

BIOCHEMISTRY

Fly Detects Poison Gas

► A SCIENTIST is investigating the "nose" of flies and hopes some day to develop a detector capable of sniffing poison gases, using the knowledge gained.

Toxic gases develop in closed environments such as submarines, mines and space cabins or may be released during an enemy attack.

Dr. Robert E. Kay, supervisor of biochemistry at the Aeronutronic Division of Ford Motor Company at Newport Beach, Calif., told SCIENCE SERVICE that the first step in the research is to determine the biochemical nature of the fly's sense of smell.

He uses flies for this research because the fly has a well developed sense of smell that he expects is similar to that of other animals in its basic mechanism. When he finds out how the fly's olfactory organ transduces chemical reactions to electric impulses, he hopes to make a machine that will detect odors and differentiate them.

Dr. Kay raises his own flies for his research. To investigate the fly's sense of smell, he will connect an instrument to the

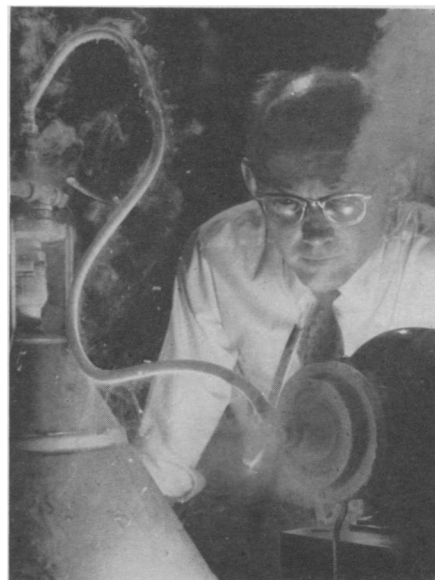
fly's head ganglia so signals can be "read" from the fly's nose and smell reactions. He expects to hear signals from the fly's whole brain, its eyes and the organ by which the fly feeds. The trick will be to weed out the signals from the olfactory organ.

So far Dr. Kay has investigated the olfactory antenna and found it is essentially hollow with nerve endings extending into the hollow interior. These nerve endings originate in the common cylinder of nerve tissue running back into the antennal nerve. The nerve itself gives an integrated signal from all the smaller parts, Dr. Kay has found.

During the investigation of the olfactory organ, Dr. Kay will expose the antenna to chemicals in vapor form and note the amplitude and frequency of nerve signals.

The principle of the basic mechanism of the fly's sense of smell may also be useful for a type of relay for computers. It could also possibly be used on a gas chromatograph instead of an ionization detector.

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Westinghouse

DRY BALL BEARING—A ball bearing, fastened to the shaft of an electric motor, is operating without grease or oil at 320 degrees below zero Fahrenheit. Such bearings are being tested by Westinghouse Research Laboratories, Pittsburgh, for performance in outer space.

ENGINEERING

Treat Sewage by Bacteria Jolted With Electricity

► TINY BACTERIA jolted with an electric shock may increase the efficiency of many sewage treatment plants.

Large savings would result because of a reduction both in the volume required of sewage plants and in the time of treatment, Prof. J. A. Borchardt, University of Michigan engineer, told the Water Pollution Control Federation in Toronto.

The organisms helped by the electric field are the "methane bacteria" used in the final stage of reducing sewage to simple, non-harmful organic materials—such as water, carbon dioxide and methane.

As the bacteria work in their biochemical environment, a constantly changing acid balance is produced in the environment.

Because of the uncontrolled variations, large safety factors must now be built into the fermentation system, Prof. Borchardt said.

This development may permit large reductions in the fermentation tank volume by controlling the acid balance through application of the proper electric field to the environment.

In laboratory studies, four electrodes were used in every culture, and the results measured.

So far only laboratory experiments have been carried out, but the results look promising enough to go to a small pilot plant of several hundred gallons, Prof. Borchardt said. One big question is how much current is necessary to accomplish the same results on a larger scale.

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VIROLOGY

Vaccines Against Viruses

► A PROGRAM of regular yearly vaccinations to protect the entire population against viral respiratory diseases was predicted at the three-day international Conference on Newer Respiratory Disease Viruses held at the National Institutes of Health, Bethesda, Md.

Dr. Clayton G. Loosli, dean of the University of Southern California School of Medicine, cited the effectiveness of such programs in military populations and emphasized that respiratory viruses are responsible for more than 50% of all acute human illnesses suffered in the United States.

Attended by 504 virologists from the U.S., Canada, England, The Netherlands, Japan, Czechoslovakia, Denmark, and India, the conference was described by Dr. Loosli as "the greatest single gathering of those interested in respiratory viruses we have had."

Dr. Loosli, chairman of the conference, said live vaccines prepared along the lines of live polio with attenuated strains promise more enduring immunity than killed vaccines.

Dr. Loosli said the conference also made clear that common cold viruses being isolated in the U.S. are of the same general types as those being isolated in other parts of the world.

New findings on pleuropneumonia-like organisms (PPLO) have opened important paths of investigation for virologists, as indicated by intense conference interest in the subject. PPLO share viral and bacterial characteristics, are affected by antibiotics, and have very recently been shown to be an important cause of primary atypical pneumonia.

Dr. Loosli said findings reported at the

conference indicate that one type of virus may interfere with another when several are implanted simultaneously for the development of antibodies. This, he pointed out, is why we do not give shots for all three types of polio at once.

"For this reason," he said, "I am less enthusiastic than some about the possibilities of an 'all-in-one' vaccine." He said at the present time serial implantation of viral agents several days apart is a more feasible method of protecting individuals against the many virus invaders which have recently been isolated.

The conference, sponsored by the University of Southern California School of Medicine under a grant from the National Institute of Allergy and Infectious Diseases, may become a bi-annual event to bring virologists up-to-date in their fast-developing field, according to Dr. Loosli.

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MEDICINE

Aerosol Trailer Device May Replace Cold Shots

► A NEW METHOD of widespread distribution of cold vaccines may soon be used. It consists of a trailer with an apparatus for spraying a mist of vaccine to be inhaled by persons wearing face masks.

The new technique would provide protection against colds with low doses of cold viruses. Dr. Vernon Knight, clinical director of the National Institute of Allergy and Infectious Diseases at National Institutes of Health, Bethesda, Md., said that it could be used to apply a variety of vaccines.

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