

action. Test marketing showed that an expenditure of \$40,000 a day (about \$2,750,000 for the three-month period) would achieve that desired result in a campaign covering both the U.S. and Canadian market.

The NMC advertising plan will begin this spring, according to NMC Steering Committee Chairman Richard Hutton. Advertising will be focused on Saturdays from late April through May to maximize its effect for all growing zones.

**EXPANSION**

**OMC Lincoln adds large warehouse**

OMC Lincoln is building a 102,000-square foot parts warehouse at its manufacturing complex in Lincoln, NE, announced Herbert A. Jespersen, div. manager, vice president Outboard Marine Corp.

Jespersen said that with the addition of the warehouse, all in-process parts storage will be consolidated under one roof. The new facility will incorporate a multi-level, rack-storage system that will expand the firm's present parts warehousing capacity.

The new warehouse will streamline production of products coming on line this year, such as the company's new 72-inch Front Line mower and Mini-Miser electric personnel carrier.

**TECHNOLOGY**

**Nuclear chemistry explains nitrogen loss**

Researchers at Michigan State University are using techniques of nuclear chemistry to study the loss of nitrogen applied to soils with the aim of trying to reduce it and thereby make fertilizer use more efficient. About 25 percent of the nitrogen given to soils escapes as gaseous nitrogen or nitrous oxidetrous oxide.

According to Jim Tiedje, professor of crop and soil sciences and microbiology at MSU, less is known about denitrification, the process by which nitrogen is lost to the soil, and a competing process, which conserves nitrogen in a form plants can use, than is known about many other basic biological processes. The tool that has made it possible for Tiedje and his co-workers to begin to unravel these processes is a radioactive


isotope of nitrogen produced in the MSU cyclotron.

Michigan State is one of only a handful of institutions in the world using nitrogen-13 for research and one of only two universities in the nation producing the isotope for agricultural studies. Nitrogen-13 is the key to finding out what happens to nitrogen applied to the soil because it makes it possible to trace small amounts of nitrogen as it is transformed by soil microorganisms.

"In our studies of denitrification, use of the radioisotope nitrogen-13 is particularly important," Tiedje says, "because the product, nitrogen gas, must be detected in our atmosphere, which is 80 percent nitrogen. This can be done only if we have nitrogen-13 as a tracer."

Experiments with nitrogen-13 nitrate applied to soil can reveal how much of the nitrogen escapes as free nitrogen or nitrous oxide and what conditions promote or retard this loss.

*Continues on page 72*



*Announcing a course in the*  
**CONTROL OF WEEDS  
 AND ORNAMENTAL  
 INSECTS AND DISEASES**  
**MARCH 13 & 14, 1980**  
 Stephenson Service/Div. of  
 Stephenson Chem. Co.  
 2444 West Point Rd.  
 College Park, GA 30337

The purpose of this course is to offer training in the recognition, biology and control of outdoor pests including the fundamentals of weed identification and control. In addition to providing basic training, the course is designed to cover subject areas specified by EPA for the certification of commercial applicators. Topics include:

- Laws, regulations, labeling and pesticides
- Insects and insect control
- Plant disease and their control
- Weeds and weed control

Instructors are  
 Dr. Harry Pratt and W.E. Blasingame.

For additional information call:  
 In Georgia 762-0194 (collect)  
 Outside Georgia toll free 1-800-241-3343

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**DON'T CUT OUT QUALITY.**

DO IT RIGHT, WITH STANLEY.

Quality, by our standard, is something which goes a lot further than making tools. To Stanley, it means: a full line of tree trimmers for every job; the best warranty in the business; complete parts backup; and distributors to help you anywhere in the country. It's also the efficiency, safety and dependability of hydraulic power. We don't trim on anything so that you're able to do your trimming faster. Stanley Hydraulic Tools: 3810 S.E. Naef Road, Milwaukie, Oregon 97222. Phone (503) 659-5660. Telex 360771. Write or call.

