



Botjer, left, and Harmonay examine 0217 Brand Fylking sod which Harmonay has installed on 5th tee.

came to this country with some talent and experience in golf course architecture. Later, Willie Tucker became one of the well-known course architects of the country. Significant is the fact that the new golf club venture at this early point in its history—when members were few and the budget was crimped—recognized the necessity for placing a full-time grounds management employee on the payroll.

This tradition for operating a superior course now lies with Roger Harmonay, St. Andrews course superintendent, who joined the group in this capacity in 1961. However, Harmonay's association with St. Andrews started in 1939, when Roger was a 9-year-old caddy. He worked at this and at various club jobs during youth—later majoring in agronomy at the University of Massachusetts. Being a native of the area and after other golf superintendent positions, Harmonay found himself "home again" at St. Andrews Golf Club in Westchester County, near Yonkers, N. Y.

#### **New Improvements**

During Harmonay's 8-year tenure, he has built a new chipping green, rebuilt putting greens, built new tees, updated the irrigation system, developed a system of continuous drainage, carried a 5-year reforestation program to replace 97 large elms which the Club unfortunately lost (some 300 new trees have been planted), added cart roads, replaced traps with newly designed units, and sodded special areas.

In addition to these special course



Trap-edging is George Hirniak, a member of Harmonay's ground management crew.

improvement projects, Harmonay has developed a turf maintenance and improvement program which he

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## RAPID-GRO

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believes is especially appropos to the St. Andrews area. He places great emphasis on a winter fertilizer program, based on careful soil testing and interpretation. Soil samples are sent regularly each fall to Cornell University at Ithaca, N.Y., for testing. He coordinates the results of these with a summer testing program in which he uses a kit.

A late May flood two years ago invaded certain sections of the course and the resultant damage was certainly not included in Harmonay's work schedule. This flood boosted winter kill of turf from 50- to 90-percent above normal, with killing continuing until mid-August. An intensive reconstruction turf program put the course within 95 percent of normal by October.

Harmonay has a grounds management crew of six year-round employees. An equal number are added for the summer season. Winter duties require more help at this course because of a sophisticated curling rink and a full winter program. Harmonay uses year-round employees for the curling program as well as for winter maintenance and management duties relating to the golf course and equipment.

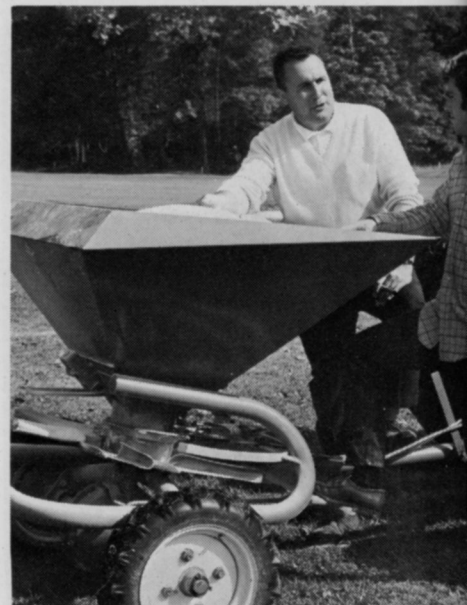
### Greens Covered

Prior to the expected heavy freezes common to the Westchester County area, Harmonay sees that greens are covered with pine tree boughs and manure for protection.

He uses a mercury snow mold preventive on both greens and tees, and in addition on troublesome fairway areas. Harmonay figures a normal season's fertilizer treatment will include about 30 tons on the 160-acre course. The 18-hole course is a par 70, and a total of 6170 yards. This breaks down into 30¼ acres of fairway, more than 92,000 square feet of greens, and 54,000 square feet of tees.

Founder of St. Andrews was a

Harmonay chats with John Wood (right) of Yonkers, summertime helper, who has been fertilizing with a new Lily drill.





