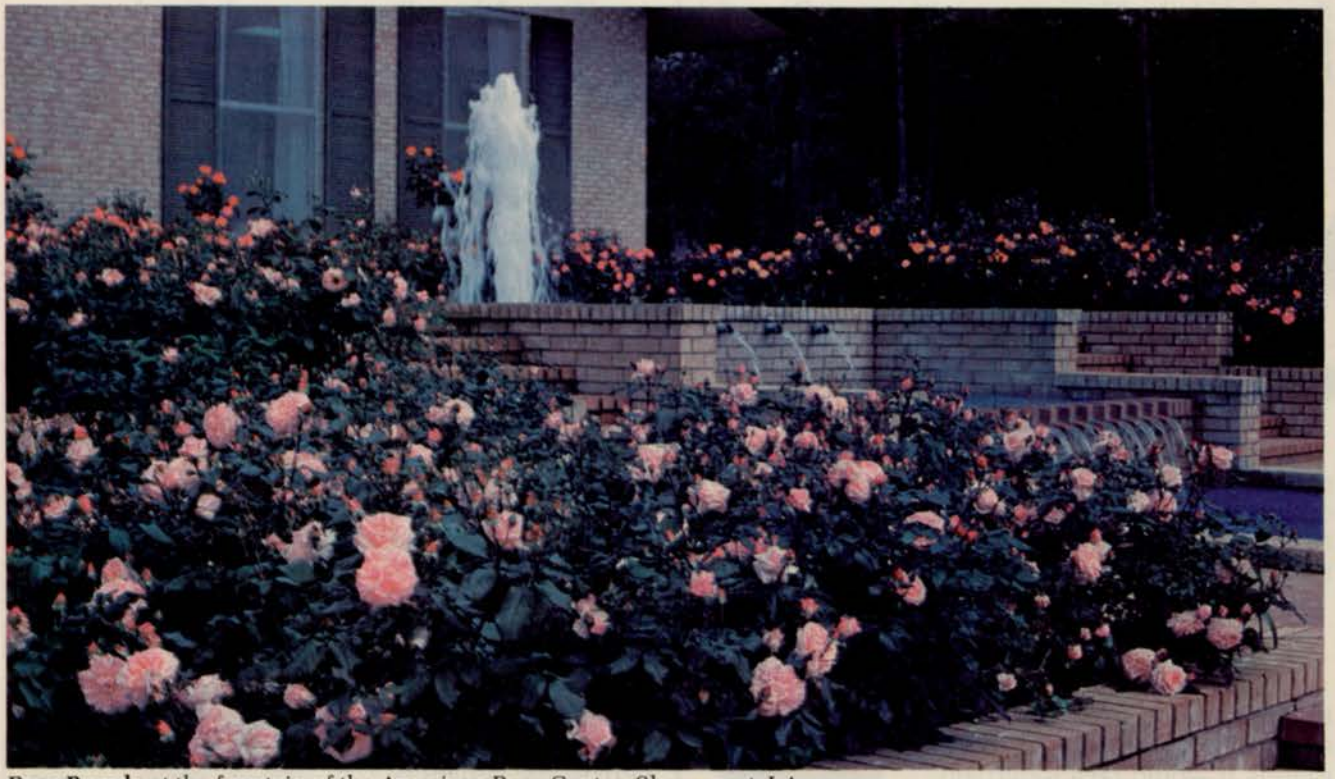
OUT OF INTENSIVE CARE:

THE PLACE FOR ROSES IN THE LANDSCAPE



Rose Parade at the fountain of the American Rose Center, Shreveport, LA.

Hedge of China Doll at Cypress Gardens, FL.

BY ANN REILLY

Roses do not deserve the bad image they often have, because they do not require the intensive care most people think they do. Given a good plant, the right location and a minimum of care, roses will reward you with many months of colorful blooms each season and will be appreciated to their fullest by the people using the facility, be it a golf course, park, recreational area, office complex, or residence.

Shrub and the larger floribunda

Continues on page 60

Ann Reilly is a horticultural writer widely recognized for her expertise in rose selection and care. She is also the executive director of a number of landscape and nursery groups.

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Bum Phillips, Head Coach, New Orleans Saints

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Bison Diesel
30 hp

So, as one pro to another, if quality performance is the name of your game, check out the winning team of mid-size tractors built by the pros—Mitsubishi.

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Circle No. 130 on Reader Inquiry Card

Rose planting at the Toro Co., Minneapolis, MN.

or polyantha roses make excellent hedges and can be used along property lines to hide fences or be "living" fences themselves. "The Fairy" and "Betty Prior" are good variety choices for this use, as is "China Doll", so dramatically used in Cypress Gardens, FL. It grows so thick that no man, child, animal or vehicle could or would want to fight the thorns to get through it. Pruning needs are minimal and can be achieved with hedge clippers if desired.

Lower hedges or borders along paths, entryways, median strips and parking lots can be magnificent when floribundas are the plants of choice. Many of the new varieties are practically sterile; therefore they do not set seed but instead produce more flowers. With the additional color on these varieties comes the phenomenon of clean petal drop and rapid regrowth. What this means is very little removal of dead flowers and therefore less maintenance. Try the varieties "Trumpeter", "Accent", "First Edition" or "Sunsprite". "Simplicity" (or its lookalike "Carefree Beauty") is another excellent shrubby rose variety and was the chosen variety to brighten the sides of the driveway into the Fair Grounds in Corvallis, OR.

When pruning roses in spring for maximum visual effect, prune away all but four of the strongest canes and cut them to 24 inches. Lower pruning will result in larger but fewer flowers.

Climbing the fence

Split rail, chain link or other types of fences that surround the entire property or areas within the grounds are ideal sites for climbing roses, especially the newer varieties such as "America" or "Tempo" that will bloom continually to provide constant color. With rare exceptions, climbers are very hardy and can be ignored during the winter except to make sure the canes are tied to the fence to prevent wind damage. In addition to their beauty and masking qualities, climbers have the advantage of warding off fence sitters and intruders through or over the fence. Jack McCarthy at Old Westbury Country Club on Long Island recently installed several dozen climbers for this purpose and is planning on adding more.

Climbers are not high maintenance roses despite their large size. Pruning mainly involves the removal of dead wood and keeping the plant within size boundaries. Jim Kirk, who maintains 7,000 plants at Rose Hills Memorial Garden in Whittier, CA, controls the growth of the canes at 10 feet by arching them around and down at a 45-degree angle. This, he finds, stops the canes from growing and also produces more bloom, easing the maintenance chore and enhancing the attractiveness of the grounds.

To maintain the climbers on 2½-miles of fence, Jim subcontracts to one man for 10-12 hours every 4 to 6 weeks. The other 7,000 plants are completely tended by two full time men. Once planted, a 100-rose planting should take about 1¼-man hours per week.

Beds of roses

The traditional "rose bed" still has its place around a club house, administration building, flag pole or similar site. It can be styled in either a formal or informal fashion to fit in with its surroundings and can be as large or as small as you desire. Consider the vista from the driveway, offices and other focal points when designing the layout. When planning this type of planting, it is best to stick with one or at the most two varieties for mass color effect. This is not the place for a patchwork quilt. When choosing varieties to plant in pairs, select types with compatible colors and growth habits. Good combinations are "Europeana" and "Iceberg" (red and white); "Sunsprite" and "Accent" (yellow and red); "Garden Party" and "Electron" (white and hot pink); or "Fragrant Cloud" and "Saratoga" (orange and white).

Planting distance apart is important when designing beds or hedges; a good rule of thumb for beds is 2-feet for standard size rose bushes and 6 inches to 1-foot apart for miniatures in temperature climates. For dense hedges, tighten the distance up a little; add another six to twelve inches for frost-free areas. This planting distance not only allows the plants to grow to their full size potential, it also shades the ground sufficiently to keep it cool, moist and weed free.

Weed control

These last three desirable characteristics are also achieved with

Continues on page 62

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Circle No. 113 on Reader Inquiry Card

Roses *from page 60*

a good 2 to 3-inch mulch which can be of almost any organic material, pure sphagnum peat moss being the most obvious exception. If redwood is available, it is about the best mulch as it practically repels insects; cedar is also good. Other good and easily accessible mulches are shredded oak leaves or chopped evergreen branches that may be available from your own prunings. With the combination of a deep mulch and a preemergent herbicide such as Dacthal (if you can find it this year), Ronstar-G or Betasan, weeds can all but be eliminated in the planting bed, making life and rose growing easier.

Where space is limited or low plantings are desired, miniature roses are an answer. If you normally set out bedding plants, try minis instead. They'll give you more months of bloom each year along with eliminating the need to use your maintenance crew to replant marigolds or petunias every year. Miniatures require little attention. they can be pruned with hedge shears to 3-6 inches in early spring and can be trimmmed back 6-8 inches in summer if they need it. Where dichondra can be grown, add it as a ground cover under minis and you'll have no problems with mites.

The popularity of container plantings continues to rise and roses make a good choice here. The World Trade Center in New York City has used container roses in its seasonal displays. Select a floribunda or miniature for largest flowering effect and be extra careful to prune as symmetrically as possible. Use a peat-lite planting media for best growth and be aware that the rose planted in the container will need more water than the same plant in the ground.

Care tips

Although roses can be grown under less than ideal conditions if attention is high, to keep your maintenance to a minimum provide them with the ideal of at least six hours of sun a day and a well drained, improved soil with a pH in the range of 6.0-7.0.

Watering can be done as needed by a manual method or tied into the automatic irrigation system. Harold Goldstein, Director of the American Rose Center in Shreveport, LA, prefers drip irrigation under the mulch as it uses less water and fertilizer can be added as watering is carried out. On the opposite extreme, Jim Kirk at Rose Hills waters as needed with overhead sprinklers set at 36″ high between the plants. Watering frequency depends on the heat and is somewhere between twice a week and once every two weeks. He feels the overhead watering is an advantage to keep the plants clean of smog residue, which aids growth and reduces disease. If you follow overhead watering, do it in the morning if possible to further reduce the chances of spreading disease.

Most people turn up their noses at roses because of the stories of insect and disease problems that plague them, yet the men who tend to them on their grounds do not report problems provided a few basics are followed: 1) plant in at least six hours of full sun; 2) select a site where there is good air circulation; 3) prune to keep the center of the plant open; and 4) spray as necessary.

The major insect pest of roses, the Japanese beetle, is no problem where grubs are properly controlled. Aphids are easily controlled with a number of chemicals and spider mites with Kelthan or Plictran. Mildew responds to Tersan 1991 and blackspot to Thiram or Captan. West of the Rockies, blackspot is rarely a problem. Most grounds managers seem to spray the roses when they're spraying the surrounding turf as long as the material is safe and useful, and not make a big thing of spraying. As an added incentive to planting roses, disease resistance is on the increase in new rose varieties.

Wintering the cold

Another headache can be winter kill, yet The Toro Co. in Minneapolis and the Bayview Country Club in Toronto, both certainly in two of our colder spots, report no loss over the winter as long as a simple protection method is used. Both pile up mulching material around the roses in winter, and evergreen boughs are added to this in Minnesota. In spring the mulch is not removed but instead spread over the bed as summer mulch. If you are located in a frosty area, stay away from most yellows, whites, and pale pinks as they tend to be more prone to cold damage. In other words, stick to red and dark orange roses.

Fertilizing is something that unfortunately can't be done when the turf is being fertilized, as the high nitrogen is the turf fertilizer will cause the roses to bloom poorly or not at all. Instead, use a balanced 5-10-5, 5-10-10, 7-7-7 or similar formulation spread on top of the mulch and watered in. Do this anywhere from once a season to once a month depending on your available time. The more, the better.

Except for minis and the self-cleaning floribundas spoken of earlier, roses should have the spent blooms removed as soon as possible to encourage them to re-bloom quickly. Instead of waiting for the blooms to fade, why not cut them at their peak and use them in the office, lobby or clubhouse? Having roses to cut for this purpose is one reason why James Wylie at the Bayview Country Club in Toronto grows the "Queen of Flowers".

What's the bottom line here? Are roses more work? The question must include "as compared to what?" Compared to no ornamentals at all, surely they're more work. Compared to other ornamentals, they are slightly more work, but isn't maintaining a perfect bentgrass green, a tough athletic field or a velvet lawn more work? And isn't it worth it? **WTT**

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Circle No. 136 on Reader Inquiry Card

IRRIGATION RENOVATION AT TIGER STADIUM ADDS TO EFFICIENCY

Padded heads are checked by Century's Ben Taliaferro (left) and director of stadium operations, Ralph Snyder.

