

FORESTRY

Trees Shrink and Swell Day to Day

► TREES sometimes show surprising variations in growth.

Trees sometimes stop growing at their base while they continue to increase in diameter farther up. Sometimes they grow on one side of the trunk, while the other side is shrinking. These situations might be reversed the next day or the next week.

This makes it difficult to measure a tree accurately. Prof. T. T. Koslowski, chairman of the University of Wisconsin's forestry department, and Prof. F. H. Bormann of Dartmouth College, have found. An increase in diameter may be permanent growth, or it may mean the trunk is swelling up with water it will lose later on.

Of 272 measurements taken in the cooperative project, 41 showed net weekly shrinkage because of water loss. However, most trees usually show a net gain in diameter during a week. A tree may gain a little one day and lose on another day, but it usually comes out ahead for the week.

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BIOCHEMISTRY

Vitamin E Increases Fertility in Hamsters

► WHEAT GERM oil added to the diet increases the rate of pregnancy—in hamsters.

The oil, rich in vitamin E, caused aging female golden hamsters to become pregnant more frequently, have more successful pregnancies, and give birth to larger litters.

These conclusions were reached in one of the first controlled studies of the effects of vitamin E on aging animals, conducted at the University of Oregon in Eugene.

Vitamin E is often called the anti-sterility vitamin. The new research adds strength to the theory that vitamin E is foremost among certain nutritional substances improving chances for successful pregnancies in mammals—including humans.

"Certainly the basic function of vitamin E is just as active in human beings as it is in hamsters," said Dr. A. L. Soderwall, biology professor in charge of the project.

He believes vitamin E's chief beneficial action may be the toughening of blood cell membranes. The vitamin appears to maintain red blood cells in a healthy state, preventing hemorrhage in the uterus and loss of the young.

Dr. Soderwall's earlier work had shown that although female hamsters are capable of reproduction from ages one month through 25 months, the sizes of litters are markedly reduced during the final 12 months. The apparent cause is a breakdown between the fetus and the placenta during the final days of the gestation period, with subsequent reabsorption of the young within the mother's body. This, in turn, may be caused by fragility of the aging hamster's red blood cells, which tend to break down under the stress of pregnancy.

In the experiment, aging hamsters getting wheat germ oil showed 83.9% fertility and

58% deliveries, compared with 36.1% fertility and 23.4% deliveries for an untreated control group. Those receiving vitamin E averaged 5.2 per litter, compared with 3.75 per litter among the others. The control group had an average of only 3.76 embryo implantations per animal, while the vitamin E group averaged 6.11.

An adequate amount of vitamin E is not normally a problem in human pregnancies. The vitamin is present in most fresh vegetables and in several vegetable oils. Lack of vitamin E may become a factor in areas where people are living on near-starvation diets, however.

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ENTOMOLOGY

Two Laboratories for Grain Insect Control

► SCIENTISTS at two new U. S. Department of Agriculture research laboratories constructed at state agricultural experiment stations are seeking basic scientific knowledge they hope will lead to better control of grain insects.

Dedication and formal opening of the basic research laboratories took place this summer at Brookings, S. D., and Tifton, Ga.

A more thorough knowledge of the physiology, ecology, and biology of about 40 major grain insects is the primary aim of work at the laboratories. Such information will be used in developing more effective methods of chemical, biological, and cultural control.

Estimated annual losses caused by grain insects are about \$1 billion.

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ICHTHYOLOGY

Gills Allow Salmon To Adapt to Salt Water

► THE QUICK adaptation to salt water made by salmon spawned in fresh water that return to the sea is due to their gill systems, research by Dr. Malcolm Gordon, University of California, Los Angeles, zoologist has indicated.

Theoretically, when the fish go from fresh water into the high salinity of the sea, they should be expected to become dehydrated. Studies of salmon tagged with radioactive sodium chloride have shown that they are able to change the permeability of the gill system so they lose very little water in the change-over from fresh to salt water. Thus the salt concentration does not build up in their blood.

Certain sea-going frogs in Thailand as well as European toads also can adapt to salt water environment. Their tolerance to increased salt concentration in their body, Dr. Gordon said, is largely through regulation of their kidney mechanism. Unlike the salmon, however, the body fluids of the European toad become almost equal in salt concentration to the water in which they live.

