

TORO (from page 32)

nical training programs "in the field" in all five of the company's marketing regions.

Previously, all training programs were conducted at the Division's Riverside, Calif., headquarters.

Other changes in the 1974-75 class schedule include elimination of tuition charges. All field courses will be for residential and commercial irrigation contractors. Special courses will be offered in California for landscape architects and college and university instructors.

Bruce C. Camenga, manager of field technical training for Toro Irrigation, said the courses have been designed for contractors whose business is expanding and who need technical assistance in training new personnel, as well as for contractors new to the irrigation business.

For more information on the Irrigation Institute, write to Camenga at: Irrigation Division, The Toro Company, 5825 Jasmine Street, Riverside, Calif., 92504

Ciba-Geigy Move Announced

The northeast region sales office of Ciba-Geigy Corporation's Agri-

cultural Division has relocated from Newtown, Conn., to Washington, Pa., a suburb of Pittsburgh.

Northeast regional sales manager Keith Brum said the new office is nearer the center of the Division's northeast sales and research regions. He said the Pittsburgh area offers better access to a full service airport and interstate highway systems, faster mail service and improved office facilities.

Lawn Maker Names Sales Rep

Environmental Turf Management (ETM) of Chantilly, Va., has been named by Lawn Maker Inc. as exclusive sales representative for the Virginia and Maryland areas.

Headed by Dennis Ivey, ETM will be responsible for sales of the Lawn Maker multi-function turf care combine, in addition to the training of purchasers in the operation of the equipment.

Ivey will be conducting training sessions throughout the winter for users who will be entering the field of automated lawn care service for the first time. The company provides complete training and other assistance to purchasers of its equipment.

Research Contract Granted For Pesticide Analysis

The EPA has awarded a \$182,536 research contract to the Battelle Memorial Institute, Columbus, Ohio, for a study of the toxic impurities of pesticide compounds.

The contract calls for a two-phase investigation of six pesticide compounds: Endosulfan (thiodan), Trifluralin, Furadan, Atrazine, Ferban and PCNB.

Phase I will involve an evaluation of their commercial synthesis routes, including solvents, additives and all starting materials. In phase II, the six compounds will be subjected to detailed analysis, including the use of a variety of analytical techniques to assist in unequivocally identifying the impurity compounds. All impurity compounds which are present in concentrations of 0.05 percent or greater will be reported.

The two-year study is being funded by EPA's National Environmental Research Center in Research Triangle Park, N.C. The work is part of the Center's continuing program to develop analytical methods for pesticidal compounds.

Announcing the new Asplundh "Whisper Chipper"

Looks the same — sounds so different!

This new unit has all the dependable features of our famous chipper line. However, there is a remarkable difference — a great reduction in noise. Modification kits will be available for many existing models. **Asplundh Chipper Company, a division of Asplundh Tree Expert Co., 50 E. Hamilton Street, Chalfont, Pa. 18914**

ASPLUNDH



BRUSH DISPOSAL — PROBLEM TO PROFIT

ANTI-POLLUTION LEGISLATION restricting burning has had a positive effect for the maintenance section of the Ohio Department of Transportation, as it has for many other states. What looked like a real brush disposal problem after EPA regulations went into effect has proven beneficial for the department.

"Instead of having to haul cut brush and tree limbs in loose, bulky loads to a landfill site or a burning station," said O. Carson Barklow, "we use Wayne Brush Chippers." Barklow is Assistant Deputy Director of Operations and Maintenance for Ohio's Department of Transportation.

The department is divided into 12 districts. This past year each district purchased a Wayne Brush Chipper for maintaining highway rights of way, and to dispose of nuisance brush and low overhanging tree limbs thus improving vehicular clearance and sight distance for safer driving. A positive side benefit in the use of chippers is the creation of mulch now used on the roadside. Using a standard five-cubic-yard dump truck, which spreads salt in winter months, chipper chutes are adjusted to throw chips directly into the truck and they are then taken to a stockpile area.