The recent renovation of Tiger Stadium in Detroit, gave Assistant Director of Stadium Operations Frank Feneck an opportunity to improve the stadium's old irrigation system. The stadium and irrigation system were plagued with old designs and worsening repair records. The renovation also gave Century Rain Aid of Detroit a chance to evaluate the basic needs of a baseball field more precisely and come up with a modern efficient design.

Feneck indicated the old system was plagued with freezing problems despite the park's efforts to flush the system in preparation for Detroit's often harsh winter season. Designed like a diamond with heads placed randomly throughout the field, it would often interfere with the game.

"It seemed like line drives were forever hitting one of the heads, sending the baseball flying past fielders often for a double or triple," Feneck said. "Repair costs were starting to bog us down."

The job was put out to bid and

Fewer heads, but more zones make Tiger Stadium's new system more efficient, less hazardous.

Century came in lowest with a bid of less than $12,000 for a Rain Bird system. The plan was designed by Century's Ken Hodas and Ben Taliaferro to incorporate a scientific application to irrigation of the playing field. It contained 11 zones to provide different levels of irrigation to each area. For example, the wings (outside the foul lines) did not need the same water as the infield or outfield. Also, to assure uniform distribution during frequent gusty winds, low trajectory heads were specified.

Century subcontracted installation to Bob Quigley, Sprinkler Services Co., a firm with 12 years experience in Detroit and in athletic fields. "We had to be extremely careful not to damage the turf when we installed the system," Quigley said. "Head heights were held down to minimums in order to avoid player injury." As an added precaution, the heads are covered with a soft, astroturf-like material which provides protection and conceals them when not in use.

Installation of the system, designed to irrigate roughly 18,000 sq. yards of turf, took ten days using a

Continues on page 66

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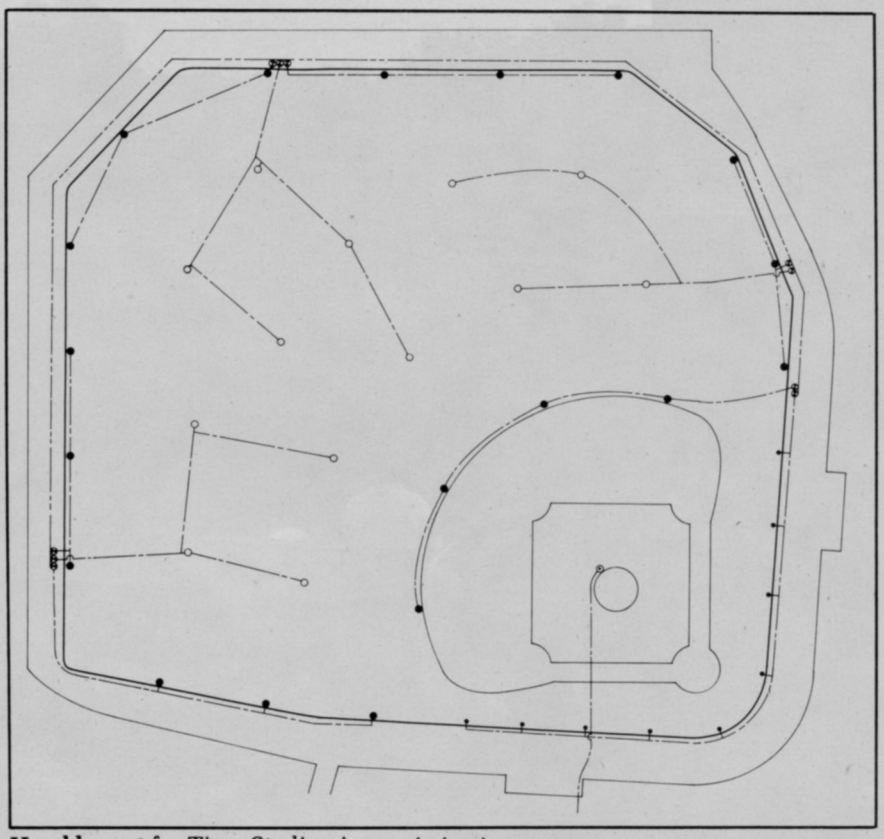

Head layout for Tiger Stadium's new irrigation system.

crew of six men in early October. Pipe, ranging in size from one and one-half to two and one-half inches in diameter, was pulled into place. Heads were removed from the old system but the old pipe was not removed. The controller (Rain Bird RC-1260AB) was concealed behind the outfield padding.

The outfield heads were reduced from 30 to 17, and the infield has a single head directly behind the pitcher's mound. The system gets its water from the city and uses a 25 horsepower pump.

Feneck irrigates from early April through mid-October, despite the region's 32-inch annual rainfall. Only six or seven inches fall during the summer months, requiring 12 to 14 inches of compensating moisture.

"Because the system is automatic, we don't have to hold off watering until Saturday after a game because we couldn't get the field wet Friday night," said Feneck. "We set the controller and let the workman stay home." **WTT**

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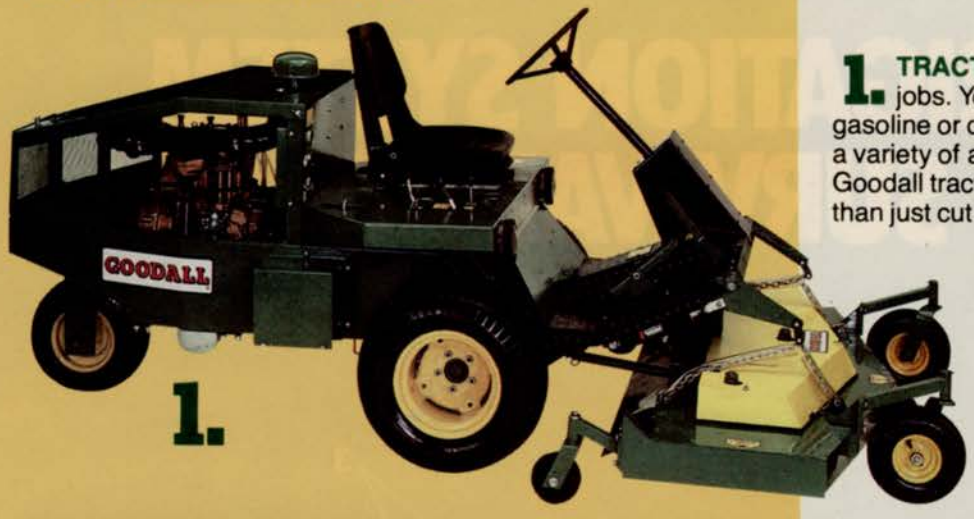

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Today the ability to manage water more wisely is a matter of survival for irrigation professionals. A predicted water shortage will severely limit the amount of water available for irrigation. In turn, causing forced restrictions on water usage that may threaten the lifeblood of your business. Don't take any chances. Meet this challenge with ten new water-saving products from the world's leading manufacturer of irrigation equipment. The Rain Bird irrigation system survival kit. We're committed to helping your business survive any water shortage.

1. The ISC "Independent Station Controller."
Save water with the precision that comes from having a separate program for each station on the clock. Rain Bird is pleased to introduce the ISC "Independent Station Controller" available soon in 16, 24 and 32 station units. Owning an ISC is like having a separate controller for each valve. And should watering times need to be cut back, just depress the water budgeting button for instant adjustments in 25 percent increments.

2. Pressure Regulating PRS Modules.
Stop wasteful misting from over-pressurized sprinklers. The new PRS Pressure Regulating modules with Schrader valves take pressures as high as 200 psi and effectively regulate from 100 psi down to 15 psi (±5 psi). And they are suitable for all Rain Bird EFA, EP, or PVE series electric control valves.

3. 1800 Series high-pop spray heads.
Reach above taller drought-tolerant turf cuts and ground covers for uniform water distribution with the new Rain Bird 1800 Series high-pop spray heads. The new patented multi-function, co-molded wiper seal assures positive pop-up and pop-down for the full line of two, four, six and twelve inch models. While a special ratchet device on the six and twelve inch models resists tampering and makes adjustment of the spray a snap.

4. 1400 Series pressure compensating bubblers.
Stop water waste caused by changes in water pressure from rolling terrains and friction loss with the new 1400 Series pressure compensating bubblers. Available in one-quarter, one-half and one gpm flow rates, the 1400 Series fills the gap between drip emitter flow rates in gallons per hour and sprinkler rates in gallons per minute.

5. New MINI-PAW "Seal-a-Matic"™ Sprinkler
Rain Bird introduces a new water-saving 15103 SAM model. The "Seal-a-Matic" option on this new MINI-PAW ends water wasted by low head drainage caused by changes in elevation as great as 10 feet.

6. New "Short Range"™ MINI-PAW Sprinkler
The new "Short Range" 15103 SR model eliminates water waste associated with overspraying. Filling the performance gap where spray head coverage ends and small rotors begin, the 15103 SR offers low trajectory throw, low gallonage operation and an adjustable radius from 15 to 25 feet.

7. New matched precipitation rate spray nozzles.
End overwatering expenses with the new matched precipitation rate spray nozzles. Available in plastic or brass, the nozzles fit all Rain Bird 2800, 1800 and 171G series pop-ups and plastic PA-8 and brass A-7G shrub adapters.

8. P3-PJ short range impact sprinkler.
The new Rain Bird P3-PJ sprinklers minimize problems caused by wind interference by throwing a single stream at a slope-hugging 15 degree angle. And with gallonage as low as 1.6 gpm, the precipitation rate resists slope run-off and puddling.

9. Adjustable rain shut-off device.
Avoid the high cost and embarrassment of wasting water in a downpour with the new rain shut-off device from Rain Bird. When rain water reaches the adjustable sensing probes at a pre-set level, the shut-off device interrupts all power to the electric valves on the controller's next cycle. When the water evaporates, the system returns to normal operation.

10. Low cost automatic residential control valves.
Conversion from manual to water-saving automatic irrigation system control is simpler and more cost-effective with the new line of Rain Bird low cost residential valves. Highlighting the line is the AVA "Automatic Valve Actuator" available in three-quarter and one-inch models for conversion of many Rain Bird and competitive manual valves.

Together with the PAS anti-siphon valves and the AGV automatic globe valves, Rain Bird provides the best in low cost residential controls.

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RAIN BIRD

Circle No. 141 on Reader Inquiry Card

VEGETATION MANAGEMENT

By Roger Funk, Ph.D., Davey Tree Expert Co., Kent, Ohio

Q: *How do you treat St. Augustine decline (SAD)? (Texas)*
A: St. Augustine decline (SAD) is the only major viral disease infecting turfgrasses and cannot be cured with chemicals. Although the best solution is to plant resistant cultivars, susceptible turfgrass can be improved through proper maintenance. Apply fertilizer high in potassium and iron and low in nitrogen. Do not overapply pesticides, particularly phenoxy herbicides. If the turf is grown in shade, do not apply phenoxy herbicides and mow slightly higher.

Q: *I would like to add variety to the landscape plantings at one of our state mental institutions. The goldenchain tree is being considered but I have heard that its parts are poisonous. Is this true? (Indiana)*
A: A number of sources, including a publication from the Arnold Arboretum of Harvard University, state that all parts of the goldenchain tree (*Laburnum anagyroides*) are poisonous, particularly the flowers and seeds which contain a substance called cystine. If eaten, the person may experience vomiting, convulsions, and even death.

Two references to examine prior to purchasing trees for this specific purpose are *Poisonous Plants of the United States* by W. C. Muenscher (1947) and *Poisonous Plants of the United States and Canada* by J. M. Kingsbury (1964).

Q: *What is the latest information on maple decline? Has any specific disease been identified as the cause and can it be controlled? (Michigan)*
A: As with many disorders, we do not as yet, have the final answer(s) and research continues. At present, a number of factors have been associated with maple decline either as an inciting agent or as a contributing factor. These include deicing salts, soil compaction, nutrient deficiencies, drought or prolonged wet soils, high soil temperature, girdling roots, insect defoliation, pollution, mechanical injury, root disorders and basal cankers. Maple decline is usually a "complex" of many of these factors.

Identification and correction of the causal agents in conjunction with high nitrogen fertilizer and proper watering has given the most consistent results. Of course, proper tree selection, soil preparation, and planting practices will minimize the potential for stress conditions that weaken maple trees and trigger maple decline.