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# WIPE OUT WEEDS

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HERBICIDES

**The broadleaf weed 'specialists' designed for professional turf programs.**

Here's why BANVEL® herbicides are the professionals' choice for weed control:

- Used as directed Banvel will not harm trees, ornamentals or turf—it just eliminates weeds.
- No season restrictions. Lay down Banvel from early spring to late fall—all through the growing season.
- Rain will not affect Banvel. It keeps on working because it translocates—penetrates leaves and is absorbed through roots to attack every part of the weed.
- No special spraying equipment necessary. It is easy to clean out of equipment after use.
- Mixes readily with hard or soft water.
- Easily stored through winter months without losing potency.

**Banvel herbicides—products for professional turf men**



# Velsicol

VELSICOL CHEMICAL CORPORATION  
341 East Ohio Street  
Chicago, Illinois 60611

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## “Oak becoming a necessity for survival”

There is probably no other tree as useful for shade and a multitude of other needs as the oak, says Charles W. Dunn, executive vice president, Florida Nurserymen and Growers Association.

The live oak (*Quercus virginiana*) has the greatest endurance. It survives disease and insects, wounds from cars, roots cut from water line repairs, and a variety of soils. Live oaks produce strong and massive branches that can withstand even the severest of hurricanes. Many are over two or three hundred years of age.

The massive spread of the live oak can cut energy bills during the summer. Cool breezes beneath its canopy are almost as good as air conditioning. Leaves are shed during late winter to permit warm sunshine on the house. The leaves are excellent for mulching azaleas and other acid loving plants.

### SEED

#### Northrup King names Churchill to manage

Northrup King Co., Minneapolis, MN, has appointed Joe Churchill as assistant manager, Professional Turf Products Div.

In his new position, Churchill will be responsible for supply management of Northrup King turf mixtures and improved grass seed varieties. Prior to this position, Churchill worked at Northrup King's research center in Eden Prairie, MN.

### FLOWERS

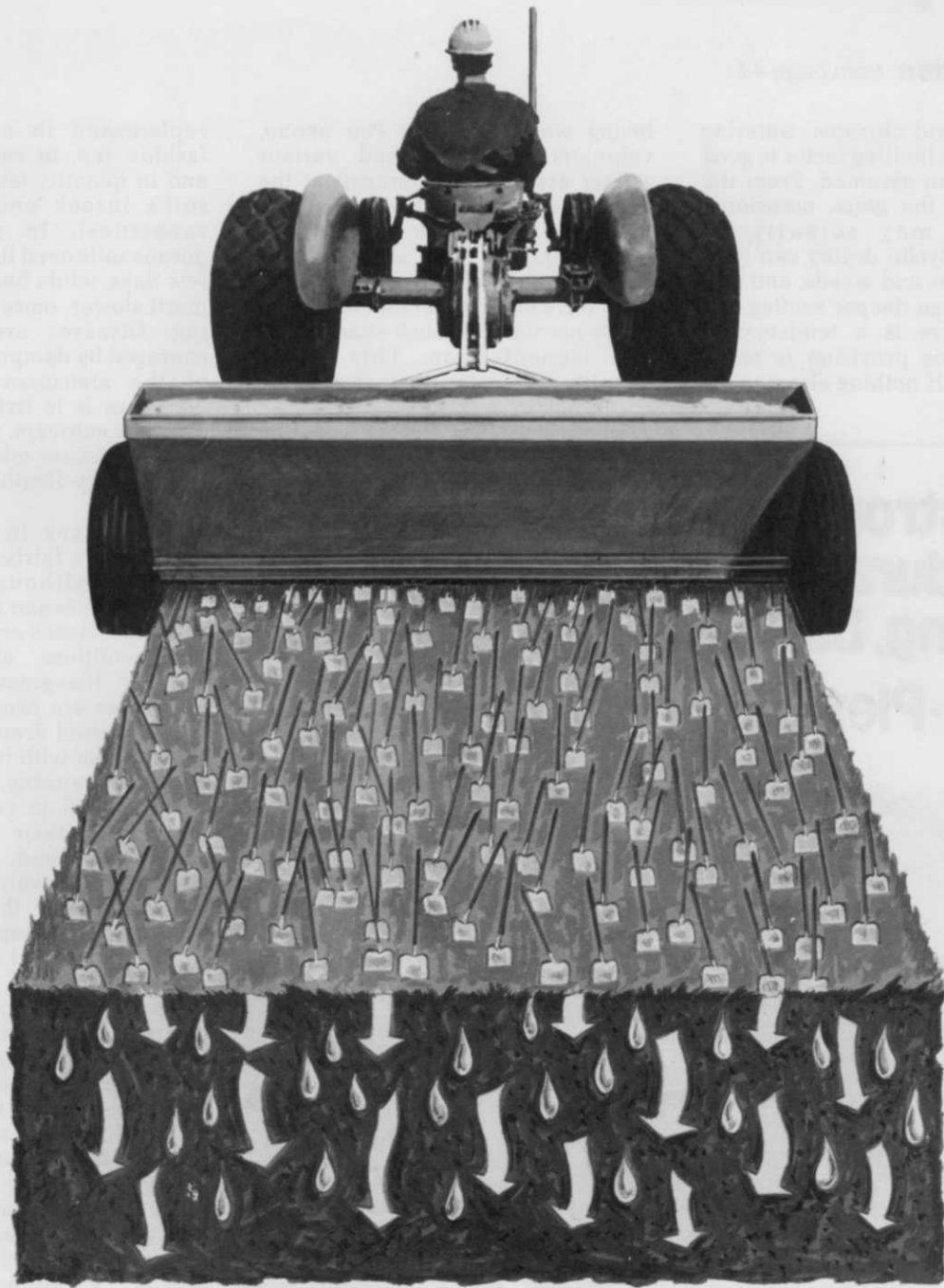
#### Zinnia ranks at top of flowering annual list