Each crew can fill as many as three truckloads of



Ohio's Department of Transportation has found brush disposal with Wayne Brush Chippers to have many beneficial side effects.

chips a day. Chips are allowed to decompose for several months and are used extensively in the state highway landscaping program. In some instances, the chips are directly distributed by the chipper back onto the soil to cover bare spots where seed hasn't taken, or in natural wooded areas.

"The wood chips provide an excellent base for new growth," said Barklow, "and the mulch also helps prevent erosion by retaining the soil. One advantage of this system is that unlike straw, chips are more dense and don't blow away as readily."

The Department of Transportation maintains 16,000 miles of rural, state and federal highways throughout Ohio's 88 counties.

"Increased productivity of brush chippers has opened up a new phase of tree and brush disposal for the department," Barklow said. "The chippers have plenty of power and their safety features are an important factor with the extensive work load of our department." In addition to using their Wayne Chippers for highway clearance, the department also uses them in roadside rest area maintenance, providing safer, more esthetic rest areas for the traveling public.



After chips are spread, fertilizer is broadcast over the top and the area is seeded.

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INFRARED (from page 35)

Naturally-red objects appear yellow or green. Green objects which are not plants do not reflect much infrared, therefore show in the final picture as purple. This effect enabled aerial photographers in the Korean War to detect camouflage which was painted green, and was the original reason for the development of infrared color film.

How can infrared color photography be useful to us? Anyone who deals with plant growth has a potential use for infrared color photography. Since plants reflect large amounts of invisible near infrared

radiation, recording it on film may give us information about plant response that we cannot see with our eyes.

For example, consider the visible light and infrared radiation that comes from the sun and falls upon a green leaf. The blue and red wavelengths are largely absorbed by the chlorophyll in the leaf and provide the energy for photosynthesis. Green light is partially reflected and we see plants as a green color. Infrared is reflected from deeper in the leaf tissue, and in greater amounts than green light. Any disease or stress on the leaf tissue may cut down on the amount of infrared re-

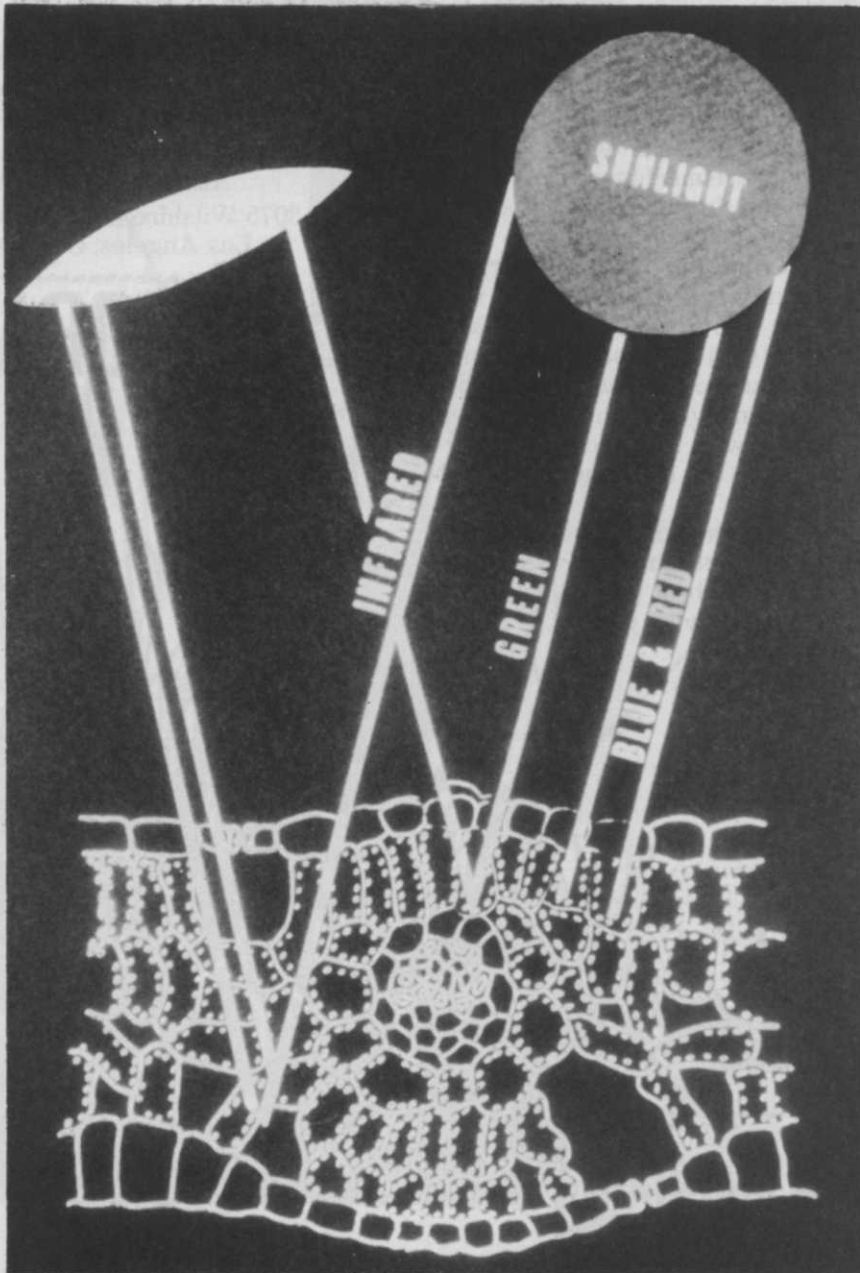
flected, without changing the amount of green light reflected. When this happens, we may be able to spot an adverse condition by taking an infrared photograph before we can see the symptoms with our naked eye. This is called *previsual detection*.

