



Houston uses a road grader to improve drainage ditches.

pon is used on cattails. For soil sterilization around lights, markers, fences and buildings, Foamicide 1000 is used, containing bromacil, diuron and MSMA.

But the storage area also includes DSMA, Pramitol, Karmex, Ansul 529, Monobor-Chlorate and TH De-Pester.

Vegetation for Safety's Sake

Aside from turf aesthetics, weed control objectives are dictated by safety standards. High weeds can obstruct visibility of landing lights, interfere with radar, obstruct drainage, create fire hazards, and increase mowing frequency and cost.

Solid turf coverage is particularly

Houston and Chicago airports are swept down fore and aft, concrete and turf. The sweeper below is working the boulevard approaches to Houston Intercontinental.



needed along edges of runways to minimize the dust and debris kicked up by increasingly powerful jet planes. The 747 has necessitated widening runways at O'Hare from 150 to 200 feet, Humbard said. Under full power, he explained, the 747 engines' backblast is so tremendous it shears off the metal runway lights.

Headaches — Public and Construction

"Our greatest problem is the peak construction activity we operate under," said Humbard. "We no more than get something planted before we have to dig it up again. Often this means we must move trees at the wrong time of the year."

Construction, he added, has required the contracting for 40,000 yards of sod for each of the past three years.

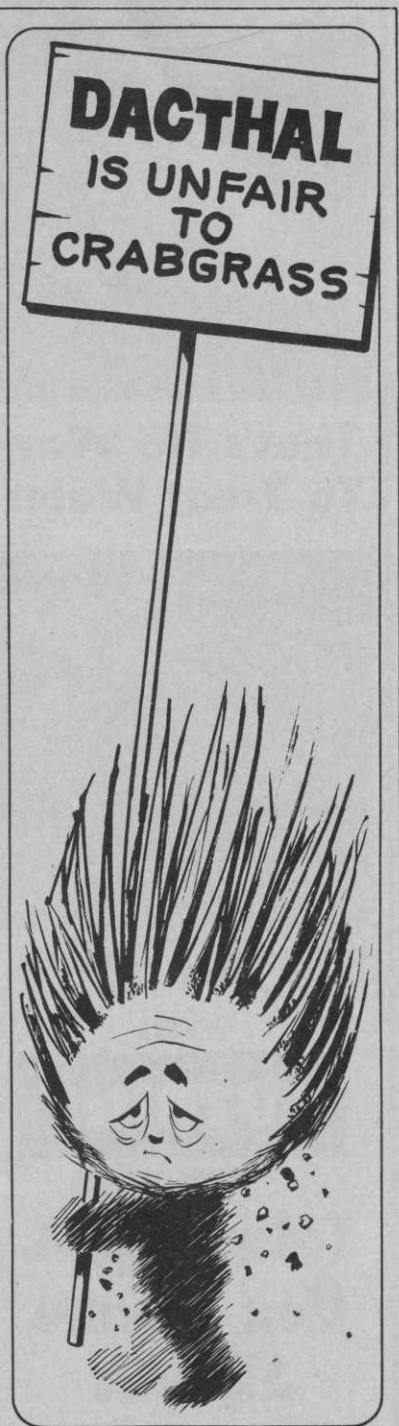
"The public itself is a big problem," continued Humbard, because of its misuse of turf areas. "I would guess we pick up 400 tons of cigarette butts a year. Our hang-up in some places is where turf won't grow because of the nicotine content of the soil. We're considering trying artificial turf."

Collins, estimated the cost of picking up trash at Houston at \$180 per day.

Building Houston From Ground Up

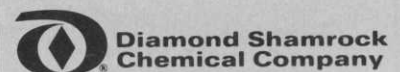
Collins, a retired air force pilot, former golf course and landscape contractor, and a college-trained business administrator and agronomist, faced a monumental task when Houston Intercontinental was begun "out in the sticks" 22 miles from downtown. However, previous experience in such a large undertaking helped.

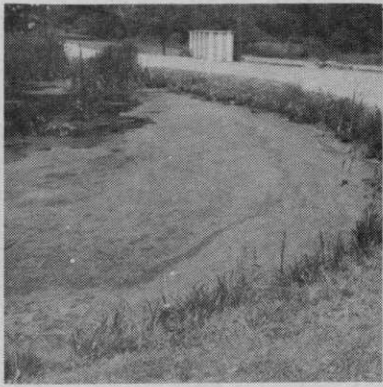
At one time he handled much of the landscaping for the NASA complex, employing 67 men and working under contracts totaling as high as \$2.3 million. He had been with the Houston parks department, in charge of the botanical garden, before becoming airfield and grounds



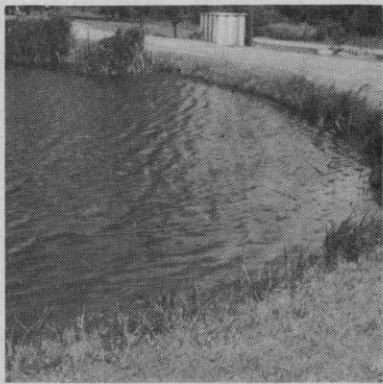
THAT'S FOR DIAMOND SURE!