According to the amount of seed sold, zinnia, marigold, petunia, nasturtium, alyssum, aster, morning glory, portulaca, snapdragon, and sweet pea rate as the most popular flowering annuals.

Zinnia, a plant native to Mexico and Central America, is one of the most easily grown annuals for seeding directly into the garden. This, along with the wide range of colors, flower forms, and plant sizes and strong resistance to pests, makes zinnias so popular.

Marigold seeds may also be successfully planted directly into the garden. However, for earlier bloom, plants should be purchased or seeds started indoors. Color of marigolds is limited to yellow and orange shades but many plant forms and sizes are available.

Petunias, which come from Argentina, have extremely small seeds and should be started indoors or purchased as started plants. They are best suited to sunny locations in well-drained soil and have few pests.



**Easy way to loosen heavy clay soil!  
Works like millions of tiny hoes.™**

Sof'n-Soil™ Gypsum works its way down to loosen heavy clay soil so it can breathe. Lets air and water penetrate, boosts efficiency of costly fertilizers. Sof'n-Soil, a natural mineral, stimulates vigorous root systems—promotes growth of grass, trees, shrubs, and flowers. Ecologically safe, Sof'n-Soil is not lime. It's neutral, non-

caustic, non-burning—harmless to plants, pets, and people. And here's the bonus: Sof'n-Soil supplies essential calcium and sulfate sulfur in readily available form, stimulates decomposition of organic materials, too. Write to us at 101 S. Wacker Dr., Chicago, Ill. 60606. Dept: WTT280.



CHEMICALS DIVISION

**UNITED STATES GYPSUM**

Primary Supplier of Secondary Plant Nutrients

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Except in arid climates, watering is not often the limiting factor to good turf, as is often assumed. From the standpoint of the grass, occasional drying out may actually be therapeutic. Cyclic drying can help thwart diseases and weeds, and will likely encourage deeper rooting. All too often there is a tendency to overwater once provision is made for irrigation. If nothing else, water-

loving weeds such as *Poa annua*, volunteer bentgrass, and various sedges are then encouraged at the expense of the grass (few grasses are naturally adapted to a constantly soggy soil).

At the height of the growing season most turfs lose only about an inch of water per week through evaporation and transpiration. This is the quantity of water that should be

replenished in a common sense fashion (i.e. at rate of application and in quantity tailored to the local soil's insoak and water-holding capacities). In general, sandy, porous soils need light watering each few days, while heavy, clay-silt soils merit slower, more prolonged watering. Diseases are generally encouraged by dampness, although one of the measures for countering *Fusarium* is to irrigate moderately. The new cultivars, most of them with bred-in disease tolerance, are likely to be pretty flexible as to watering schedules.

