

The specialist must be keenly aware of three factors when attempting to identify disease: appearance of individual plants; weather conditions at the time and prior to appearance of the disease; and management practices.

Application of fungicides can be done several ways, but R. R. Muse of Ohio State's Wooster research center said spraying is preferred "simply because it provides a more efficient and better distribution."

Muse stated that complete and uniform coverage of fungicide — that is, wet leaves, crown, and thatch area — can be achieved with 5 to 10 gallons of spray per 1,000 sq. ft.

"In some cases, five gallons are satisfactory against diseases such as powdery mildew and rust, "which attack mainly the grass blades" he said. "Other diseases, such as Sclerotinia dollar spot, Rhizoctonia brown-patch, Pythium light, and Helminthosporium melting-out, in which the organisms attack the crown and roots, require 10 or more gallons."

Plant pathologist Noel Jackson of the University of Rhode Island doubted the development of a fungicide that would be a universal panacea for all turf ills.

Laboratory success for a fungicide doesn't always follow with field success because conditions vary so greatly, said Jackson. And methods of testing and evaluation vary from research center to center.

To improve fungicide research and evaluation, Jackson reported that the turfgrass committee of the American Phytopathological Society recommended recently the establishment of nationwide test standards. The standards would cover all aspects of field experimentation, growth chamber and greenhouse studies; The committee charged with recommending standards would also offer suggestions on how to develop a centralized, interstate cooperative facility for obtaining and compiling meaningful data.

A carefully planned fungicide program may be important, but may not be needed, suggested Lowell E. Moser of Ohio State.

"By carefully planning and modifying a turfgrass site, selecting disease resistant varieties, keeping a balanced fertilizer program, irrigating as infrequently as possible and preferably in the morning, mowing with sharp mowers, and keeping thatch under control, one could expect less disease."

Intelligent management won't eliminate disease on fine quality turf, he added, but where medium

quality turf is sufficient it often is enough to avoid a severe disease problem.

Soil Temperature Effects on Plants

Soil temperature and air temperature characteristics aren't always parallel, disclosed James M. Latham, Jr. agronomist for the Milwaukee Sewerage Commission.

The turf manager needs to pay more attention to temperature below the surface, Latham indicated, if he is to establish and maintain healthy turf.

It is well known that soil temperature directly affects germination, growth, and bacterial activity, therefore it is important for the turf man to know whether a soil tends to be cooler or warmer.

Latham listed these factors as indicators of warmer soil: dark color and dry, south slope, well-drained, uncompacted, bare, and in equatorial latitude. Cooler soil factors, he said, are light color, north slope, poorly drained, compacted, forested or cropped and polar latitude.

(Continued on Page 14)

of the country have bluegrass fairways and tees, James L. Holmes, Agri-Systems of Texas, Inc., Bryan, sees a trend to bentgrass.

Fairway irrigation and player demand for short height of cut are the reasons, he said. "If a blend or mixture is all that is required, simply use seaside," he advised.

"Great variation in type is perhaps the most favorable trait of seaside. Where this grass has been regularly and constantly seeded or overseeded, certain types develop under given environmental conditions."

Penncross is finding favor as a green and tee turf, simply because it is easier and cheaper to establish by seeding, claimed Holmes. "It is tremendously easier in reestablishing a uniform turf in a deadened area."

Turfgrass Disease

Of greatest importance is the discovery of turfgrass diseases at the earliest stage, stressed Clinton F. Hodges of Iowa State University. Once large areas have been lost, identification of the specific disease is extremely difficult.

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Presidents, Man-of-the-Year . . . And the Whole Gang



Newly elected president of the Ohio Turfgrass Foundation, Richard Craig, left, is offered best wishes by Robert Reiman, outgoing president (upper left picture) Charles Tadge, right, receives OTF's "Man-of-the-Year" award from Harry Shrode, awards committee chairman. The leadership that produced the big show and will plan the one next year at Cincinnati

is, from the left: Robert Miller, executive secretary; Richard Craig, president; Tom Evans, first vice-president; Robert O'Brien (front), second vice-president; Robert Reiman, outgoing president; Gene Probasco, treasurer; Paul Morgan, director; Fred K. Buscher, director; Bill King, director; Harry Shrode, director; Paul Mechling, director.

(Continued from Page 11).