Unfair? It's deadly! Dacthal® herbicide knocks out crabgrass before it gets started. Spray Dacthal W-75 or spread Dacthal granules before crabgrass comes up. Your worries are over. Dacthal has been widely used for many years on leading golf courses and other fine turf areas. It won't leach or wash out, even with frequent watering. See your local turf chemicals dealer or write to Agricultural Chemicals Division, 300 Union Commerce Bldg. Cleveland, Ohio 44115.





That's No Way To Treat Water



This Is!
with

CUTRINE

U.S.D.A. Reg. No. 8959-1

**Today's Safest,
Most Effective
Algaecide**

**Treat your water
right and not
interrupt
watering
schedules**

Find out how . . .

Circle our number for information

APPLIED BIOCHEMISTS, INC.
P.O. Box 91900
MILWAUKEE, WISCONSIN 53202

For More Details Circle (122) on Reply Card



Pat Collins talks shop with his two supervisors, Lee Hightower, left, and Harry Clifford, center.

superintendent for H.I.A. four years ago.

Collins first tackled those neck high weeds by burning. That was five years ago. A soil test indicated an 8.4 pH.

A program of encouraging what common bermudagrass there was with 13-13-13 "didn't do so well." The successful program that followed to take care of weeds and at the same time establish turf might best be described as the "scorched earth fertilizer policy."

"We applied 1,500 lbs. per acre of fertilizer in a 90-day period," Collins said. "We got tremendous weed control. Then a three-inch rain came at the right time and the grass almost greened up over the weekend."

He began (1969) with 750 lbs/a in March and 500 lbs/a in May of urea 45 and 38 with formaldehyde. In July, limestone with an 8-2-4 base was added even though the soil test didn't show a need for it.

In March of 1970, another 500 lbs/a of 45% urea was applied.

This spring, the program changes a little. The rate is the same. In March, 15-5-10, including 16% sulfur, .8% iron and .5% zinc, went down. Ammonium sulfate, 21-0-0, will be applied in May. Boulevards will again get the 8-2-4 limestone.

Collins is hoping to replace com-

mon with 328 hybrid bermudagrass along the slopes. An additional 575 acres gets a once-a-year fall application of 12-24-12.

It is particularly along the 105 acres of boulevard approaches to the airport where Collins wants that golf course perfection. It is mowed at 1/2-inch with flails and reels until July (a new 10-blade reel can now mow to 1/8-inch). From July to about the third week in September, the height is raised to one inch. Mowing is weekly, with thatching and sweeping done every fifth cut.

For insect control, Collins applies chemical with fertilizer to control fire ants. Diazinon is used on the pine bark beetle, with spraying done spring, summer and fall.

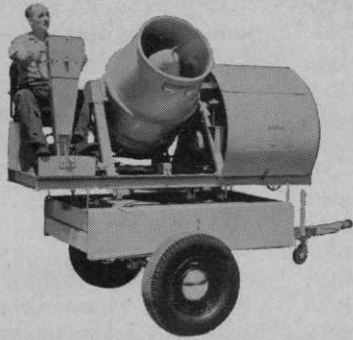
Employee Training

Though his training is in other fields, whatever he does Collins is "thinking public relations" — better yet, human relations. The obvious result is a generally more pleasant working atmosphere, a staff that takes pride in its work, and one that gives maximum effort.

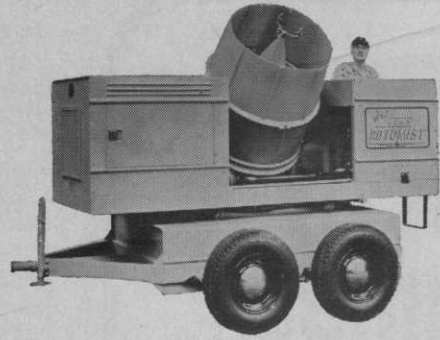
Collins' training program is therefore multi-functional: to broaden knowledge and skills; increase employee confidence; afford opportunity to advance in salary and responsibility; and create an attitude

Below are Chicago employees Elba Page, left, tree trimmer and landscaper, and Ralph Arthur, motor truck driver.



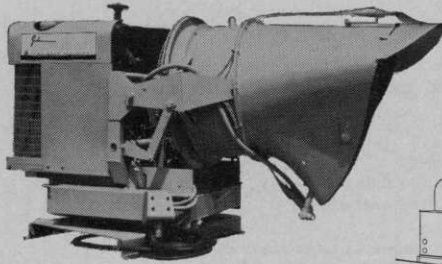


MODEL 100G ROTOMIST® shade tree, sanitation, mosquito control, leaf windrowing. 29" fan delivers 28,000 CFM at 100 mph.



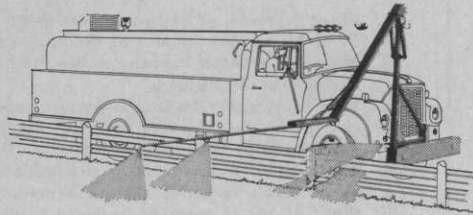
MODEL 303T ROTOMIST biggest performer among mist-type shade tree sprayers. 40" fan, 60,000 CFM air volume.

when it's shrubs or trees,



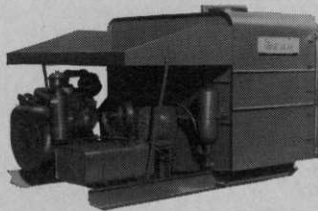
ROTOCAST® specially designed for roadside weed control. Teardrop discharge head provides reach plus close-in coverage.