Dr. Gordon has been studying the salmon under a grant from the National Science Foundation.

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IN SCIENCE

GEOPHYSICS

Nuclear Detection Sites Can Be Drastically Cut

► A TOP British Government nuclear expert has claimed that the number of stations, now demanded by the West, to detect nuclear explosions can be drastically cut.

Sir William Penney, deputy chairman of the British Atomic Energy Authority, said that only 20 stations might be needed in a worldwide nuclear detection network. The West is currently demanding a 180-station network with inspection rights to go into Russia to investigate any suspicious event recorded.

President John F. Kennedy is now meeting with his top advisers to map strategy for presenting modifications in U.S. proposals for nuclear testing. The Administration is expected to soften its demands on international inspection, but it is doubtful whether it will go as far as Sir William has suggested.

Sir William based the number of stations on seismic research now being conducted at Eskdalemuir, Scotland. The research is known as Project Seagull.

Sound waves from depth charges exploded in the English Channel were picked up at the Scottish site. By noting these waves and those from earthquakes, the scientists are able to "fingerprint" distinguishing characteristics.

The depth charges produce waves similar to atomic explosions.

The 20 stations should be able to detect all explosions. But the exact identity of these signals may have to be checked by examining records collected nearer the suspicious site, the scientist cautioned.

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ENTOMOLOGY

Insecticide in Plastic Squelches Termites

► RESOURCEFUL termites are licking the wood shortage problem by turning to plastics for food. But scientists found they could spoil the feast by mixing insecticides in the plastics.

Whether plastics with insecticides will be harmful to man and animals remains to be seen, explained Drs. F. J. Gay and A. H. Wetherly, entomologists of the Commonwealth Scientific and Industrial Research Organization at Canberra, Australia. But plastics are much more resistant to the tiny boring pests.

The scientists found that plastics vary widely in resistance to termites, ranging from very good materials such as nylon, epoxy and polyester resins, to easily damaged polyethylene and polyvinyl chloride. Plastics are used frequently for piping and coating for electrical cables.

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E FIELDS

TECHNOLOGY

Electrons Will Sterilize Medical Items Cheaper

► DISPOSABLE medical products, such as syringes and catheters, will be economically sterilized by bombarding irradiation beginning this fall.

A linear accelerator (LINAC) will supply the irradiation, Dr. J. W. Clark, manager of the nucleonics division of Hughes Aircraft Company in Fullerton, Calif., told SCIENCE SERVICE. No lingering radioactivity would be retained in the irradiated products.

The medical trade was revolutionized when the throw-away medical products were substituted for reusable supplies. Previously sterilization by irradiation has only been done in the laboratory.

Dr. Clark said that the method also looks promising for the sterilization of drugs. Drugs are now sterilized by irradiation in Mexico, but the method will not be used in the U.S. until a complete check of drugs has been made. Chemicals in drugs are more sensitive than appliances. Tests must show that no radioactivity lingers in the drugs or that the chemicals in them are not made less effective.

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SPACE

Guidebook to the Moon Soon to Be Published

► SPACE-AGE engineers at the Martin Company are preparing something new in the way of travel guides—a guidebook to the moon.

The company's Space Systems Division has received a contract from the National Aeronautics and Space Administration's Marshall Space Flight Center at Huntsville, Ala., to prepare a lunar handbook and an earth orbital operational manual.

The two volumes will serve as reference books for space scientists and engineers in design of spacecraft and rockets, and analyses of future space flight missions—in effect, guidebooks for space travel.

The manuals will bring together all current information on the particular facets of space travel such as trajectories, forces acting on an orbiting object, times, speeds, space environment, rendezvous, and heating during reentry.

Martin last year prepared a manual on orbital flight operations in cooperation with the Marshall Space Flight Center. The manual since has been published by McGraw-Hill as "Design Guide to Orbital Flight."

The comprehensive book will include such wide-ranging topics as guidance and attitude control, orbital maneuvers, tracking networks, specific mission satellites such as communications satellites, satellite lifetime, and solar flare effects.