Mowing fairways and green aprons is John Gurka, using IH tractor and 7-gang Toro mower.

native Scotlander, John Reid, who had learned the game in his native land of Scotland. He secured some equipment (two sets of clubs) and invited some of his friends to join him in a nearby cow pasture. The common term of the day, "cow pasture pool," came into being as the U.S. pioneers of the game "went about playing the game with a determination and perseverance that must be admired." A published history of St. Andrews, which was a project of the Club in honor of its 50th anniversary, also notes that the

cow pasture location gave way shortly to the "old apple orchard," and later to Grey Oaks, a well-planned 9-hole course, before play began at the present Mt. Hope location in 1894.

Reid is not only known as the father of golf in this country, but St. Andrews began tournament play during this early period, and was a principal in development of the United States Golf Association, though when founded the name of the USGA was the Amateur Golf Association of the U.S., and still later

the American Golf Association. A Club member, Henry O. Tallmage, served as the first association secretary. John Reid declined the presidency of the new association and supported Theodore A. Havemeyer of Newport as the first president. Just 50 years later, in 1938, Reid's son, Archie, was elected president of the USGA.

### Early Clubs

Early clubs of the era which enjoyed interplay with St. Andrews were Tuxedo (1889), Newport (1890), and Shinnecock Hills (1891). Countless others quickly followed these and today there are more than 9500 public, municipal, and private courses open for play in the U.S.

Traditional stories abound when members discuss the history of the St. Andrew's Golf Club. Noteworthy is the long accepted view that U.S. Steel was founded by Andrew Carnegie and associates during a round of golf, and at Carnegie's cabin which was located on the grounds.

The Club has survived two world wars which decimated its membership and a major depression. Today, strength is at an all-time high with some 250 members, all avid golfers. Another change is that rules have been relaxed to allow the ladies to use the course and dining facilities, a practice unthought of in the early days of this and similar clubs.

<sup>1</sup> H. B. Martin and A. B. Halliday, *St. Andrew's Golf Club*. Copyright 1938. St. Andrew's Golf Club.

Ladies now join men in play at St. Andrews, a relatively new innovation at this Club.



**T**HE FIGHT against Dutch Elm Disease will be won in the laboratory is the motto and goal of Elm Research Institute, a national organization born of the increasing need to prevent the extinction of the stately American elm.

At the present rate of loss of a million elms annually, the species could be extinct in a single generation, leaving whole cities, parks and historic buildings barren of beauty that has been uniquely American since this nation's birth. Elm Research Institute, headquartered at Waldwick, N.J., is doing all it can to prevent this from happening.

Founded not long ago by prominent conservationists under the National Chairmanship of Governor Harold E. Hughes of Iowa, Elm Research Institute correlates the raising of funds and the fostering of research by qualified scientists whose ultimate goal is the development of a safe and practical control for the dreaded Dutch elm disease.

The non-profit Institute is financed solely by membership dues. Because all directors and executive personnel serve without salary, ERI is able to apply all of its resources to the purpose for which it was founded: finding the fastest and most effective way to control Dutch elm disease.

Elm Research Institute estimates that less than \$25,000 was spent last year on Dutch elm disease research in both private and commercial laboratories. Balancing this against an annual loss of a million elms shows how lacking these research efforts are. Time is running out, says ERI. To accomplish what remains to be done in time to save our elms, the full resources of science must be utilized, the Institute cautions.