HIGHWAY BOOM provides a lowcost answer for spraying over guard rails as well as sodded right-of-ways.



TURFKEEPER handles high pressure spraying applications of liquid fertilizer, weed or brush control chemicals. 17-nozzle, 3-section boom, wide flotation tires.

roadside spraying or any other spraying job



SKIDMOUNTED ROYAL heavy-duty high-pressure sprayer models. 25, 35 and 60 GPM @ pressures to 800 PSI. Plus Royalette and Royalier models.

MODEL 1010G SPRAYER designed for golf course operation on a Cushman. 13-nozzle hinged boom, 100-gallon Fiber Glass tank, full-flotation tires.



...select JOHN BEAN

John Bean sprayers offer the widest selection, in air-type or high-pressure models, each one is job-designed for maximum efficiency. Send for free product catalogs.



POWER SPRAYING EQUIPMENT

JOHN BEAN

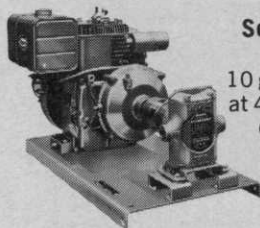
DIVISION

Lansing, Mich.-Ocoee, Fla.-San Jose, Calif.

Hypro sprayer pumps

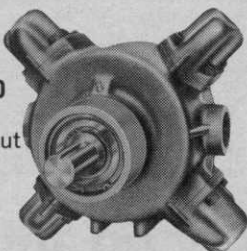
Choose from a wide range of pump designs and materials to suit your requirements: cast-iron, Ni-Resist and bronze pump housings... even nickel plating on piston pumps.

PISTON PUMPS



**Series 5200
Big Twin**
10 gpm output
at 400 psi with
6 hp engine

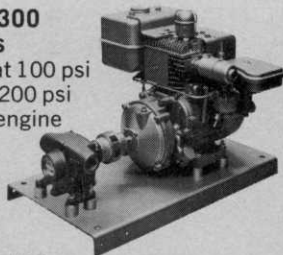
**Series 5400
4-Cylinder**
25 gpm output
at 600 psi



ROLLER PUMPS

Choice of rubber or nylon rollers

**Series 6300
6-Rollers**
6.9 gpm at 100 psi
6 gpm at 200 psi
4 hp gas engine



**Series 7560C
8-Rollers**
10 gpm at 200 psi
with 4 hp engine

Write for complete pump catalog or request pump recommendation for your need.

Hypro / 

A division of Lear Siegler, Inc.
347 Fifth Avenue NW, St. Paul, Minnesota 55112

that will build a good image for the department.

It's not uncommon, he said, that "the training my men get leads to a better paying job somewhere else."

How does the public relations angle in training come about? "If someone stops my man and asks what he's spraying, I want him to know, rather than shrug his shoulders. If he says it's DSMA and is then asked 'what's that?', I want him to know. And I want him to know why he is doing what he is."

Regular employee meetings are devoted to problems, plans, and additional classroom-type instruction. Sometimes, exams are given. Examples of questions asked are in Table I.

Responsibility is delegated to two supervisors, Harry Clifford and Lee Hightower, and four foremen — Jesse Hightower, Tom Anglin, L. C. Douch and Earl Perkins. Job classifications include laborer, semi-skilled, truck driver, mechanic, and three grades of operators.

Collins has plans well in mind for reclaiming more brush land and beautifying existing grounds as Houston Intercontinental Airport grows to accommodate a passenger volume of 8 million by 1975 and 13 million by 1980. And Ray Humbard, though he hasn't the time to verify that planes arrive and depart every 48 seconds at O'Hare, probably is ever pondering what landscaping he must tear up next.

TABLE I — Typical Examination Questions

For truck drivers:

1. What is known as hydraulic over air?
2. Give the present tire size of the Dodge dump truck?
3. What is the water capacity of the Ford water truck?
4. Describe booster brakes.
5. How do you put the Dodge power wagon in four-wheel drive?
6. How many yards of wet sand will the Dodge dump truck hold?
7. Does the Cony wagon have a six- or 12-volt system?
8. What water pressure can be produced from the Ford water truck?
9. Why do you downshift a truck in motion?
10. What license is required by state to drive a vehicle with passengers?

For Mechanics:

1. How does the Simplex grinder work?
2. Do you understand and know how to lap the reel after it's sharpened?
3. What does the bale lift do on the Toro mower?
4. What is a bedknife?
5. How many cutting blades are on the present reel of the Toro mower?
6. Name the two most important systems on the entire Toro Spartan mower.
7. How many hydraulic knobs operate the up and down positions of the reel mowers?
8. How many cylinders does the motor on the Toro tractor have?
9. What kind of brake system does the Toro tractor have?
10. What is the ratio wheel to reel?