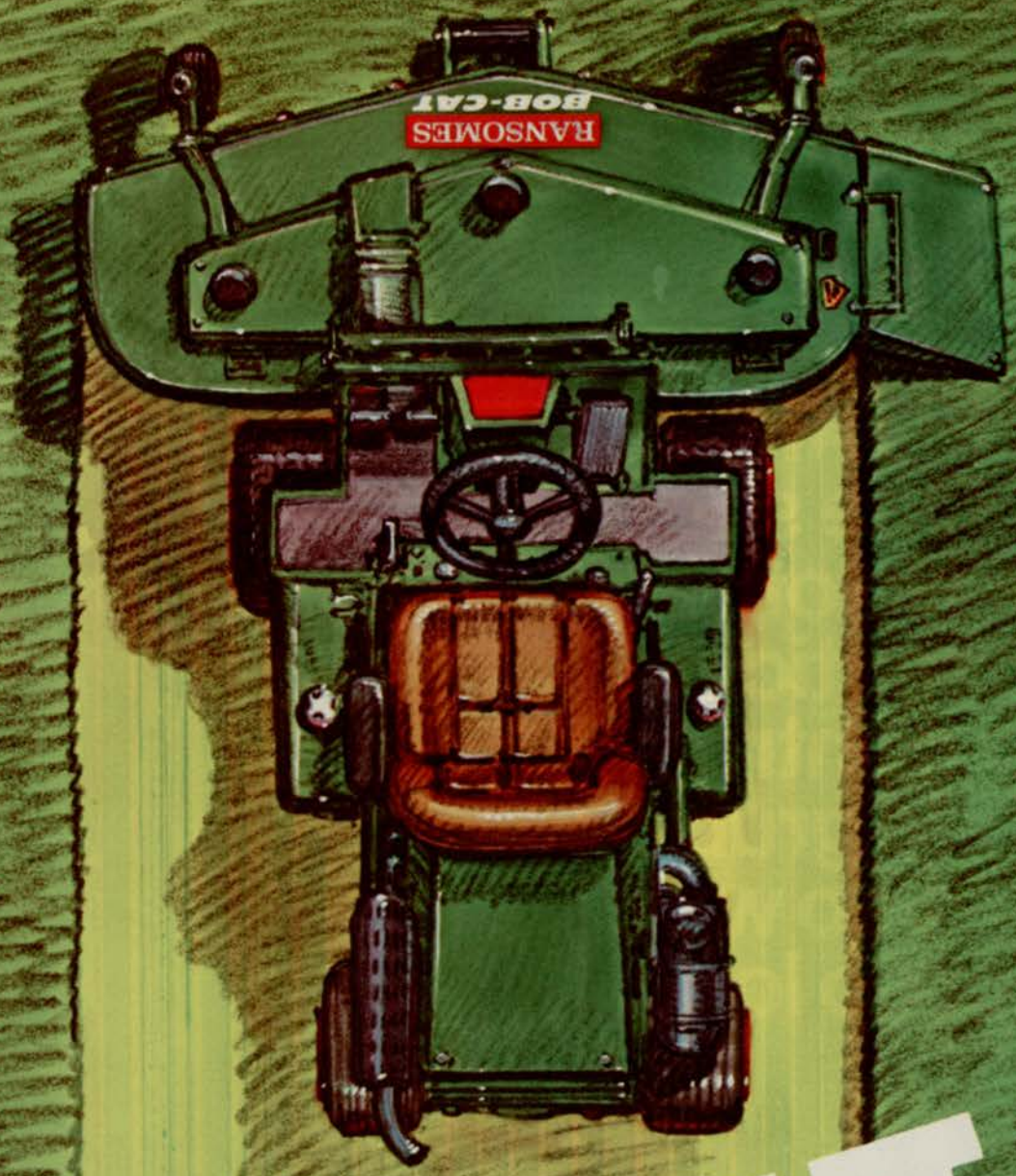
Q: *I have been told that fungicides increase the amount of thatch. How is this possible and is it really a problem? (Georgia)*
A: Most fungicides cause thatch accumulation by inhibiting microorganisms that decompose thatch and by increasing the shoot tissue that must be decomposed. However, I am not aware of any research that shows that the increase in thatch is significant.

Q: *Can you tell me a reference for the relative sensitivity to salts of trees commonly grown in central and northeastern United States? (New York)*
A: In the November 1976 Journal of Arboriculture, an article by Michael Dirr entitled "Selection of Trees for Tolerance to Salt Injury," provides a rather comprehensive list of trees ranked according to their relative salt tolerance. More recent information can be obtained from Dr. George Hudler, assistant professor of plant pathology at Cornell University, Ithaca, New York.

I have included a list of the relative salt tolerance of trees and ornamentals which I compiled from various sources. Since investigators often place a tree species in different categories, contact your local extension service to determine if any information is available for your particular area.

Relative salt tolerances of trees and ornamentals

Good Salt Tolerance		Moderate Salt Tolerance		Poor Salt Tolerance	
Scientific Name	Common Name	Scientific Name	Common Name	Scientific Name	Common Name
Quercus robur	English oak	*Thuja spp.*	arborvitae	*Fagus spp.*	beech
Populus alba	white poplar	*Juniper spp.*	juniper	*Juglans nigra L.*	black walnut
Robinia pseudoacacia L.	black locust	*Salix alba tristis*	weepinggold willow	*Tilia spp.*	linden
Gleditsia triacanthos L.	honeylocust	*Pinus ponderosa*	Ponderosa pine	*Euonymus alatus*	winged euonymus
Elaeagnus angustifolia L.	Russian olive	*Fraxinus pennsylvanica*	green ash	*Spirea spp.*	spiraea
Crataegus spp.	hawthorn	*Juniperus virginiana*	Eastern red cedar	*Viburnum spp.*	viburnum
Quercus rubra	red oak	*Gleditsia japonica*	Japanese honeylocust	*Alnus incana*	speckled alder
Quercus alba	white oak	*Acer negundo L.*	boxelder	*Rosa spp.*	rose
Morus spp.	mulberry	*Malus baccata*	Siberian crab	*Acer pseudoplatanus*	sycamore maple
Pinus nigra Arnold	Austrian pine	*Ribes nigrum heterophyllum*	cutleaf European black currant	*Populus nigra italica*	lombardy poplar
Prunus serotina	black cherry	*Pyracantha spp.*	pyracantha	*Acer rubrum L.*	red maple
Populus grandidentata Michx.	large-toothed aspen	*Ligustrum spp.*	privet	*Acer saccharum*	sugar maple
Pinus thunbergi	Japanese black pine	*Populus deltoides*	Eastern cottonwood	*Buxus sempervirens*	common boxwood
Pinus rigida	pitch pine	*Populus spp.*	poplar	*Ulmus americana L.*	American elm
Lycium halimifolium	matrimonyvine	*Salix nigra*	black willow	*Pinus strobus*	white pine
Fraxinus americana L.	white ash	*Catalpa speciosa*	Northern catalpa	*Tsuga canadensis*	Canadian hemlock
Ulmus procera (campestre)	English elm	*Cydonia oblonga*	quince	*Ostrya virginiana*	American hophornbean
		Quercus macrocarpa	bur oak	*Taxus spp.*	yew
Acer platanoides L.	Norway maple	*Shepherdia argentea*	silver buffaloberry	*Pinus resinosa*	red pine
Acer saccharinum L.	silver maple	*Populus tremuloides*	trembling aspen	*Carya ovata*	shagbark hickory
Prunus virginiana L.	chokecherry	*Betula lenta*	sweet birch	*Malus spp.*	apple
Aesculus hippocastanum	horsechestnut	*Betula papyrifera*	paper birch	*Pinus sylvestris*	Scotch pine
Ailanthus altissima	ailanthus	*Betula populifolia*	gray birch	*Abies balsamea*	balsam fir
				Picea pungens	Colorado spruce



PRIME CUT

A product of new technology, the Ransomes Bob Cat Diesel provides the professional turf-maintenance industry with the most efficient grass machine ever developed.

Fuel consumption for this incredibly quiet diesel is 40% less than gasoline and the engine will pay for itself in only 650 hours.

The big 74" deck makes short work of major mowing jobs and provides trouble free performance and a prime cut on every pass.

See your Ransomes Bob Cat distributor or call Ransomes, Inc., One Bob Cat Lane, Johnson Creek, WI 53038. (414) 699-2000.

RANSOMES
BOB-CAT

Circle No. 142 on Reader Inquiry Card

®OFTANOL. One shot. No other insecticide controls white grubs so well for so long.

The use of OFTANOL for turf pest control is registered in many states. Check with your state extension office for registration information.

One-shot white grub control with OFTANOL represents a dramatic breakthrough in turf management.

With a single application at the recommended rate, OFTANOL controls white grubs through the entire season.

But that's only part of the story.

Properly timed, that same application can also control major insects such as billbug, chinch bug, Hyperodes weevil and sod webworm.

For example, apply OFTANOL for the first infestation of surface feeding insects. You'll establish season-long white grub control at the same time.

82101 SPG

And it doesn't stop there!

Or, treat for Hyperodes weevil in the spring. You'll also receive white grub control for the entire season.

Other insecticides requiring multiple applications can't provide this performance and flexibility.

OFTANOL has other advantages, too: won't tie up in thatch . . . resists leaching . . . doesn't require watering in.

No wonder OFTANOL is the new insecticide turf managers are asking to learn more about. OFTANOL can fit into your insect control program, too. Ask your turf chemicals supplier for this free OFTANOL FACTS brochure.

Don't trust your turf to anything less.

Mobay Chemical Corporation
Agricultural Chemicals Division
Specialty Products Group
Box 4913, Kansas City, MO 64120

OFTANOL is a registered TM of the Parent Company of Farbenfabriken Bayer GmbH, Leverkusen.

Circle No. 131 on Reader Inquiry Card

declined 31.4% to 151,000 units having a F.O.B. value of $266 million. Last year's 220,000 units were valued at $351 million.

Estimated shipments of lawn tractors/riding mowers totalled 620,000 for the 1981 model year, down 23.3% from 1980. F.O.B. factory value also dropped to $453 million or 14.5% less than 1980 values.

Rotary tiller shipments were off 24.9% to 501,000 units, a decline of 166,000 units from the 667,000 shipped in 1980. Factory value decreased 13.2% from $159 million to $138 million.

The twelve-month across the board declines can be attributed in part of high interest rates and a decline in household spending.

The twelve-month period begins in September and ends August 31, 1981. Companies participating in the OPEI statistical reporting program account for a vast majority of total industry shipments of the above products.

EQUIPMENT

Jacobsen posts 1981 sales increase

In an address to a group of major U.S. and Canadian turf product distributors, John Dwyer Jr., president of Jacobsen Division of Textron, Racine, WI, said that company volume for the sales year ending September 30, 1981, was up over the previous year. He added that continued gains are predicted for 1982.

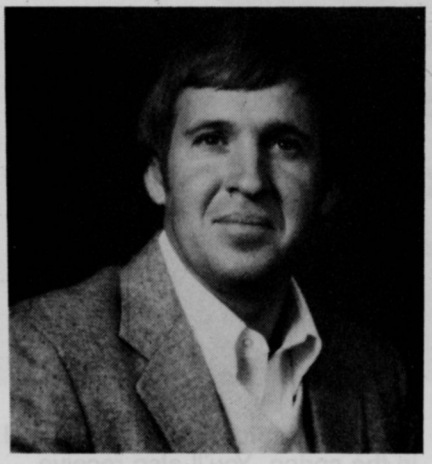
Dwyer told the distributors, who represent approximately $200 million annually in total turf-related sales, that Jacobsen's sole focus is turf and grounds maintenance equipment now that consumer lawn and garden care products are part of Textron's Homelite Division. "The company's operations have been streamlined by the change," Dwyer told the group.

The distributors noted that in the future customers will look less at unit price and more at efficiency, durability, service and parts backup. They indicated that while "systems" machines will probably continue to be offered, market direction will focus on units designed to perform one specific job well.

GOLF

Steve Tyler Joins Standard Golf Co.

Standard Golf Co., Cedar Falls, IA, has named Steve Tyler sales representative to represent Standard's Pro-Line golf course accessories throughout the U.S.



Steve Tyler with Standard Golf.

