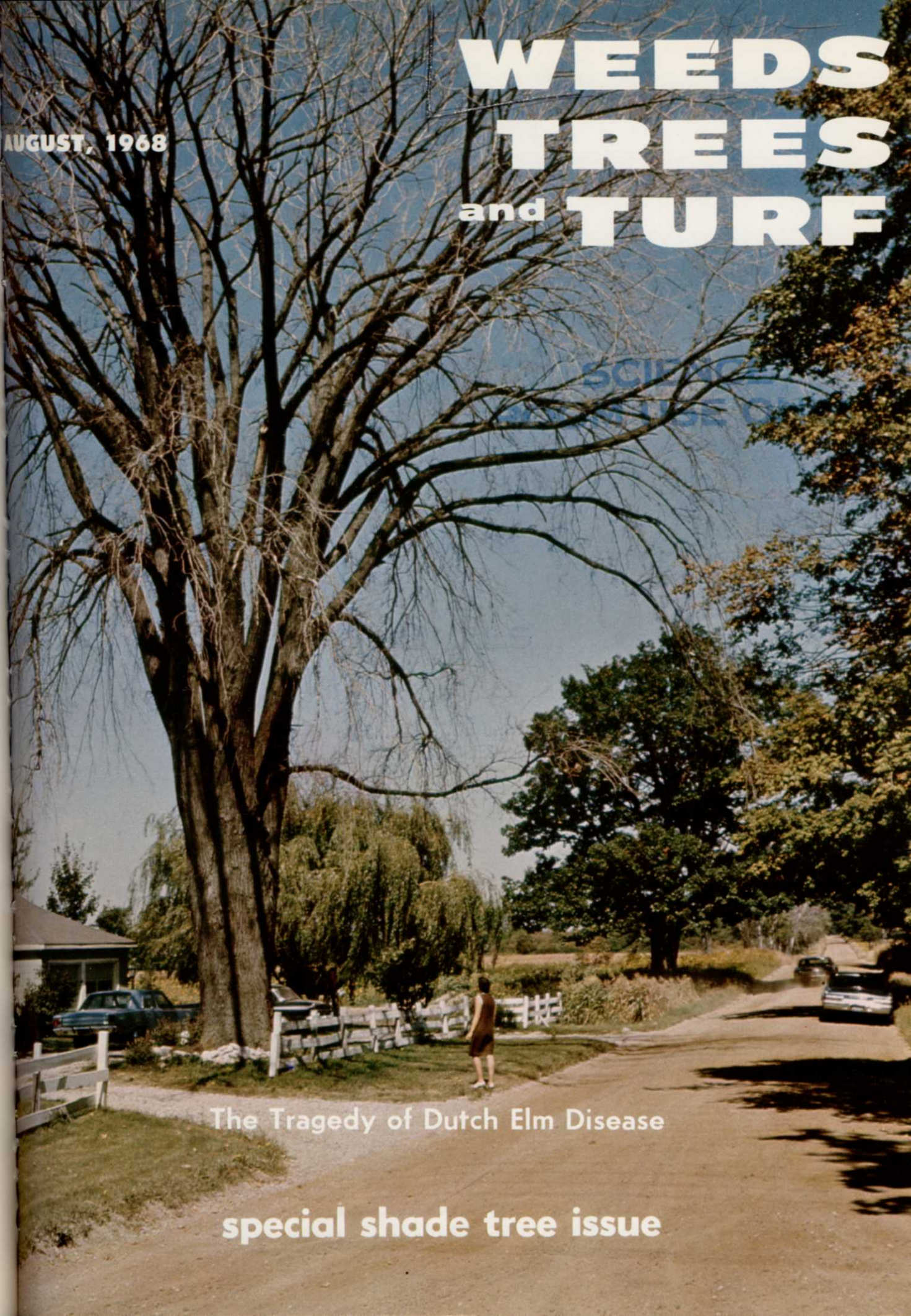
AUGUST, 1968

WEEDS TREES and TURF



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CIRCLE No. 1 READER CARD

The Cover

Majestic elm featured this month is victim of Dutch elm disease, and is representative of the real tragedy which has ravaged this vintage type tree in America.

This particular elm had been saved by a yearly spray program until this past season when the homeowner decided to take the chance and failed to negotiate a new spray order with his tree care company. Result was loss of an asset, not only to his property but to the community, which is irreplaceable.

For this special shade tree issue, WTT has asked Dr. Richard Campana, past-president of the ISTC and a research pathologist at the University of Maine to present a round-up of research and current control efforts on Dutch elm disease in America. His article begins on page 6.

Eliminate Guesswork in Chemical Spraying

Guesswork is foolish when applying chemical controls for weeds, insects or diseases, says Frank E. Boys, agricultural chemical specialist at the University of Delaware.

Less than the recommended herbicide rate can result in less than satisfactory weed control, he says. An overdose may kill or seriously injure an entire crop.

To eliminate the guesswork from your spray program, calibrate spray equipment before applying chemicals, Boys advises. Be sure to accurately measure the correct amount of pesticide and water before spraying.

Measure the size of the fields to be treated, as mere estimation of acreage increases chances of using improper spray rates.

WEEDS TREES and TURF

FORMERLY WEEDS AND TURF

August 1968
Volume 7, No. 8

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Beauty for Posterity

This month WEEDS TREES AND TURF magazine salutes the tree care industry in general and International Shade Tree Conference members in particular. This group, made up primarily of professional arborists, has been interested in beautification since the 1920's when they first started getting together. Their program of establishing trees along with tree care and management not only preceded by many years the current National Beautification Program but meant that a previously established action program, national in scope, along the lines of beautification was already accomplishing much in our cities and along our highways.

The recent national beautification effort came at a time when the country proved to be ready for beautification. It served to give impetus to the entire industry of arboriculture. ISTC members deserve much of the credit.

This month the International Shade Tree Conference membership is meeting at Chicago for their 44th convention and trade show. Some 1000 members and friends will register and take part in this event. Tree problems and research affecting them will be studied along with numerous subjects affecting arboriculture. Through the efforts of the ISTC these problems have become a concern of our citizenery.

The ISTC has made great strides in areas which have served to standardize tree care and management. Their shade tree evaluation work done in cooperation with the National Arborist Association is basic to the industry. Similar educational ventures have proved equally beneficial.

Of most import for the professional arborist has been the establishment of local ISTC chapters throughout the nation. These chapters meet regularly and serve as a year-round forum for industry progress. Legislation, especially municipal ordinances, has been developed and followed through to adoption via local chapter action. Local chapters also serve as a means of communication between local members and as a stimulus for progressive programs of the national conference group.

We therefore salute ISTC and the NAA and appreciate the opportunity to be a part of their progressive program.

WEEDS TREES AND TURF is the national monthly magazine of urban/industrial vegetation maintenance, including turf management, weed and brush control, and tree care. Readers include "contract applicators," arborists, nurserymen, sod growers, and supervisory personnel with highway departments, railways, utilities, golf courses, and similar areas where vegetation must be enhanced or controlled.

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CIRCLE No. 3 READER CARD

Dr. Richard J. Campana, left foreground, participates in tree planting ceremony at 1967 International Shade Tree Conference at Fairmount Park, Philadelphia. Dr. Campana, chairman of the department of botany and plant pathology at the University of Maine and one of the foremost researchers actively searching for new methods of control for Dutch elm disease, is the immediate past president of ISTC. He agreed to relate his experiences and observations regarding the national DED program at the request of WEEDS TREES AND TURF magazine. The editors are happy to publish this extensive insight into the problem by Dr. Campana.

Dutch Elm Disease:

A Matter of Priorities

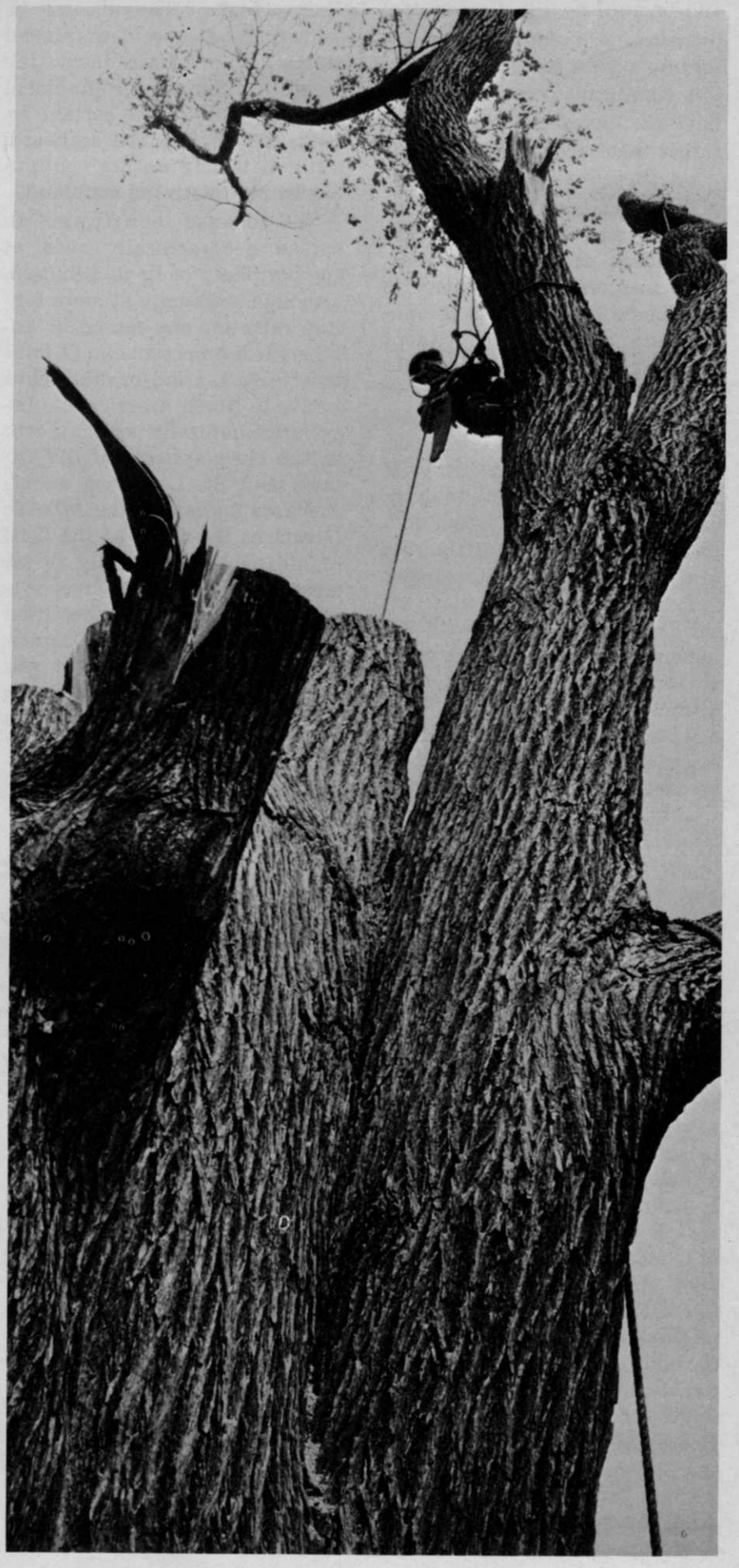
By DR. RICHARD J. CAMPANA
University of Maine
Orono, Maine

THE DUTCH elm disease is an American tragedy. Introduced inadvertedly to the United States from Europe by 1930, it rages unabated through native elms of field and forest, and seems slowed only temporarily and sporadically in relatively few urban areas at great cost in time, labor and money.

It is the most serious and devastating shade tree disease in North America. Not only has elm been one of the most populous species in most cities and towns in midwestern and northeastern United States; but elms are natively distributed throughout the eastern half of the U.S. as a forest tree principally along streams. The disease is unusually serious because it kills most trees once the main stem is affected, it continues to spread and intensify each year, all species of elm are susceptible to some degree, it creates ideal conditions for proliferation of elm bark beetles which make its greater distribution possible, and at present there is no known cure for trees affected. The disease is characterized by wilting of foliage caused by clogging of water conducting vessels, and is caused by a microscopic fungus, *Ceratocystis ulmi* (Buism.) C. Moreau, which multiplies and moves in such vessels. The fungus may be spread from diseased to healthy trees by root grafts

between such trees, or by either one of two elm bark beetles (the native American, *Hylurgopinus rufipes* Eichh.; or the introduced European, *Scolytus multistriatus* Marsh.) The origin of the disease is obscure. It appeared unexpectedly and unknown in war-torn areas of Western Europe following World War 1. In Europe it spread throughout the continent and destroyed extensive elm stands wherever it occurred. In Canada and the U.S. it spreads unchecked through native elms of field and forest, and continues to decimate urban elm populations in the absence of effective measures to prevent its spread. It is truly a tragedy of monstrous proportions which continues to unfold before our eyes with each succeeding disastrous period of new infections. The disease may be controlled only in the sense that its toll may be limited, and only within limited areas requiring substantial effort on the part of local residents.