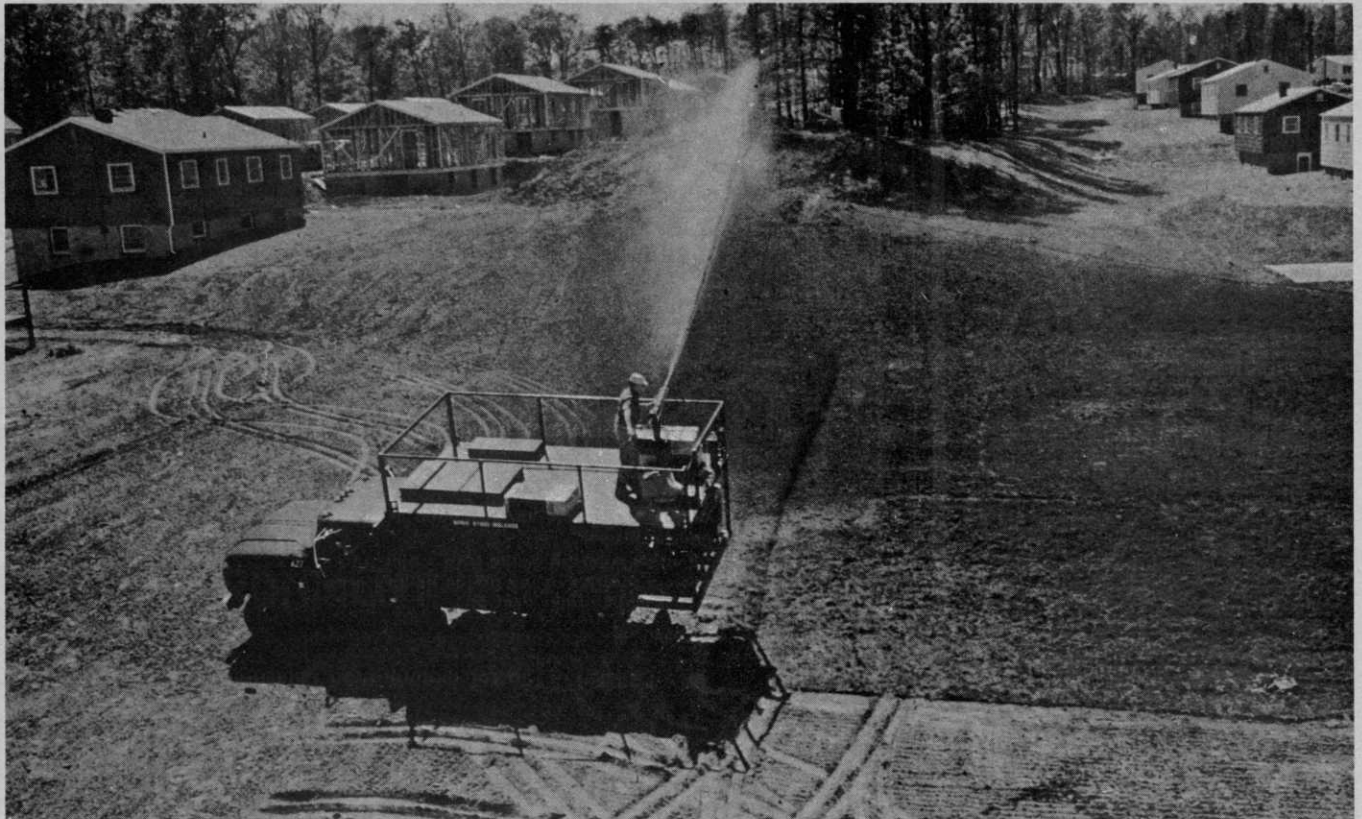
For Operators — Grades one, two and three:

1. In what position of the PTO speed shift lever do you engage the 1,000 rpm shaft and the 540 rpm shaft on the Ford 5000?
2. How long is the hose on the Thuron ag sprayer?
3. Can you operate the backhoe?
4. How many cubic yards does the hopper hold on the Rogers sweeper?
5. When using the Astron mower, what two gears are best for mowing?
6. What is Mr. Collins' telephone number?
7. Who is the airport manager? The Director of Aviation?
8. Name some of the fertilizers we use.
9. What is the total acreage we maintain?
10. Do you always read the Tech Book on the tractor or piece of equipment you are operating? (If your answer is No, you better begin after today.)

For Foremen:

1. State the difference between mulch and soil additive?
2. What is the chemical difference by application and results of a selective herbicide from a soil sterilant?
3. List the rate per acre of fertilizer applied in March, May and July.
4. What is a balanced fertilizer?
5. What is the difference between seeding, sprigging and sodding?
6. Why do we test soil?
7. What is a surfactant and what is it used for?
8. What kind of fertilizer is used to promote fast growth? To promote root growth?
9. What is DSMA? 328?
10. How many vehicles can you operate yourself and teach others to operate them?

BOWIE Presents...