Before joining Standard, Tyler managed two municipal golf courses in Cedar Falls. He has been a superintendent or assistant superintendent for 14 years. He is affiliated with the Golf Course Superintendents Association of America, the Iowa Golf Course Superintendents

Continues on page 76

Association (president in 1978) and the Iowa Turfgrass Institute (president in 1980).

Standard Pro-Line accessories include ball washers, benches, flags, flag poles, putting cups, club washers and sighs.

FORESTRY

Karnosky named to Consortium post

Dr. David Karnosky has been named to succeed Dr. Lee Herrington as executive secretary of the Consortium for Environmental Forestry Studies.

A graduate of the University of Wisconsin with a Ph.D. in forest genetics, Dr. Karnosky has conducted research on the effects of air pollution on forest trees. Currently he is forest geneticist at the New York Botanical Garden Cary Arboretum in Millbrook, NY, where his work includes developing disease-resistant elms and examining stresses on trees in the urban environment. He is also adjunct associate professor at Marist College in Poughkeepsie, NY, and at the State University of New York (SUNY) College of Environmental Science and Forestry.

Karnosky will administer Consortium programs under an Intergovernmental Personnel Act agreement with the USDA Forest Service's Northeastern Forest Experiment Station. The Consortium consists of 12 northeastern universities and the Forest Service. Through grants to individual universities, the Forest Service funds community and environmental forestry research projects, which are coordinated by the Consortium. Their aim is to improve the quality of life in the northeast. More than 200 papers and six major publications have been produced by Consortium members over the past ten years.

As executive secretary, Karnosky will oversee the coordination of continued research in such areas as tree breeding, insect and disease control, air quality, urban microclimate, and forest planning and management.

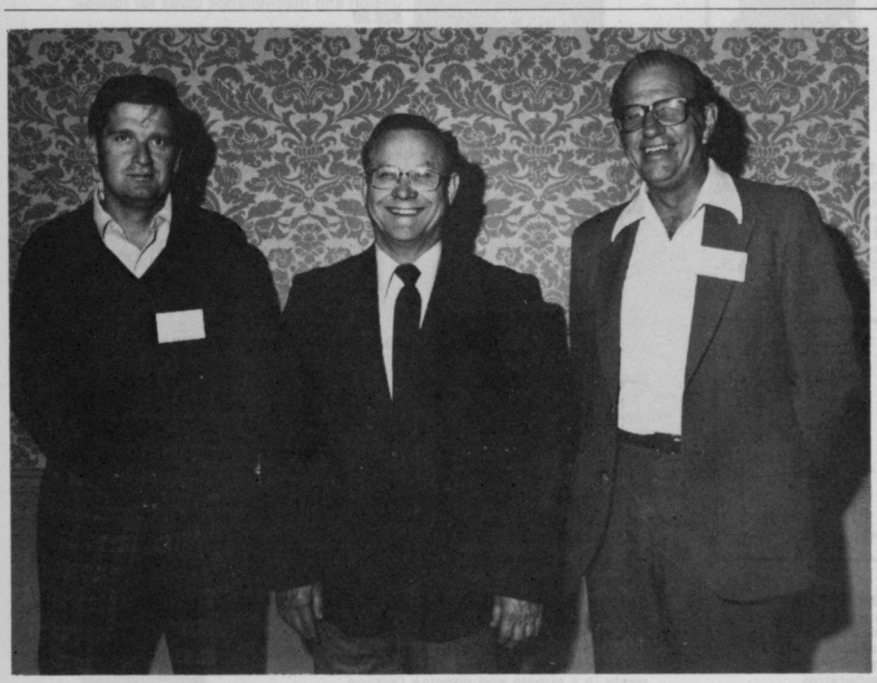
TURF

Midwest groundskeepers get tips on field care

Featured at the clinic were Gene Bossard, head groundskeeper at Comiskey Park since 1940, and his son Roger Bossard, who serves as assistant in charge of a staff of 18 grounds personnel at the oldest par in the major leagues. The Bossards explained how local park districts and high schools could adapt the major league club's grounds program to suit individual needs and budgets.

Among the more important topics covered in the clinic were the proper

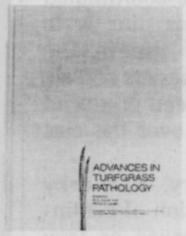
Continues on page 80



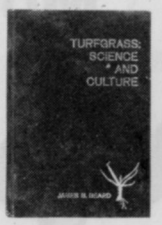
Officers of the Lawn Seed Division of the American Seed Trade Association were elected at their joint meeting with the Atlantic Seedmen's Association in Providence, RI. They are (left to right) William Junk, secretary-treasurer; Willard Hovde, chairman; and Bob Peterson, vice president.

Bookstore

010, 015-ADVANCES IN TURFGRASS PATHOLOGY
by Dr. B.G. Joyner & Dr. P. Larsen
Leading U.S. turf pathologists report on turfgrass diseases, pythium blight, snow molds, fairy rings, leaf spot of Kentucky Bluegrass in Minnesota, initial and filed fungicide screening, turfgrass disease resistance, etc. Contains new ideas on how to combat turfgrass problems. **$27.95 hardcover, $18.95 paperback**



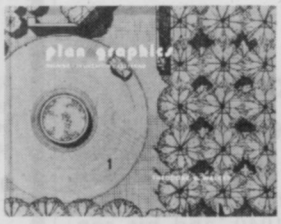
110, 120-TURF MANAGER'S HANDBOOK by Drs. William Daniel and Ray Freeborg
This specially designed manual by leading turf specialists is a comprehensive, organized approach to turfgrass science and care. An easy, on-the-job reference for planning, purchasing, hiring, construction and plant selection.
$23.95 hardcover, $18.95 paperback



630-TURFGRASS: SCIENCE & CULTURE by James Beard
Comprehensive basic text and reference source used in many leading university turf programs. Includes findings of current research compiled from more than 12,000 sources. **$23.95**

355-PERSPECTIVE SKETCHES by Theodore D. Walker
A reference source of ideas, media use, styles and techniques. Grouped by subject matter. Illustrates technique for vegetation, vehicles, play equipment and recreation facilities, people, animals, etc. **$19.50**

365-PLAN GRAPHICS by Theodore D. Walker
Focuses on plans, elevations, sections and lettering. Provides many different examples to be used as guidelines in personal soil experimentation. Includes graphic techniques for site analysis and design concepts. **$21.00**



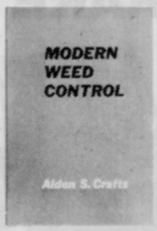
375-SITE DESIGN AND CONSTRUCTION DETAILING by Theodore D. Walker
An introduction to the subject of site design and construction detailing. Focus is on design implementation. Discusses the nature of construction drawings. Presents the characteristics, origin and nature of construction materials. **$24.00**

345-COST DATA FOR LANDSCAPE CONSTRUCTION 1981
Kathleen W. Kerr, Editor
An updated unit cost data reference for designers and cost estimators. Developed to fill the tremendous need for detailed landscape construction cost data. Laid out in easy-to-use CSI format. Annual.
$24.95

340-CONSTRUCTION DESIGN FOR LANDSCAPE ARCHITECTS
by Albe E. Munson
Design specifications for layout, grading, drainage, structures and irrigation. Also explains mathematics of drafting. **$24.50**

335-LANDSCAPE DESIGN THAT SAVES ENERGY by Anne Simon Moffat and Marc Schiler
Practical guide to landscaping a home or office to reduce space heating needs by as much as 30 percent annually. Contains specific planning strategies for the four main climatic zones of the continental United States. **$9.95 paperback**

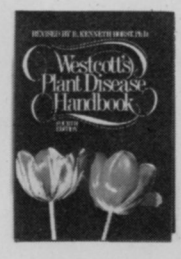
530-INTERIOR PLANTSCAPING by Richard Gaines
One of the first handbooks directed at the professional interior plantscaper. Includes design and maintenance clues for foliage.
$28.50



545-MODERN WEED CONTROL by Alden S. Crafts
Deals exhaustively with the botany, chemistry, plant physiology and ecology involved in modern weed control technology. Contains lists and classifications of herbicides and an abundance of illustrative material that will help the reader visualize the varied aspects and forms of weed control. **$19.50**

565-WEEDS by Walter C. Muenscher
Second edition. Premier text for identification and basic natural history for weeds found in the continental United States and Canada. Ecological data on weed biology combined with excellent keys and plant descriptions makes this an essential reference book. **$32.50**

510-**HORTUS THIRD** from Cornell University
A 1,300-page concise dictionary of plants cultivated in the United States and Canada. A reference which every horticultural professional should have. **$99.50**



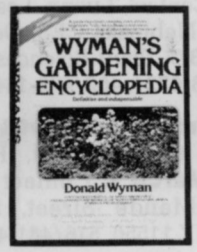
570-WESTCOTT'S PLANT DISEASE HANDBOOK by Kenneth Horst
This fourth edition offers professionals the latest diagnostic and disease control information. Plant entries designed to simplify diagnosis, plus background on the classification of plant pathogens. This handbook gives a specific description of each disease, susceptible plants, specific symptoms of the disease, reported locations and control measures for each disease and their side effects. **$34.50**

455-THE GRAFTER'S HANDBOOK by R.J. Garner
Revised and updated fourth edition. The encyclopedia of plant propagation by grafting. Contains information on the chemical control of weeds in orchards, on diseases and on the vegetative propagation of woody plants. **$16.95**

440-FUNDAMENTALS OF ENTOMOLOGY AND PLANT PATHOLOGY by Louis L. Pyenson
Limited to the study of insects, related forms, nematode and plant pathogens. Discusses nature and control of these pests in a simple and concise fashion.
$22.00

Bookstore

490-GREENHOUSE OPERATION & MANAGEMENT by Paul Nelson
Such important aspects as greenhouse heating and cooling, root media, watering, lighting, temperature and pesticide application are presented in this text. Material on greenhouse siting and construction, post-harvest handling, marketing and business management are also included as necessary considerations for keeping your operation solvent. **$19.95**



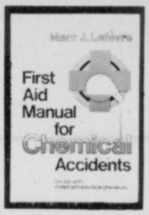
580-WYMAN'S GARDENING ENCYCLOPEDIA by Donald Wyman
A classic reference on all aspects of gardening. Offers advice on planting and maintenance information on new plants, cultivation, insecticides, herbicides and fungicides. Contains 10,000 articles, 206 drawings. 170 photographs and a color hardiness zone map. **$29.95**

670, 680-GUIDE TO TREES by Simon & Schuster
Beginner and experts reference to 300 trees with 350 full-color illustrations. This authoritative guide supplies you with a full description of size, color, shape, leaves, flowers, fruit and seeds; information on habitat, propagation and growth conditions PLUS hardiness zone maps, glossary and index. **$19.95 hardcover, $8.95 paperback**

665-THE OXFORD ENCYCLOPEDIA OF TREES OF THE WORLD Bayard Hora, Editor
An authoritative reference describing the principal trees of the world. Includes biology and growth of trees, ecology of different types of forest, forest management, timber usage and pest and disease control. **$24.95**

385-TREES FOR ARCHITECTURE AND THE LANDSCAPE by Robert L. Zion
A book of photographic tree definitions, or portraits, intended to facilitate communication between the landscape architect, the architect and the layman. **$11.95**

795-FIRST AID MANUAL FOR CHEMICAL ACCIDENTS by Marc J. Lefevre
This indispensable guide helps you take quick corrective action to minimize the harmful effects of chemical accidents. Written for people (other than doctors) called on to aid fellow workers who are victims of such work-related accidents. A must reference for any work situation involving hazardous chemicals. **$16.50 paperback**



790-RECREATION PLANNING AND DESIGN by Seymour M. Gold
A comprehensive look at recreation needs for parks and how they can design the park facility for the community. Book's content can help justify construction and maintenance needs. **$31.95**

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410 - DISEASES & PESTS OF ORNAMENTAL PLANTS $26.50
660 - DISEASES OF SHADE TREES $23.50
610 - DISEASES OF TURFGRASS $30.00
450 - GARDENING IN SMALL PLACES $7.95
480 - GREENHOUSE MANAGEMENT FOR FLOWER & PLANT PRODUCTION $15.35
350 - HANDBOOK OF LANDSCAPE ARCHITECTURAL CONSTRUCTION $48.50
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380 - MANUAL OF WOODY LANDSCAPE PLANTS $19.00
780 - PARK AND RECREATION MAINTENANCE MANAGEMENT $18.95
390, 395 - PHOTOGRAPHIC MANUAL OF WOODY LANDSCAPE PLANTS $22.00 hardcover, $14.60 paperback
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770 - TREE SURGERY $18.95
650 - TURFGRASS MANAGEMENT $17.95
640 - TURF IRRIGATION MANUAL $22.95
620 - TURF MANAGEMENT HANDBOOK $14.65
560 - WEED SCIENCE $24.00

CLOSEOUTS

ORDER THESE TITLES AT SPECIAL REDUCED PRICES!