As the Dutch elm disease continues to spread, it probably now destroys millions of trees annually. Moreover, it continues to stimulate public interest and emphasizes clearly the inability to prevent its spread from one area to another. Unfortunately there is much misunderstanding and widespread ignorance about many aspects of the disease. Even among research entomologists and plant pathologists there is disagreement on its many aspects. It is obvious, that among scientists many points of conflict arise, either where there is no evidence at all, or where the evidence is merely indicative but not conclusive. In any event, after 16 years of continuous work with the disease, it has become increasingly apparent to the writer that Dutch elm disease is far more complex as a biological phenomenon than most realize. During this period, many of us have accepted too easily without critical evaluation, not only ideas for miraculous prevention



and/or cure by chemical magic, but also more plausible ones affording a false sense of security. The significant point is, that we have often accepted ideas as facts, rather than recognizing them for what they really were, as hypotheses, assumptions or conclusions derived from assumptions. In practice, perhaps the most serious mistake we have made is to educate the public to the advantages of spraying, without stressing strongly enough either the meticulous thoroughness and timing required for effective application of suitable chemicals, or the relative inadequacy of spraying without prior and proper attention to sanitation, and treatment for potential root grafts. The purpose of this paper is to present some new views on the Dutch elm disease with the hope that they may help to clarify certain aspects of this most difficult biological puzzle. Various aspects of the disease will be discussed under the subtopics of: spread and distribution, susceptibility, symptoms, diagnosis, transmission and control. There is no attempt here to discuss any of these topics at length; emphasis is placed only where the writer believes there has been misunderstanding and possible misinformation.

Spread and Distribution:

The disease continues to spread at three levels: from state to state; from area to area within states; and from one section of urban control zones to others. It is now known to be within an area bounded by: the provinces of Quebec, Ontario, New Brunswick and Nova Scotia, Canada, in the North; the Atlantic Ocean in the East; the states of North Carolina, Tennessee, Oklahoma, Arkansas and Texas in the South; and the states of Kansas, Nebraska and South Dakota in the Midwest. Isolated infections were reported from Denver, Colorado over ten years ago, and only within the past year from Boise, Idaho. The disease is known to be present within all states and provinces inside the larger, contiguous, geographical area, as well as on certain islands off the eastern seaboard, some of which are not contiguous by road with the mainland.

The disease continues to spread geographically even at the periphery of its distribution, although seemingly at more limited rates for one reason or another. The American elm *(Ulmus americana* L.*)* and/or other elms native to North America are distributed naturally as far north as the river systems of the Ottawa and St. Lawrence watersheds, as far east as the Atlantic Ocean, as far south as the Gulf of Mexico and generally as far west as the numerous river systems will alow in the the Great Plains (i.e. in The Dakotas, Nebraska, and Kansas). It was surprising to the writer to learn that the American elm is even known to be present in the foothills of the Black Hills of Wyoming.

In the North it is likely that spread of the disease is limited by extremes of cold which preclude or limit occurrence of one of the insect vectors *(Scolytus multistriatus* Marsh.*)*, considered by many to be the more effective of the two known carriers of the causal fungus. In the East the only deterrent to spread of the disease seems to be the Atlantic Ocean, which limits to a great degree transportation of contaminated elm wood, as well as aerial transmission of bark beetles and viable inoculum. However, road access to large islands, such as Long Island in New York and Mt. Desert Island in Maine, makes such islands easy targets. On the other hand, to the extent that they have native or introduced elms, islands isolated by substantial stretches of open water are less easily invaded by the disease.

In the south the disease ap-

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pears to be limited both by temperature and less dense populations of both native and planted elms. In transmission from elm to elm the fungus on the body of the insect vector is expected to remain viable longer under conditions favoring slow desiccation. Also, the fungus is limited in growth and development by high temperatures. To the extent that the degree and duration of the heat of the South favor rapid desiccation of viable spores, and limit growth and reproduction of the fungus on or in the host trees, they should be expected to act as deterrents. On the other hand, possibly the heat and high humidity of the South could favor the European elm bark beetle, so that it may produce more than two broods per year. But even if this were possible, it would not be expected to increase the probability for spread to a significant degree, because of the primary importance of the first brood. However, I have seen no data on this.

In the West spread of the disease seems only to be limited by native occurrence of the elm itself. However, its occurrence beyond native distribution, into urban areas first in Colorado and more recently in Idaho should be instructive. It reemphasizes the role that man plays in spread, and thus should serve as another living warning that elm populations, however remote beyond the range of native elms, are still open to invasion with the help of man in all his multitudinous activities and travels. However careful we should try to be, it is not unlikely that the disease could be introduced inadvertedly into the relatively cool, wet and most favorable climate of the Northwestern states of Oregon and Washington, and the province of British Columbia. The apparent elimination of infections in Denver, and the possibility of elimination in Idaho, should not lull us into a false sense of security where more favorable conditions may occur for survival of the fungus. If the disease gets into coastal Washington, Oregon and/or British Columbia, only the occurrence and distribution, or lack thereof, of elm populations would seem to be significant as natural factors favoring control.

Susceptibility:

The American elm has long been recognized by many authorities as the most susceptible to Dutch elm disease of all elms known to man. Also, it is conceded generally that native European and especially native Asiatic elms have greater resistance to the disease than do most North American species. Various hybrid selections of European and Asiatic elms have been reported to have a degree of resistance close to immunity. However, it should be clear, that it is almost impossible to be certain of high resistance under all conditions, since variation in strains, and thus virulence, of the fungus may change. We have every reason to believe that sexuality and hybridization by the causal fungus are common, thus new strains and capacities of virulence are possible continuously. However, this should not discourage us from seeking resistant varieties, even in the most susceptible American elm.

With the American elm in particular, a considerable degree of resistance to one or more strains of the fungus is becoming increasingly apparent. This is evident, when, of hundreds of trees inoculated with a single fungus strain, only a fraction become diseased, and many of the diseased trees recover. On the other hand, with certain other strains more often than not, most of several hundred trees inoculated do become diseased and die. Unfortunately, it is probable that most naturally diseased trees are infected by multiple fungus strains with varying degrees of virulence. This is apparent where sexual fruiting structures of the fungus are found naturally produced in many diseased trees. This phase of the life cycle of the fungus is possible when 2 different, but compatible mating strains are present in the same tree, indicating the distinct possibility of different genetic capacities for disease causation. Another example, illustrating variability in virulence, may well be the single large tree surviving, when all others surrounding it are killed. Such a tree is often easily infected and killed if inoculated deliberately with a pure culture of the fungus. In the past we have often regarded such trees as "fortuitous escapes" lucky enough to have been inoculated naturally. While this may often be so, it is more probable that such trees are actually exposed to no more than a single fungal strain. It is also possible that they either failed to become infected, or did become infected, but recovered. They could then easily become diseased later from a different fungal strain. Fortunately, in many cases, they may never

Recent Symposiums on Dutch Elm Disease

Two major symposiums on Dutch elm disease have been held during the past year, one a regional meeting during June, 1967, at the US Forest Service Laboratory, Delaware, O., and an international symposium, February, 1968, at Iowa State University, Ames, Ia. Copies of proceedings are available respectively from John W. Peakcock, recording secretary, Northeastern Forest Experiment Station, Box 365, Delaware, O., and Iowa State University Press, Iowa State University, Ames, Ia.

again become exposed to any strain.

Symptoms:

Although much has been written on early foliage symptoms of Dutch elm disease, most descriptions either are merely repetitious of earlier writings, or are so superficial that they do not reflect different symptom patterns that may signify differences in degree and timing of infection. The so-called typical "first evidence of infection," as the single wilting branch "flagging" in sharp contrast to the remainder of the foliage, has often been used as a model to educate the public. In reality, however, the first evidence of the disease in a newly infected tree is probably not often visible to anyone but an investigator, who knows precisely when an inoculation was made. According to this writer, the first actual evidence of a new infection, when terminal crotches are inoculated, is a slight distortion or curling of leaves or leaf margins nearest and terminal from the point of introduction and development of the fungus (in research, the inoculation point). As such leaves bend inward on themselves, they show only a faint loss of green and their dull green undersides are exposed, giving them a dull, grey-green tint. This distortion and faint discoloration without other symptoms are rarely noticed, as they occur only in terminals, and are not readily discernible at this point except to a trained observer. Shortly thereafter, both yellowing and/or browning of foliage is often common, as well as premature abscission of leaves at all stages of infection, although many leaves do not abscise at all. But even such later symptoms may escape notice, since they occur only on branch ends distal to small twig crotches, often only high in the crown and not visible from the ground. In fact, it is not uncommon for many such infections to go unnoticed in the year of inoculation, because further symptoms may not occur that year at all. More often than not, in studies by the writer with various single strains of the causal fungus, this has happened with hundreds of inoculations. But this is an account only of terminal inoculations in twig crotches in wood of 2 and 3 years of age, designed specifically to simulate introduction of the fungus where the European elm bark beetle does it naturally.

When the fungus is introduced into larger stems supporting larger areas of foliage, similar symptoms as described above are more sudden, conspicuous and easily detected. This type of inoculation is often described as producing such severe wilting that the succulent terminal collapses, bends and becomes the so-called "shepherds crook," so often described as typical. In the view of the writer this symptom is neither common nor typical in the year of inoculation. When it does occur, it signifies that the fungus had time to build up a "massive head of wilting steam," and such a symptom can occur only while terminals are succulent and when active growth is in progress (i.e., early in the growing season). Thus,

(Continued on page 24)

Dead trees such as these killed by Dutch elm disease demonstrate the tremendous problem and potential high cost of removal.

Briefly:
Freeman L. Parr, Parr and Hanson, Inc., Hicksville, N. Y., is a professional arborist and the current ISTC president. In the following article, WTT is happy to present his views regarding both past performance and outlook for the future of the Conference. Parr as a businessman hopes to create interest in the organization by many. He believes the ISTC needs to devote still more effort to educational projects, and thereby become a great help in solving tree care problems throughout the world.

International Shade Tree Conference President

Reviews History and Predicts Progress for Group

Growth for I.S.T.C.

By Freeman L. Parr

INTEREST in an organized tree care movement goes back to the 1920s. At that time, many firms throughout the country were forming organizations devoted to the care and maintenance of trees. Colleges began to offer subjects pertaining to arboriculture.

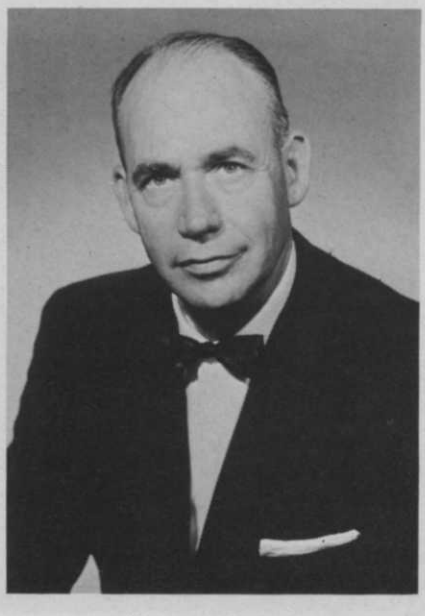
Eventually, a group of people decided it would be worth their while to start up a yearly conference, where those interested could discuss the many and varied problems of tree care. Thus, came the birth of the National Shade Tree Conference, later known as the International Shade Tree Conference.

Prime movers in this organization were the men interested in commercial application of shade tree care, although most of the educational work was handled by university-trained people and people known at that time to hold a scientific classification.

However, during the growth of the organization the commercial arborist was one of the most interested in devoting a great deal of time and money to the projects of the ISTC. From the first president holding a commercial classification until the present time, there have been 9 presidents serving the organization. While it may be thought that the commercial arborist has a selfish interest, his willingness to put time and money into organizations such as the ISTC has greatly aided the growth and activities engaged in by the group.

Commercial Interest

The values of the Conference regarding its members changed in relation to the era through which it passed. During the war years, the representation through the ISTC allowed all people engaged in commercial tree care work plus other interested people to speak with one voice to the national government concerning their rules and regulations. The outgrowth of this need was the formation of the trade association (National Arborists Association), which served to represent the trade during the forties.