Can infrared photography be useful in everyday agricultural and environmental management? We set out to answer this question in the summer of 1973. Although a number of research studies have pointed out various specialized uses of infrared aerial photography, we knew of no one doing it commercially except on a high-priced, special project basis. We reasoned that if relatively inexpensive aircraft and hand-held 35 mm cameras could be used, the cost of aerial photography might be lowered to the point at which it could become a routine management tool.

To find out, we made monthly flights from April to October over the state of California in a rented Cessna 172. We asked county extension agents and university researchers to submit requests for aerial photos of crops or land uses of their interest. Our photographer made a simple frame on which he mounted two 35 mm cameras. Using a double cable release, both cameras could be snapped simultaneously to obtain matching color and infrared color photos of an object. At the end of the season we had accumulated 3,000 pairs of color and infrared photos of crops of all kinds, rangeland, forest and wild lands, urban and recreation areas. After polling the agents and researchers, we came to the conclusion that we had: (1) learned a great deal about some of the uses and techniques of aerial photography, and (2) barely scratched the surface of its potential applications. Here are some of the things we found out.

Aerial photography using any film can increase one's knowledge.

Patterns in soils and vegetation that are not readily apparent to the person on the ground show up clearly from the air. Even though a farmer may be aware of a thin spot in a crop, its size and shape are much more exactly defined by an aerial photo. Often an area of intermediate growth around the thin spot will prove to be much larger than the farmer realized by ground obser-



When sunlight strikes a green leaf, blue and red light are absorbed and used in photosynthesis. Green light is reflected, giving plants a green color. Infrared is even more strongly reflected than green, but we cannot see it.

vation only.

Interpretation of aerial photos requires good ground information.

The site should be examined on the same day the aerial photos are made. As soon as the photos are processed, interpretation of patterns can be made from notes taken during the ground examination. Unexplained patterns may require re-examination of the site and perhaps collection of soil or plant tissue samples for laboratory analyses.

Color pictures are usually preferable to black and white. Infrared color photos may or may not give more information than color photos.

