

# natural sciences

## HOLOGRAPHY

### Insecticides studied

Scientists engaged in insecticide research for the U.S. Forest Service have used holography to study insecticide sprays falling on insects.

The three-dimensional picture technique enables the researchers to measure tiny spray drops and solid particles as they fall, size them three-dimensionally, and study their rate of descent, contact with the insect, and evaporation. According to researchers Dick Roberts and Marion Page, they hope their work will lead to developing new, nonpersistent insecticides and other safe methods of forest insect control.

The equipment consists of a laser and camera system and a hologram reconstructor. Operating at a billionth of a second exposure, the laser photographs the aerosol droplets hitting the insect. The camera records the picture on a photosensitive plate, which is then placed in an image reconstructor. The hologram image is projected on a television screen for study.

## FORESTRY

### Aged Sequoias victims of winter

More giant sequoias have toppled this spring and summer than anyone can remember falling in any previous single year. Ten of the ancient trees fell in one area of Sequoia National Park, closing a campground.

In Yosemite National Park this spring, the 2,000-year-old Wawona Tunnel Tree became a victim of the falling epidemic affecting the *Sequoia gigantea*, monarchs of the redwood forests.

According to the National Geographic Society, the toll is blamed on the record winter snows that have made the ground two-to-three times as wet as usual, thereby loosening the roots.

## MICROSCOPY

### Holography for biologists

A holographic microscope system intended specifically for biological studies has been designed and built in a joint effort by scientists at the Naval Medical Research Institute at Bethesda, Md.

Developed by Lt. Richard G. Buckles and his sister Dr. Mary Cox of the University of Michigan, the holography system allows microscopic examination of large areas of living tissue. This enables the operator to study the motion of circulation. To be employed primarily in the study of decompression sickness, known to divers as the bends, the optical system will enable Navy scientists to observe where and how gas bubbles are formed in tissues.

## MICROANATOMY

### Scanner solves puzzle

The secret of what enables the agile gecko lizard to stroll upside-down across glass and perform other remarkable sticky-footed feats has been revealed by a New York University scientist.

Dr. Joseph F. Gennaro reports in the August-September *NATURAL HISTORY* that microscopic suction cups provide *Gekko gecko* his phenomenal grip. Using a scanning electron microscope which permits three-dimensional viewing at a magnification of 35,000 diameters, Dr. Gennaro observed that the chevron-shaped pads on the lizard's toe were composed of an array of brush-like structures called setae. Each seta is a double brush with fringed tips capped by minute suction cups which help the lizard cling to the surface.

## NUTRITION

### Antibodies give clues

A new technique for evaluating the nutritional quality of protein may result from the research carried out at Iowa State University under a U.S. Department of Agriculture grant.

Scientists there have shown a close correlation between the number of antibody-producing cells in the spleen and the adequacy of protein quality in the diet. Cell counts were higher in the spleens of rats fed a protein mixture containing 3.3 percent of rice protein plus 1.7 percent from protein derived from mung beans than from a diet supplying the whole 5 percent of the protein from rice alone.

The active search for non-animal protein sources to increase the availability of low-cost, high-quality food has focused on the importance of distinguishing different protein values. Protein malnutrition is associated with lowered resistance to infection because of a deficiency of amino acids obtained through dietary protein. It is therefore necessary to know if a diet utilizing non-animal proteins provides the body with adequate kinds and amounts of different amino acids for the development of immunity.

## WILDLIFE

### Botulism hits waterfowl

Nearly one-third of the 30,000 pintails and other waterfowl that normally summer in the Tulare Lake Basin of California's San Joaquin Valley have fallen victim to botulism poisoning, and the worst may be yet to come.

According to the Bureau of Sport Fisheries and Wildlife, unless conditions change drastically, the loss of waterfowl will rise swiftly as the first of nearly two million ducks that winter in the area begin to filter in from the north this month.

The botulism affecting the birds is similar to food poisoning in humans. A bacterium which naturally occurs in Western soils produces the powerful poison under certain conditions of moisture and temperature during the summer and early fall. Scientists are not certain whether the birds take in the poison with contaminated food, or if the poison is produced in the intestinal tract from bacteria associated with material that the birds have ingested.

Most birds succumb to the poison, losing muscle control progressively to the point of either drowning or becoming victims to predators. Flooding suspect areas and removing the bodies of dead animals are of slight help.