Freeman L. Parr

During the growth of the ISTC we were fortunate to have two men of high caliber and repute to help remedy problems. Dr. L. C. Chadwick, who served as secretary-treasurer from 1938 until 1965 when he was elected executive director, has been active in the group for a period of thirty years. Dr. Paul E. Tilford joined as editor in 1939 and served until 1967, at which time he resigned to become the mayor of Wooster, O.

During this time there was a parallel growth of the NAA. Dr. Tilford served as director during the entire development period of this organization and until 1966.

As the educational function of the ISTC grew, many volumes of the proceedings are a history in itself. One outstanding work was "Transplanting of Trees and Shrubs in the Northern United States," which received wide circulation throughout the country. Other works followed, the most noteworthy being the shade tree evaluation work done in cooperation with the NAA. This was one of the most widely distributed booklets ever published by the Conference, and it is used throughout the country as a basis for shade tree evaluation. A model street tree ordinance was published and was well received by municipal people throughout the States.

While all this work was being coordinated on a national basis, there was being formed through-

out the different sections of the United States the affiliated chapters of the now International Shade Tree Conference. Through the work of these chapters, much of the grass root accomplishments have helped the individual members solve their day-to-day local problems. It is also in this area that the future of the Conference lies. A strong chapter growth will indeed vastly strengthen the national coordinating structure.

Regional Emphasis

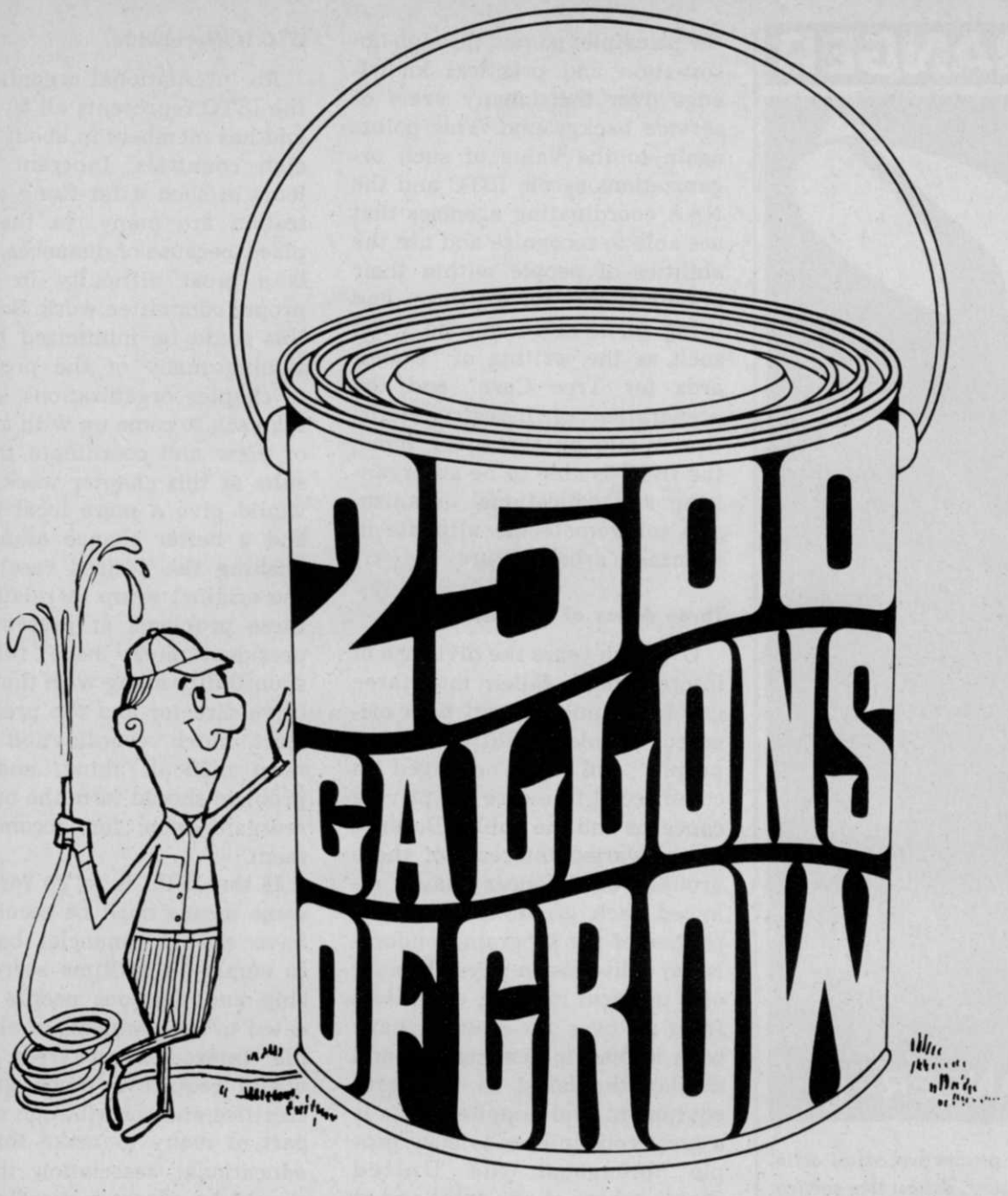
The Western Chapter is divided into six regions. Each year meetings held in the various regions are followed up by the western meeting in Phoenix, Ariz. The Mid-Western Chapter encompasses the large areas around Chicago and St. Louis. Not only do they have a yearly chapter meeting, but there is much cooperation between themselves and such organizations as the St. Louis Arborist Association. This is also true of the Ohio chapter, which has a great number of International members within the state. They meet each year at Columbus in conjunction with the Ohio Nurserymen's Association and have brought forth such developments as major medical coverage for the members, street tree evaluation programs, and a statewide safety program worked in conjunction with the State of Ohio. Our Canadian chapter across the way has been the sponsor of several international meetings and has gained great support in the parks and municipal systems throughout Canada. One of the younger chapters, the New England Chapter, was recently able to coordinate the many organizations within their states (such as the Massachusetts Tree Wardens and other societies) into one large meeting at Amherst College. This was well attended and offered an excellent program that was interesting and informative. This chapter has made great strides in the proper direction, which is of the greatest value to the chapter—that of coordinating all local associations into an organized level so that they may save time and have the facilities for proper meetings. There is a great problem of distance in the Southern Chapter, which runs from the state of Maryland to the tip of Texas. It is hoped that more regional meetings can be held in the future to tie together this vast area. Although lacking in number this past year, one of the better programmed meetings of the year was held at Orlando, Fla. This same thing, in a smaller way, holds true of the Pennsylvania-Delaware Chapter which has strong groups in the Pittsburgh and Philadelphia areas.

Strength in Chapters

In general, the chapters have news letters which are sent to members to keep them informed of happenings in their local areas. The continued development of these chapters, in coordination with the ISTC, means a much stronger over-all organization.

As in all things, time moves on and changes come about. At one point there was very little information about tree care in written form. Over the past number of years state and local Extension Services have assigned some extension people to cover that phase of horticulture in which the public is most interested (lawns, trees and shrubs). This action is becoming a great force throughout the country and makes it much easier for the average man to secure proper information.

There is inherent danger in certain points to allow government agencies to become theoretical authorities on all phases of tree care. If tree care organizations are to continue their own background of authority, they must do their own practical research and application of



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the principles gained through observation and practical knowledge over their many years of service background. This points again to the value of such organizations as the ISTC and the NAA coordinating agencies that are able to recognize and use the abilities of people within their organizations to institute and bring forth much needed work such as the writing of "Standards for Tree Care" and the preparation of industry statistics. While on the other hand, the ISTC is able to be an organizing and educational organization to promote the ultimate in informed arboriculture.

Three Areas of Interest

Over the years the divisions of interest have fallen into three groups: municipal and park oriented people; utility oriented people; and those engaged in commercial tree care for private concerns and the public. Because of the varied interests of these groups, conferences have allowed each group to present a portion of the program, conducted on split-session days. Because of a uniform interest, exhibitors from all over the country have been invited to demonstrate and display the latest in tree care equipment and supplies. This is a great convenience to busy people throughout the United States, where at one point and at one time of year they may gather to see new equipment, to hear about the latest in tree care problems and to discuss these problems with people in their own line of work. This coordinating educational function is of great value and one that certainly should be expanded.

In projecting the future, there seems to be no conflict between the ISTC and the NAA. In a true sense, the ISTC is the coordinating educational association, while the trade association is a functioning organization to promote the best things for commercial tree care people.

ISTC Is Worldwide

An international organization, the ISTC represents all 50 states and has members in about 7 foreign countries. Inherent problems in such a far-flung organization are many. In the first place, because of distances, there is a great difficulty in doing proper committee work. Some of this could be minimized by assigning many of the problems to chapter organizations, allowing each to come up with a point of view and coordinate the results of this chapter work. This would give a more local flavor and a better chance of accomplishing the desired results. In the original setup in relation to these problems at present, the president must have full responsibility along with the executive director and the president elect. Such coordination is a most difficult thing; and this problem should form the basis of reorganization for accomplishment.

If the ISTC is to go forward, some means must be secured to have enough financial backing to employ a fulltime secretaryship and vigorous people dedicated to the problems of all people interested in trees. This would require a much greater sacrifice and contribution on the part of many to make this the educational association that it should be. Greater coordination of all people interested in tree care problems will be needed.

Need for Projects

Through the coming years the ISTC should devote itself to the greatest extent to its education projects. It should continue to represent all areas of interest in trees. With 40 years experience as a background in bringing together all of these interested people, certainly the problems will be met and its future will be one that supplies the greatest help in solving tree care problems throughout the world.

Microfoil boom developed by Amchem Products, Inc., was demonstrated to Hyacinth Control Society following presentation by John H. Kirch of Amchem.

Inland Water Use Demands

Aquatic Weed Control

The Hyacinth Control Society, dedicated to control of noxious aquatic weeds, has become a leader in information on control and management in this relatively new but increasingly important phase of vegetation control. WTT reports on the 8th annual meeting of the Society, held last month at Winter Park, Fla.

NOXIOUS aquatic weeds must be controlled if inland waters are to be used. Such waters are a valuable resource nationwide, too important economically to permit takeover by aquatic weeds.

For example, take the case of Citrus County, Fla. A special campaign advertises this area as Florida's outdoor wonderland. Yet, noxious weed problems in the Crystal - Homosassa river areas has reduced beauty and robbed the famed waterways of this area of much of their value for recreational purposes. While water hyacinth problems have been controlled, 2 foreign weeds introduced only 7 years ago have

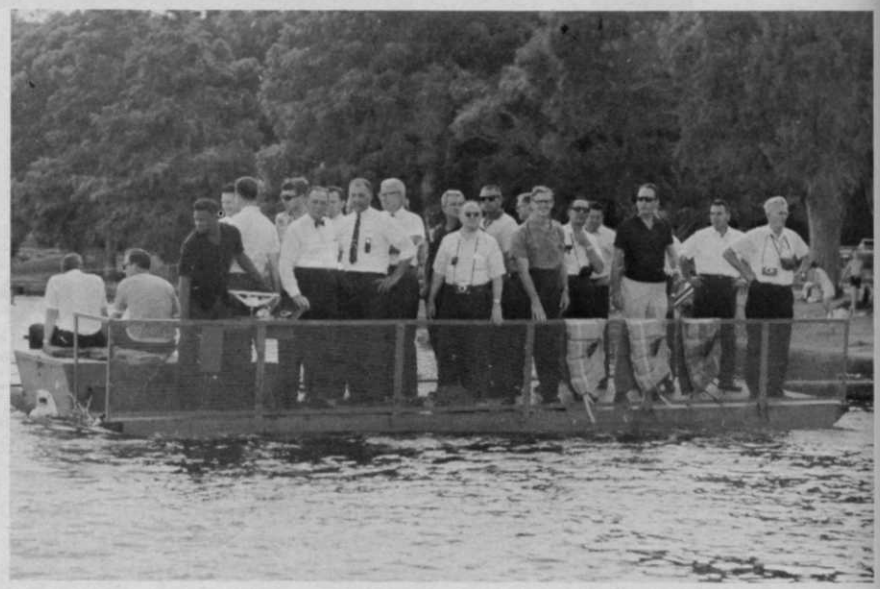
Robert D. Blackburn and Dr. Lyle Weldon of the Agricultural Research Service, USDA, at Fort Lauderdale, discuss results of research herbicidal plots on Lake Virginia at Winter Park, Fla. Strip method of treating has been used to successfully avoid fish kill.

blocked navigation and recreational use on more than 12,000 acres of these waterways. One business development, valued in the hundreds of millions of dollars, has been declared bankrupt primarily because of aquatic weed problems in this Citrus county area alone. Several groups of citizens are now requesting that their waterfront property be devalued for tax purposes because of the aquatic problem. Should this precedent be set by court action, it could lead to property devaluations throughout the state of Florida, costing millions of dollars in taxes needed to fight the aquatic problem. The problem of Citrus County, Fla., regarding aquatic weed infestation is not an isolated case. It is but one such instance related by E. R. Hafner, executive secretary of the county commissioners of the state at the 8th annual meeting of the Hyacinth Control Society, recently at Winter Park, Fla.