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430 - FLOWER & PLANT PRODUCTION IN THE GREENHOUSE $13.60
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WTT 22

EVENTS

The current issue of WEEDS TREES & TURF carries meeting dates beginning with the following month. To insure that your event is included, please forward it, 90 days in advance, to: WEEDS TREES & TURF Events, 757 Third Ave., New York, NY 10017.

National Arborist Association 1982 Annual Meeting, Maui Surf Hotel, Maui, Hawaii, **Feb. 14-18.** Contact National Arborist Association, Inc., 3537 Stratford Road, Wantagh, NY 11793, 516/221-3082.

Third Symposium on Environmental Concerns in Rights-of-Way Management, Islandia Hyatt House, San Diego, CA, **Feb. 15-18.** Contact Bess Bragg, P.O. Drawer LW, Mississippi State, MS 39762

Turfgrass Worker's Short Course, Orange County Cooperative Extension Service, Orlando, FL, **Feb. 18.** Contact Orange County Cooperative Extension Service, 2350 East Michigan Street, Orlando, FL.

International Society of Arboriculture Chapter Meetings; Penn-Del, King of Prussia, PA, **Feb. 25-26. Southern,** Savannah, GA, **Feb. 21-24.** Contact ISA, 5 Lincoln Square, P.O. Box 71, Urbana, IL 61801.

26th Annual Shade Tree Short Course, Scheman Continuing Education Center, Iowa State University, Ames, IA, **Feb. 23-24.** Contact Laura Sweets, Iowa State University CES, 515/294-1160.

Residential Landscape Design Short Courses, Ohio Agricultural Research and Development Center, Wooster, OH. **Design Detailing, Feb. 24-26; Advanced Landscape Drawing, March 24-26.** Contact Fred Buscher, Wooster Area Extension Center, Ohio State University CES, 216/262-8176.

International Erosion Control Association Conference XIII, Little America Hotel, Salt Lake City, UT, **Feb. 25-26.** Contact Bob Fischbach, P.O. Box 817, Freedom, CA 95015, 408/688-3288.

Fifth Annual Trees for Nebraska Conference, Nebraska Center for Continuing Education, Lincoln, NE, **Feb. 26-27.** Contact Luann Leaming, University of Nebraska CES, Dept. of Horticulture, 377 Plant Sciences, Lincoln, NE 68583-0724, 402/472-1640.

14th Annual Professional Turf & Plant Conference, Colonie Hill, Hauppauge, NY, **March 1.** Contact Jerry Strein, 547 Maude Street, South Hempstead, NY 11550, 516/481-4836.

Pennsylvania Turfgrass Conference and Trade Show, Hershey Lodge and Convention Center, Hershey, PA, **March 1-4.** Contact Christine King, Pennsylvania Turfgrass Council, 412 Blanchard Street, Bellefonte, PA 16823.

Midwest Regional Turf Conference, Purdue University, West Lafayette, IN, **March 1-3.** Contact W.H. Daniel, Purdue University, Dept. of Agronomy, West Lafayette, IN 47907, 317/494-4785.

Events *from page 78*

Iowa Turfgrass Conference and Trade Show, Marriott Hotel, Des Moines, IA, **March 1-3.** Contact Ed Cott, 105 Horticulture Building, Iowa State University, Ames, IA 50011, 515/294-1870.

51st Massachusetts Turfgrass Conference and Sixth Industrial Show, Civic Center, Springfield, MA, **March 2-4.** Contact Dr. Joseph Troll, Stockbridge Hall Room 12, University of Massachusetts, Amherst, MA 01003-0099, 413/545-2353.

American Sod Producers Association Midwinter Conference, Royal Lahaina, Maui, HI, **March 3-5.** Contact Bob Garey, Association Building, Ninth and Minnesota, Hastings, NE 68901, 402/463-4683.

Canadian Turfgrass Conference and Show, Constellation Hotel, Toronto, Ontario Canada, **March 7-10.** Contact Mary Gurney, 698 Weston Road, Toronto, Ontario M6N 3R3, 416/767-0387.

"Interiorscape Design—A Total Approach," Airport Hilton, Salt Lake City, UT, **March 12.** Contact Scott Wolford, Utah Chapter/ASLA, 57 W. So. Temple #300, Salt Lake City, UT 84101, 801/364-1718.

International Society of Arboriculture 33rd Annual Convention, Valhalla Inn, Toronto, Ontario Canada, **March 16-19.** Contact ISA/Canada, P.O. Box 995, Station B, Willowdale, Ontario Canada M2K 2T6.

Maine Turf Conference, Merry Manor Inn, South Portland, ME, **March 17-18.** Contact Vaughn Holyoke, Deering Hall, University of Maine, Orono, ME 04469, 207/581-2111.

Tree Care—Urban Forestry Foreman Training, Davey Environmental Services, Kent, OH, **March 22-April 2.** Contact Richard Abbott, Davey Environmental Services, 117 South Water Street, Kent, OH 44240, 1-800/321-7572.

Soil Erosion and Sedementation Control Short Course, Vance Tyee Motor Inn, Olympia, WA, **March 23-24.** Contact Roy Goss, Western Washington Research and Extension Center, Puyallup, WA 98371, 206/593-8513.

News *from page 76*

choice and blend of clay dirt and bank sand in a rebuilding plan to upgrade old or improperly built fields, use of irrigation and most effective drainage patterns for fields receiving heavy usage. "Fall is a logical time for local park districts to undertake a rebuilding program because summer athletic programs have ended and the fields can be worked without disrupting playing schedules," said Roger Bossard. Additionally, IMC specialists discussed and distributed technical data on how to rebuild baseball and football fields.

SEED

Northrup King promotes Vetter and Churchill

In an effort to restructure its professional turf department, Northrup King Co., Minneapolis, MN, has promoted Larry Vetter and Joe Churchill.

Vetter has been promoted to national sales manager for the Medalist turf products department. Churchill moves to the marketing department and has been named assistant product manager for Medalist Turf Products, reporting to Dennis Erickson, product manager for all lawn and turf products.

The initial Medalist marketing effort will concentrate on certain regions of the U.S. Future marketing efforts will consist of a national network of Medalist turf product sales specialists.

CHEMICALS

Bryson named president of Elanco Products Co.

Elanco Products Co., Indianapolis, IN, the agricultural division of Eli Lilly and Co., has named Vaugh Bryson president.

Prior to the appointment, Bryson served as a vice president of Eli Lilly International Corp. with responsibility

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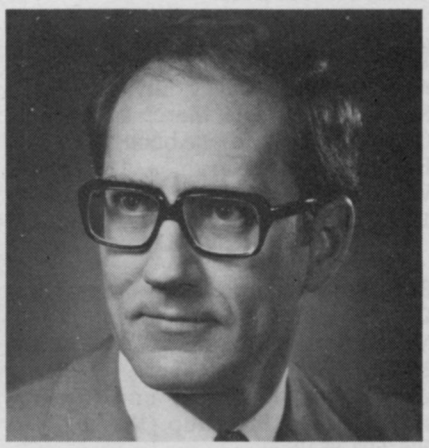

New Elanco President Vaugh Bryson.

When the job has to roll – when rolling's the job, you can depend on Brouwer!

When you have to deliver Hitch-Hiker 3500 delivers!

Sod, bags, pipes, bricks, blocks, lumber, boxes, or nursery stock, Hitch-Hiker 3500 picks up and loads them, hitches onto the transport and goes to work again unloading at the job site. Bumps, mud, tight corners, Hitch-Hiker handles them all safely with fuel and maintenance economy. Pallet retriever option is another money-saver. Hitch-Hiker really does a job for landscapers and sod producers. Ask us for a proof-of-performance demonstration.

Roll it right with the Brouwer 230 and 130 Turf Rollers

Hydrostatic drive is what you want for a smooth slip free job. The Brouwer Tandem 230 ride-on has it linked to a sturdy 5HP engine capable of driving the big 30" rollers at a steady acre-eating pace. The special rounded edge rollers eliminate turf damage. The oversize steering wheel is what you need for walking the unit on steep slopes. Turning radius is just 4'.

With a simple conversion package the 230 converts quickly, easily to a single roller unit for use on turf, athletic courts and in confined areas. Ride it or walk it, the Brouwer 230 and 130 turf rollers save time, trouble and labour costs.

"CALL OR WRITE US FOR THE DEALER NEAREST YOU"

BROUWER

The Turf Equipment People

Brouwer Turf Equipment Limited, Woodbine Ave., Keswick, Ontario, Canada L4P 3E9 Tel: (416) 476-4311

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News *from page 80*

for pharmaceutical and agricultural product marketing in Europe, the Middle East and Africa. In a previous assignment, he had similar responsibilities for Australia, Canada, Japan, the Far East and South Africa.

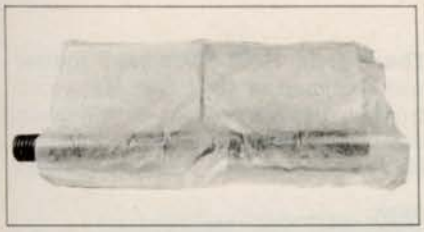
Oftanol adds Virginia registration

Oftanol 5%G, manufactured by Mobay Chemical Corp., Kansas City, MO, has been registered for use in Virginia. Oftanol is a granular organophosphate insecticide that is used for control of white grub larvae (such as Japanese beetle, Black turf grass Ataenius and Green June beetle), Hyperodes weevil, billbugs, chinch bugs and sod webworms.

In an effort to get Oftanol into the hands of potential users more rapidly, Mobay applied for both state-by-state and federal registration. While federal registration is still pending, Oftanol has been approved for use in Connecticut, Delaware, Illinois, Indiana, Kansas, Maryland, Michigan, Missouri, North Carolina, New Jersey, New York, Ohio, Pennsylvania, Rhode Island and West Virginia.

PRODUCTS

Drain-Chek by Brighton By-Products Co., is a groundwater drainage system available for use on slopes, basement areas and agriculture or general field use. The prefabricated system consists



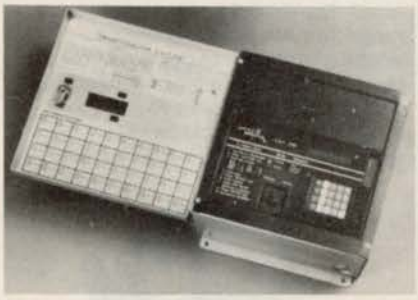
of a vertical fin drain protected by filter cloth, and can be used with or without standard drain tubing.
Circle No. 158 on Reader Inquiry Card

Miller Tilt-Top Trailer, Inc.'s model 1406 compact trailer measures 78 inches between its fenders and has a 14-ft. loading platform. It was designed

to carry wider and longer loads than comparable 6,000 lb. capacity units. Forged spindle 4-in. drop center axles give a loaded 1406 a low 13-in. ground clearance for increased stability.
Circle No. 159 on Reader Inquiry Card

Flyking Kentucky Bluegrass produces a thick, low-growing turf that the Jacklin Seed Company recommends as an excellent "backbone" for any turfgrass mix. According to Jacklin, Flyking has improved resistance to many diseases, and improved tolerance for drought, heat, cold, smog and traffic.
Circle No. 160 on Reader Inquiry Card

Regency Electronics has introduced an energy management controller for commercial use. The EMC 5700 stores up to 57 timed commands and programs can be scheduled for 24-hour, weekday, or weekend only cycles. An

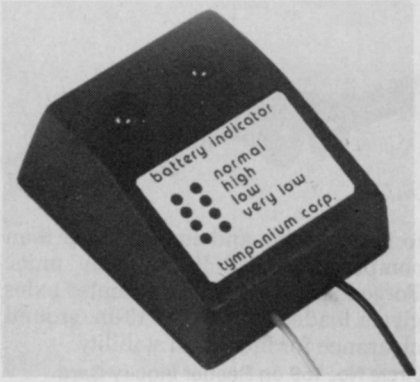


external input feature allows for activation of a pre-programmed set of commands from a remote location.
Circle No. 161 on Reader Inquiry Card

