

GENERAL SCIENCE

Mocked Grants Backed

Although ridiculed by a politician, grants from the National Science Foundation are defended by their recipients as worthy, scientifically and practically—By Walter Wingo

► SPENDING Government money to study the diving habits of seals and the mating calls of Central American toads fails to enrapture at least one Congressman, but it may have practical as well as scientific value.

Knowledge gained from the projects could give fresh insight into what happened to the crew of the atomic submarine Thresher and into ways to stimulate a failing heart.

In a newsletter to his constituents, Rep. Richard L. Roudebush (R-Ind.) panned the studies, which he spotted in a list of 294 grants approved recently by the National Science Foundation. He ridiculed the Foundation also for its \$103,980 award for "Films on Eskimo Culture" and \$2,911 award for an investigation of "The Fern Flora of Peru."

"Perhaps we should pick more esoteric titles for our projects," one recipient, Dr. Albert Mead of the University of Arizona's zoology department, told SCIENCE SERVICE. NSF awarded Dr. Mead \$5,700 to supervise the seal study.

"Seals are not too far from us physiologically," Dr. Mead said. "We are interested in finding out what adjustments a seal's body makes to withstand sudden changes in pressure and temperature when it dives. I need only to mention the recent tragedy in the Atlantic (the Thresher sinking), to indicate the importance this information can have to the lives of men."

An Antarctic explorer, Gerald Kooyman, who is working for his doctorate at the

University, plans to carry out the experiments. Mr. Kooyman and an electronic engineer devised a set of instruments to attach to seals. The devices will measure changes in heart action and blood pressure as the seals plunge to various levels.

Information from the Foundation shows the other three projects lampooned by the Congressman also have greater value than their titles might indicate.

With a \$21,200 grant Dr. Kenneth R. Porter of the University of Denver Research Institute will seek evidence of an evolutionary relation between toads' mating calls and certain gland secretions "highly important" in heart stimulation experiments.

Dr. Douglas L. Oliver of Harvard University received the grant to film Eskimos as part of an experimental social science program being produced for children in grades 1 to 12. The program is "a cooperative cultural approach to the history of mankind starting with simple cultures in harsh environments to modern Western civilizations."

Another Harvard scientist, Dr. Rolla M. Tryon, received the fern study money. Peru has one of the wealthiest tropical flora in the New World.

"But there is a real danger," Dr. Tryon said, "that many kinds of living things will be destroyed before they are even catalogued—including the ferns."

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PSYCHOLOGY

Color Vision Carried In Electronic Code

► COLOR VISION is carried by an electric circuit in the nervous system, investigations have indicated.

The way humans and animals see color has long been a mystery.

In a new theory of color vision, explained by Dr. A. J. Cacioppo, head of the life sciences department at Goodyear Aerospace Corporation, Akron, Ohio, electrical impulses are held to be the carriers of color information.

The impulses develop when specialized cells in the eye respond to color. Each color, it is believed, sets off a distinctively shaped wave form.

The impulses are transmitted to a network of nerve cells that "recognize" the form of the wave. The nerve cells then relay this information to the brain where the color is subjectively perceived.

In research by Dr. E. L. Paulter and R. A. Wilson, demonstrating the wave theory, the eyes of cats and rabbits were tested with electronic devices.

Cones, the cells specialized for color vision, were each sensitive to the entire spectrum of color, the investigations indicated. They could translate all colors into electrical impulses.

It has been previously believed that there were three separate classes of cones, for red, for green and for blue color vision, and that all other colors were seen because the cells worked together.

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Goodyear

COLOR LINES—The physical representation of a perceived color, this wavy pattern carries color information from the retina to the brain. The pattern of electrical impulses for a color is shown on an oscilloscope at the life sciences laboratory, Goodyear Aerospace Corporation, Akron.

BIOPHYSICS

Magnets Ripen Tomatoes

► A LARGE MAGNET may some day become a standard kitchen device for the housewife who wants her vegetables ripe in time for supper.

Two Utah horticulturists have shown that green tomatoes put under a magnet, especially near its south pole, will ripen much faster than those a few feet away.

After six days their average magnetized tomato was at the "breaker" stage—starting to color—while the average control tomato was still green. In eight days, the average magnetized tomato was pink. It took the control group three more days to reach that point. By then the magnetized tomatoes were almost red.

The idea that magnetism has an effect on organic substances is not new.

A century ago the French chemist Louis Pasteur passed planes of light through two samples of tartaric acid. One sample was obtained from the bottom of wine casks and the other was produced more clinically in his laboratory.

He noticed that molecules of the first acid seemed to deflect the light in only one direction. Molecules of the second, however, seemed to be optical isomers, some kicking light to the right and others to the left.

He concluded that the earth's magnetic field caused atoms to line up in the same manner in all molecules of tartaric acid found in nature.

Three years ago it was noted that a magnetic field seems to give a boost to germinating seeds. The effect was named magnetotropism.

In Nature, 199:91, 1963, Drs. A. A. Boe and D. K. Salunkhe of Utah State University suggest that the effect on the seeds and on tomatoes is due to a loss or gain of protons or other reactive groups in magnetized compounds.

They theorize that a magnet, or even the earth's natural magnetic field, activates or quickens an enzyme system and thus respiration.

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