The Society annual sessions have become the foremost forum for aquatic weed control information in existance. Each year, about 200 commercial operators, municipal, county, state, and federal officials, company personnel and others charged with solving aquatic weed problems, gather for a 4-day session. They present papers on subjects which include practical control, new methods, chemicals, and basic research. This latest meeting attracted visitors from northern, midwestern, and even far west states. Interest in the session which goes far beyond the southeastern US where aquatics are more rampart than in other areas at the present time indicates that the aquatic problem has become a national menace.

Society President Reports

Society president Robert D. Blackburn, biologist for the Agricultural Research Service,



Members attending annual meeting view plots from barge, above, and by boat, right. Lake is largely infested with hydrilla.

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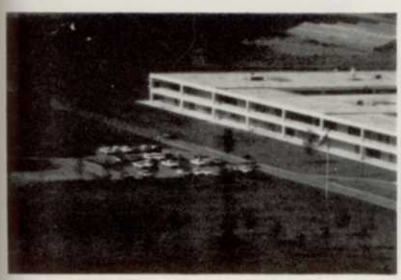

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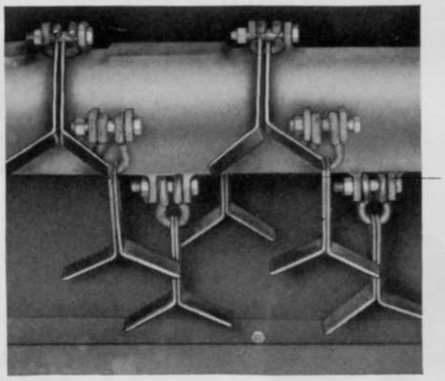

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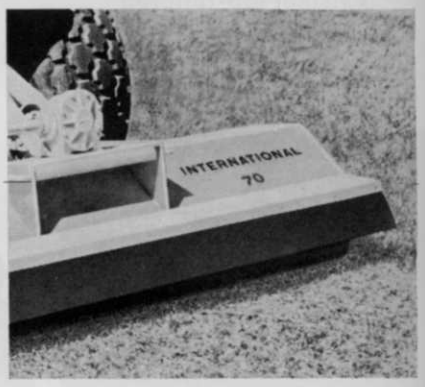

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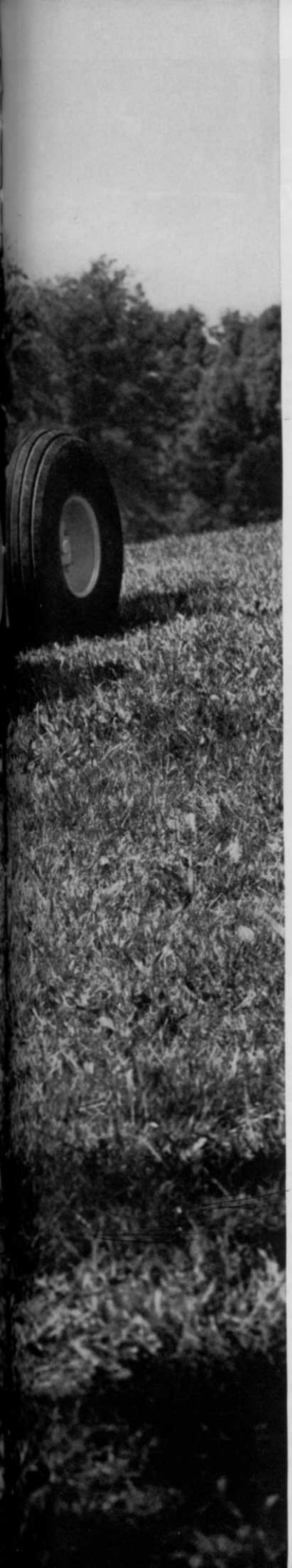

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CIRCLE No. 11 READER CARD

Many methods of handling residue of harvested aquatic weeds have been tried. Among new innovations under trial is this new piece of equipment, designed for pelletizing to be used as cattle feed.

Robert E. Eron, St. Petersburg, Fla., demonstrates his newly developed foam generator for pesticide applications.

USDA, at Fort Lauderdale, in the annual presidential report discussed Society efforts to aid those charged with aquatic weed control.

He reviewed the purpose for which the Society was founded —that of providing practical information for those who need such whether they be drainage district supervisors, mosquito control district directors, custom applicators, or crew chiefs of spray boats.

Removing aquatics has in the past been attempted by mechanical methods such as chains, drags, disks, and more sophisticated equipment. But today, the only practical approach is use of chemicals. Safe herbicides,

Mechanical harvester at right is owned by city of Winter Park, Fla., and is used to harvest aquatics as a means of keeping lake open for recreational purposes.

Blackburn said, are available for use in areas where drift might affect surrounding vegetation. Studies, he stated, show that mechanical removal costs 5 to 10 times as much as chemical means.

Public apathy for large scale spraying programs probably results from the fact that aquatic weeds are never totally eradicated. Blackburn implied that aquatic weed control groups have failed in efforts to explain modern aquatic weed control to the public. The fine control job done to date is unsung largely because of the impossibility of completely eradicating the undesirable plants.

Helicopter pilot and veteran sprayman William J. Perdue, left, Lake Wales, Fla., and W. T. DeBusk, Pennsalt Chemicals Corporation, Montgomery, Ala., discuss aquatic control.

Concern and efforts to control noxious aquatics will continue, Blackburn said, because such weeds have become more than a nuisance. Today, he said they are a national problem and rapidly growing more serious. The nation's 170,000 miles of irrigation canals and 190,000 miles of drainage canals and ditches are becoming less and less effective because of aquatic weed growth. Further, there are similar problems nationally with the nation's 2 million farm ponds and small reservoirs, streams and waterways which are 10 feet or less in depth. All waters, regardless of depth, he said, are subject to floating aquatics. In fact, he went on, Hydrilla verticillata has been found growing in water which was 30 feet in depth.

Main reason for the speed up of aquatic growth is the input of nutrients from sewage effluent, fertilizer run-off from farm lands, and the urban residential movement to water areas. Today, he said, the homeowner, sportsman, civic club member, and many in the population at large are familiar with names like water hyacinth, elodea, sea lettuce, alligatorweed, and eurasian milfoil. In Florida, he stated, various civic and conservation clubs have taken the problem of aquatic weeds as conservation projects.

The problem of aquatic weeds in many lakes and streams has progressed to the point that according to Blackburn we can no longer discuss control, but must discuss aquatic vegetation management. Control of all weeds, he said, would not be desirable, or economically feasible. A further concern must be the tremendous amount of nutrients released should all such plants be decomposed in water. To remove them mechanically would be even more expensive. Thus, the choice is to manage them.

Nonchemical methods of control have received broad publicity, Blackburn said, and need to be thoroughly investigated. He mentioned such methods as use of insects, snails, fish, manatees (sea cows), and other biocontrol agents. Possible use of aquatic plants for human or animal food supplements, mulch, fertilizers, and other economical uses also need further study, he stated. Blackburn called for continuing research and study of the physiology, life cycle, anatomy, and morphology of aquatic weeds in relation to their control.

Among leaders of aquatic weed control for the Hyacinth Control Society are the following, left to right: Fred John, Belle Glade Drainage District, retiring director; Dr. Lyle Weldon, ARS, USDA, Society editor; James D. Gorman, Hillsborough County Mosquito Control Unit, retiring vice-president; Frank Wilson, Polk County Mosquito Control Unit, president; Robert D. Blackburn, ARS, USDA, vice-president and retiring president; Paul R. Cohee, Hercules, Inc., secretary-treasurer; Stan Abramson, Southern Mill Creek, director; R. P. Blakeley, Old Plantation Flood District, director; and John W. Woods, Florida Game and Fish Commission, director.

State Control Sought

In a resolution aimed at the Florida legislature, the Society asked for an adequate research

(Continued on page 37)

Equipment demonstrated by Aqua Weed Control Corp., Orlando, Fla., included swamp vehicle, below. Left to right are: Jim Jones, Tim Blair, Art Barrett, and Mike Abrahram.

L. E. Bitting, Sr., left, Old Plantation Water Control District, Broward County, Fla., and Paul W. Kolm, Stull Chemical, San Antonio, Tex., talk shop.

Dutch elm disease

(from page 11)

such a symptom is indicative to the writer that the fungus had been present in stems larger than twigs for some time, and is more suggestive of an infection that had occurred initially in the previous year, rather than one occurring in the present one. While the writer has been able to produce such "shepherds crooks" with massive inoculations of large stems, in eight years of successive inoculations he has never seen such a symptom from terminal inoculations.

Diagnosis:

The Dutch elm disease is so common over the landscape in the northeast, the midwest and adjacent parts of Canadian Provinces, that almost everyone who observes trees can and does accurately pinpoint much genuine Dutch elm disease. Accordingly, the point is often raised, that positive diagnosis is only of academic significance, because diseased elms from any origin are potentially dangerous as sources of bark beetles carrying the causal fungus. There is much truth to this, and positive diagnoses are only required under certain conditions. They are often required by state law for partial compensation, and must be continued by those concerned with reimbursement for tree removals, as well as by those seeking to avoid legal action, to placate a client, to satisfy ones curiosity, or to ascertain the cause in any case.

However, there is often unnecessary misunderstanding about the nature of diagnosis and the significance of results. In a few words, samples of an ailing tree suspected of the disease are treated in the laboratory to favor growth and development of the causal fungus. If present, the fungus most often grows out from the sample and may be identified either in pure culture, or by characteristic asexual structures. Since other fungi also cause similar field symptoms, and separation of the causal fungus from them is necessary, only trained persons can make diagnoses with confidence. Unfortunately, it is not often appreciated by amateur pathologists, who can learn easily to recognize characteristic features of the causal fungus, that there may be other fungi present that resemble *Ceratocystis ulmi*, and that there are atypical strains of the causal fungus as well. Every pathologist or mycologist who works with the causal fungus comes to recognize these variations, and at one time or another has had serious reservations and disagreements with colleagues as to what *is* it, and what *is not* it.

But aside from the identification itself, what is the significance of a positive test? We can say with confidence that the Dutch elm disease fungus has been isolated from a certain diseased tree. Usually this means the tree will die if the fungus has entered the main stem. With most such cases in the past, I never doubted that such trees should be destroyed. However, within the past few years I have seen more than one elm recover where the fungus had invaded the main stem, and for this reason, I have become more cautious about such a recommendation. It is possible for the causal fungus to be limited to the growth ring of one year, and if for any reason it is unable to cross into the growth ring of the following year, the tree may and often does recover on its own.

But what of a negative test result? Does it mean that Dutch elm disease is not present? Not necessarily, often another sample will be positive. In one situation where I had examined the tree in the field, I refused to be satisfied with three successive negative tests and obtained a positive only on the fourth one. However, if one isolates another known pathogen than the Dutch elm disease fungus, there is good reason to consider the test truly negative; but if no microorganism is obtained, and all field symptoms are indicative, another sample should be taken. It is my opinion that at least one kind of microorganism must be isolated from discolored elm wood, or the test is void.

Transmission:

Fungus transmission is the vital point in spread and distribution of the disease, and is presently the focal point of control. Until recently spread of the fungus was believed to occur almost exclusively through the activity of either one of the 2 elm bark beetles (the native, *Hylurgopinus rupifes* Eicch., and the European, *Scolytus multistriatus* Marsh.). Although transmission of the fungus in the vascular system by root graft between noninfected trees had been demonstrated over twenty years ago, and some transmission in this manner was known to occur, it was given little attention until quite recently. However, studies have shown that probability of root grafts among closely spaced urban elms may be substantially high, and spread of the fungus by this means must now be given careful consideration. Unfortunately it has not been given the attention that it deserves. Although the writer is unaware of any studies on the speed of graft formation and subsequent transmission, he has seen evidence to suggest that grafting may be possible within a 2-year period from the first contact between adjacent root systems. Also, field observations by others suggest that speed of fungus transmission by spore movement may be rapid. Unfortunately, there is as yet relatively little evidence on actual frequency of transmission of the causal agent and subsequent development of disease. A question is raised as

to whether or not actual transmission occurs naturally by forces within the grafted system, by active growth or migration of the fungus, or by mechanical disruption occasioned by cutting one of the 2 grafted trees. Even before the frequency of root grafts had been explored by others, the writer had seen positive evidence in the field of root transmission of the fungus only following cutting of a known diseased tree. Of course grafted healthy trees may become diseased eventually without the cutting of attached diseased ones, but transmission is most probably accelerated by such cutting. This is the basis for the recommendation made over ten years ago by the writer and others, that immediately on confirmation of Dutch elm disease, action be taken to sever potential root connections between nearby healthy trees *before* (and not after) the diseased tree was removed. This point emphasizes the need for further studies on the nature and speed of spore movement across such grafts.