#### ERI Grants

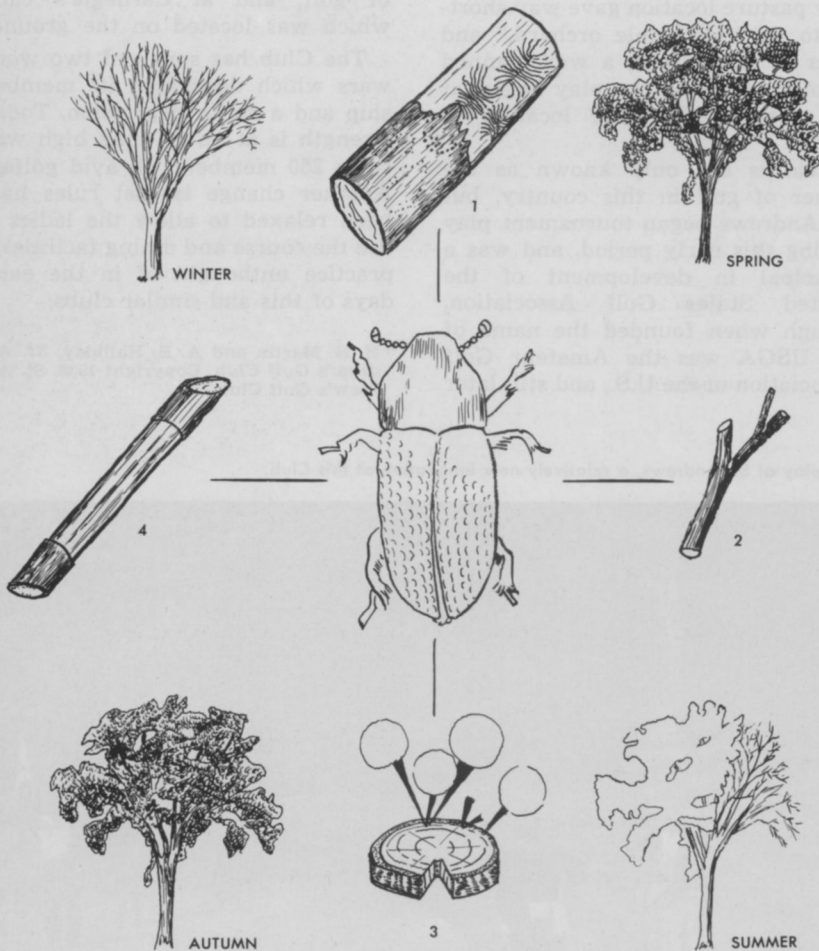
One major way in which the Institute combats DED is to give research grants to leading entomologists and plant pathologists. Research through ERI grants is now in progress in five of the nation's universities.

A three-year grant of \$30,000 to the University of Wisconsin involves research on altering the chemical code through which certain tree species either attract or repel feeding by specific insects. The university is also engaged in other control studies.

With a \$3,000 grant from the Institute, Michigan State University is breeding thousands of wasps destined for a "seek-and-destroy" mission among elm bark beetle larvae. The pupae of these wasps feed exclusively on the elm bark beetle lar-

Conservationists are fighting to stop  
a million tree deaths a year

# Elm Research Institute



The European elm bark beetle emerges in the spring from brood galleries through "slotholes" (Fig. 1) in the bark of an elm log. Feeding in healthy elms on one and two-year-old twigs (Fig. 2), these beetles introduce the fungus (diagrammatically shown in Fig. 3). As the fungus grows, it forms gums and resins that plug the vascular tissue (Fig. 4) causing wilting and subsequent death of the tree. The chief cause of spread comes from standing diseased elm in which the beetle overwinters.

vae. This natural beetle enemy represents by far the least expensive means of controlling beetle populations and, consequently, Dutch elm disease, the researchers reveal. Other beetle predators are also being sought.

Iowa State University is using its \$5000 ERI grant to study the responses in the tissue and chemistry of elms to infection by the pathogens of Dutch elm disease. It is hoped that this project will yield data on both the chemotherapy required to cope with vital responses and on the characteristics of resistance to disease.

An Institute grant of \$75,000 to be disbursed over a three-year period has been made to Cornell University to study and identify characteristics of DED-resistant strains. The objective here is to develop true American elms with natural resistance to Dutch elm disease.

Finally, a \$15,000 grant to New York University's School of Communications is being used to produce a film to dramatize the urgency for immediate support of the ERI "crash" program to find a control for the elm-killing disease.

**What ERI Offers Members**

Elm Research Institute offers its members a variety of free services, most of which are not available from any other source. These services range from counseling on every phase of elm care to field testing of new products for elm disease control by accredited experts, who deliver to member organizations objective and confidential reports without cost or publicity.

From its nursery of thousands of 3- to 5-foot elm seedlings, the Institute will furnish stock for replanting in any quantities to individuals, civic groups and municipalities for the cost of packing and mailing.

A Product Development service accepts ideas on disease control from any source, gives expert and confidential evaluation and puts innovators in touch with commercial or scientific agencies to further development.