We like the matched color and infrared color photos because they give a record of how the scene looked to the eye, plus the possibility of greater interpretation from the infrared. Often we see the same patterns with each film, but they are usually plainer and more contrasting in the infrared picture. Only occasionally were we able to see patterns in the infrared photo that we could not see in the corresponding color one. Nevertheless, we think the infrared is valuable because of its greater contrast, and its greater ability to penetrate haze.

Nutrient deficiencies and non-uniform fertilizer application show up well.

Deficient yellow leaves in color photos appear white in infrared photos. The contrast between deficient leaves (which show up white) and healthy ones (which appear red) on an infrared photo is much greater than the contrast between the corresponding yellow and green leaves in a color photo.

Patterns of aerial fertilizer application, which is particularly susceptible to non-uniform spreading, are easy to trace in an infrared photo.

Sprinkler irrigation patterns are easy to spot.

Sprinkler-irrigated areas can suffer from non-uniform water coverage due to winds or improper system design. Patterns which are barely visible on the ground are amplified in the aerial view. Again, the infrared provides greater contrast.

Burned areas are particularly visible on infrared film.

The green living vegetation versus gray ash on color photos becomes red versus black on infrared.

We did not accumulate much ex-

perience with diseases, insects or weed infestations. We think there will be times when infrared color photography will be invaluable in diagnosing the spread of these plant competitors. There may also be cases in which infrared will not be as much help as we would like. A great deal of work needs to be done on the photographic characteristics of many plants under controlled conditions including various kinds of stress.

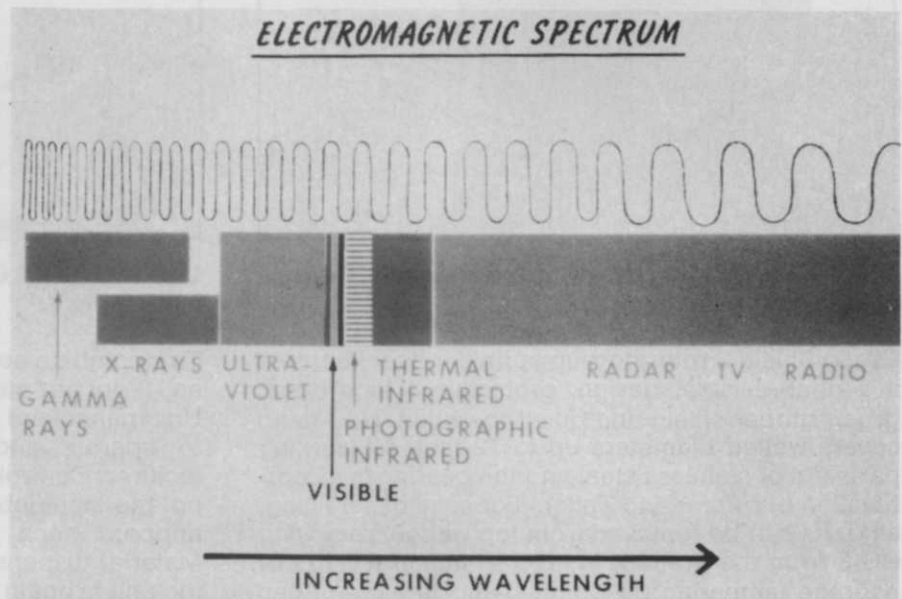
On the operational side, we found it quite easy to get good aerial photos from hand-held 35 mm cameras. We recommend a high wing plane with a window which can be opened wide. (On Cessna 150 and 172 aircraft, a small brace can be disconnected to allow the window to swing up parallel to the wing.) Removing a door from the aircraft is not recommended for anything but short flights on warm days. A cold wind in the cabin is distracting to both pilot and photographer. Approximately vertical photos can be made by banking the plane about 45 degrees when directly over the photo site. However, oblique photos are often just as good, and are easier for both photographer and pilot.