Returning to beetle transmission of the fungus, we know that some beetles may be carrying enormous loads of viable fungus spores, but we know also that some beetles may carry none at all. We know further that all spores are not viable, and that viability is to some degree a function of desiccation. It is also apparent that spores deposited in wounds made by feeding beetles do not always gain access to vessels, and it is suspected by the writer on the basis of studies, that many viable spores either do not travel far in the vascular system or are inactivated at the infection point by antagonism from other microorganisms.

Another aspect of beetle transmission that requires comment is the timing of beetle emergence and activity. Depending on climatic conditions at various latitudes, beetle emergence usually begins from late April to mid-May. At least two broods of either beetle are possible, but the European species may have two and one half or even three. Much emphasis has been placed on peak emergence of broods, so that some people actually believe that these are the only significant times that beetles are available for transmission. However, beetles are reported to be emerging and active over the entire growing season from early May at least to early frost. Thus the emphasis on peak emergence may be misleading, unless interpreted accurately. The first peak emergence around mid-June is unusally significant in that this is the period of maximum available fungus-carrying beetles precisely in the middle of the most susceptible period for the elms with respect to new vessel development. Although a second brood of beetles may occur in August, this one has much less significance because the elms are beyond maximum susceptibility. However, this does not mean that infection cannot occur at this time; it only means that it is less probable. The writer has had no difficulty inoculating elm in August, with positive disease development. However, such late season infections are often likely to be walled off by the tree and remain isolated. When this occurs, they are in effect inactivated.

Control:

Of all the different aspects of Dutch elm disease on which we have definite information for guidance, control seems to me to be the least understood. As a general concept the word implies more than it really means for Dutch elm disease. In this sense it is an unfortunate choice of a term, that may not only enlist public support for a worthy cause, but may lead also to bitter disillusion and total lack of support when a misunderstanding becomes clear. Among those who try to understand the disease in all of its immense biological complexity, control means only a limitation of disease among a limited population of elms within a limited area, given careful and systematic application of tested procedures. But few public officials understand the complexities involved and in practice are allowed to believe that they have done or are doing the proper thing to insure disease control.

As currently understood by the writer, there are only 4 control measures accepted generally as effective both in theory and actual test. Two of these are indirect and are designed generally to reduce the probability of fungus-carrying elm bark beetles in or nearby healthy trees to be protected. The most significant of these is sanitation, which involves the elimination not only of all diseased and/or beetle breeding elm wood, but of all such wood potentially hazardous for such breeding as well. In effect this means elm wood diseased or weakened from any cause. The significance of this measure is the need for wholesale cleaning of weakened elm wood by constant cutting, trimming and pruning generally. This in itself when properly done is a most formidable chore, and for this reason can only be done effectively for limited numbers of highly valued elms. The other indirect method is general maintenance involving watering and fertilizing when and where essential to prevent or minimize weakening of branches sufficient to allow invasion by beetles. In a well managed shade tree population, these practices should be routine and systematic, but here, too, numbers of trees so treated will be limited by time and resources.

The remaining 2 methods of control are direct. Spraying is designed to coat every square millimeter of bark annually with a chemical that will kill every

visiting beetle, and by so doing prevent infection completely. The theory is sound, experimental results have been proven, but in practice results have often been disappointing. Economics, insecticidal controversy, cluttered streets, parked cars, logistics, weather, time available labor, ignorance, irresponsibility of labor, *et al. ad infinitum* combined, appear to preclude the precision and meticulous care necessary for effective spraying of large numbers of trees with due attention to all required conditions. Adequate manpower and resources within time limits alone, are rarely available for the assignment. The result seems to be a diffusion of effort and spray over a widely scattered elm population, too large for the resources used. If spraying for Dutch elm disease is to retain or regain confidence in the eyes of the public, it is my view that it must be more limited and more carefully applied.

Unfortunately, spraying has been used too often as a control measure at the expense of both sanitation and root graft treatment. It has often been shown to be ineffective for this reason alone. Since good sanitation complements spraying, in its near or total absence, even moderately good spraying may be relatively ineffective. Under extremely intensive beetle pressure it is difficult to see how even excellent spraying can be perfect, and many contaminated beetles, with viable spores should be expected to survive for successful inoculation.

Concerning root grafts, it should be obvious that overhead spraying will be wasted, if the fungus is moving underground. And yet it is my understanding that treatment for root graft is widely neglected, and in some areas is not used. As with all control measures economics plays a major role here. But again this emphasizes a point that keeps recurring in control, i.e. the inadequacy of money, manpower, machines and time to exercise all proper control measures.

The question of pruning a single infected limb from an otherwise healthy tree as a control measure, has been raised by many with hopeful anticipation. As with many pathologists I have seen severely wilted limbs pruned and complete recovery of the tree, especially where the fungus apparently had been removed completely. On the other hand, I have seen scores of trees die following pruning. Saving a tree by pruning still seems to be a relatively rare phenomenon in spite of many successful cases. In one situation, a large severely wilted branch was pruned but discoloration of the vascular system was evident in the main stem. The owner was informed that the tree would die, but the tree was not removed, so that its demise could be studied. Two years later the tree still lives in a perfectly healthy condition. However, such cases are rare. In most cases, by the time a tree wilts conspicuously enough to be sampled, the chances are good that the fungus is by then deep in the tree, has been able to cross from one growth ring to another, and cannot be removed by pruning. Thus, there is little likelihood that such a tree will survive. However, there is much here that we do not know. I have altered my own views here radically, and no longer condemn a desirable elm to the axe until I am certain the disease will not cease, either with man's aid or none at all. A few words of warning, however, known diseased trees cannot be left unattended. At the very least they must be pruned carefully. Also, every tree owner who elects to try to save a diseased tree must be informed fully, so that the practicing arborist will not assume an unwarranted responsibility that might result in embarassment or even legal action.

Conclusion:

Over the past sixteen years the writer has observed with interest the operation of many Dutch elm disease programs. In spite of some noteworthy successes in control over a long period of time, even the best programs sustain substantial losses in certain years. Unfortunately, more programs than not have failed disastrously. This has led the writer to ask himself if it is really possible to control Dutch elm disease satisfactorily on a community-wide basis. In evaluating each of the control methods necessary for a successful program, it is now my view that the community will indeed be rare that will actually support in practice the kind of complete and thorough control program necessary according to theory. If there is any community in the U.S. that, over a period of years, has practiced complete, thorough and timely spraying, complete thorough and timely root graft treatment where needed, and complete and timely maintenance under conditions of adverse environmental stress, such as drouth, I have yet to hear of a detailed report. In practice most control programs appear to involve at least some of these measures, some use even one or 2 thoroughly, most use but one or 2 on a piece meal basis, but how many, if any, use all as prescribed?

In my experience, much sanitation is inadequate or too late, because of the sheer enormity of the wood to eradicate. Most spraying is inadequate in deposition or untimely in application. Root graft treatment seems to be generally ignored, except for certain areas, and complete maintenance with water and fertilzer when and where needed for an entire population of elms seems prohibitive economically and physically.

In effect, where community-wide control of the disease is in

(Continued on page 37)

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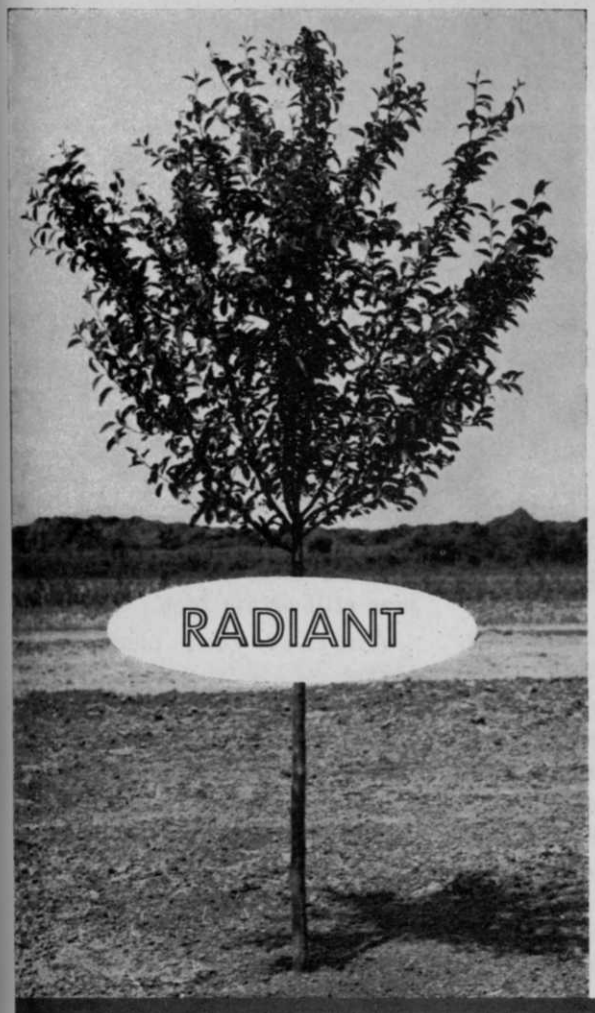

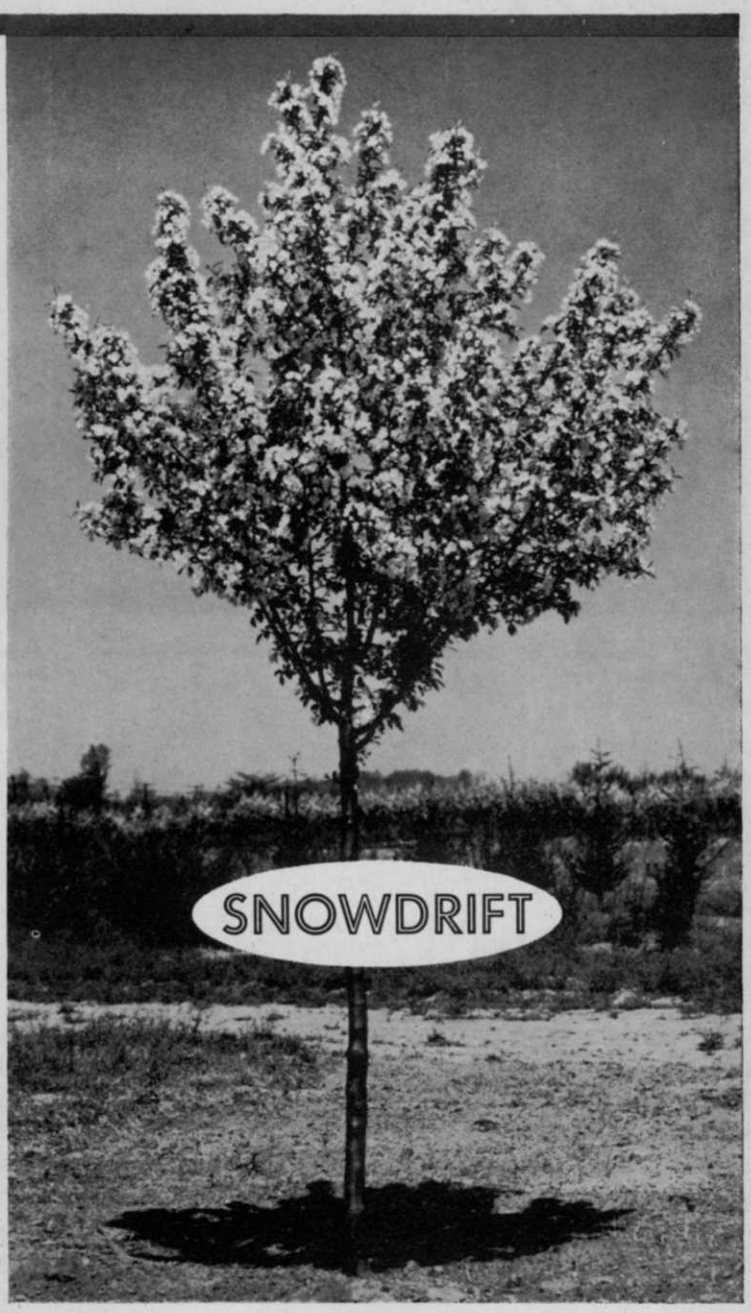

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CIRCLE No. 13 READER CARD

Photo 1. More than 25 years ago I noticed this white oak tree, singed by fire, dead.