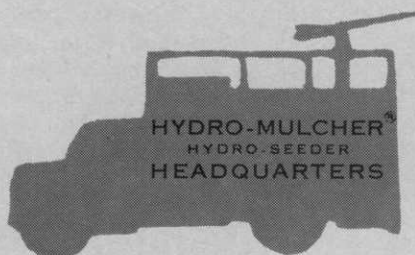
View at forest service nursery of 500-gallon Bowie Hydro-Mulcher with large flotation tires and baffle for controlled mulching of 54" beds.

the First Proven Environmental **FAST GROWTH** **PROGRAM** for vegetative planting

1 SAVES THE
ENVIRONMENT

2 SPEEDS
GROWTH

3 SAVES
MONEY



WRITE TODAY FOR NEW BOWIE
FAST-GROW PROGRAM... *IT'S FREE!*

BOWIE INDUSTRIES, INC.

P. O. BOX 931 BOWIE, TEXAS 76230 AC 817 872-2286

For More Details Circle (107) on Reply Card

THE GYPSY MOTH



*Nature's
Ecology
Disrupter*

A GAIN IN 1971, gypsy moth caterpillars are expected to cause widespread damage throughout much of the Northeast, and the foliage of oak, birch, basswood, maple, apple and other hardwoods is high on their list of favorites.

Concerted efforts by state and federal authorities, custom applicators and concerned citizens have so far limited the range of this voracious insect to most of New England and New Jersey along with eastern areas of New York and Pennsylvania. It seems likely, however, that it will eventually break out of this confinement. To some extent, in fact, it already has since Somerset County on the Pennsylvania-Maryland line was last year officially declared an infested area. This marks the most westerly reach of the gypsy moth and poses an ominous threat that creeps ever nearer to the 100 million acres of valuable hardwood forests in the Ozark and Appalachian mountain ranges. Widespread defoliation in these areas could very easily lead to alarming losses that would have serious economic effects on timber and timber-related industries.

Last year, gypsy moth caterpillars partially defoliated almost one million acres of trees. This represents an area considerably larger than that encompassed by Rhode Island. In New Jersey alone, 130,000 acres were stripped while almost 370,000 acres in Connecticut were subjected to similar damage. New York's losses were extended over 430,000 acres of leaf canopy.

Obviously, this kind of damage drastically alters our environment and upsets the ecological balance. Dead and dying trees offer songbirds and game insufficient shelter, forcing them to move elsewhere. Snakes—including poisonous species—are driven by higher ground temperatures to lower altitudes and thus closer to man. Campsite cover and watershed protections are destroyed and rain causes erosion. In addition to creating severe fire hazards, dead and dying trees destroy the beauty of our woodlands.

Naturalist Brought Moth to U.S.

The tragic fact is that the gypsy moth is not even native to this country, having been imported from Europe to Medford, Mass., in 1869 by a French naturalist who was attempting to crossbreed it with silkworms. A quirk of fate caused

a cage of these caterpillars to be smashed in a windstorm, enabling them to escape into surrounding woodlands. Thriving in an environment virtually devoid of natural enemies, the gypsy moth increased rapidly. By 1880, almost 400 square miles around Medford had been heavily infested.

The life cycle of this insect begins in late April and early May when an average of 550 tiny caterpillars hatch out of their fuzzy, buff-colored egg cases. Climbing at once into the tops of preferred trees, they begin feeding on leaves, moving downward as they grow larger on thin silken strands to feed on foliage at all levels. When hardwood foliage is in short supply, these pests will turn to the needles of hemlock, pine, spruce and other evergreens. Whereas two or three defoliations are usually sufficient to kill hardwoods, a single stripping is fatal to evergreens.

While still in an early growth stage (or instar), caterpillars are small enough to be swept off strands and carried by winds from hilltop to hilltop—often for distances of up to 50 miles. As fully grown caterpillars, they measure about two inches in length and can be readily identified by the rows of blue and red spots on their dark brownish bodies which are covered with such stiff hairs that birds won't eat them. If they fall into water, fish will reject them for the same reason.

After a feeding period that lasts up to 10 weeks, caterpillars go into their two-week pupal stage from which they emerge as moths. In this adult form they mate, and during late July and early August the females deposit egg cases on convenient sheltered surfaces such as tree trunks, stone walls and fenceposts, thus completing this vicious cycle. Unfortunately, however, female moths don't limit egg-laying locations to stationary objects. They'll also lay eggs on cars, trailers, trucks, boats and even in the wheelwells of jet aircraft. This is what makes efforts to control the range of these pests so difficult.

Even though stringent quarantine measures continue to be enforced each year by all nine states currently known to harbor gypsy moths, traps put out last year under state supervision caught male moths in Virginia, Maryland and Delaware. Inspection teams in Florida, Minne-

sota, Texas, Wisconsin, Virginia and California destroyed egg masses found on vehicles—all of which had passed through infested camping areas in New England.

But sheer luck is not enough to prevent gypsy moths from striking out trees. Clearly, a sensible control program must be maintained if these insects are to be held in check. However, chemical control is only one answer to a complex problem that also demands what the New Jersey Department of Agriculture calls an "integrated approach." As the term implies, this supplements so-called natural controls with the use of chemicals as a means of checking insect damage but not at the risk of upsetting the balance of nature or altering the ecology.