Continues on page 84

Products *from page 83*

Tympanium Corp. has introduced a battery voltage indicator for monitoring 12v lead acid battery systems. The encapsulated indicator features a pair of colored LED's that light to signal any of



3 malfunctions: amber for insufficient charging, red for overcharging, and both for serious loss of charge.
Circle No. 162 on Reader Inquiry Card

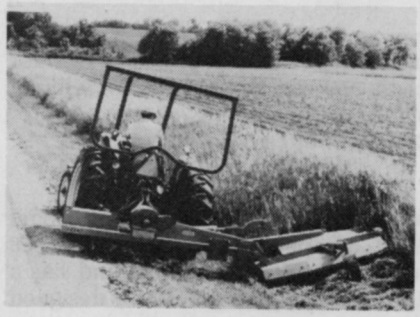
Weed Popper from Wonder Products Mfg. was created to remove hard-to-pull weeds, such as Dallis grass, by the roots without the user having to kneel or bend. The tool is made of heavy-

gauge steel, zinc-plated for rust resistance, with a lacquered wood handle and tines of hardened steel.
Circle No. 163 on Reader Inquiry Card

The John Deere 650 is a compact utility tractor providing 14.5 hp at the PTO. Powered by a 2-cylinder, water-cooled 52.1 cubic-inch diesel engine, it features a sliding gear transmission with eight forward and two reverse speeds, and a ground clearance of 11.3 inches. Power steering and mechanical front-

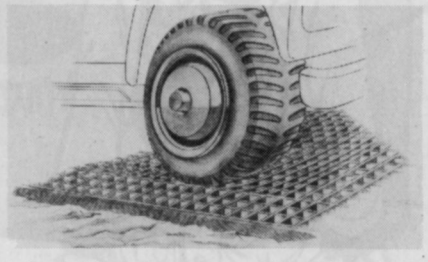
wheel drive are optional.
Circle No. 164 on Reader Inquiry Card

The Woods' S260 ditch bank mower was designed to cut a five foot swath from 90 degrees upward to 70 degrees downward. Overlapping free swinging blades were created for clean mowing



and the mower deck can be locked into a vertical position for road transport. Safety features include shielded universal drive line and belts.
Circle No. 165 on Reader Inquiry Card

Reusable anti-mud grids by Grass Pavers Ltd. were created to prevent wheel rutting and mud bog down of heavy vehicles running over soft soil. The polyethelyene grids are designed

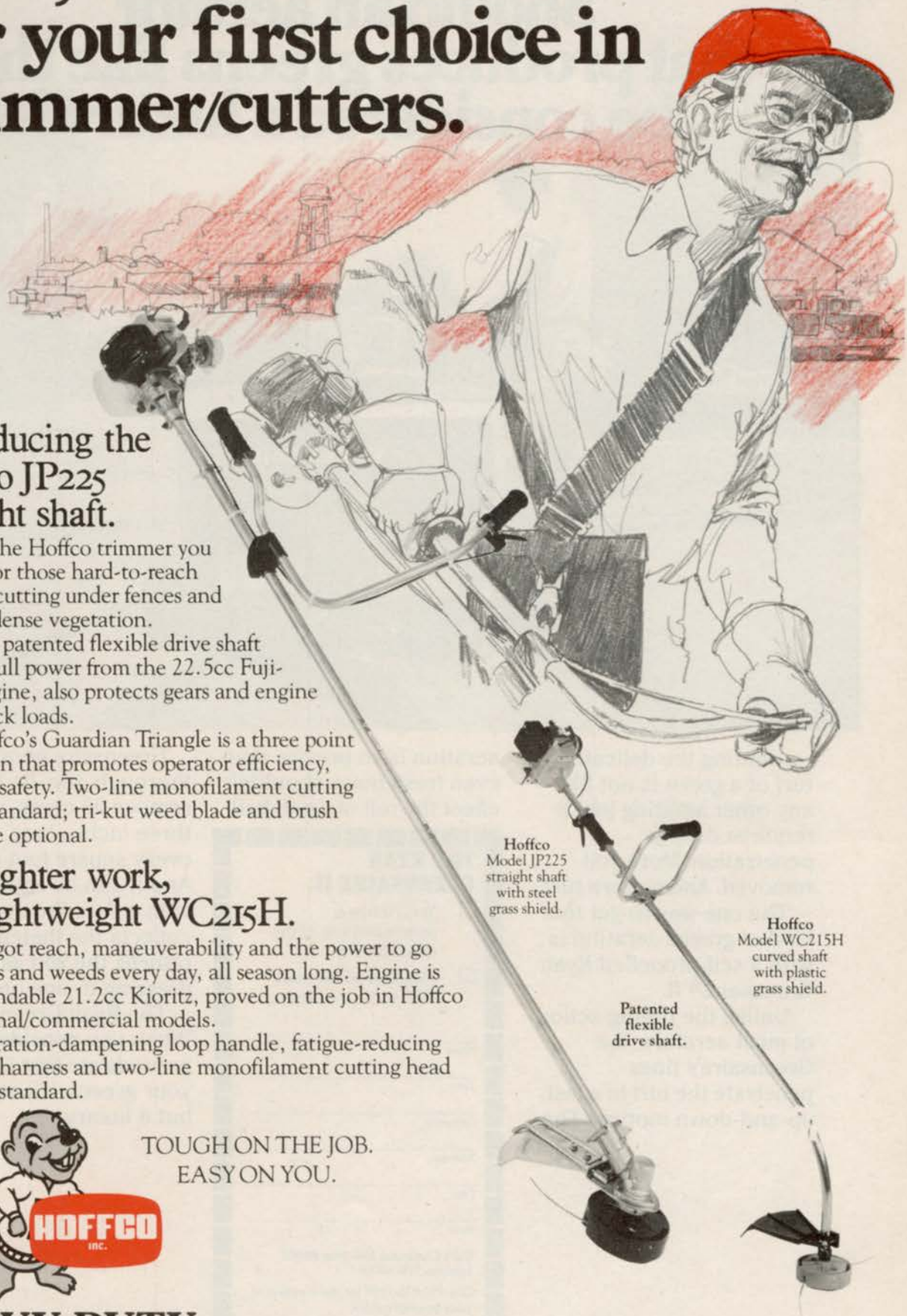


to be laid over non-reusable filter cloth and can be utilized wherever vehicles are needed for off-the-road purposes.
Circle No. 166 on Reader Inquiry Card

Midmark Corp. has introduced a compact, 7.5 hp walk-behind trencher with a variable digging speed for different soil conditions. Its 20,000 lb. digging chain is designed to trench as deep as 30-in. and as wide as 6-in. Other

Continues on page 89

Now, a second choice in shafts for your first choice in trimmer/cutters.



Introducing the Hoffco JP225 straight shaft.

It's the Hoffco trimmer you wanted for those hard-to-reach jobs like cutting under fences and pruning dense vegetation.

Our patented flexible drive shaft delivers full power from the 22.5cc Fuji-robin engine, also protects gears and engine from shock loads.

Hoffco's Guardian Triangle is a three point suspension that promotes operator efficiency, comfort, safety. Two-line monofilament cutting head is standard; tri-kut weed blade and brush blades are optional.

For lighter work, our lightweight WC215H.

It's got reach, maneuverability and the power to go after grass and weeds every day, all season long. Engine is the dependable 21.2cc Kioritz, proved on the job in Hoffco professional/commercial models.

Vibration-dampening loop handle, fatigue-reducing shoulder harness and two-line monofilament cutting head all come standard.

TOUGH ON THE JOB.
EASY ON YOU.

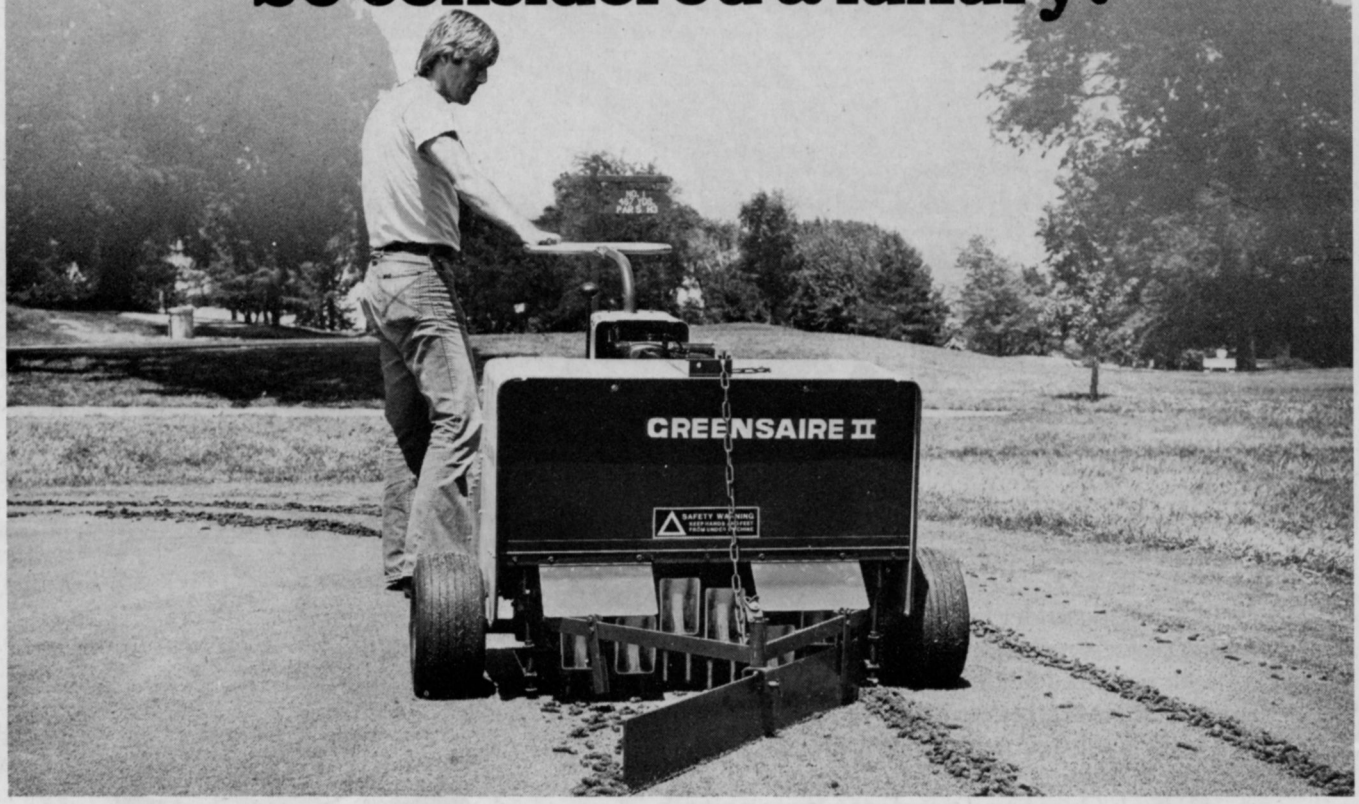
HOFFCO inc.

HEAVY DUTY

Hoffco, Inc.•Dept. No. WTT-282•358 N.W. F St.•Richmond, IN 47374

Circle No. 120 on Reader Inquiry Card

Should an aerator that produces greens like this be considered a luxury?



Aerating the delicate turf of a green is not like any other aerating job. It requires deeper penetration. More soil removed. And no torn turf.

The one way to get that kind of greens aeration is with a self-propelled Ryan Greensaire® II.

Unlike the rolling action of most aerators, the Greensaire's tines penetrate the turf in a fast, up-and-down motion. The aeration is so precise that even fresh holes shouldn't affect the roll of a golf ball.

Greensaire aeration is thorough, too. Its tines remove 36 cores, up to three inches long, from every square foot of turf. And it can be equipped with a Core Processor that collects the thatch and returns the soil as top dressing in one operation.

The Ryan Greensaire II. When you consider that grounds are first judged by your greens, it's anything but a luxury.

CUR2-5760

THE RYAN GREENSAIRE II.

☐ Yes, I'd like a demonstration of the Greensaire II.

☐ Please send me your 1982 turf-care catalog.

Name

Title

Company

Address

City

State ZIP

2104 Cushman, P.O. Box 82409
Lincoln, NE 68501

Call: 402/435-7208 for the location of your nearest dealer.