Photo 2. Five years later I passed the same spot. The tree was still standing.

Death of A Forest Giant

By Grover Brinkman

More than twenty-five years ago I passed this white oak tree, in the bottomlands of an Illinois creek. A grass fire had singed it, and the tree had died. Already some of the smaller branches were falling, although the trunk was still dry and solid. Lumbermen for some reason passed it up, even though at this stage it would still be valuable to the logger.

Five years later I chanced to pass the same spot again. The old tree was still up there, on its feet. But its trunk was denuded of most of its bark now, and most of the smaller limbs were gone as well. I tested the trunk. The rotting process was starting, but it hadn't penetrated more than the sap of the trunk. The ruggedness of the old tree was impressive. Life had left it possibly seven or eight years ago, yet during all of this time it had buffeted storms and the elements without falling.

The years rolled by. I didn't get back to the old tree. I presumed it was long down.

Then one day, fifteen years from the time I'd taken the last photo of it, I had a chance to make another check.

I was visibly surprised. It was still standing, remarkable as it seemed.

The rotting process was very evident now. Woodpeckers had bored into its trunk. It had the look of a defeated warrior. I was positive that it would fall within weeks.

But it didn't. I checked with a friend, who hunted in the area. Months later he assured me it was still on its feet.

Another year passed. Still there.

But this Spring, when I went back to the spot, it had fallen. It had broken up, in its last ride to earth. But the trunk was still intact. I dug down with an axe—the center of it was still sound, hard and brittle.

Its age, from a leaflet in the forest mould, to its death?

I'm not sure. No doubt it was approaching the century mark when the fire killed it. From its death, to its fall, thirty-two years elapsed.

Trees are tough. This old white oak was tough as they come.

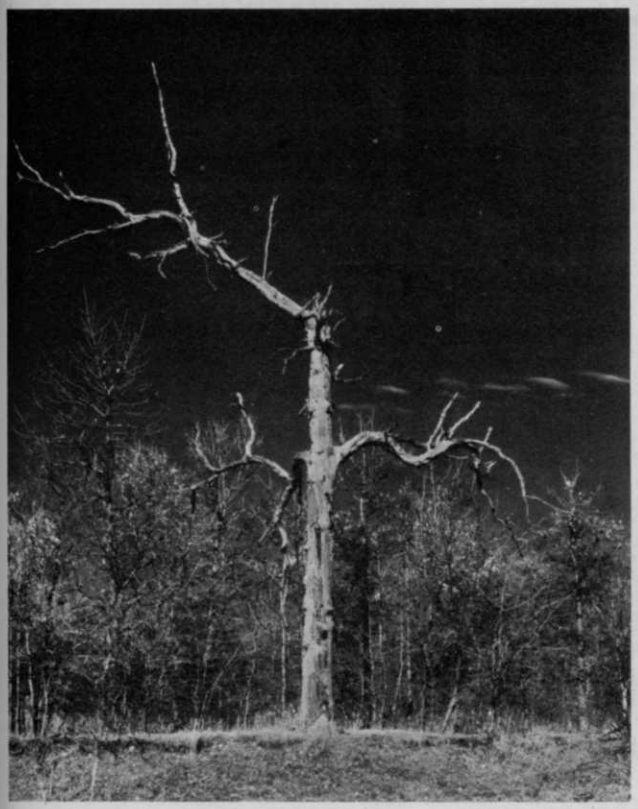

Photo 3. Then, 15 years later, a rotten shell now, the tree was still on its feet.

Photo 4. Finally, I chanced to pass again. The tree was down. From death to fall, 32 years elapsed.

Checking for Borer Damage in Shade Trees

Insect borers (beetle larvae) attack both established and newly transplanted trees weakened by lawnmower injury, disease, sunscald, or the transplanting itself, says Richard L. Miller, Extension entomologist at The Ohio State University.

Feeding on that part of the tree just beneath the outer bark, several of these larvae can girdle a tree, causing its death.

The first sign of borer damage on an established tree may be a large patch of peeling bark. Underneath you'll find small grooves where borers have burrowed in all directions. To save the tree, cut out the dead area back to live bark and down to hard wood. Paint the area with tree wound material, then follow with a thorough chemical spraying.

DDT or dieldrin are recommended sprays for all trees. Four applications at 30-day intervals (beginning mid-May) are required, as egg-laying adults are active over 3 to 4- month periods. Spray the trunk thoroughly to the lower branches.

Miller says that wrapping newly translanted trees before the larvae have had a chance to enter them will help prevent borer attack. Wrap the trunk from the ground to the lower branches with burlap or with tree wrapping paper.

Herbicide Incorporation Requirements Vary

The type of herbicide you use determines whether you should incorporate it, says Gerald Miller, University of Minnesota extension agronomist.

Volatile herbicides such as EPTC should be incorporated deep enough to reduce surface loss. Those less volatile but that tend to lose effectiveness when left on the soil surface (such as atrazine) may also perform best when incorporated.

However, herbicides such as CDAA and linuron are usually most effective when applied to the surface.

Leaching can decrease effectiveness of highly soluble herbicides, Miller says. This is also true at times of low solubility herbicides when incorporated. The loss of effectiveness may be caused by greater absorption onto the soil or organic matter particles when mechanical incorporation is involved.

Miller cites recent evidence that many preemergence herbicides control certain grass weeds best when the chemicals are positioned for uptake in the shoot zone. He also describes a "dilution effect" that occurs as incorporation depth is increased. When incorporated, he says, herbicides should be kept relatively shallow and concentrated in the shoot zone.

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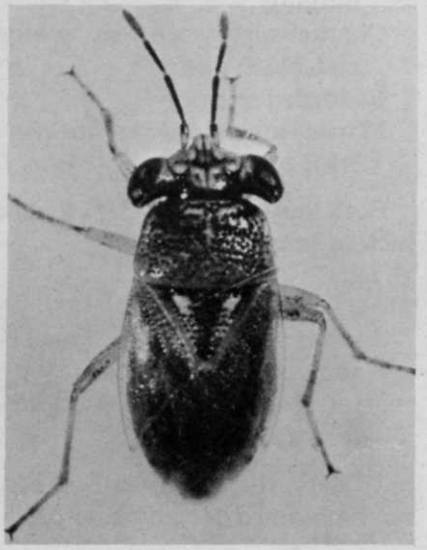
CIRCLE No. 12 READER CARD

Some Chinch Bugs Aren't

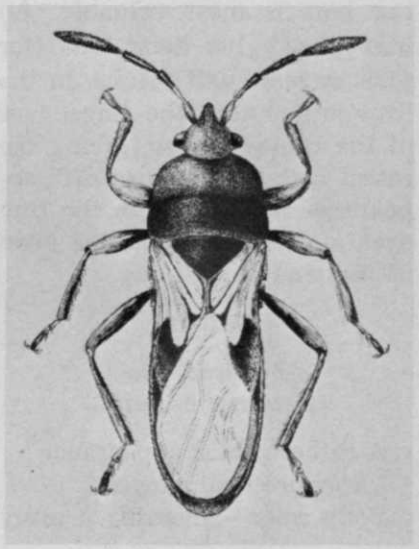
By Ira Caplan

New York State Agricultural Extension Service

In May of 1963 the proprietor of a golf course in Rockland County called us in to check on the identity of an insect infestation. He had been told that the abundant insects were chinch bugs and that an expensive spray program would be required to prevent wide-spread damage to his turf. The greens and fairways most certainly had a heavy infestation of insects, but close examination disclosed that the insects were not chinch bugs. At the time we could only tell the proprietor what the insects were not, and it was some time later that we were able to obtain an authoritative identification by entomologists in Washington. The report was that the invaders were indeed true bugs, as is the chinch bug, but with the rather descriptive common name of "Big-eyed Bug" *(Geocoris bullatus)*. It was also reported that this insect was not parasitic upon grass and thus that no expensive insecticide application was necessary.



Big-eyed Bug



Chinch Bug

History and Distribution

The "Big-eyed Bug" *(Geocoris)* was first described in the 1800's and first found in New York State in the mid 1920's. The recorded distribution in New York State is rather wide. *Geocoris* has been found in numerous areas of Long Island, frequenting the hot, sandy banks of both shores. It is found all along the Hudson Valley, north to the Adirondacks and across the state to the Buffalo area. During 1963, as a result of our publicity throughout the Extension Service, the Big-eyed Bugs have been reported in the Syracuse area, the Schenectady-Albany area, and the New York Metropolitan area.

Reference manuals record that in the United States the insect has been commonly found throughout Florida and ranges north to New Jersey, west to southern Indiana, Oklahoma, and Colorado and south and southwest to Texas, Arizona, California, and Mexico.

Habits of Geocoris

The Big-eyed Bug *(Geocoris)*, like the chinch bug, is a true bug and both belong to the insect family *Lygaeidae*. The two insects frequent the same type of sunny, hot dry conditions, and we have often found all stages of both insects running together in turf areas.

Little is known about the biology and feeding habits of *Geocoris*. We do know that these bugs are predaceous in habit, that is, they feed upon other insects in contrast to the chinch bug which sucks the sap from various grass plants. There is a report from Virginia that *Geocoris* feeds on insect eggs, plant bugs, and leafhoppers. In California, some members of the genus are reported to feed on mites.

Identify and Save

It is important that any turf manager be able to distinguish between the dangerous hairy chinch bug and the apparently harmless Big-eyed Bug. In general, damaging chinch bug infestations are very rare in New York State except in the southeastern area and on Long Island, whereas the Big-eyed Bug apparently is quite frequent throughout most of the state. Damaging infestations of the true chinch bug in up-state areas are usually traced to the importation of the insects in plant ma-

terial, and apparently there is no survival through the following winter.

Contrasts between the adult Big-eyed Bug and the chinch bug are clearly evident in the accompanying illustration. Since these insects are about the same size, and both very small (to 1/5 inch long), a hand magnifying lens is most valuable. An inexpensive 10x hand lens (for $1.50 or less) will suffice. In the illustration note the huge eyes of the Big-eyed Bug, giving the insect body a "chopped off" appearance in contrast to the tiny eyes and small triangular head of the true chinch bug.

Adults

Big-eyed Bug
(Geocoris bullatus)

A rather robust appearance
Large protruding eyes
Body color—generally a pithy black, a reddish yellow tinge on the under or vertical surface
Blackish leg color
A rather rapid mover

Chinch Bug
(Blissus hirtus)

A more slender body shape
Eyes smaller, not nearly so bulging
Characteristic whitish wings and black body
Reddish leg color
Moves much slower in contrast to *Geocoris*.

Both insects about 1/6 to 1/5 inch in length.

Nymphs

Similar to adults in appearance but not winged.
First two instars have characteristic banding.

To date, the Big-eyed Bug can not be blamed for any turf damage. Thus it will behoove anyone who is to embark on an expensive spray program to learn what these insects look like. It may save some time and, to be sure, some money. But don't jump to conclusions! Some chinch bugs aren't but there are a lot of chinch bugs that are!

Spell It Out in Grass Via Warren's Monogram

Now you can spell out whatever message you desire in living grass, according to Warren's Nurseries, Palos Park, Ill.

Warren's Monogram Bluegrass, soon to be available to the public, can be used to spell out the name and address of home owner or business corporation. Lighter in color than Merion, for example, it stands out from the other grass in which it is planted.

Locke's heavy-duty, "safety-conscious" mower is easy to handle, according to its developers. Designed for work on sloped grounds, it cuts at the easy rate of three acres an hour and handles jobs too big for smaller units.

Hillside No Problem With Locke's New Mower

The Devere-Locke division of Locke Manufacturing Companies, Inc. has made available its heavy-duty, 700-lb. "Expressway Patrol" mower, designed especially for highway grass maintenance and hillside mowing.

Developed over a three-year period with the co-operation of experienced highway maintenance engineers, the mower is geared to cut grass as tall as a man while moving across a steep slope; then, on the second pass, it completely cleans the hillside, says Locke. Its 60-inch blades manicure grass on slopes up to 40 degrees.

Providing safety for the operator, the mower is designed to stop dead after seven feet of travel, even when headed down a 36° slope after being turned loose by the operator, according to Locke.

Devere put the engine only five inches off the ground to provide for lots of hill-hugging ability. Its dual wheels make the mower "untippable," says the company.