Temperature variation diminishes as soil depth increases, Latham pointed out. The depth where no change occurs is called the neutral layer. The neutral layer for daily temperature change is five inches deep; for annual variation, 40 feet. At 30 feet, he said, the seasons are reversed.

Dr. Paul R. Henderlong at Ohio State illustrated how temperature affected seed germination (percentages recorded 10 days after seeding) with this chart:

Species	90°-80°	75°-65°	60°-50°
Pelo ryegrass	65%	92%	62%
Pennlawn fescue	42	86	40
Penncross bent	50	58	46
Highland bent	53	43	45
K-31 fescue	36	55	58
Park bluegrass	32	45	20
Merion bluegrass	—	5	—

The optimum air temperature range for bluegrass and fescue growth has been reported to be about 75 to 85 degrees, Henderlong said. Yet the optimum soil or root temperature range is 60-70 degrees. Optimum soil temperature for root development of bentgrasses and ryegrasses is about 85-65 degrees. Growth rate for grasses in general indicates an optimum temperature somewhat higher than that for root growth.

Soil and air temperatures have profound influence on fertilization, stated R. E. Blaser, agronomist from Virginia Polytechnic Institute.

"The 14 mineral nutrients needed by turfgrasses do not diffuse into root tissue by themselves," he said. Temperature influences availability of nutrients in soils through chemical and physical effects on soil materials and through growth stimulation or retardation of microbes and turf plants.

Phosphorus availability is lowest when temperature is low. Too much nitrogen when soil temperature is favorable for growing can overstimulate above ground leaf growth at the expense of root health. With high nitrogen content in the leaf and reduced energy reserves in the roots, disease can be just around the corner, he warned.

Experienced turfmen know when it's "dollar spot weather" or "brown patch weather," claimed plant pathologist Dr. Robert E. Partyka. It's an indication, he said, that soil and air temperature is quite important in the development of turfgrass disease. As a rule of thumb, he listed these air temperature brackets "right" for producing the following diseases:

Show Mold, *Fusarium nivale*, 32-

45 degrees; Brown Patch, *Rhizoctonia solani*, 64-73 degrees for mycelial growth (But at 80-85 and a relative humidity of 100%, the fungus can completely blight a large area within six to eight hours. A rapid temperature drop to the 64-66 degree level favors sclerotial formation. In some cases, sclerotia may form within an hour.); *Helminthosporium sorokinianum*, leaf spotting at 68 degrees, leaf spotting with some blighting at 75-85 degrees, and severe blighting with no leaf spotting at 95 degrees; Dollar Spot, peak activity at 70-80 degrees;

Copper spot, *Gloeocercospora sorghi*, fungus begins to grow when soil temperature reaches minimum of 62 degrees for seven days (air temperature may be in the 68-75 range); Anthracnose, *Colletotrichum graminicola*, 80-85 degrees; Pythium blight, *Pythium aphanidermatum* and *P. utimum*, most favorable at 85-95 degrees; Powdery mildew, *Erysiphe graminis*, 65 degrees; Fusarium blight, *Fusarium roseum* and *F. tricinctum*, 77-95 degrees; rusts, *Puccinia graminis*, 70-75 degrees, once fungus has invaded the tissue, 85-95 degrees favors growth; stripe smut, *Ustilago striiformis*, 50-60 degrees; and soil-borne nematodes generally grow best at 65-75 degrees,

temperatures that also favor good turf growth.

Grounds Beautification

Industry might warm up its welcome from a community by leading with its plan for landscaping.

Some people don't want industry because of its lack of emphasis on grounds beautification, said Jack Sybrant of Duncan Landscaping, Youngstown, Ohio.

"Many times we're called in too late," he added. "with the only solution of the beautification problem being to screen the business from the public."

Where we can landscape, he continued, "we try to soften the structural lines to make the structure look comfortable with its surroundings."

The same idea is applicable to home beautification, observed James Caldwell, horticulturist at Ohio State.

But first, he said, you have to get their attention focused on beautification. Then give them the right information; sell them the right plantings; talk about year-around effort; don't over-clutter.

Frank Dobie of the Sharon Golf Club at Sharon Center, Ohio, observed that a "well-planned beautification program can be a good public relations program with members."

Edward Friedhoff described the tree-planting and grounds beautification at the Cemetery of Spring Grove at Cincinnati. Year-around appeal is important, with the whole idea being to please the living who come there, he said.