RYAN®
TURF-CARE EQUIPMENT

Circle No. 146 on Reader Inquiry Card

Circle
the
Reader
Service
numbers
of those
items of
interest
to you.

GET MORE FACTS

features of the Midmark 108 include hydrostatic propulsion with infinite speed, and an outboard headshaft bearing.
Circle No. 167 on Reader Inquiry Card

An operator-programmable nuclear gauge for the automatic processing of irrigation scheduling data is now available. According to the manufacturer, Campbell Pacific Nuclear Corp., the Hydroprobe is the first device of its

kind, allowing the operator to enter data directly into a computer, and within seconds get back scheduling information in printed form.
Circle No. 168 on Reader Inquiry Card

The Ground Ox by Taylor Manufacturing Co. is a three yard scraper/leveller featuring positive forced ejection and patented guidance systems.

With the ejection door opened, the Ox operates as a scraper; with the door closed to one foot behind the cutting blade, it becomes a field plane. It is designed for simple maintenance and easy manuversability according to Taylor.
Circle No. 169 on Reader Inquiry Card

Sudbury Laboratory, Inc.'s weather-resistant plant stakes are constructed of lightweight steel with a plastic coating. Available in a variety of lengths, the dark green Dura-Stakes have a tooth-style surface created for easy tying and vining.
Circle No. 170 on Reader Inquiry Card

Circle No. 140 on Reader Inquiry Card

How to make a great crabgrass herbicide even better for turf.

About the only thing that could make Chipco® Ronstar® G herbicide better for turf would be to lower the cost. So that's what we've done. Now you can get the superior performance of Ronstar G at a

dramatically reduced price.

Nothing controls crabgrass and goose grass better than Ronstar G. And you get this great weed control for the whole season with just one easy, early application.

Treat your turf with Ronstar G. The great crabgrass herbicide with the better-than-ever price. Rhône-Poulenc Chemical Co. Agrochemical Div., Rhône-Poulenc, Inc. Monmouth Junction, NJ 08852.

RONSTAR® G HERBICIDE

Circle No. 144 on Reader Inquiry Card

CLASSIFIEDS

RATES: 75 cents per word (minimum charge, $20). Bold face words or words in all capital letters charged at $1.00 per word. Boxed or display ads charged at $70 per column inch (one inch minimum). Agency commissions will be given only when camera-ready art is provided by agency. For ads using blind box number, add $5 to total cost of ad. Send ad copy with payment to Dawn Anderson, WEEDS, TREES & TURF, 1 East First Street, Duluth, MN 55802.

BOX NUMBER REPLIES: Mail Box number replies to: WEEDS, TREES & TURF, Classified Ad Department, 120 W. 2nd St., Duluth, MN 55802. Please include box number in address.

HELP WANTED

LAWN CARE SPECIALIST—Applicator needed for rapidly expanding commercial lawn care company. We are one of the most reputable companies in the Washington DC metropolitan area. Experience in turf management preferred, but not a must. Excellent advancement opportunities with a competitive salary and full benefits. Write WTT Box 285. 2/82

Grow with us! Established but aggressive and growing tree and landscape company is looking for an experienced, take charge individual to help us establish a new landscape maintenance division in the Chicago suburban market place. Must have a good working knowledge of horticulture and be able to work with customers (sales) and manage landscape maintenance workers. Please send resume, salary history and requirements to WTT Box 284. 2/82

LAWN SPRINKLER SALESMAN: Residential—Commercial—Golf Course, Toro Distributor for Colorado, looking for one more good salesman to live in Denver and sell sprinkler materials. Send resume and contact John Collier, Irrigation Manager, L. L. Johnson Distributing Company, 4700 Holly, Denver, CO 80216, (303) 320-1270. 2/82

ESTIMATOR/SALES—Opportunity for an enthusiastic individual with an innovative growing landscape contractor. Experience and/or degree is necessary. Responsibilities involve estimating commercial insulation, sight analysis, advertising and purchasing. Excellent benefits. Natural Landscape Contractors, Inc., P.O. Box 4434, Silver Spring, MD 20904. (301) 384-7766.

SUPERINTENDENT OF CONSTRUCTION AND PLANNING—North Bakersfield, CA (Pop. 36,000) Salary 2370-2893/mo. salary DOQ. Responsible for Planning—Design—Development district facilities. Training and experience as Landscape Architect or Architect or California General Contractor. For application and data sheet, apply to William Rasmussen, General Manager, North Bakersfield Recreation and Park District, 405 Galaxy Avenue, Bakersfield, California 93308. Closing date 3/1/82 or call district office—area code (805) 399-2906. 2/82

HELP WANTED
LANDSCAPE SALES

Position in sales with commercial landscape contractor for person with selling, design, mathematics and landscaping skills. Send resume to:

Jim Wheeler Vice President
CHAPEL VALLEY LANDSCAPE COMPANY
3275 Jennings Chapel Road
P.O. Box 159
Woodbine, Maryland 21797
(301) 924-5400
An Equal Opportunity Employer

TREE CARE SALES—Houston Tree Systems is a well established but growing company involved in tree care, transplanting and farming. Experience with trees in the Houston area and all phases of tree surgery, cavity work, insect and disease control is desirable. Ability to estimate work and degree in forestry required. Excellent income with benefits and potential for advancement. Send resume to Houston Tree Systems, 2308 Campbell, Houston, Texas 77080. 2/82

IRRIGATION SUPERVISOR for established Connecticut irrigation contractor. Previous experience in installation and supervision of irrigation crews essential. Excellent opportunity to join a rapidly expanding company. Excellent salary and future for qualified person. Send complete resume and salary history to Mark Sosnowitz, Sprinklescape, P.O. Box 175, Glenville Station, Greenwich, CT 06830. (203) 869-4149. 3/82

PROJECT MANAGER—Landscape contracting firm emphasizing commercial ground care seeks high qualified applicant who can motivate a crew. Managerial and horticultural experience required. Willing to work long hours for high rewards in a growth oriented company. Natural Landscape Contractors, Inc., P.O. Box 4434, Silver Spring, MD 20904.

HORTICULTURIST—Experienced Horticulturist to work in our Landscape Maintenance Division. B.S. in Horticulture or related field required. Must be familiar with insects and diseases of ornamental plant material and turfgrass. Must enjoy working with people and possess good communication skills. Must have the ability to establish a training program for our employees. Send resume and salary history to **OAK BROOK LANDSCAPE CO.**, 1000 Oak Brook Road, Oak Brook, IL 60521. Attn: Robert Winter. 2/82

AREA MANAGER—Landscape contracting firm emphasizing commercial ground care and high quality performance seeks highly qualified applicant with strong managerial experience and horticulture knowledge. Successful applicant will assume responsibilities and make his own decisions. Must be willing to work long hours for high rewards. Natural Landscape Contractors, Inc., P.O. Box 4434, Silver Spring, MD 20904.

LANDSCAPE MAINTENANCE FOREMAN: Excellent opportunity available for a responsible, enthusiastic person experienced in lawn & shrub care. **LANDSCAPE PRODUCTION FOREMAN:** Position available for person experienced in commercial work. Applicant would be expected to advance to a supervisory or managerial position. Salary, benefits, profit-sharing available. Send resume to Sarver Company, 11676 Perry Highway, Wexford, PA 15090. 2/82

Expanding eastern Pennsylvania landscape/tree care company, is looking for good sales people. Groundfloor opportunity for a take-charge person. Income opportunities unlimited for the right people. Rusk Landscaping, Ltd., P.O. Box 91, Levittown, PA. 2/82

LANDSCAPE MAINTENANCE DIVISION SUPERVISOR: Career opportunity with a growing Wisconsin landscape contractor. Must have 3 to 5 years supervisory experience, sales experience, and a good horticultural background. Benefits. Starting salary negotiable. Send complete resume and references to: David J. Frank Landscape Contracting, Inc., N120 W21350 Freistadt Road, Germantown, WI 53022, or call (414) 255-4888. 3/82

New Jersey Commercial Chemical Applicator Co. needs experienced professional to work operation with Cushman spray rig. 125 acres to maintain. Pay commensurate with experience. Creative Landscaping, 31 John Street, Ridgewood, New Jersey 07450 (201) 773-5567. 2/82

Nationally known lawn care firm needs branch manager to supervise in the servicing of over 1800 accounts. We need a take-charge person capable of overseeing our entire operation. Unlimited opportunities for the right person. Supervisory experience is necessary. Knowledge of the lawn business is not a requirement. Send resume and salary requirements to Lawns—P.O. Box 198, Morrisville, PA 19067. 2/82

BUSINESS OPPORTUNITIES

WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15553 N. East Street, Lansing, Michigan 48906. Phone (517) 484-7726. TF

Continues on page 94

Now ... a solid state controller that's so easy to program but so low in price!

Digital readout

0 to 60 minute timing per station; up to 3 start times

Timing accurate to 1 minute per month; active day light

Automatic or manual operation; individual station man operation

Pump/master valve circuit switch (except IC-4)

Battery back-up provides programming protection in case of power failure

UL listed

IC4 *(indoor mount) operates 4 stations, for about $80**

Precision irrigation control at your fingertips . . . it's yours with this new series of solid state controllers from TORO. So easy to program—or re-program whenever necessarry. So reliable, too. Unlike typical electro-mechanical controllers, these TORO solid state models have no gears, motors or cams which eventually wear out or require adjustments. Using state-of-the-art micro electronics throughout, these new control units provide accurate, trouble-free control for your automatic sprinkler system. And you can have this control for around $80.

STARTING AT AROUND

$80*

*Manufacturers suggested list price; subject to dealer option

For more information, see your TORO distributor, or write:

THE TORO COMPANY,
Irrigation Division
Dept. WT-282, P.O. Box 489,
Riverside, CA 92502

OTHER IC SERIES CONTROLLERS AVAILABLE:

IC4D—*4 stations $99.95**

IC8—*8 stations $179.95**

IC12—*12 stations $219.95**

TORO®

FOR SALE

Colorado Rocky Mountain Tree Spraying Business located in a growing city of the Colorado Rocky Mountain's front range area. Call (303) 353-8825.

FOR SALE: 300 Gal. Stainless Steel Sprayer, 20 Gal. per minute. Excellent condition. With Gun & hose. Trailer attachment available. Call (201) 364-3838 or Write—Squirt, 314 - 8th Street, Lakewood, NJ 08701. 2/82

FOR SALE: ANTIQUE TORO TRACTOR. MODEL A OR B ENGINE (DON'T KNOW WHICH). ALL ORIGINAL. ALL OPERATIVE. BEST OFFER. GREEN VELVET SOD FARMS (513) 848-2501. 2/82

FOR SALE: Young but well established nursery and landscaping business for sale. $100,000. worth of assets; highway frontage, only established firm for 30 mile radius, has good growth potential, located in southeast corner of Iowa. Tree spades, tractors, trucks, and trailers. Linn A. Cornick, P.O. Box 493, Mt. Pleasant, Iowa 52641. Call: (319) 986-6158. 2/82

Finn Bantam Hydroseeder mounted on tandem trailer. Trailer never used. Very good condition. $5,750.00. (219) 291-1413. 2/82

Used Spray Units For Sale

1,250-gallon stainless steel tanks. Mechanical agitation. FMC 20 gallon/minute pump. Hanney electric reel. Ford F600 and Chevy C60's — '76's, '77's, '78's and '79's.

Call (502) 241-7341. T.F.

Completely overhauled and dielectrically insulated 45′ Sky-Workers—For Sale and Rent. 90 day guarantee on sales. Call Aerial Lift, Inc., Milford, Conn. (203) 878-0694. TF

SKYWORKER AERIAL BUCKETS: Sales, Parts and Service. New and used units available to 65 feet. New and Used brush chippers, Hydro Ax's, used stumpers, sprayers and digger derricks also available. Call or write P. C. GOULD SALES COMPANY, Plains Road, Essex, Conn. 06426. (203) 767-1636. 3/82

WANTED

Wanted: Used Stainless Steel Combines, that aerates, rolls, sprays liquid, and used Tractors and Trailers, as formerly used by Lawn-A-Mat dealers. Write: Conestoga Golf & Country Club, Conestogo, Ontario. N0B 1N0 or call 1 (519) 664-2234. 4/82

"Wanted Mowers" Woods or Servis 15′ Rotary. Woods 5 or 6′ Side Mount. Call: (412) 793-4665 or (412) 793-3870 between 8:00 and 4:00 weekdays. 4/82

WANTED: Ryan Jr. 12" Sod Cutter 5 or 7 Gang Reel Type Mower. Tillmann Landscape Nursery —2735 University Avenue, Green Bay, Wisconsin 54301—(414) 468-1132. 2/82

WANTED TO BUY: USED ASPLUNDH BRUSH CHIPPERS. CALL (607) 692-4712. 3/82

WANTED—Brouwer or Princton sod harvester, forklifts, sod truck. Contact Robert Speidel, Panther Creek Sod Farms, Tallahassee, Florida—Rt. 2, Box 560-A, 32301. (904) 877-8608. 2/82

PGA Golf Professional with excellent promotional, teaching and merchandising experience **wishes to lease or purchase golf course.** Write WTT Box 286.