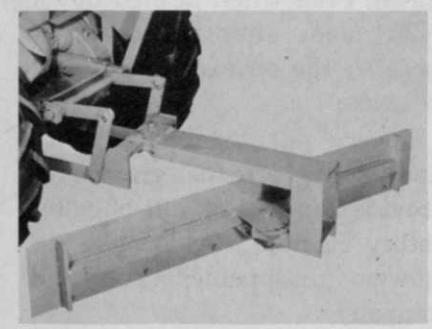
For more information, write the company, 1085 Connecticut Ave., Bridgeport, Conn.

The Ohio Turfgrass Foundation has awarded a grant of $10,000 to The Ohio State University for study of turfgrass management. According to Robert W. Miller, left, associate professor of agronomy at The Ohio State University, and who will be conducting the research, the grant makes possible additional research in the fields of better turfgrass on golf courses, industrial grounds, cemeteries, parks, and home lawns. Shown with Miller are Novice G. Fawcett, center, president of The Ohio State University, and Charles H. Tadge, president of the Ohio Turfgrass Foundation and Mayfield Country Club Golf Course Superintendent, South Euclid, O., who is presenting the check.

Lynn Kellogg, right, golf course superintendent of Oak Hill CC, Rochester, New York, receives from Charles DeMartin, center, Oak Hill's grounds committee chairman, a plaque from the Golf Course Superintendents Association. Kellogg was honored for his outstanding contributions in preparing the Oak Hill Country Club for the 1968 U.S.G.A. Open Championship. Kellogg was named Oak Hill's golf course superintendent in January, 1966. Two weeks after his appointment he was informed that the course would hold the 1968 U.S.G.A. Open Championship. He had been grooming the course for this event ever since. DeMartin, after making the presentation, made these points about the U.S. Open at Oak Hill: more than 30,000 man-hours of volunteer work went into it by Oak Hill members; provisions were made to handle between 80,000 and 100,000 people, at the rate of 20,000 to 25,000 a day, and to handle 8,000 cars a day; and Oak Hill also fenced the perimeter, plus adding 25,000 stakes and miles of telephone wires.

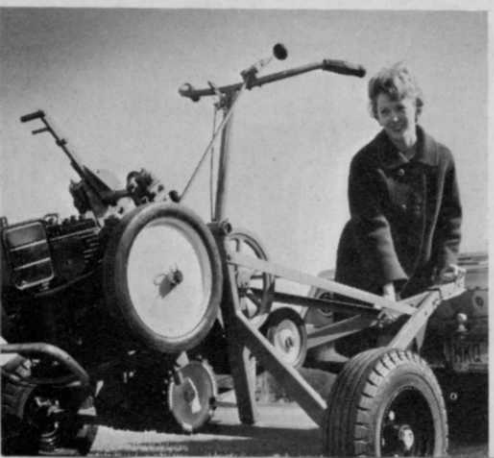
New Products . . . Designed for the Vegetation Care Industry

Vermeer Manufacturing Company, offers the new Model TS-30 Tree Spade. Designed to dig a maximum tree ball 30″ in diameter, 36″ deep, the Tree Spade is ideal in moving trees and shrubs, and for root pruning. Its telescoping spades completely encircle the tree and then inch carefully into the ground. Tree and ball are hydraulically lifted into transport position. The TS-30 operates in approximately 6 to 7 foot rows with 5 to 6 foot spacings. Information: Vermeer Mfg. Co., Pella, Ia. 50219. (Circle No. 17 on Reader Card).



New attachment by Economy Tractor is rear-mounted grader blade. As an aid to fine grading, landscaping, and other assignments, the blade can be angled in any of 5 positions. Write Engineering Products Co., 1005-HF Anoka Ave., Waukesha, Wis. 53186. (Circle No. 18 on Reader Card).

Even a small woman can easily attach, raise and move a 265-pound sod cutter with a new Tote Trailer manufactured by the Ryan Equipment Company, 2055 White Bear Ave., St. Paul, Minn. 55109. Trailer attaches to any ball hitch. (Circle No. 19 on Reader Card).



The Hypo-Hatchet Injector-Silvisar system injects a metered amount of tree-killing chemical into a tree in one operation. The hatchet weighs less than three pounds and is used as an ordinary hatchet. The simplicity of operation requires little training of personnel. Write The Ansul Company, Marinette, Wisconsin 54143. (Circle No. 20 on Reader Card).

Stamp out drought

SUMMER

WILT PRUF Anti-Transpirant *adjusts* plant transpiration, the natural process of water-loss, to the season's needs. During a hot, dry spell, WILT PRUF conserves precious moisture to combat summer scald. You can transplant safely through the summer months by spraying with WILT PRUF before you dig. Summer, winter, spring and fall, WILT PRUF saves plant lives. *Write on your letterhead for 50-page technical manual of applications.*

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CIRCLE No. 15 READER CARD

NS-1-67

Insect Report

WTT's compilation of insect problems occuring in turfgrasses, trees, and ornamentals throughout the country.

TURF INSECTS

GREAT BASIN TENT CATERPILLAR
(Malacosoma fragile)

Oregon: Very heavy on bitterbrush again in 1968 in Klamath County; numerous brush patches completely defoliated along 30 miles between Sun Pass and Chemult. Mostly penultimate instar and few beginning to migrate. Little evidence of virus killing June 6.

FALSE CHINCH BUG
(Nysius ericae)

Missouri: Heavy in nurseries in southwest area where pepper grass common.

A MEALYBUG
(Heterococcus sp.)

Arizona: Treatments ineffective on seed Bermuda grass on Arizona Island, Yuma County.

A SOFT SCALE
(Pulvinaria iceryi)

Florida: Taken on Pensacola Bahia grass on experiment station at Ona, Hardee County. This is first Florida Division of Plant Industry record for pasture grass in State.

THRIPS
(Chirothrips spp.)

Arizona: Heavy enough in Bermudagrass seed fields to require treatments from Yuma Valley to Roll Valley in Yuma County.

INSECTS OF ORNAMENTALS

A COCKROACH
(Neoblattella detersa)

Florida: Collected on begonia plants at Miami, Dade County, December 3, 1965. This is a new United States record. This species is also known from Jamaica.

AN YPONOMEUTID MOTH
(Argyresthia cupressella)

Oregon: Adults began emerging from arborvitae week of May 24 at Salem, Marion County.

FLETCHER SCALE
(Lecanium fletcheri)

Wisconsin: Laying eggs on yew, arborvitae, and juniper in Jefferson County. Egg laying about 5-90 percent complete.

A PIT SCALE
(Asterolecanium bambusicola)

Florida: Adults collected from bamboo at nursery in Daytona Beach, Volusia County.

JUNIPER WEBWORM
(Dichomeris marginella)

Michigan: Full-grown larvae in webs; pupation expected soon.

A WEEVIL
(Ochyromera ligustri)

Virginia: Adults collected on lilac at Smithfield, Isle of Wight County, July 13, 1967. This is a new State record.

TREE INSECTS

ADELGIDS
(Adelges spp.)

Maine: *A. abietis* caused concern; incidence apparently above 1967.
Virginia: Some motile first instars of *A. tsugae* still active; most on hemlock twigs; infestations extensive and widespread at Richmond. Winged females observed for first time in State.
Wisconsin: *A. strobilobius* egg laying underway on Grant County European larch.

APHIDS

Vermont: *Mindarus abietinus* very numerous; severe curl and wilting of new growth on balsam fir.
Maine: *Cinara strobi* abundant on ornamental white pine in southern area in late May.

NATIVE ELM BARK BEETLE
(Hylurgopinus rufipes)

Wisconsin: Adults flying, eggs laid and hatching June 5 in Menominee County.

ELM LEAF BEETLE
(Pyrrhalta luteola)

Nevada: Heavy adult feeding at Winnemucca, Humboldt County.
Utah: Active at Cottonwood and Highland Drive.

ENGRAVER BEETLES
(Ips spp.)

Wisconsin: Females oviposited June 3 on jack pine pulpwood piles in Jackson County. Active May 31 in spring burn area of Vilas County where egg galleries in Scotch and jack pines.

AN YPONOMEUTID MOTH
(Argyresthia cupressella)

Oregon: Adults emerged from various cypresses week of May 31 at Portland; bad infestation this year.

MIMOSA WEBWORM
(Homadaula anisocentra)

Alabama: First larval generation light; feeding on Lee County mimosa.
Ohio: First instars feeding on Tuscarawas County honeylocust.

PALES WEEVIL
(Hylobius pales)

Ohio: Adults feeding on seedling Scotch pine in Scioto County planting. Killed approximately 10 percent of trees planted in 1968 and damaged many more, such as to make survival doubtful.

WHITE-PINE WEEVIL
(Pissodes strobi)

Maine: Egg laying underway May 13 at Alfred and Sanford.

Compiled from information furnished by the U. S. Department of Agriculture, university staffs, and WTT readers. Turf and tree specialists are urged to send reports of insect problems noted in their areas to: Insect Reports, WEEDS TREES AND TURF, 9800 Detroit Ave., Cleveland, Ohio 44102.

Landscape Horticulture Program Offered by UM

The University of Minnesota has announced it will offer a new two-year program in landscape horticulture geared to prepare students for supervisory positions in that field.

The program will combine classroom instruction with practical work experience at the University Arboretum and commercial companies. As students will receive pay for their work experience, they will have the opportunity to help finance their education.

Those completing the program may find openings in nurseries or in maintenance of commercial or highway landscape, parks or golf courses. Students interested in sales can find opportunities with corporations marketing agri-chemical products; those interested in business may become proprietors of their own nurseries or landscape service companies.

For additional information, write to Harold Pellett, Horticulture Dept., University of Minnesota, St. Paul, Minn. 55101.

Classifieds

When answering ads where box number only is given, please address as follows: Box number, c/o Weeds Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

Rates: "Position Wanted" 10c per word, minimum $3.00. All other classifications 20c per word, minimum $4.00. All classified ads must be received by Publisher the 10th of the month preceding publication date and be accompanied by cash or money order covering full payment. Boldface rule box: $25.00 per column inch, two inch minimum.

HELP WANTED

MANAGEMENT and Construction Superintendent Wanted—Aggressive man with experience and knowledge of all phases of turfgrass construction and management. Be able to handle men and equipment. Good salary, many benefits, 5 day work week with regular hours. Send resume. Reply to: Turfco Lawns, Inc., 1140 Bethlehem Pike, Flourtown, Pa. 19031.

MANAGER WANTED for one of Michigan's largest sod farms growing on peat, located near Lansing, Michigan. Profit sharing, hospitalization and living quarters. This is a $10,000 a year position. Reply to: Huron Sod Farms, Inc., 30877 Pennsylvania, Romulus, Michigan 48174. Phone 313 941-2730.

FIELD SUPERVISOR Industrial Weed Control firm in eastern Pennsylvania is looking for a field supervisor. Degree in one of the agricultural sciences is desirable but not necessary. Write Box 30, Weeds, Trees and Turf, 9800 Detroit Ave., Cleveland, Ohio 44102.

FOR SALE

ESTABLISHED Tree Service. 31 years in Chicago and suburbs. Business in operation and ready to take over. Retiring. Brown Tree Service. 739 Belmont Ave., Chicago, Illinois 60657. Phone 312 472-3997.

80 ACRE sod farm on peat. 70 acres of Merion ready to cut. Metal barn, deep well for irrigating. Near Lansing, Michigan. Phone Ann Arbor 313 662-9398.

Aquatic Weed Control

(from page 23)

program which would utilize both federal and state facilities and financing, state supervision of control on a statewide basis, and the authority to perform field operations in any area not covered by a specific local program and where control is necessary to safeguard the state as a whole.

Frank Wilson, director of the Polk County Mosquito Control District, Bartow, Fla., was elected as new president. Blackburn, the retiring president was named vice-president, and Paul R. Cohee, Hercules, Inc., Orlando, Fla., continued as secretary-treasurer. New directors elected for the Society were: Stan Abramson, Southern Mill Creek, Tampa, Fla., John W. Woods, Florida Fish and Game Commission, Tallahassee, Fla.; and R. P. Blakeley, director of Old Plantation Farms, Plantation, Fla. James D. Gorman, Tampa, Fla., is the retiring vice-president, and retiring directors are Fred W. John, Belle Glade, Fla., and Dr. Fred W. Zurburg, Lafayette, La. Dr. Lyle Weldon, ARS, USDA, Fort Lauderdale, Fla., continues as editor and will publish proceedings of the entire annual meeting. These are automatically mailed to Society members and are available on a purchase basis for non-members.

Members voted to stage their 1969 annual meeting during June at the Holiday Inn, Palm Beach, Fla.