Dave Willits, in reporting about his landscaping efforts around Columbus Public Schools, offered graphic illustrations of what happens when maintenance isn't considered in landscape plantings. In a relatively short time, a complicated, though attractive, planting can become an eyesore if the time and labor isn't available to maintain it.

Election and Awards

Richard Craig, superintendent of the Camango Country Club at Cincinnati, was elected president of the Ohio Turfgrass Foundation. Elected to serve with him were: First vice-president — Tom Evans, Velsicol Corporation; Second vice-president — Robert O'Brien, Century Toro Dist., Inc., Toledo; Treasurer — Gene Probasco, Lakeshore Equipment and

Supply Company, Bloomington; and directors — William King, Princeton Board of Education, Cincinnati; and Paul Mechling, Sylvania Country Club, Toledo.

Charles Tadge, superintendent of the Mayfield Country Club of South Euclid, was named Man-of-the-Year. Other awards included: Outstanding Service — Dr. Richard R. Davis of the Ohio Agricultural Research and Development Center at Wooster; Membership — Ronald Smith, grounds superintendent at Bowling Green State University; Past Presi-

dent — Robert Reiman, sales service and traffic manager of the Ohio Lime Company at Woodville.

The Ohio Turfgrass Foundation presented a check for \$2,400 to Ohio State University for scholarships awarded to six students. They are Randy Rausch, Brian Thrasher, Jerry Jackson, Gary Chamberlain, Richard Boehm and Thomas George Vandendenden.

Chamberlain, Vandendenden, and Thomas Urbansky receive scholarships from the Golf Course Superintendents Association of America.



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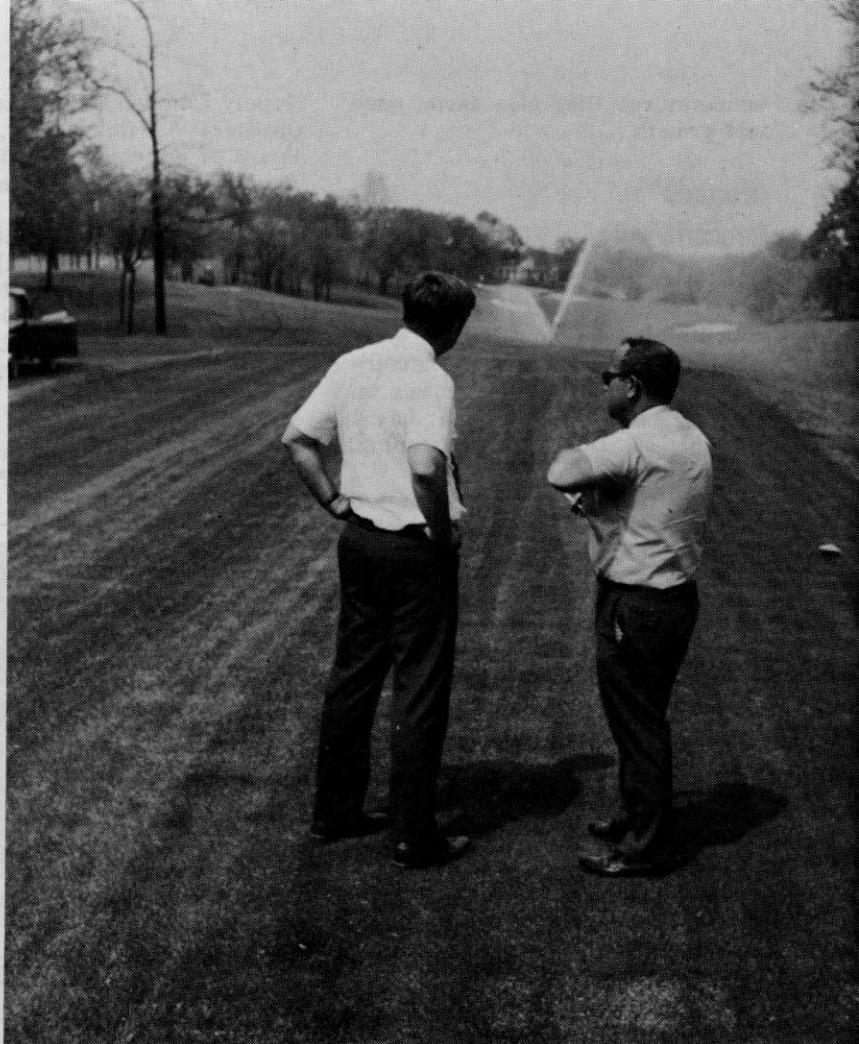