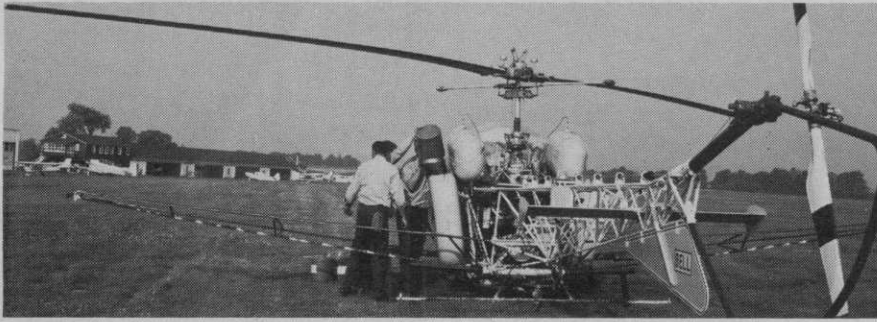
Control Approaches Varied

Federal and state authorities continue to work with natural controls and are raising and releasing parasites, predators and sterilized male gypsy moths in the hope that they will substantially reduce populations of this pest. Work also continues on insects sex attractants and insect disease organisms. But these undertakings are expensive to maintain, and William Gillespie, Assistant Commissioner of Agriculture in West Virginia and chairman of the National Gypsy Moth Advisory Council, has stated that the \$360,000 being spent annually for these purposes will have to be augmented by an additional \$875,000 each year for the next five years if results are to remain favorable. Furthermore, there is little reason to assume that these natural controls will ever entirely replace chemicals.

The current public outcry against the use of chemical pesticides would have us believe that we can dispense with these materials entirely. But the matter is not that simple. And while the debate rages, gypsy moths and other forest and shade tree insects continue to devastate our landscape. With nationwide restrictions against the use of DDT in effect, federal, state and municipal authorities have been compelled to find suitable substitute insecticides that offer acceptable insect control and yet are compatible with current environmental concerns.

Sevin carbaryl insecticide appears to be one of the answers, and again in 1971 this product is to be included in many public spray pro-





This is the type helicopter rig used by New York's state conservation department in its Gypsy Moth control program.

mulations can be applied by air and also through ground equipment such as modern high-pressure sprayers and mist blowers.

The New York Program

Here is the approach being taken to combat gypsy moths in New York.

Commissioner Henry L. Diamond says the Department of Environmental Conservation will undertake landowner surveys in the lower Hudson Valley and on Long Island to determine those areas eligible for aerial spraying. Aerial spraying is one element of a "controlled multi-faceted program," he says.

"It is the professional judgment of the Department that a carefully regulated spraying operation should be conducted in the Lower Hudson Valley and on Long Island, beginning in mid-May and running for six to eight weeks. The extent of the spraying program will be based on landowners' consents, the size of the eligible tracts and funds available."

Other aspects of the Department's gypsy moth control program include:

- Reliance upon natural biological controls such as a gypsy moth egg parasite to keep in check the infestation in Essex County in the Champlain Valley.

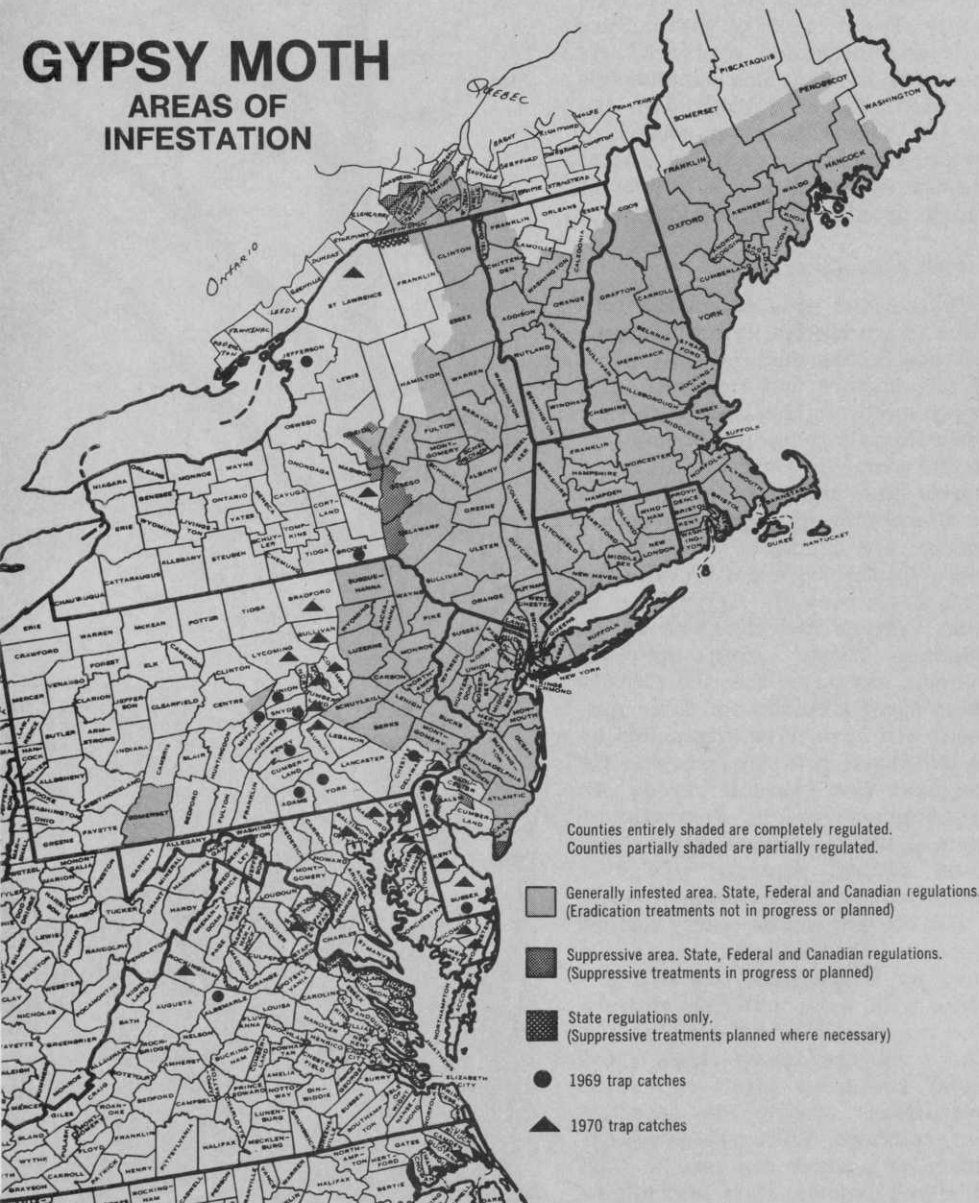
- Large scale experimentation on the use of the "sex attractant" and continuation of experimental work on other biological controls with emphasis on methods of inhibiting natural reproduction of the gypsy moth.