Differences in irrigation preferences are fairly marked between species, although not greatly different between cultivars within a species. Fescues are well-adapted to dry conditions, especially in hot weather; bluegrasses and perennial ryegrasses are broadly tolerant, but "prefer" good drainage; bentgrasses are at home with high humidity and frequent watering. Bermudagrasses respond well to generous watering because of their vigor and rapid growth. Indeed, most southern species have evolved in humid environments so they "appreciate" some irrigation, especially on soils of the sandy coastal plain and in the arid Southwest.

**Fertilization**—Judicious use of fertilizer is one of the most effective means for encouraging turf (thus discouraging weeds), and enhancing the attractiveness of the lawn. Fertilizers rich in nitrogen are appropriate for a foliage-producing plant such as lawngrass. Most of the time a complete fertilizer (one containing all of the major nutrients — nitrogen, phosphorus, and potassium) is utilized. Potassium is increasingly recognized as important for winter hardiness, general resistance to disease, and sturdy growth. Phosphorus promotes root growth, especially in seedling grass, and helps grass achieve a jump on familiar weeds. Almost invariably nitrogen will be needed in any fertilization program, and a soil test can give guidance as to the necessity for other nutrients.

Simple pH determinations reveal acidity and the need for lime. Lime is often advantageous in regions of heavier rainfall, such as the eastern United States. In recent years sulphur has promoted grass health and retarded weed invasion (noteworthy of *Poa annua*), especially in the Pacific Northwest and

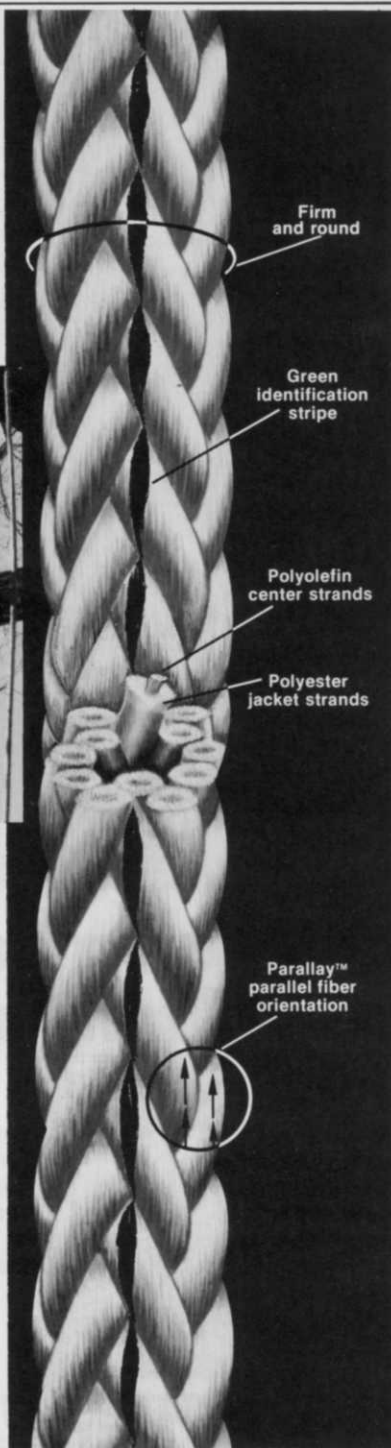
## New, stronger more durable climbing, bull rope, Arbor-Plex™



Arborplex™ 12-Strand... a new Samson rope designed to replace manila for climbing and bull rope. Arborplex has been extensively evaluated in the field and has proven itself with these advantages.

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- Good knot holding
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Arbor-Plex is now available through Samson Distributors. Send for descriptive literature and name of local source. Samson, Dept. AP, 99 High Street, Boston, MA. 02110