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For More Details Circle (104) on Reply Card

The best in golfing played this course in 1969. It's the NCR course at Dayton, Ohio, site of the PGA tournament. Naturally, it had to be in superb shape, and the man responsible is Jack Hart. Hart (right) is visiting with Roger Gilmore of Diamond Shamrock Chemical Co. Hart watches over 54 holes, and that's why two-way radio communications between the maintenance building and key vehicles is vital.



Golf's Best Played NCR Course That Boasts Turf Management by Ear

JACK HART says he "plays everything by ear" in his job as golf course superintendent at the NCR Country Club, Dayton, Ohio. Over the years, the sensitivity in that "ear" has paid off for him.

Especially last year.

This was the year Jack's course was not only played over by the nation's top professional golfers, but was seen in glorious living color by millions of avid golfing enthusiasts via TV. It was the year Jack's turf took on the 51st annual PGA Tournament, and Jack wasn't taking any chances that his turf would be anything less than perfect.

To accomplish this, Jack relied heavily on his years of experience to tell him what needed to be done and when, to keep his turf as healthy, good-looking and playable as possible. And the consistently high turf quality of the NCR course was certainly a factor in choosing

it as the site for the 1969 PGA Tournament.

Has a Feeling for Trouble

Take control of turf fungi, for example. "As a rule, I'll wait until I see some appear," Hart says, "after awhile you can nearly feel when they're going to hit. Like brown patch—I can see that grass standing up a certain way and I just know we're going to start getting some brown patch."

"I really can't go by any rigid program, because nature doesn't follow a rigid program," Hart explains. "I play everything by ear, hour by hour."

But Hart's explanation of his intuitive grasp of the situation also brings out what is possibly an equally important part of his success as a course superintendent — management. Hart knows how to manage his resources, and he knows which resources he can count on to solve

the problems which crop up.

"The first thing I've got to have, with the three courses that I'm responsible for," (He handles 36 holes at the NCR course and another 18-hole private course adjacent to it) "is to have men I can count on. And



Sometimes, laments Hart, "It seems we have more different plants, more grasses, more insects, more diseases, more everything" . . .

I'm fortunate in that respect," Hart says. "I've got one top assistant, Clyde White, and an excellent foreman on each course, all connected by two-way radio."

Weed Control Constantly

Next, he depends on high quality "tools of the trade," and knowing how to use them. "Weed control is a constant job, and we're always looking for better ways of handling it," Jack says. "We were using silvex for clover and broadleaf control," he says, "until we started using Dacamine a few years ago. We've had wonderful results with Dacamine, in that it gets the weeds beautifully and doesn't injure the grass at all—no leaf burn or anything."

"It seems to be a completely different formulation than any of the phenoxy herbicides we've used," he adds. "I've found it to be completely non-volatile—we haven't burned an oak since we've started spraying with Dacamine."