A No. 12 or No. 15 Wratten filter or equivalent is used with infrared color film to filter out blue light. Exposure settings are more critical than for ordinary color film since light meters do not measure infrared radiation. You can come close, however, by setting your light meter

at ASA 100. Take one infrared color picture at the camera setting your light meter calls for, and one each at the F-stop above and below this setting. One of your pictures should be properly exposed. Use a shutter speed of 1/250 second or faster for aerial photography.

Infrared color film requires some special handling because it is easily damaged by heat. Never allow the film to become warmer than ordinary room temperature. An afternoon in a hot car can ruin it. Ideally, the film should be kept frozen before use, and should be warmed to room temperature in the canister (to prevent moisture from condensing on the cold film) a short while before use. The entire roll should be exposed in one day, the film removed and processed immediately. Try to assure that the film will remain cool while on its way to the processing laboratory. If a roll is not completed, it is better to waste the unexposed frames than to leave the film in the camera for another time.

With these suggestions, anyone should be able to take reasonably good infrared color aerial photos. A little experimentation on camera settings and aircraft altitudes may be necessary to obtain the best results. Almost everyone knows someone who flies, and most pilots will welcome an excuse to fly. Even if you have to charter a plane and pilot, the cost of an hour or two of flying may be cheap in relation to the usefulness of your aerial photos.



The electromagnetic spectrum is composed of many useful forms of energy. Visible light covers only a small part of the total energy band; a large part of the infrared portion of the band is thermal infrared.



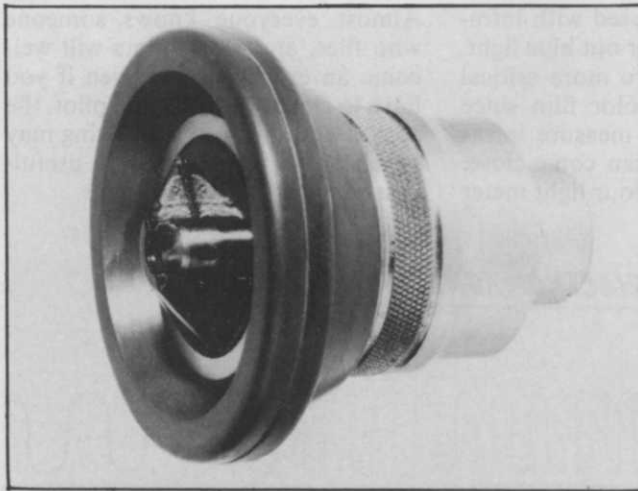
TS-20 TREE SPADE: Vermeer Manufacturing Company, Pella, Iowa.

Smallest in the Vermeer line, the new TS-20 Tree Spade is designed for low-cost high-production tree balling operations. Can be used by nurseries, tree farms or landscapers who grow large quantities of young trees, bushes or shrubs for resale, or by cities and parks for large-scale tree "banking" projects. TS-20 hooks up with tractor for single unit mobility. Hydraulically-controlled steel spades sink 18 inches below surface to form firm 20-inch diam. tree ball. For more details, circle (701) on the reply card.



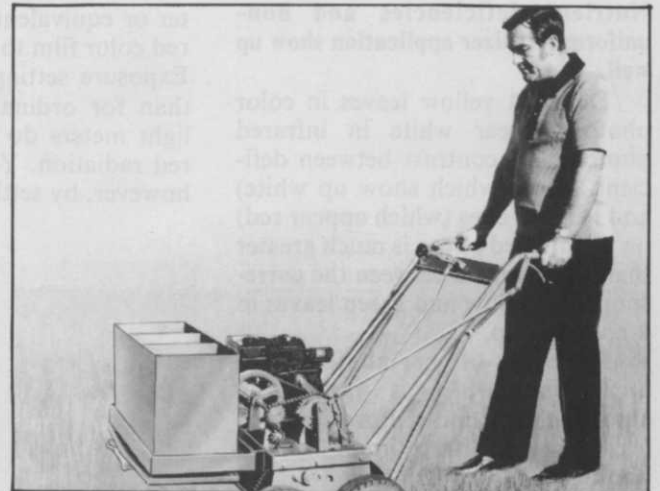
PRO INDUSTRIAL SPRAYER: Root-Lowell Corporation, Lowell, Mich.