Circle 171 on free information card

Continues on page 76


# Field-proven systemic spray replaces trimming on hedges, shrubs and ground covers!



# Atrinal®

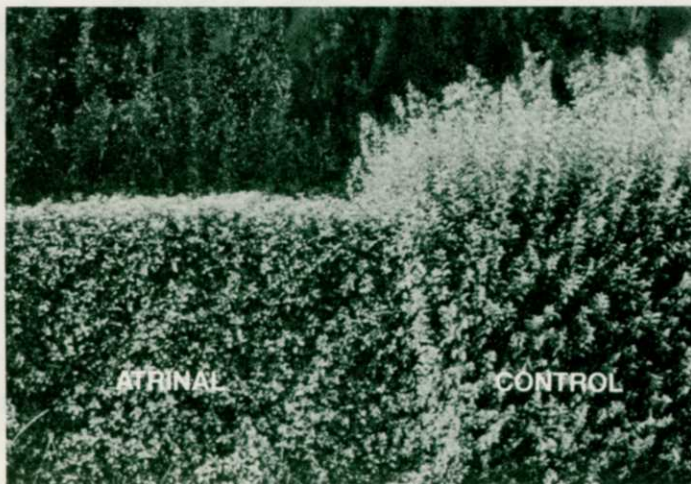
Spray with Atrinal and you'll reduce hand-trimming time, and labor... and in landscaping, time is money!

Spray Atrinal on hedges, shrubs and ground covers and they will require less trimming and pruning and have a more compact shape. Atrinal can also be used to remove unwanted blooms or fruit on certain species. And spraying is faster and easier. Atrinal, now being introduced to the American market, has enjoyed continued success in Europe.

Trust Atrinal. Use it, then watch your labor costs go down as profits go up! Get all the facts. See your distributor or write—Maag Agrochemicals Marketing,  Hoffmann-La Roche Inc., Nutley, N.J. 07110.

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**Atrinal®**  
 Liquid Concentrate  
 Systemic Plant Growth Regulator



RCD 5591

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75

more positive control!

## NEW D-5 EARTH DRILL



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## SUPER D WEEDONE® APPLIED BY METER-MISER



**Only way to total lawn weed control!**

Super-D is the formulation that's right for you with broader coverage for your dollar and a broad range of weeds under control.



AGRICULTURAL PRODUCTS COMPANY, INC.  
AMBLER, PENNSYLVANIA 19002

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## Turf Selection

from page 74

in Florida. In general, the newer cultivars are more responsive to fertilization than is common grass, the majority of them having been bred and selected for a regimen of care that included fertilization. Moreover, the newer cultivars are on the whole more resistant to disease, so there is not the worry about hot weather forcing (from fertilization and watering) that often wreaks havoc with common grass.

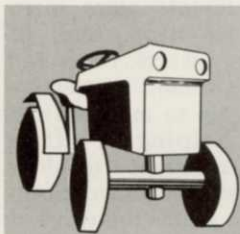
Southern lawns are typically fertilized at spaced intervals throughout the growing season, usually at rates of about one pound of nitrogen to the thousand square feet on each occasion. At one extreme is bermudagrass, a heavy feeder, the other centipedegrass (and perhaps bahia) which resents heavy fertilization. The other southern species fall in between; by and large they perform better and have better color if regularly fertilized. In the North, creeping bentgrasses are perhaps most in need of fertilization among modern lawngrasses, with fescues least demanding. Bluegrass and perennial ryegrass look better when adequately fertilized, and some difference shows up between bluegrass cultivars (Merion, for example, is a heavy feeder, while several other cultivars seem to survive quite well on a light regimen).

The advantage of autumn and early winter fertilization with northern grasses has been recognized in recent years, with only light feeding recommended as spring progresses. In the southern portions of the bluegrass belt, about two-thirds of the fertilizer may be applied in autumn, rather little during the summer (it would benefit weeds then, and perhaps encourage disease with common bluegrass). Even in northern portions of the bluegrass belt advantage is seen from late season fertilization.

**Soil Manipulations** - When preparing the soilbed, whether for seed or sod, advantage should be taken of the opportunity to introduce needed nutrients while the soil is being cultivated. Heavily used turf may merit incorporation of amendments, such as high percentages of sand to facilitate drainage, calcined clay, organic materials to bolster aggregation, and so on. In the majority of cases, however, soil treatments other than the mixing of fertilizer are too costly, and a good stand of grass is generally obtainable merely through

Continues on page 78

# Quit toying around!



Whether taking care of property is your business, your pleasure, or simply your responsibility, you need the proper equipment to do a proper job.

Satoh tractors are engineered for the optimum blend of power and speed for efficient and economical performance in a complete range of

applications. And throughout Satoh's full line of 14 diesel and gas-powered 2 and 4-wheel drive tractors, sized from 15 to 38hp, the features most often demanded by professionals are standard.

