BIOLOGY

To Probe Pigeon Mystery

➤ THE ANCIENT MYSTERY of how homing pigeons manage to navigate over unfamiliar territory and find their way back to the home loft has attracted Navy interest.

The Office of Naval Research is using a new system that makes it possible, for the first time, to track a pigeon during the entire flight. There are hopes that the work, which is part of a research program in biological orientation, will lead to new concepts for developing miniaturized navigation and detection systems.

The equipment got its first trial when a pigeon was tracked during a 20-mile jaunt to its home in the Philadelphia area. It carried a tiny but powerful radio transmitter, weighing less than an ounce, on its back. Attached to the transmitter was a 40-inch antenna, trailing behind and below the bird, and partially encased in a glass fiber rod to keep it from tangling with tail feathers.

A beacon receiver designed to operate with the transmitter can pick up the signal from any direction over a 20-mile range. Two receiving stations were set up along the probable flight path to record directional information at exact, predetermined time intervals.

The transmitter permits trackers to pinpoint the bird's location at any time, although the exact path is normally plotted after the flight.

Later, a more complex system of sensory devices may be built to monitor environmental changes and the bird's reaction to them, measuring such items as blood pressure and respiration.

The Navy scientists' next projected move is the tracking of larger birds—notably the gooney bird, or albatross. They want to find out ways to get the birds to move away from airfields such as the one at Midway Island, where they frequently endanger aircraft during take-offs and landings.

American Electronic Laboratories, Philadelphia, developed the system for the Navy. The same firm is now working on a tracking system for aquatic animals—such as porpoises, whales, sharks and marine turtles—which come close enough to the surface to permit the instrument package to transmit.

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BIOCHEMISTRY

Best Anesthetic Predicted

➤ THE BEST anesthetics will be mixtures of compounds whose molecules are of such size and shape as to fit in holes in networks of 20, 24 and 28 water molecules, Dr. Linus Pauling, Nobelist in chemistry, California Institute of Technology, told SCIENCE SERVICE.

Dr. Pauling's new theory on the action of anesthetics enables him to describe the chemical substances that will act best as anesthetics.

Dr. Pauling has linked the action of anesthetics with the formation of compounds in which molecules of one substance are trapped in a network of molecules of another substance, such as water. These unusual compounds are called clathrate compounds. Water forms traps that look somewhat like the cells in a honeycomb except they are five-sided instead of six-sided.

The molecules of anesthetics fit into the holes of water lattice structures containing 20, 24 or 28 molecules of water. The clathrate compounds thus formed are very small crystals that cause unconsciousness when they occur in the brain fluid.

Chloroform forms a hydrate microcrystal that contains 17 molecules of water per molecule of chloroform. If a mixture of xenon, a rare inert gas, and chloroform is used, the clathrate compound contains two molecules of xenon in addition to the 17 molecules of water per molecule of chloroform. This new clathrate is more stable than the one without xenon. For this reason it should be more effective.

Mixtures of two or more compounds such as carbon tetrafluoride, carbon bromide trifluoride, carbon fluoride trichloride and fluothane with xenon should produce very stable clathrate crystal.

The patient would breathe the mixture of gases, which would then pass through the blood to the brain fluids where the small crystals would form.

Dr. Pauling believes that consciousness requires a constant interchange of electrical energy in the brain. The presence of microcrystals in the brain interferes with the passage of electric currents from one brain cell to another causing unconsciousness.

This new approach to understanding unconsciousness should shed light on many mental problems. It may lead to the development of methods of restoring consciousness to persons subject to prolonged periods of unconsciousness.

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BIOLOGY

World Biological Year Proposed by Scientists

➤ AN INTERNATIONAL Biological Project, similar to the International Geophysical Year, has been proposed and is receiving active support from top scientists and scientific organizations throughout the country.

In the first public discussion of the Project, Dr. Hiden T. Cox, executive director of the American Institute of Biological Sciences, said such a plan is now under active consideration.

Between five and seven years of preparation and arrangements would be necessary and the project itself would have to run longer than International Geophysical Year, which lasted 18 months.

The main aim of the project would be the marshalling of scientific forces for a massive attack on such world problems as population control, food, farming of the oceans and the polar areas, cancer and radiation.

Speaking on a local radio program in in Washington, D. C., Dr. Roger D. Reid, Office of Naval Research, said that "we can no longer afford the luxury of leaving biological research to the chance that someone may come up with an essential bit of information. We must define our problems and make a concerted effort to find answers."

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VETERINARY MEDICINE

New Drug Controls Worms in Cattle

➤ A VETERINARY drug reported to control any and all of the intestinal worms that attack cattle and sheep has been developed by British scientists and is now being field tested in the United States and Canada.

If the tests are successful, the drug, called Promintic, probably will be available in the United States before the end of the year.

The drug already has been tested on 1,000 cattle and 3,000 sheep in Britain. When injected under the skin, it destroyed the parasites at all stages of growth, thus reducing the probability of reinfestation from later growth of immature worms.

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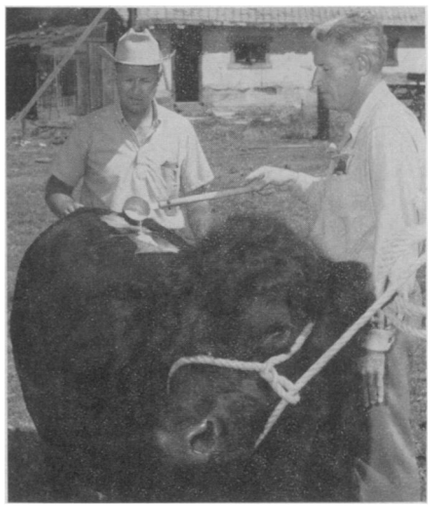

CATTLE GRUB KILLER—A chemical for killing cattle grubs is ladled on the back of an Aberdeen Angus bull at the University of California, Riverside, where this new method for killing the pests was developed. The chemical penetrates the body of the bull and kills the grubs before they can damage the hide of the animal.