Elm Research Institute also provides member garden clubs, civic groups, etc. with a talk and color film on elm conservation. It maintains an extensive library on elm disease control, from which members may request any available material.

The organization is also furthering the cause of the American elm by making available special stamps that can be affixed to business or

personal correspondence. These stamps that promote saving our heritage of elms can be purchased in any quantity from a single stamp (10¢) to pads of 196 stamps (\$10), according to the Institute.


Also available to members is a ten-minute speech that can be given to any group on how to save our elms through a nationally mobilized effort. The talk describes how unity of effort is being achieved through ERI and tells of the progress being made toward controlling Dutch elm disease. The New York University

film now being produced will also be available.


Institute members receive a Spring and Fall bulletin summarizing progress made and reporting new methods of elm conservation. They also receive periodic reports on the Institute's activities.

**Williams College**

An example of dedication to the cause of the American elm is quite evident in ERI charter member Williams College of Williamstown, Mass. Founded in 1793, here is one




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institution that has definitely not given up on the American elm.

"In my mind there is no other tree that compares with the American elm for suitability to a New England college," says Director of Physical Plant Peter P. Welanetz, who is also responsible for landscaping the campus. "It has beauty and grace, and, having a tall, slender trunk, provides shade without closing off views of the campus."

Welanetz believes that the Dutch elm problem can be minimized through a carefully planned, continuous program of care for healthy trees, detection of infested ones and quick removal of elms beyond saving.

Regular spraying, feeding and pruning are basic in caring for the 200 or so American elms on Williams' 450-acre campus, according to Welanetz. Surgery is also used. Weak spots in the wood that might be attacked by elm canker are cut and the cavity filled with concrete. Williams' program also calls for the transplanting of healthy young trees to replace those that must be removed.

Thinking of the future, Welanetz has begun an elm nursery. A hundred seedlings planted in the spring

of 1965 are reportedly thriving.

"We are going to continue our program," Welanetz promises, "and when an effective control of the disease is found, we will be far ahead, in terms of beautiful trees, of those who think the American elm is a lost cause."

#### ERI Members

Other institutional charter members of Elm Research Institute include Dartmouth College, National Audubon Society, University of Delaware, University of Notre Dame and Wisconsin Arborists Association.

Municipal members include: Bridgeport, Conn.; Elmhurst, Ill.; Kansas City, Mo.; St. Cloud, Minn.; Utica, N. Y.; and Wellesley, Mass.

Charter members of professional status include: Clapper's Tree Service, Crawford, Neb.; Lake Geneva Gardeners' Assn., Lake Geneva, Wis.; Lakeside Tree Experts, Barrie, Ont., Canada; Morrow Tree Service, Sewickley, Pa.; and Walgren's Tree Service, Hamden, Conn.

Elm Research Institute's Board of Directors consists of the following: R. G. Carmichael, Bettendorf, Ia.; Joseph Dietrich, Greenwich, Conn.; George Goodall, Portland, Me.; George Hafstad, Middletown, Wis.;



Such a small beetle making such a small bark pattern (above) as it overwinters can cause such a large tragedy, as the picture at right attests.



Edwin S. Irish, Warren, Mich.; J. A. Kimmel, Toronto, Ont., Canada; Curtis May, Beltsville, Md.; John G. Michalko, Cleveland, O.; Walter P. Morrow, Sewickley, Pa.; Carl J. Schiff, New York, N. Y.; Maunsell Van Rensselaer, Saratoga, Calif.; and Frank Vaydick, Kansas City, Mo.

Membership is open to all individuals, organizations and municipalities feeling a responsibility for safeguarding our national heritage of elms, says the Institute. Annual dues, which are tax deductible, are explained in the chart at right.

**What Can You Do to Help?**

In addition to joining ERI, you can plant elms to insure that there will be elms to save when DED control is finally achieved, the Institute urges. If you belong to a garden club, Audubon Chapter or any civic organization, you can support elm conservation, replanting and corporate ERI membership.

For membership applications or requests for more information concerning Elm Research Institute, write John P. Hansel, Executive Secretary, 60 West Prospect Street, Waldwick, N. J. 07463.