For example. Dual-range multi-speed selective sliding gear transmission with differential lock. Power take off with multi-step speed control and integral safety shield around the PTO shaft. Live hydraulic implement control and rugged Category I 3-point linkage. Environmentally-sealed brakes with independent pedals and hinged interlocking plate. Heavy-duty electrical starting system for all-weather dependability. Full instrumentation for instantaneous monitoring of all engine functions. And more.

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## Turf Selection from page 76

fertilization, sensible mowing, and perhaps watering if needed.

All grasses tend to improve soil as they grow in it, fingering rootlets that are partly recycled each year throughout the top several inches. On some hydrophobic soils wetting agents may help to keep the rootzone moister, or on water-logged ground to facilitate drainage. Applications of sulphur or gypsum may help control iron chlorosis of grass, on alkaline soils of the West high in sodium. Ground limestone for acid soils, and sulphur for highly alkaline ones, are familiar means for adjusting pH (most grasses do best in a mildly acid to neutral medium; bent-grasses and centipede grasses are adapted to more acid conditions, and all species are rather broadly tolerant).

**Other Perquisites** - The main attentions that generally spell success for turf have been highlighted. Yet special problems do occur, and some are receiving no little attention.

Irrigation water is becoming increasingly expensive and is not always of the highest quality. In the Southwest, particularly, salinity

problems arise. Alkalagrass (*Puccinellia*) and saltgrass (*Distichlis*), are adaptations from the plains which withstand relatively high salinity. The species are not competitive where other grasses flourish. Even among the conventional lawn-grasses slight differences among species and cultivars show up in ability to withstand saline environments (in California, for example, Fyking showed superior salinity tolerance among bluegrasses).

Thatching of lawns is a modern problem, in which undecomposed tissues accumulate at the base of the sod. Zoysia is notorious for being slow to disintegrate, while in the North fine fescue is more resistant than bluegrass or perennial ryegrasses. With all species, vigorous cultivars produce more vegetative growth (potential thatch) than less aggressive ones. Thatch-formation is influenced by many factors, but in general biological agents have not increased thatch decomposition. A moist thatch environment, as under a light topdressing, of soil, is usually most effective for reducing thatch. The newer cultivars will probably

build up thatch a bit more rapidly than common grass, simply because they are dense and vigorous. Occasional dethatching at a season when quick recovery will occur may prove helpful.

Aerification is advocated for compacted soil. Coring, in which pencils of soil are removed, rather than spiking, during which indentations are made, is generally preferable. It creates avenues for insoak of water and nutrients. The core holes often fill quickly with roots, indicative of favorable oxygenating conditions.

Pesticide treatments were mentioned under weeding, and, of course, extend to insects, fungi and nematodes (eelworms). Impressive new products come to market from time to time, helping to offset buildup of pest resistance to older pesticides. As was mentioned, bred-in pest resistance seems the wave of the future with lawngrasses. A groundswell of interest in integrated pest management (IPM), in which natural controls as well as pesticides play a major role, is also evident.

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Model 20-004



Model 20-006



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And that's never been more obvious than with our new Front Line rotary mower.

### Built for keeps.

The Front Line's 72" mower deck is made of 12-gauge carbon steel, reinforced and arc welded. It has a multi-disc PTO clutch, direct drive to the deck gear box with a sealed and lubricated shaft drive. The hydrostatic transmission is driven by two continuously engaged "A" section belts with self-adjusting tension.

There's no need to worry about overloading the Front Line's engine. The combination of our high torque engine and specially designed mower deck allows you to mow tall weeds and fine grass.

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The Front Line's cut in fine grass is so smooth, you won't believe it was made with three separate blades. That's because the blades overlap 1/2" to reach every inch of grass in the full 72" swath. Also, the cutting height is adjustable to eight positions, from 1" to 4 1/2" in half-inch increments.

Operating the Front Line couldn't be easier. With individual front wheel brakes, and wheel-type steering controlling a single rear wheel, you get tight maneuverability and better control on varying terrain.

The Front Line's mower deck makes your job easier, too. It extends more than a foot to

one side, so you can trim right up to fences or trees. And it lifts hydraulically for transport over curbs. What's more, a large capacity fuel tank lets you work up to 6 hours between refills.