The lunar handbook will be prepared in a similar manner covering all aspects of a space flight to the moon, a landing, and the return flight including such information as environmental conditions on the moon's surface. Much of the information involves complex computations and thus will be presented in chart and graph form.

The project, which is to be completed in nine months, will be directed by Jorgen Jensen of Space Systems Division's advanced design department. Mr. Jensen was senior author of the orbital flight guide published last year.

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PLANT PHYSIOLOGY

Growth Inhibiting Agent Found in Hard Wheat

► WHY IS IT that watermelon seeds do not germinate inside of ripe melons?

The right conditions are there—water, warmth, nutrients—the same things that will enable the seed to germinate a few months later.

Preliminary studies by Michigan State University scientists indicate that most seeds—not just watermelon seeds—are dormant at the time of harvest because they contain chemical compounds which inhibit germination. These compounds, it is believed, later undergo chemical change allowing the seed to grow.

If they can be isolated, they might prove invaluable. It is likely that they could be used to develop means of controlling many types of biological growth, perhaps even cancerous growth.

"However," notes MSU professor of biochemistry, Dr. Nathan E. Tolbert, "this is rather speculative. Just isolating the responsible compounds may prove very difficult since they appear to exist only for a very short time."

Dr. Tolbert, with the aid of Dr. Woodland Hurt, research associate in biochemistry; Dr. Everett H. Everson, associate professor of farm crops, and Dr. Harold M. Sell, professor of biochemistry, is doing research to learn what compounds inhibit germination.

The project, supported by the Herman Frasch foundation, grew out of a very practical problem. Soft wheat, a mainstay of Michigan agriculture, is one of the few plants with seeds which will germinate at the time of harvest.

This is a hazard since rain at harvest time can spoil the crop.

Dr. Tolbert ground up hard wheat, which is dormant at harvest, and dissolved the grindings in water. He found that this solution inhibited germination of soft wheat.

This indicates that hard wheat has an inhibiting agent not present in soft wheat, he said. He has succeeded in isolating an inhibitor from the hard wheat grain, but it has not yet been identified.

His present problem is to find which compounds in the solution are responsible, purify them and study how they react to inhibit the growth of soft wheat.

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TECHNOLOGY

Newsprint Can Now Be De-Inked for Reuse

► YESTERDAY'S news may be dead, but yesterday's newspapers are very much alive.

Technicians have devised a method of removing the ink from old newspapers so the newsprint can be re-used. Approximately 40 publishers in New Jersey, including the Newark News, are using this new technique developed by the Garden State Paper Company.

Paper manufacturers have been de-inking coated paper stock for a number of years, but this is the first time it has been commercially practical to remove the ink from newsprint, traditionally the least expensive grade of paper.

Paper produced in this fashion is competitive in quality with paper made from wood pulp. In addition, it promises to help save valuable timber reserves and avoid periodic shortages.

The basic problem was to find a substance that would dissolve the ink and permit it to be washed away. Coated paper, such as that used in many popular magazines, can be treated by simply removing the clay additive which produces the paper's shiny surface, since the ink washes right away with it. Unfortunately, newsprint acts like a sponge and just sops up ink which clings tenaciously to its fibers.

After several years of work a method was devised to de-ink the paper by Garden State but they were not able to restore its proper shade of whiteness.

At this point they turned to American Cyanamid Company which has a long history in dyes and paper chemicals. Cyanamid's researchers found the right dye combination and the problem was solved.

Garden State's plant produces about 150 tons of this reclaimed newsprint a day. The process involves shredding the paper and reducing it to a pulp with the addition of water and a chemical. Thousands of gallons of water are then used to flush out the ink. After the Cyanamid dye is added to the pulp, in the blending stage, the newsprint is produced as it would be in a conventional paper mill.

However, with everybody turning in their newspapers for reclamation, scientists will now have to devise a substitute to wrap up the garbage.

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AGRICULTURE

California Palms Outdate Those in Near East

► CALIFORNIA date growers have beaten growers in the Near East at their own game.

A California palm yields five times more dates per year than one in Iran, the Food and Agriculture Organization of the United Nations reported in Rome. Lack of water plus poor irrigation methods and insufficient cultivation are blamed for the poor yield in Iran. The date is the staff of life for many people in the Near East.

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