**ELM RESEARCH INSTITUTE MEMBERSHIP APPLICATION**

MEMBERSHIPS	DUES		
	Initial	Annual	Annual
	Life**	Sustaining	Regular
<b>Individuals</b>	\$1000.00	\$ 25.00	\$ 5.00
<b>Organizations*</b>			
Local	1000.00	100.00	25.00
State	2500.00	250.00	50.00
National	5000.00	500.00	75.00
<b>Municipalities</b>			
Cities of:			
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10,000 to 50,000	1000.00	200.00	50.00
50,000 to 100,000	1500.00	300.00	75.00
100,000 to 500,000	2500.00	400.00	100.00
500,000 and Over	5000.00	500.00	200.00

\* Includes all organizations, such as clubs, commercial companies, institutions, associations, foundations, etc. Categories describe scope of operations whether city-wide, state-wide or national.

\*\* Life members hold membership for the duration of the corporation. Dues are payable upon acceptance of application and are in lieu of any other annual dues.

To: The Secretary, Elm Research Institute, 60 West Prospect St., Waldwick, New Jersey 07463.

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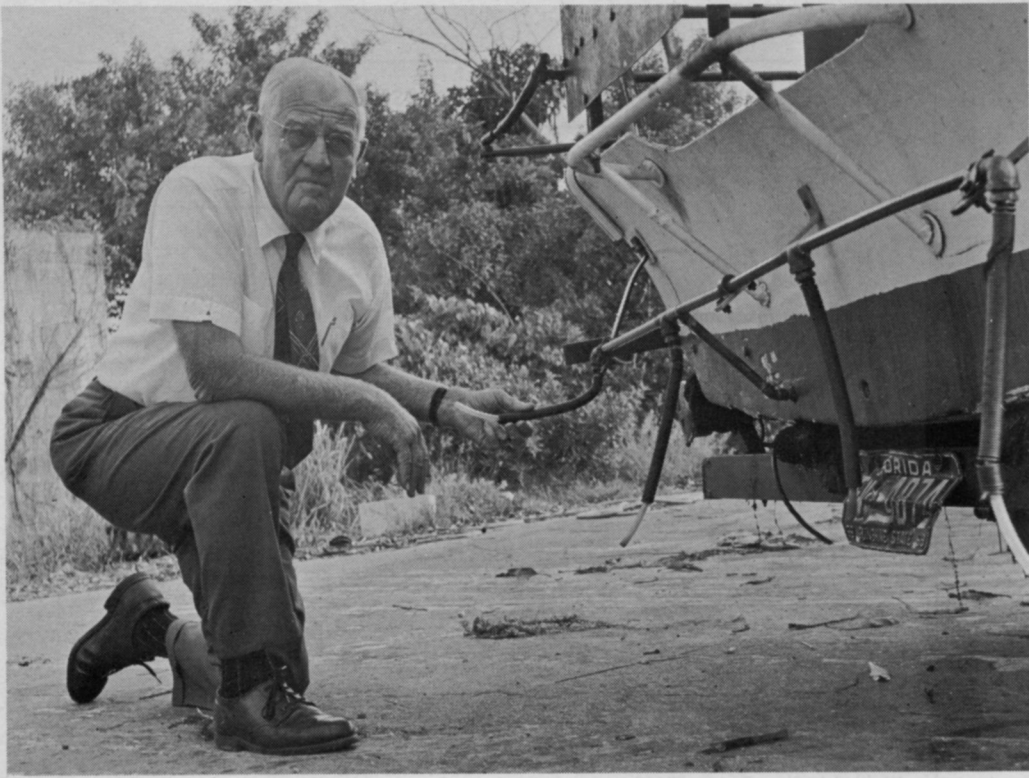
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Florida's Charlie Johnson shows his airboat's flexible, plastic downspouts through which acrolien is released into lakes and canals. Spouts are wrapped in springs to keep them pointed downward.

## 'CREEPING CHARLIE' Uses Aqualin to Kill Aquatic Weeds

**B**IG VOLUME business awaits the weed control contractor who can do aquatic weed work. This is the opinion of Charlie

P. Johnson, owner of a Miami, Fla., lawn spraying firm and a pioneer in Florida in weed control contracting.

Johnson has demonstrated his confidence in the future of aquatic weed control contracting by assembling a \$12,000 combination of airboat, trailer and truck, specially designed for combatting aquatic weeds.