The spraying program would be an effort "to hold the line while we pursue a research program to develop adequate biological controls," the Commissioner says:

The aerial spray program would use a single application of the pesticide Sevin and would be undertaken with the approval of landowners. Spray blocks of less than 50 acres in size cannot be treated by air.

The intent of the spray program is to reduce the numbers of gypsy moths from their present epidemic levels to a point where natural biological controls may be effective. Similar spray programs in previous years have resulted in at least a 90% reduction in the gypsy moth population in areas treated only one time. It is hoped that in these treated areas, biological control in the form of a gypsy moth egg parasite—*Oencyrtus kuwanae*— and the introduction of other parasite species will provide the so-called "stacked control" required to keep

GYPSY MOTH AREAS OF INFESTATION



Counties entirely shaded are completely regulated.
Counties partially shaded are partially regulated.

- Generally infested area. State, Federal and Canadian regulations. (Eradication treatments not in progress or planned)
- Suppressive area. State, Federal and Canadian regulations. (Suppressive treatments in progress or planned)
- State regulations only. (Suppressive treatments planned where necessary)
- 1969 trap catches
- ▲ 1970 trap catches

grams. Introduced in the United States 13 years ago, Sevin has been used all over the world to control many destructive insect species attacking 90 different crops and also trees, turf, flowers and shrubs. Sevin provides effective control and is not persistent. It does the job and then quickly breaks down into harmless components that do not

pollute water, soil or air. It is low in toxicity to man, birds, fish and other wildlife.

Several different formulations of Sevin are available for tree protection spray programs undertaken by custom applicators and governmental authorities. These include both wettable powders and liquid-type concentrates. Each of these for-

A Princep foundation gets most weeds before they become weeds.

It's a more attractive way to keep bare ground bare. Using Princep® herbicide to kill weeds before they come up. That way you don't have a lot of ugly dead weeds hanging around as you do with contact weed killers.

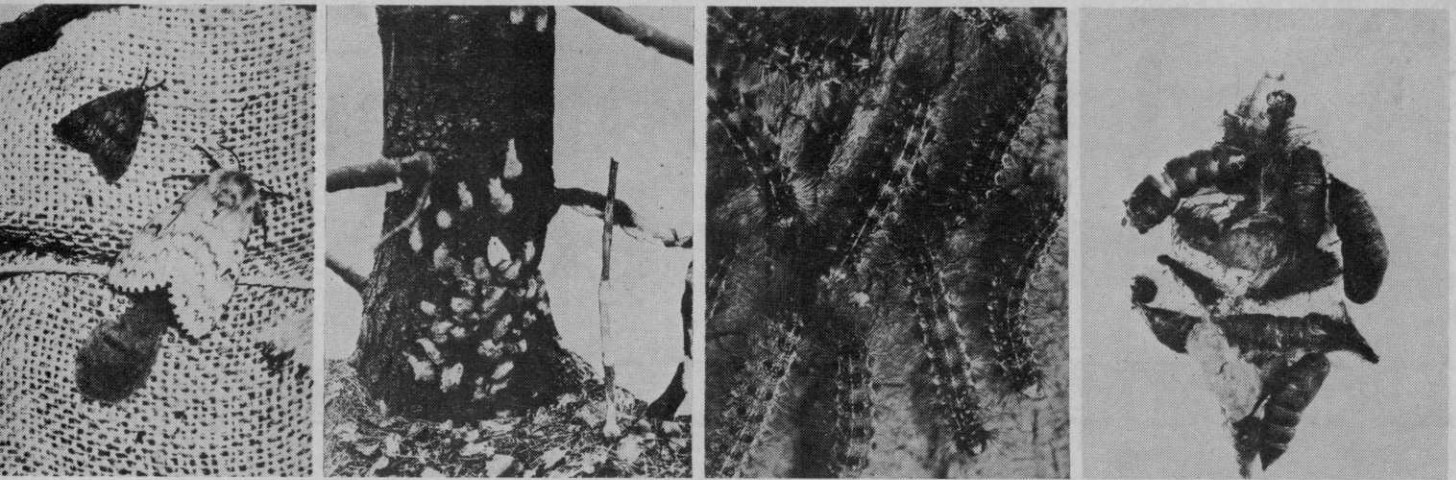
Not that Princep eliminates the use of contacts entirely. You may need them to get the few weeds Princep misses. But starting with Princep as the foundation for your herbicide program you can solve the bulk of your weed problems. More economically and safely than anything else.