Dutch Elm Disease

(from page 26)

trouble, it is not for failure or proven control methods, but instead of failure to apply all measures needed as prescribed. Failure to do so seems to result from a combination of factors involving both human and physical relationships. I believe that current effort, time and money now diffused over the community with but limited success, can best be used on limited numbers of highly valued trees. Many trees now pruned and sprayed are not worthy of this attention, because they are not only potentially hazardous for disease spread, but are also without aesthetic attraction. Such trees should be destroyed rather than protected. A reassessment of priorities is clearly necessary for control programs to be more successful. Priorities should be shifted from selectivity of control methods, to value and location of selected, desirable elms to be protected. *All* control measures should be used only on *limited* numbers of elms, and current selectivity of only one or two control measures for all elms should be abandoned as undesirable and hopeless. Ultimately, the disease can be expected to reduce all urban elm populations to fewer numbers of elms that may be protected with complete care, but if current practice continues some of the most beautiful and desirable trees will have gone and many grotesque ones may live on. The message here is to insure complete protection to those trees for which shade tree care has a purpose, anything less will ultimately jeopardize the integrity of arboriculture.

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New Jersey Now Growing 3000 Acres of Sod Yearly

The New Jersey Department of Agriculture reports that its state sod growers now have more than 3000 acres of "instant lawn" under production.

Of the Garden State's 31 sod farms, 15 are located in central counties, 9 in northern, and 7 in southern.

Sod production got underway in the state about 30 years ago; since that time, local and out-of-state markets have expanded to include industry, businesses, athletic fields, golf courses, landscapers, garden centers and, of course, private homeowners.

George Mock, pesticide problems author-lecturer, was recently honored with an award for his contribution to safety in the pesticide field by the Women's Division of the Seattle-King County Safety Council.

Mrs. Warren Magnuson, wife of the state of Washington's senior senator, presented the award at the Council's annual award luncheon, at which time Mock was cited as being the "most knowledgable individual in his field in the Northwest."

Former chairman of the Governor's Pesticide Advisory Board and a Western Washington Horticulture Board member, Mock was instrumental in forming the Washington Ground Sprayers Association and served as its president for five years.

Bell Helicopter, Fort Worth, Tex., has announced that the Greek government purchased 16 of its Model 47 copters to be used primarily for spraying olive groves.

The Bells, assigned the task of spraying 600,000 acres of olive trees, were delivered to Greece in time for spraying in early June, a critical period in insecticide operations to protect the country's "No. 1" export from the Dacus Fly (Dacus Oleae).

All 16 helicopters are equipped with Bell's AgMASTER spray gear, which offers a choice of boom widths, uniform spray pattern, and snap-on installation and removal, according to the company.

Bell Agricultural specialist John Neace is in Greece to assist in formulating the proper rates of spray applications.

Trimmings

Avoid Summer Elm Pruning. Elm bark beetles are more readily attracted to elm trees pruned during the summer growing season. This attraction shows up the season after such pruning. Michigan pathologists have found elms pruned between July and mid-September especially susceptible.

* * *

New Bulletin. Just thumbed through an informative bulletin from Cornell. It's Miscellaneous Bulletin #74 and gives a good rundown on pest control around homes. Includes recommendations for multipurpose spray mixtures and for control of turf, ornamental, and tree pests. Write the Cornell College of Agriculture at Ithaca, N. Y.

* * *

Congratulations to Mrs. LaFetra. *Named California "Woman of the Year" by the state Museum of Science and Industry is Mrs. Mary Elizabeth LaFetra. She is president and co-founder of Rain Bird, big maker of sprinkler irrigation equipment. Mrs. LaFetra and her late husband, Clem, turned a single invention, the impact sprinkler, into a giant manufacturing and marketing operation. It is now distributed worldwide. Among her accomplishments in the company is development of a unique accounting system exclusively used by the corporation.*

* * *

ALCA directory. Off the press is the new '68 directory of Associated Landscape Contractors of America, Inc. Executive Director Harry Lambeth says he will send one to industry members on request. Write him at 632 Shoreham Bldg., Washington, D. C. 20005.

* * *

Aquatic Weed Control Costly. *Aquatic weeds have only in recent years become a noticeable problem in the northern areas of the country. Tropical areas such as Florida have suffered for years. Today, the Central and Southern Florida Flood Control District has almost $400 million invested in canals, pumping stations, water reservoirs, dams and spillways. Benefits of this expensive system would shortly be negated if aquatic weeds were left uncontrolled for even a short period. Costs of weed control by all agencies in this single 18-county district ranges near $2 million every year. Thomas Huser, director of this particular FCD, says new controls are needed and the search for them continues.*

Meeting Dates

Midwestern Nurserymen's Summer Meeting, Zelenka Evergreen Nursery, Grand Haven, Mich., August 13-14.

Third International Peat Congress, Laval University, Quebec City, Canada. Aug. 19-23.

Golf Course Superintendents Field Day, Turfgrass Field House, University of Rhode Island, Kingston, R. I., Aug. 21.

1968 Turfgrass Field Day, Pennsylvania State University, Joseph Valentine Turfgrass Research Center, Campus, noon August 21-noon August 22.

Hawaii 4th Annual Turfgrass Management Conference, Punahou School Campus, Honolulu, Hawaii, August 21-24.

Lawn and Utility Turf Field Day, Turfgrass Field House, University of Rhode Island, Kingston, R. I., Aug. 22.

Turfgrass Field Days, Virginia Polytechnic Institute, V.P.I. Turf Plots, Blacksburg, Va., noon Sept. 4-noon Sept. 5.

Turfgrass Field Day, Michigan State University, Traverse City Country Club, Traverse City, Mich., Sept. 4.

Maryland Lawn and Turf Show, University of Maryland Campus, College Park, Md., Sept. 7.

Western Street Tree Symposium, 11th Annual, University of California, Santa Cruz, Calif., Sept. 11.

Turfgrass Management Conference, Florida Turfgrass Association, Ramada Inn, Gainesville, Fla., Oct. 8-10.

Southern California Equipment and Materials Educational Exposition, City Park, Lynwood, Calif., Oct. 16-17.

Industrial Weed Control Conference, 3rd Annual, Texas A&M University, Memorial Student Center, College Station, Tex., Oct. 20-22.

American Society of Agronomy, 1968 Annual National Meeting, Jung and Roosevelt Hotels, New Orleans, La., Nov. 10-15.

National Aerial Applicators Association, Annual Meeting, Dunes Hotel, Las Vegas, Nev., Dec. 1-4.

Illinois Turfgrass Conference, Illinois Turfgrass Foundation, Inc., Building Auditorium, University of Illinois, Urbana, Ill., Dec. 5-6.

UCR Project Aids Farmers and Herbicide Industry

Results of a University of California Riverside project — to hasten development and use of safer and more effective weed-killing compounds for a broad range of Southern California crops — indicate forthcoming benefits to California farmers and to the herbicide industry.

Conducted by scientists from three agricultural departments and the Agricultural Extension Service at UCR, the program is supported by the chemical industry. In recent years, they point out, new herbicides have been released for commercial use before being adequately tested and screened.

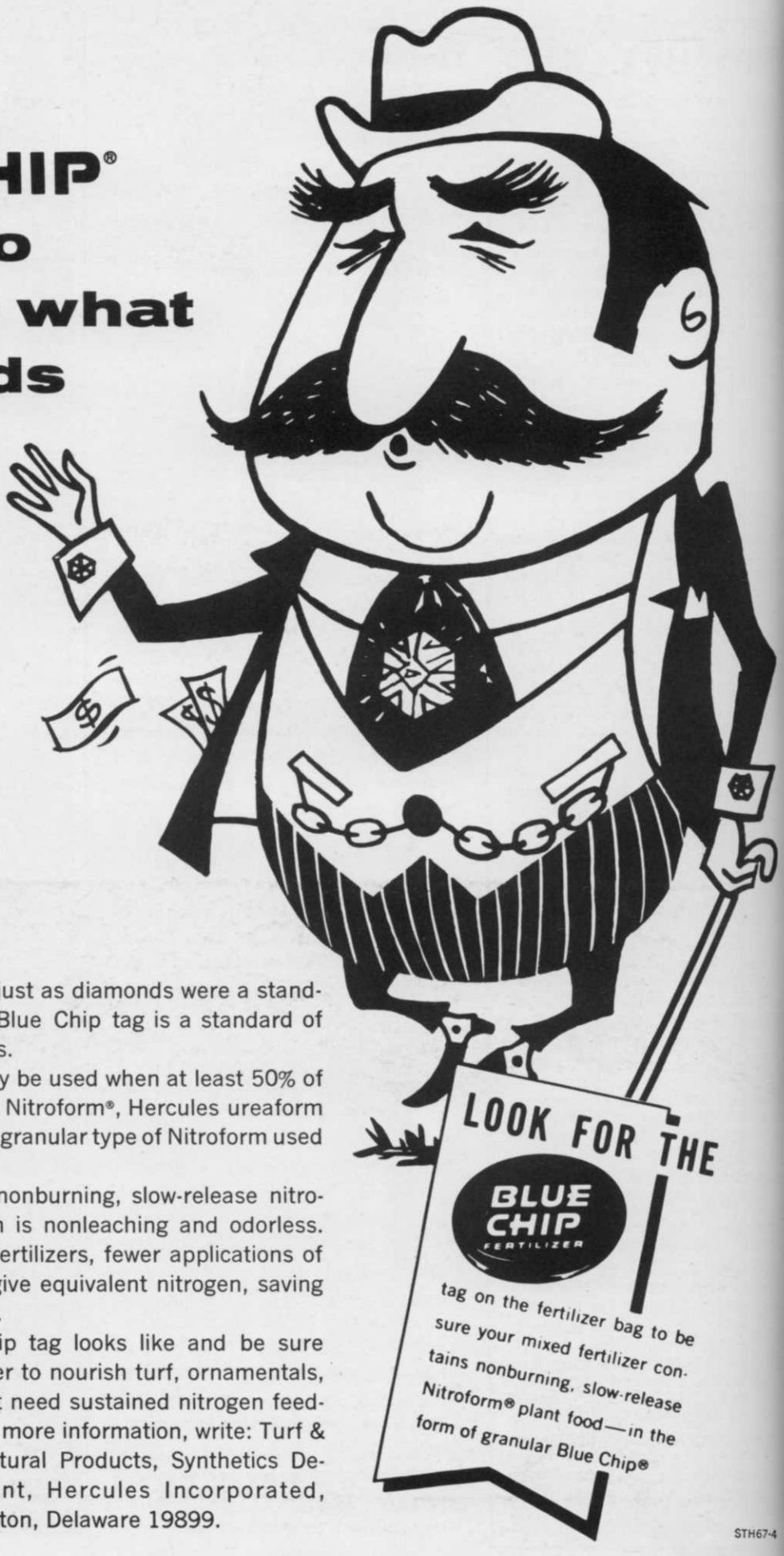
The UCR program intends to better evaluate new herbicides and to get them ready sooner for use by farmers, to help avoid losses caused by herbicide damage and to coordinate herbicide research on all major crops. In turn, the chemical industry will receive early notice as to which of its new compounds show the best potential for development as herbicides for S. California crops.

Sixty-two herbicides from 18 chemical companies were applied last fall to plots of various types of vegetables. Weeds were sown into each crop plot to ensure that the weed-killing capacity of the applied herbicide would actually be tested.

After test results are evaluated, a special committee decides what further research should be conducted on the best-performing herbicides.

The project has already produced impressive results, according to its participants. For example, performance of one developmental-stage compound has surpassed that of herbicides currently regarded as best for weed control in S. California lettuce fields. Other new compounds being tested are showing unusual selectivity in plots of vegetable and field crops.

You say BLUE CHIP® means to fertilizer what diamonds meant to me?



That's right, Diamond Jim, just as diamonds were a standard of quality to you, the Blue Chip tag is a standard of nitrogen quality in fertilizers.

The Blue Chip tag can only be used when at least 50% of the total nitrogen content is Nitroform®, Hercules ureaform plant food. Blue Chip® is the granular type of Nitroform used in fertilizer mixes.

Nitroform contains 38% nonburning, slow-release nitrogen. Long-lasting Nitroform is nonleaching and odorless. Compared to quick-acting fertilizers, fewer applications of Nitroform are required to give equivalent nitrogen, saving storage and handling costs.

Know what the Blue Chip tag looks like and be sure Nitroform is in your fertilizer to nourish turf, ornamentals, trees, and other plants that need sustained nitrogen feeding. For more information, write: Turf & Horticultural Products, Synthetics Department, Hercules Incorporated, Wilmington, Delaware 19899.

HERCULES

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