The airboat, named "Creeping Charlie," is equipped primarily for the application of aqualin, manufactured by Shell Chemical Company. It is used to reach submerged weeds, but Johnson also finds it effective against all forms of algae. The unit replaces an earlier experimental airboat which was a regular boat powered by an aircraft engine.

The airboat hull, of a type favored by Florida hunters and fishermen, is 12 feet long, 5½ feet wide and made of fiberglass. At low speed and loaded, it pulls about eight inches of water. Because of the hull design, Creep-

ing Charlie can maneuver well in lakes or canals which are clogged with weed growth. Like all airboats, it simply skims over the top.

### Lycoming Power Plant

Power plant for the airboat is a Lycoming aircraft engine generating 120 horsepower. In the center of the hull are twin tanks. One contains acrolein in a 53-gallon pressure cylinder which can be exchanged for another cylinder when exhausted. This exchange of tanks is the only handling required for the chemical supply. The second tank at the center of the boat contains carbon dioxide, which is used as a propellant to force acrolein through the flow regulator and the line which supplies chemical to a rear-mounted dispensing boom. Flow regulator is mounted at the front of the boat, under the eye of the operator. The herbicide moves from its cylinder tank through the flow meter in plastic tubing, then into



This flow meter, which shows how much herbicide is entering the water, is in the operator's constant view at the front of the airboat.



1/2-inch copper pipe at the floor of the boat.

This pipe carries the acrolein through the transom and on to the six-foot copper boom at the rear. The boom has four downspouts of 1/2-inch plastic tubing. These extend about eight inches below the surface of the water for expulsion of the acrolein gas. Tubing is flexible in case of an obstruction. Downspouts are encircled with steel springs to keep them aimed into the surface unless bent by an obstruction.

"At six miles an hour we get excellent coverage and there is just enough wake to fold in the acrolein," Johnson states. The boat makes a 6-foot swath on each pass but chemical covers an additional three feet on either side. Thus, each pass actually covers 12 feet in width.

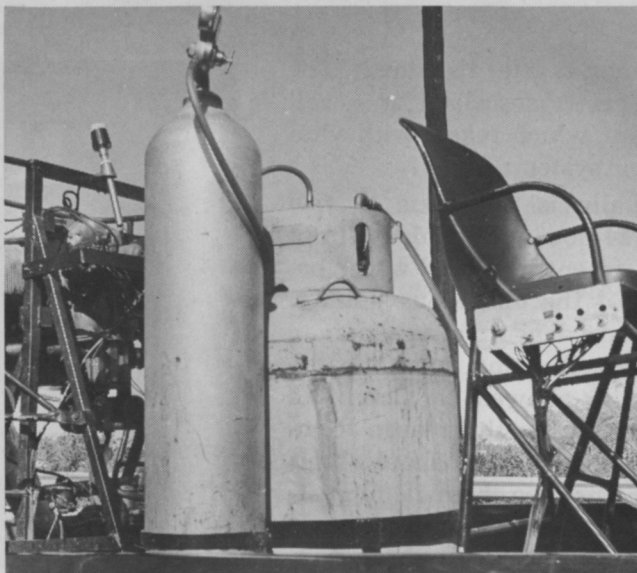
Johnson uses this applicator system to treat elodea, hydrilla, chara, pond weed, Southern naiad, cabomba, and all forms of algae. It is not used for water yacinths or for weeds emerging above the surface. While the airboat system is designed for one particular method of application, it is adaptable to spraying on or near the surface with other chemicals and for broadcasting dry chemicals.

#### No Fish Kill

In a recent lake-clearing program for a home owner's association, Johnson reported a complete absence of fish kill. This was accomplished by strip treating. He first treated only half the lake. Fish moved out of the section being treated and a few days later, he was able to treat the remaining half. In this instance, home owners wanted the lake cleared of weeds so they could again boat, ski, fish, and swim.