Clippings Say When on Fertilizer

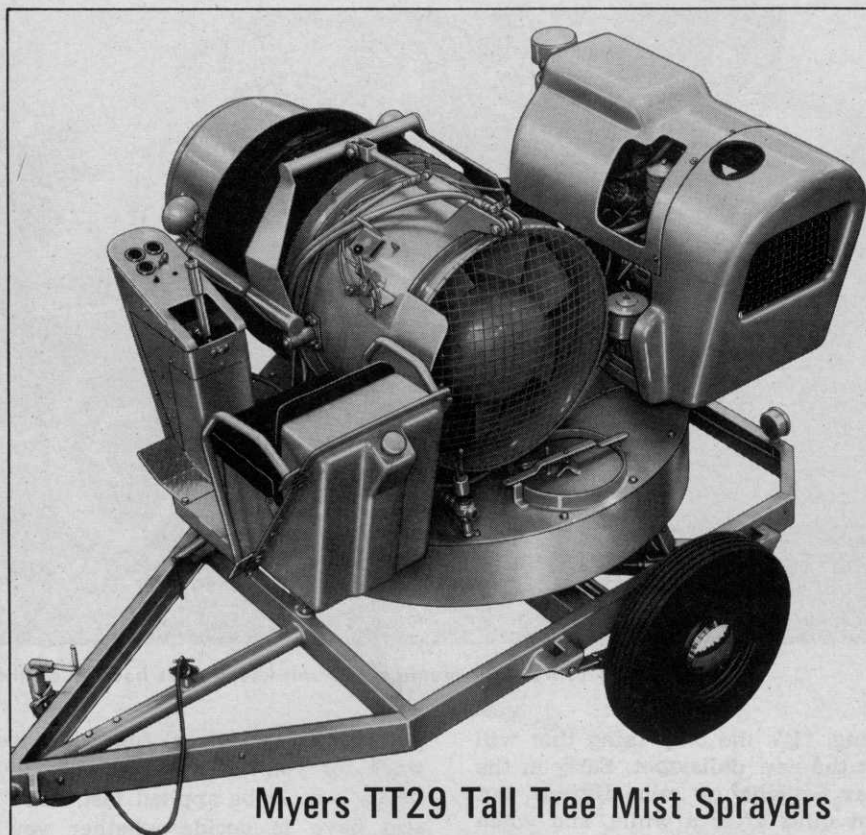
Fertilization isn't a "by guess or by gosh" proposition with Hart, either, but again he doesn't follow any rigid pattern. "It just depends on when the turf needs it," he explains. "I judge the grass by its clippings, not by its color, and fertilize on that basis. Color isn't really that important—it's how the course plays that counts. I'll bet the turf could be purple and nobody'd mind if it played well."

In general, though, Hart starts with an application of 12-4-8 or 10-3-7 in the spring and "touches up" later with a light shot of 10-3-7 or liquid urea.

When it comes to the fungus control, Hart has discovered a new friend, Daconil 2787 fungicide, to supplement the Dyrene he had been



But Hart has found a big help in weed control is Dacamine herbicide. Here, he examines some knocked-out dandelions along the edge of a fairway.



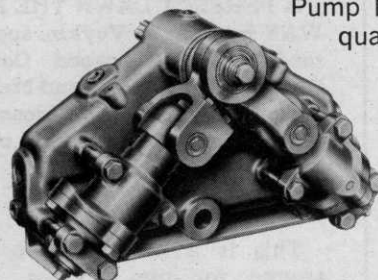
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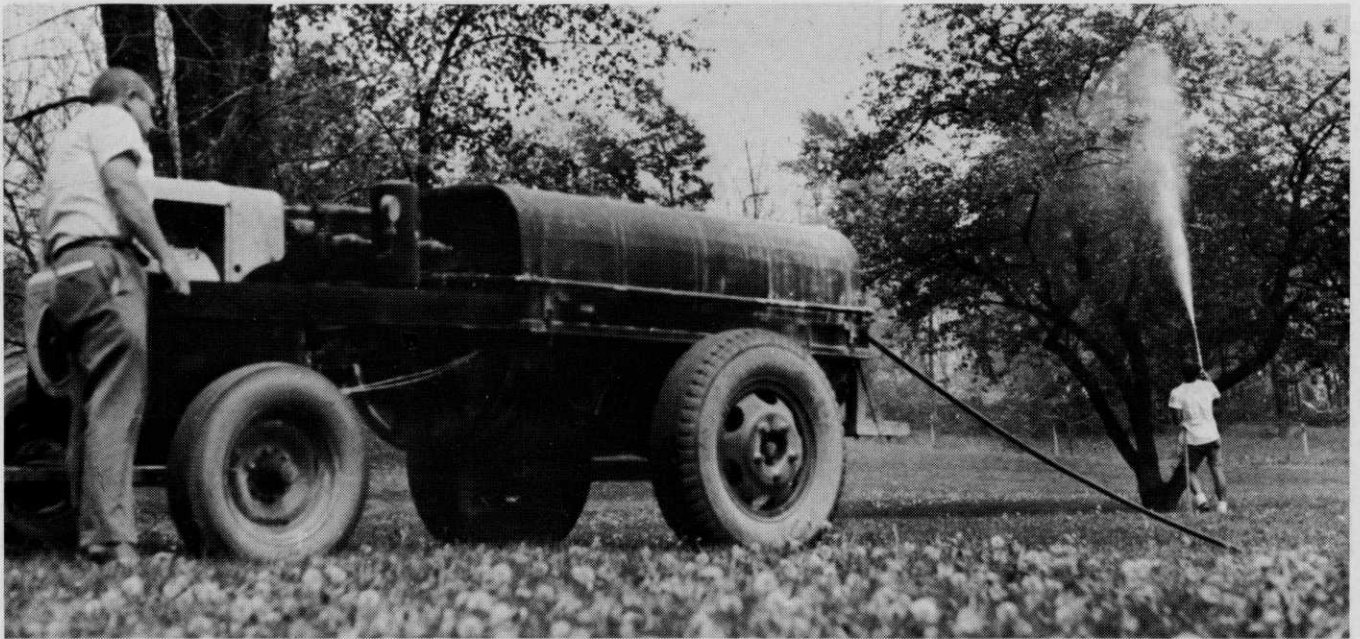
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using. "It's the only thing that will get the new dollarspot. Early in the year I might use some Dyrene, but that quits after a while, and when the going gets tough I go to Daconil 2787 fungicide."