In fact, just about the only thing in any danger from Princep are weeds. It's safe to use. There's minimal leaching and no contact action, so it's safe to nearby crops and ornamentals.

So if your object is bare ground weed control, use the safe herbicide. And the best foundation herbicide. Princep.

For information about Princep, brand of simazine, and other Geigy herbicides, AAtrex®, Pramitol®, and Atratol®, write to Geigy Agricultural Chemicals, Division of CIBA-GEIGY Corporation, Ardsley, New York 10502.

Princep by Geigy



Identification from the left: Female gypsy moth (white) and male gypsy moth (gray); femal moths laying eggs on a tree; gypsy moth caterpillars (in late instar) hatch and feed on leaves; then go into pupal cases from which they emerge as moths.

the gypsy moth in check.

According to experts in the Department of Environmental Conservation Bureau of Forest Insect and Disease Control, *Oencyrtus kuwanae* can be employed to reduce infestations about 25% annually. This technique, therefore, is suitable for epidemic, or low level infestations and is used under those conditions.

Experimental work on other biological controls in addition to parasite and predator attacks on the

moth is being explored by the Department. Two of the most interesting attacks focus on a reproductive inhibiting technique.

One method is to synthesize the scent which female moths use to attract male moths for mating. This synthetic attractant is employed as bait in a trap. The hapless males follow the scent and are captured, thus removing them from the breeding population.

Experimentation with this "trap"

approach is planned for the Binghamton area and in Jefferson County in the Perch River-Cape Vincent area.

Another method is the "confusion technique" in which an area is saturated with the female sex attractant. It is thought that this odor will so thoroughly confuse male moths that a portion of them will be unable to mate. As yet, no area has been selected for experimentation with the "confusion technique."

Herd BUILDS EQUIPMENT FOR THE LANDSCAPER



Model 1200B, 3 pt. 1200 lb. or 21 cu. ft. capacity. (Intermediate size of 750 lb. capacity also available.)



Electric Model GT-77 for use on all garden tractors with 12-volt systems.

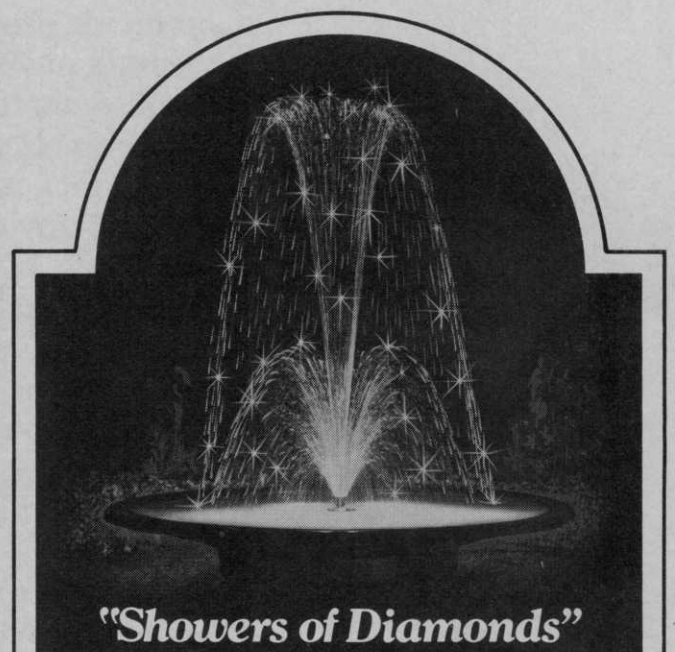
Other Models and Sizes to Choose from

Write for more information to

Herd SEEDER COMPANY, INC.



P.O. BOX 448, DEPT. 84 LOGANSPORT, INDIANA 46947



"Showers of Diamonds"

Fountains by RAIN JET

HOW THEY SPARKLE! These are the only fountains in the world which create jewel-like patterns with rotating water droplets. Patented. Choice of sizes. Complete Fountain and Bowl Assemblies (no plumbing needed), or Fountain Heads only. Also "Aquavators" for existing pools. Send for free full-color literature and prices.

RAIN JET CORP., 301 S. Flower St., Burbank, California 91503
Dept. FKK