One characteristic of acrolein, according to Johnson, is that the chemical causes treated weeds to sink to the bottom and decompose. No mass of vegetation must

**Squatty 53-gallon holds acrolein; taller cylinder at left is for carbon dioxide, which forces herbicide through feed line into the water. High seat for operator is at right of photo.**



**Johnson directs his driver in the launching of "Creeping Charlie" into the man-made lake being cleared of aquatic weeds.**



**An engine and propeller made for a light airplane power Johnson's airboat. Guardrail keeps riders from getting too close to propeller.**



"Creeping Charlie," releasing herbicide underwater, skims over lake's surface.



be removed after treatment. The chemical is described as a cell toxicant which reacts with vital enzyme systems.

Aqualin is not toxic to fish after 24 hours. Animals will not drink recently treated water because of the obnoxious quality. There are dangers in application, an example being when treated water is allowed to flow into crop areas. For this reason Johnson feels legislation should limit use of this type chemical to qualified and licensed contractors or applicators.

#### Only Two Contractors Licensed

At present, Southern Mill Creek Products, which distributes aqualin in Florida, has licensed only two contractors to apply the herbicide, along with governmental agencies.

Part of the application system being used by Johnson includes a trailer to transport the airboat from one site to another, and a one-ton pickup truck, complete with four-wheel drive and snow tires.

Training is needed for job estimating, job planning, and in treating, Johnson says. Acrolein is being applied at rates of five to seven ppm of water. Thus, a careful analysis is needed regarding inflow and outflow of water, turbulence, and other factors.

Johnson works closely with the Hyacinth Control Society, Inc., which serves as a training agency, through regular meetings. This Society serves commercial applicators, flood control personnel, U. S. Army Engineers, mosquito control agencies, county and state officials and others. Research on aquatic weed control materials and procedures receives high priority at the U. S. Department of Agriculture field laboratory at Plantation, Fla., staffed by Dr. Lyle W. Weldon, research agronomist; Robert Blackburn, botanist; and Dr. Carey Stewart, plant physiologist.



Beautiful it was along this Waukegan, Mich., street in this News-Sun photo on Aug. 3, 1962...

## It's Freers Elm Arrester

**F**REERS ELM Arrester, a new product developed by Charles R. Freers, Muscatine, Ia., has been granted USDA registration on a regional basis. It is being marketed in Illinois, Iowa, Indiana, and Missouri.

According to Freers, extensive testing has shown that the new chemical compound will arrest the fungus of Dutch elm disease, after the tree has been partially affected. Freers says the product is applied by direct injection into the trunk of infected elms. Its function is to arrest the disease, and prevent spread of the fungus throughout the rest of the tree. In tests over a 9-year period, Freer reports that many trees have continued to live.

In a healthy elm, Freers reports, injection of the chemical will prevent DED from developing even though the elm bark beetle has carried the fungus to the tree. The product, he states, has been found to be most effective when booster injections are given about every two years. Elm trees which are heavily infected, however, cannot be saved. The chemical compound, being sold as Freers Elm Arrester, is not phytotoxic, nor does it adversely affect the beetle. Instead, according to Freers' report, the

chemical is selective in destroying the fungus which is carried by the elm bark beetle.

Effective spraying and good tree sanitation, as a preventive program, have protected many elms. This has been possible where the beetle has been controlled. But, once the tree has been infected with the fungus, survival is seldom the case. No treatments are in use which will control the fungus. This control has been the goal of Freers in development of his treatment.

Another case in point which Freers believes his new product can solve is infection of trees by root graft. Many elms, he believes, contract the disease as a result of transmission via the root system when roots of infected elms and healthy trees form root grafts underground. In such cases, spraying for the beetle is ineffective. But, Freers states, injection of Freers Elm Arrester can save the tree.

Evidence of DED in a tree such as "flagging" is a signal to use the new product, according to Freers. He believes that it no longer need be a sign that the tree is doomed.

Freers has been an arborist for more than 30 years and has operated the Freers Tree Service of Muscatine. He spent almost a decade in development of the product and in experimental work and testing. The last three years, he states, have been most important. It was during this period—on a federal test plot and following the USDA requirements for evaluating the effectiveness of products claiming use in the