"Application," Hart says, "is im-

portant in getting a fungicide to work for you." First of all, he believes it must be applied fast. "You also have to decide whether you want to spray on top or get to the bottom—different diseases should be attacked in different places," he says. "Some diseases work on top of the grass—like leaf spot and smut, and some work near the bottom. Right now we're driving the spray down into the grass to clean out brown patch and pythium."

Another Secret's in Watering

What else does it take to make a PGA-quality course? "Well, if you want to call it a 'secret' of success," Hart laughs, "I guess you'd have to call good watering practices another of my 'secrets.'" There is more damage done to good turf due to over-watering, especially in hot

weather, than by lack of water."

Hart makes sure none of his turf gets watered by sprinkler in hot weather—it is always done by hand. "And," he says, "we do every bit of our fairway watering at night."

"In fact," he adds, "we don't do anything in the heat of the day—at 87 or 88 degrees everything stops, because we don't want to make the turf susceptible to bruising. More good grass is hurt by bruise than people realize. In addition," he says, "a rundown condition is the cause of much disease, like pythium."

Jack keeps precise records on his practices on all three courses. It helps him build the store of "intuition" he uses constantly in his work. And it's that big "intuition" that helped make the PGA Tournament one where a golfer's only reason for a missed putt was the golfer himself, not the turf.

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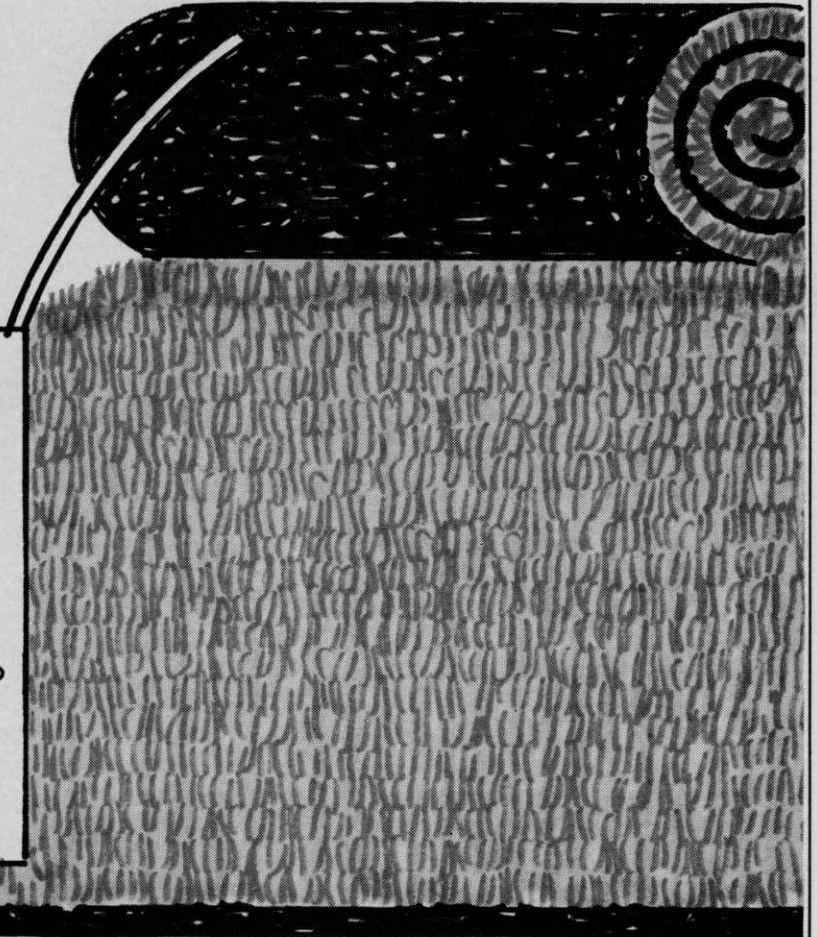
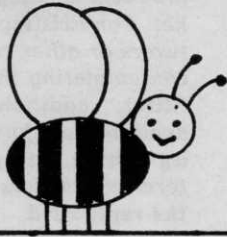
BOOK REVIEW