Newest addition to the PRO line of chemical applicators is a 3-gallon capacity compressed air sprayer with 3/4 inch diam. top opening for fast clean-out. New polyethylene pump piston cup is said to be inert to most all solutions. Other features include 42 inch rayon reinforced hose, large brass pump cylinder for fast pumpup, galvanized steel tank with electrically welded seams, rotating control valve that works in any position, and swivel nozzle with fan and adjustable cone pattern. For more details, circle (702) on the reply card.



GS-3 SPRINKLER HEAD: L. R. Nelson Corporation, Peoria, Ill.

Green Shield 3 rotor pop-up sprinkler head features a vandal-resistant design, protective 4 inch diam. green rubber shield and quiet operation. New head covers wetted diameters up to 72 feet. All working parts are of stainless steel and the bearing is a combination of rubber and Teflon. For ease of servicing, all parts can be removed from top without removing GS-3 from the ground. There are no screws to encourage tampering by vandals, and threads of cap ring are hidden from view. For more details, circle (703) on the reply card.



LAWN MAKER COMBINE: Lawn Maker, Inc., Farmingdale, N.Y.

This combine aerates and simultaneously dispenses any 3 dry turf materials at different application rates. Unit maneuvers easily in tight quarters and is simple to operate and transport, according to manufacturer. Controls of this self-propelled combine are on the handlebar. Three heavy-gauge aluminum hoppers each have 1300 cubic inch capacity. Material dispensing is automatically stopped when the unit is not in motion. powered by a 4-cycle, 3 hp engine, the combine can cover about 22,000 sq. ft. per hour. For more details, circle (704) on the reply card.



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FOR SALE: Bean R 55, Hardie sprayers, mist sprayer, old; 55 cub tractor, 1957 Ford tractor with loader and backhoe, Misc. equipment. Phone 216 451-3700; 216 761-6330.

LOG CHIPPER — Vermeer 1971, model 604, 650 total hours, diesel engine, make offer. Bob Calloway, 5148 North Flora, Kansas City, Missouri 64118. Phone 816 454-2242.

VERMEER STUMP CUTTER model 10, excellent condition, new engine, \$3,500. Shearer Tree Surgeons, 300 Basin Road, Trenton, New Jersey 08619. Phone 609 924-2800.

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Automatic Irrigation Takes Advantage of Rain

Most irrigated parts of Texas are looking for better ways to save water. One of the most intriguing ideas of how to do this is to automate drip and subsurface irrigation systems.

Both these systems are proved water savers. To automate them so water is only applied at crucial times should really save water. And it does.

The system was designed by agricultural engineers and soil physicists with the Texas Agricultural Experiment Station. One of its key parts is a control called a switching tensiometer (a soil moisture sensor), according to Dr. Charles Wendt, soil physicist at Lubbock who led the work.

The scientists bury the tensiometer in the ground at root zone level for whatever crop they want to water. The instrument takes a continuous reading of the water content of the soil, and when a pre-set degree of dryness is reached, it cuts on the irrigation system. Then, when the soil reaches a certain degree of wetness, this same control shuts off the system.

Part of the beauty of this automated irrigation system is that it is

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true supplemental irrigation; it takes full advantage of any rain that occurs.

Both drip and subsurface irrigation save water by placing it only where plants are growing. This leaves the area in between dry and ready to store any rain, even if plants have just been watered.

GREEN INDUSTRY ASSOCIATIONS:

WEEDS TREES and TURF will be polling leading organizations in the Green Industry this month. We would like to know what your organization has accomplished in 1974 and what your goals are for 1975. Reports will appear in the December Issue of WEEDS TREES and TURF.



His biggest problem was getting the job.

When John was hired five years ago he had good skills but I was apprehensive about his working here. The first thing I thought of was our workers' compensation rates. And then there was the question of how he was going to get around, how he'd get along with the other employees, and if he'd be too sick to handle the job on a daily basis.