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## More than a game from page 22

become certified requires more examinations on such subjects. Lastly, a pesticide mistake results in phytotoxic condition that is embarrassingly evident to everyone including his employers. As a group, the golf course superintendents may be the most experienced and qualified pesticide applicators and hence the safest users of pesticides. This does not mean however, that we should not be concerned about the total volume of pesticide use and all possible side effects. Thus the American Society of Golf Course Architects committee on environmental impact, chaired by an ex-bacteriologist, is preparing a white paper on the subject of golf course impact and will continue to monitor the literature to keep current and present these findings.

In summary, it is not difficult to use loaded words to evoke loaded thoughts about any site or golf course development project. But when each objection is examined in calm reflection, the benefits of the golf course in the landscape far outweigh the detrimental effects.

Having presented all of these facts and observations, it should be clear to even the non-golfer, that golf course development should be encouraged and not simply tolerated. If we introduce the general public to the many positive aspects that golf courses can bring to a community, it would seem logical for them to support any legislation that would permit golf courses to be taxed as open recreational ground and not at their highest and best use. The greatest threat to proposed and ex-

isting golf courses today is property taxes, that may be in excess of \$100,000/year in some areas. Many clubs simply cannot continue to pay such high rates and are selling their land to developers. In some cities, this problem is so acute that there has been an ordinance passed that says no golf course can be sold for any other purpose but golf until a new golf course of similar size opens. Although there is no pending legislation, we should begin now to encourage others to support fair taxing of golf courses for they are protectors of natural resources.

With the recent passage of Proposition 13 in California thereby reducing private property taxes, it is only natural that increased taxes will be expected from those still available tax sources. To many, the country clubs symbolize the elite and the rich and so little general sympathy will be shown if increased tariffs are levied on the country clubs. Unless some exemptions are made for these clubs, it could spell the end to many.

Having read this article you now have an arsenal of benefits provided by golf courses that should be used to defend their existence. Better yet would be to take the offensive and see if a committee or program of community relations could be set up to more clearly demonstrate the importance of the golf course to its' neighbors. It could be anything from designated wildlife areas or bird houses to a collection of used golf equipment donated to the schools or park systems. The possibilities are endless and successful programs will be noted in golfing publications like this.

WTT

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## Climbing from page 33

get to them easier," Hawthorne says. "A bucket operator can swing away from a tree and at it from a 40-foot height and 30 or 40 feet away."

"We can get a better perspective than a climber because a bucket truck can be put right against a trunk or the operator can even climb out of it and up the tree if he wants. Often we'll use a bucket truck to take a guy up to the first branch of a tall tree. With 120-foot tulip poplars where the first limb may be 60 feet off the ground, we can get a climber in the tree much easier than trying to throw up ropes and set up ladders."

Although not a frequent job, cavity filling in high sections of trees is something Hawthorne's crew must sometimes do. "Instead of a man sitting in the saddle to dig the cavity out, he can stand in a bucket truck and work. Excavating a cavity can take two or three hours which can be very tiring in a saddle. Depending on the size of a cavity, you may have to make a couple trips up a tree carrying cement, chisels, and other tools."

This seems to sum up much of what Hawthorne thinks is the main advantage of bucket trucks. They are a practical mechanical device which supplement man's abilities. He says, "I would not say a man could trim a tree faster in a bucket truck, but he's not going to get as tired. A bucket truck

operator could do more trees without being so winded."

A bucket truck is not for every tree. Hawthorne estimates he can probably get to 35 percent of his trees, but as far as all work goes—takedowns, shaping, pruning, and even spraying—he can use it on 75 percent of the trees in his area. He's received some contracts in towns with a good number of trees that would be too time consuming and costly to do without a lift. A smaller operation with a truck could expand and do many more jobs, he thinks.

Some of the unique jobs he's received because of the bucket lift include decorating Christmas trees, lifting solar panels onto roofs, changing lights in parking lots, raising advertising signs, elevating movie cameras and cameramen to photograph certain scenes, and spraying large areas.

Results are good, business gets better, and Hawthorne finds more things for his bucket truck to do every day. Nobody has compared Hawthorne's trees to Halsted's. One is in the east, one in the west; one uses bucket lifts, one almost exclusively climbs. Both men think they are doing the proper job as arborists. They realize that without the skill, knowledge, and practice, their work and talk would be meaningless.

WTT