A PERFECT LAWN THE EASY WAY by Paul N. Voykin, superintendent of Briarwood Country Club, Deerfield, Ill., Rand McNally & Co., P.O. Box 7600, Chicago, Ill. 60680. Hard cover, \$3.95; paperback, \$1.95.

This is a nice book to have around for two reasons. First, you'll enjoy reading it. Voykin is a good story teller and is able to see the humor in embarrassing or frustrating situations; to make the complex seem simple. Voykin

presents a month-by-month approach to lawn care. "Take it easy," he repeatedly advises. Secondly, the book is good to have around to loan to the customer, club member, or friend who's about ready to cement over his yard—or do something drastic. Voykin's title indicates he can write authoritatively—to include tips on how to try to convince your neighbor that his flowers are suffering from a "rare Moroccan disease epidemic" rather than drift from your weed-killer spraying! Have fun.

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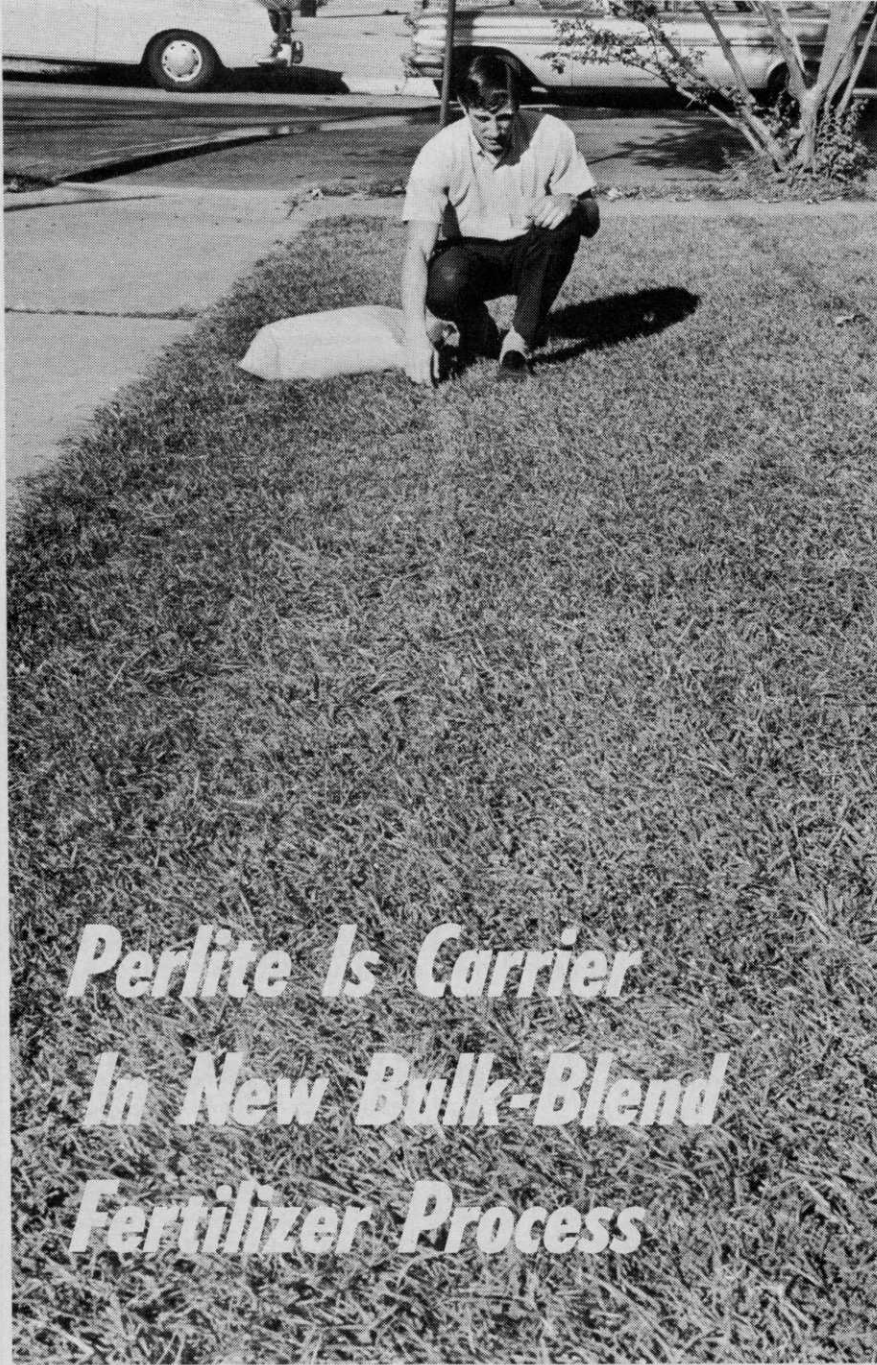
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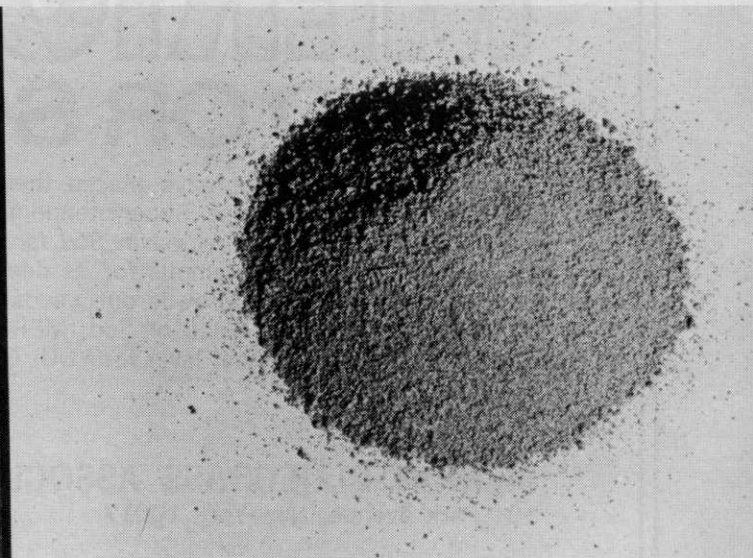
Perlite Is Carrier In New Bulk-Blend Fertilizer Process

Georgia Institute of Technology, working with the Perlite Institute, Inc., has developed an economic process for manufacturing a light-weight fertilizer containing perlite by the wet granulation process. The technique shows advantages in the production of bulk-blended lawn and garden fertilizers. A brief report follows to give you some background for evaluating the resulting products as they come on the market. For existing fertilizer manufacturers or other readers that might be contemplating the production of fertilizer, additional information is available on formulations, uniformity testing, and production data. Interested readers may circle 711 on the reply card.

FIELD TESTS on a new perlite-containing, bulk-blended lawn and garden fertilizer developed at the Georgia Institute of Technology, under the auspices of the Perlite Institute, indicate that the addition of the expanded perlite provides low production cost, better application characteristics and performance equal to lightweight fertilizers produced by conventional wet granulation processes.

The specific advantages claimed for the new fertilizer blends include:

1. Ease of application—no caking as a result of storage, dustiness during application.
2. Lower bulk density (packed); 24-28 pcf compared to 30-40 pcf.
3. Better appearance; light and uniform in color. The light color makes it possible to see on application thereby preventing overlapping



Proof of a fertilizer process is in the results. At Georgia Tech, a lawn treated with the bulk-blended perlite-containing fertilizer equaled or bettered the performance of con-

ventional fertilizers of the same analysis. Fertilizer bulk-blended with perlite, left, has 50% more volume for the same weight as conventional bulk-blended fertilizer.