Let me tell you he's worked out just fine. He's done his job well, my workers' compensation rates have actually gone down, and he's sick less than anyone in the whole place. You know, in the beginning I thought I was doing the guy a favor; now I've found that John has really done me one.



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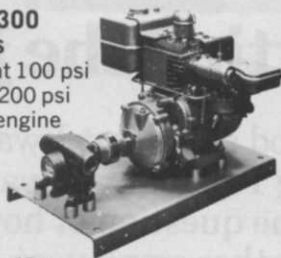
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trimmings

While most scientists are looking for ways to control the gypsy moth, USDA's Agricultural Research Service (ARS) is funding a study to find out why there haven't been any recent moth population explosions in New Hampshire. The ARS will provide \$8,200 for this one-year study and hopefully determine to what extent natural enemies of the gypsy moth stabilized the population. The New Hampshire scientists will review parasite introduction and recovery programs, as well as parasite effectiveness. They will also examine past records to find gypsy moth population explosions and subsequent collapses, the parasitism before, during and after each outbreak, changes in tree and insect complexes and kinds, dosages and effects of chemical applications.

At least someone reads the magazine. An article in the August issue of WEEDS TREES AND TURF about the tornado damage inflicted on parts of Louisville, Kentucky has aroused the humanitarian interests of a few people in the Green Industry. Sierra Chemical Co. pledged 20 commercial cases of Agriform Planting Tablets to Trees, Inc., of Louisville, to aid in their reforestation program of Cherokee Park.

Alphabetical guides to frequently violated general industry and construction job safety and health standards are now available. The pocket-size digests were developed to help employers, particularly those with small businesses, determine what rules they should follow to comply with OSHA regulations. The booklets summarize OSHA requirements for guarding against particular occupational hazards and list in detail references to particular sections in OSHA standards where the user may find the complete requirements. Single copies are available free on request from any of OSHA's regional offices in Boston, New York City, Philadelphia, Atlanta, Chicago, Dallas, Kansas City, Mo., Denver, San Francisco and Seattle.

Moon trees, grown from seeds that went to the moon and back with

Astronaut Stuart Roosa aboard Apollo XIV, have been presented to the City of New Orleans for planting in Louis Armstrong Memorial Park on the edge of the historic Vieux Carre. Dr. John C. Barber, director of the Southern Forest Experiment Station, presented the trees to Mayor Moon Landrieu at a ceremony in front of Perserverance Hall. The seedlings were grown by forest researchers following their return to NASA's Manned Space Center, Houston, Texas, after the Apollo XIV flight early in 1971.

Industrial Research Magazine's 12th annual I-R 100 Awards competition presents awards to companies developing the year's most significant technical products on the basis of their "importance, uniqueness and usefulness." One product receiving recognition was developed by Oceanography International Corp. The Zapper III directs microwaves into the soil to control weeds, grasses, fungi and nematodes. Seeds or plants are killed by accelerated motion and internal damage triggered by the microwaves. In tests conducted by the USDA, the Zapper has shown substantial increases in crop yields.

"A pesticide cornucopia," said chemist Martin Jacobsen as he discussed a number of compounds obtained from the American coneflower. The plant is a member of the thistle family. Its roots produce an unusual compound that mimics an insect hormone, thereby offering potential means for another way to control pests. Earlier, Jacobsen had identified another compound, echinacin, from the same plant, which killed house flies, mosquito larvae and German cockroaches.

"Chad," Dr. L. C. Chadwick, was inducted into the Ohio Agricultural Hall of Fame during the Ohio State Fair in late August. He served as executive secretary of the International Shade Tree Conference for 32 years and still serves the Ohio chapter in the same capacity. Instrumental in re-establishment of the International Plant Propagators Society, he served as its president in 1953-54. Recently, Chadwick served as president of the American Society of Consulting Arborists and currently is chairman of the Columbus Street Tree Commission.

For More Details Circle (120) on Reply Card