WANTED: 3 or 5 GANG WATER BALLAST FAIRWAY ROLLERS. STATE PRICE AND CONDITION. GREEN VELVET SOD FARMS. (513) 848-2501. 2/82

USED EQUIPMENT

SEEDING EQUIPMENT: 1-1974 Finn Titan Hydroseeder mounted on Mack Tandem Chassis, 1-1972 Finn Titan Hydroseeder mounted on Chevy Tandem Chassis, 1-1973 Finn Super Hydroseeder mounted on Chevy Chassis, 1-1969 Reinco Hydroseeder mounted on Ford Chassis, 1-1977 Finn Eagle Straw Blower, 2-1980 Reinco TM7 Power Mulchers. Call **THE PAUL E. BLEILE COMPANY,** Norwalk, Ohio (419) 668-3302. 2/82

REINCO HG-8 HYDROSEEDER—Skid mounted. Unit has been completely rebuilt, sand-blasted and painted with epoxy paint. Used only once since rebuilding. Asking $5,000.00. Contact: Hydroturf, Inc., P.O. Box 146, Hadley, MA 01035. (413) 584-6879. 2/82

SPYDER Forklift and Trailer, 200 hours, excellent condition, $12,500, or cash plus sod. 285 Kubota with loader, 700 hours, $5,800. (317) 873-5231, Zionsville, Indiana. 2/82

LINDIG SOIL SHREDDER—MODEL KT15—14 HP ENGINE—PRICE: $750.00. CALL: (803) 869-2561, Edisto Beach, S.C. 2/82

USED EQUIPMENT

Asplundh bucket truck, model LR50 with GMC chassis and forestry body. Very good condition and ready to go to work. $18,000. Heyser Landscaping, Inc., 400 North Park Avenue, Norristown, PA 19403 (215) 539-6090. 2/82

FOR SALE: 1975 Brower Sod Harvester, $14,000; 1975 Ford Sellick Fork Lift, $11,000; 1975 Hyster Lift Truck, $12,000; all in excellent working condition, will deliver free anywhere in U.S.A.—(216) 338-3008 days, (216) 564-7882 evenings. 2/82

Two (2) 1980 Spyder Forklifts, one Kohler, one Onan, both have fork extenders, new tires, in use daily, $12,495 each, or both for $24,000. The Grass Patch, Inc., 10743 Research Blvd., Austin, TX 78759. (512) 346-2150. 2/82

HI-RANGER BUCKET TRUCKS, 54′ and 51′, Flatbed and chip box mitts - Merrill brush chipper. Allied Enterprises, Inc., W. 204 N. 11509 Goldendale Rd., Germantown, WI 53022, (414) 255-6161 anytime. TF

BUCKET TRUCKS, SPRAYERS, MIST Blowers, Chippers, Log Splitters, Stump Grinders. Largest selection of reconditioned arborist equipment in the Northeast. Call or write with your needs. **ESSCO,** 584 **WEST HOFFMAN AVENUE, LINDENHURST, N.Y.** 11757. (516) 226-5115. 3/82

TREE REMOVAL EQUIPMENT—1968 GMC Truck with 54′ Holan Bucket, 1974 Int'l. 14′ Dump Truck with J.D. Pettibone Elbow Loader, 1973 12″ Wayne Chipper, MF-50 Landscape Tractor (Gas), 1966 3/4 ton Int'l. 4 x 4 with Winch and Plow, 1968 Chev. 9′ Dump with Prentice Cable Loader. All in good to excellent condition. (608) 539-2891. 2/82

1981 hydraulic tree sprayer, 35 g.p.m., 500 gal. stainless steel tank, trailer mounted MA (413) 527-0980. 2/82

USED GOLF CARS FOR SALE—All makes and models, 3 & 4 wheel, electric or gas. If we don't have your choice in stock we can get it. Transportation available. Mid-Atlantic Equipment Corp., Collegeville, PA. Call Now! (215) 489-1400. TF

HI-RANGERS AERIAL BASKETS 65′, 57′, and 53′. Skyworkers aerial baskets 65′, 50′, 40′. Vermeer stump cutter 1560,6. Vermeer tree spade 66, TS 44. Asplundh bucket and brush chippers. Bean sprayer, 9 ton trailer. Parkway Tree Service, 12026 W. Cherry, Wauwatosa, Wisc. 53226. (414) 257-1555. TF

MISCELLANEOUS

NEW/WICK-IT™ "Junior" **WEEDKILLER.** Lightweight hand-held wick applicator. No spray drift, low herbicide usage. Johnsongrass and other weeds growing among desirable plants. $16.95 plus $2.00 for handling. Send for brochure. Plant Production, Rt. 7, Box 441E, Fort Worth, TX 76119. 2/82 & 4/82

KELWAY® SOIL ACIDITY TESTER, used by PROFESSIONALS nationwide. Direct reading, lightweight, portable, fully serviceable, no power source. Model HB-2 reads moisture too. Available through distributors. For brochure contact Kel Instruments Co., Inc., Dept. T. P.O. Box 1869. Clifton, N.J. 07015 (201) 471-3954.

THE NEW YORK BOTANICAL GARDEN SCHOOL OF HORTICULTURE—An intensive 19-month program combining academic classes with practical work to train professionals in the field of horticulture. Curriculum includes botany, horticulture and landscape design, with work experience at both the Botanical Garden in the Bronx and at the Cary Arboretum in Millbrook, NY. Licensed by the New York State Education Department. For further information contact: Rosemary Kern, Education Department, **THE NEW YORK BOTANICAL GARDEN**, Bronx, New York 10458. (212) 220-8739. 2/82

LANDSCAPE DESIGN KIT, 37 rubber symbol stamps, ink pad, $38.50 postpaid. California add $2.16 tax. Stamps kit brochures available. American Stamp Co., Box 741, Dept. WT, Reseda, California 91335. Phone (213) 881-2808. TF

DIESEL HI-RANGER TOWERS—48-100 Feet working heights. Daily, weekly, monthly rentals with or without operator. MATLOCK LEASING, Pottstown, PA (215) 326-7711. 12/82

NEW BALL BARRIER NETTING: Made of Olefin fibers. 6½ feet and 25 feet high. Strong and tough. Will not rust. Easy to handle. For Driving Ranges and Golf Courses. Keep golf balls from straying off-course. J.A. Cissel Co., Inc., Dept. JK, P.O. Box 339, Farmingdale, N.J. 07727. (800) 631-2234. 3/82

CHALLENGING CAREER. Above average pay. Two year associate in applied science degree in golf course operations/Landscape technology. Financial assistance available. Write Western Texas College, Snyder, TX 79549. (915) 573-8511. 2/82

ADVERTISERS

NEW PRODUCTS

This index is furnished for the readers' convenience. However, the publisher can not guarantee its accuracy due to circumstances beyond our control.

There's nothing on earth like

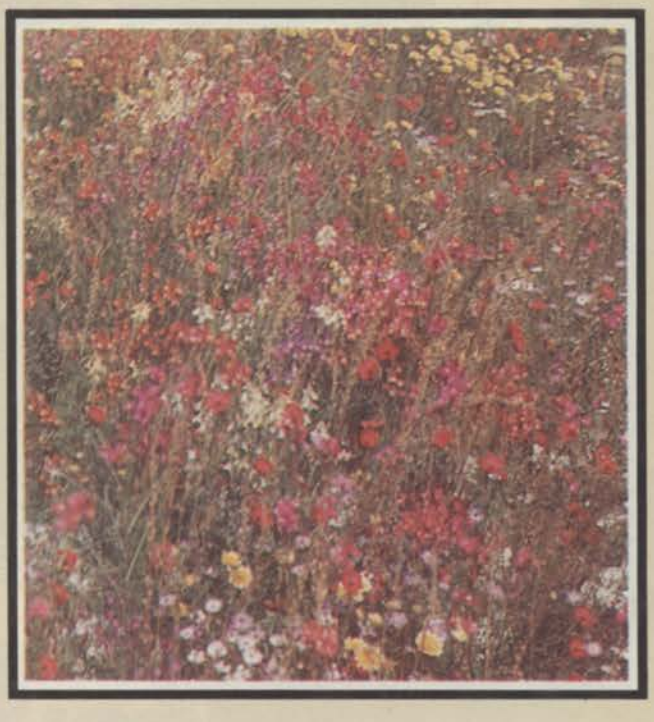
Eclipse Kentucky bluegrass is bred for out-of-this-world beauty and performance. It thrives in sun and light shade and is the ideal base for sod blends and turf seed mixtures for golf courses, parks, playing fields, and home lawns, coast to coast. In national trials, Eclipse was proven to have greater resistance to powdery mildew, leaf rust, Fusarium blight, and dollarspot disease. Eclipse stands up to harsh winter weather and easily tolerates poor fertility and high heat. For a dark green, low-growing turf with strength, density, and texture, you can't do better than Eclipse. There's nothing like it anywhere on earth.

Eclipse Kentucky bluegrass seed available exclusively from:

COWBELL SEEDS, INC., 1093 129th St., Bradley, Mich.; 850 N. Old 23, Brighton, Mich. • **GARFIELD WILLIAMSON, INC.,** 1072 West Side Ave., Jersey City, N.J.
JACKLIN SEED COMPANY, W. 5300 Jacklin Ave., Post Falls, Idaho • **NUNES TURFGRASS, INC.,** 2006 Loquot Ave., Patterson, Calif.
TWIN CITY SEED COMPANY, 500 30th Ave., N.E., Minneapolis, Minn. • **ROTHWELL SEEDS (IN CANADA),** P.O. Box 511, Lindsay, Ontario

Circle No. 117 on Reader Inquiry Card

Create a Colorful Difference



WITH Pinto BRAND **WILD FLOWER MIX . . .**

the colorful and decorative answer for low maintenance landscape areas.

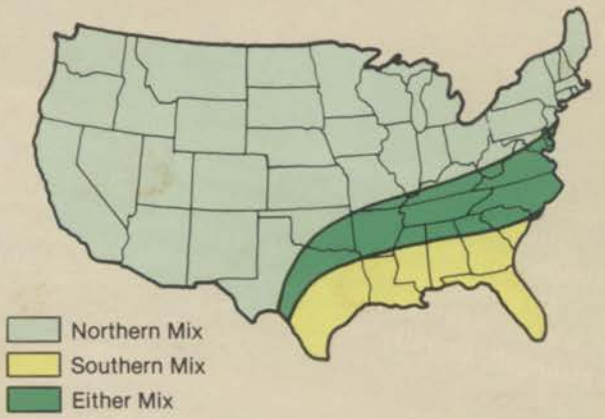
Multi-colored blends of annuals and perennials like Chicory, Scarlet Flax, Bachelor's Button, Baby's Breath and Painted Daisy. A blend that reseeds itself for lasting beauty year after year.

Pinto is ideal for any landscape — parks, roadsides, golf course roughs, home gardens, industrial and landfill sites. And perfect for areas where you don't have to mow.

Available either as 100% wild flowers, or mixed with a fescue as a Meadow Mix to aid soil stability.

It's custom blended in a Northern or Southern mix. So wherever you live, your Pinto order will be perfectly adapted for your climate. It will make this year the start of many colorful years to come.

Pinto Wild Flower Mix: the easy, low-maintenance way to naturalize your surroundings.



For more information or to place your Pinto order, call:

- **Ray or Lance Bentley, Lofts/New York (518) 677-8808**
- **Tim Bowyer, Sunbelt Seeds, Inc. (404) 491-1311**
- **John Sours or Grant Jurgensen of Jacklin Seed Company (208) 773-7581**

LOFTS **Lofts Seed Inc.**
Bound Brook, New Jersey 08805

Jacklin Seed Company
Post Falls, ID 83854

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