

## MEDICINE

# In Pavlov's Brainsteps

At Geneva, Soviet scientists report using radioactive materials to study the production of digestive juices and bile compounds, which figured in Pavlov's famous experiments.

By WATSON and HELEN DAVIS

➤ FOLLOWING IN the brainsteps of the great pre-Communist Russian, Pavlov, present-day Soviet scientists are probing the secrets of the brain and digestion with the use of exploding atomic isotopes, without surgical techniques.

The International Conference on the Peaceful Uses of Atomic Energy at Geneva was told that gray matter of the brain has greater activity as measured by protein renewal than less complex portions of the nervous system.

Dr. A. V. Palladin of the biochemical institute of the Ukrainian Academy of Sciences, Kiev, reported that the cortex, or gray matter, has the highest content of protein and uses it most intensely. The gray matter is not only the least simple part of the brain, but it evolved most recently in the animal's nervous system during the long ages of the rise of animals up the tree of life. The tracer used was radioactive sulfur isotope 35.

Research by Prof. E. M. Kreps of Leningrad has shown that there is enhanced activity in the centers of sight and sound in the brain.

Digestion and bodily functions, in the exploration of which Pavlov pioneered, have taken on a radioactive look. Soviet scientists K. S. Zamyckina and D. E. Grodzensky used radiophosphorus in tracing production of digestive juices and bile compounds, which figured in the early physiological studies by Pavlov on dogs.

Dr. Frank J. Dixon, head of the department of pathology of the University of Pittsburgh, told the conference that radioactive isotopes are showing how the antibodies, which protect the body against foreign invaders, are formed and lost. The rise of antigens which trigger the formation of the protecting substances during an infection can be followed by radioactive sulfur stuck into their molecules.

By feeding radioactive iodine to calves and then holding a Geiger counter over the thyroid glands to which this chemical travels, farmers of the future will be able to predict future milk production and tell how well the animals will stand hot summer weather, Drs. Clifton Blincoe and Samuel Brody of the University of Missouri told the conference.

With iodine 131, they have shown that a decline in thyroid activity occurs with rising temperatures above 80 degrees Fahrenheit. This makes the cows eat less and produce less milk.

Zebu cattle are less affected by high temperatures than Jersey and Holstein

cattle. The smaller Jersey cows are more heat tolerant than the larger Holstein cows.

## Fat Man Problem

➤ THE PROBLEM of the fat man was considered by Drs. B. Shapiro and G. Rose of Hadassah Medical School, Israel.

They reported the discovery that fat synthesis proceeds even in adipose tissue, ordinarily regarded as a mere depository of fat.

Due to its large mass, fat tissue is probably the body's most important site for making and using fat, exceeding even the liver. Their studies showing this were made with radiocarbon labeled compounds traced through the body, pinpointing the sites of fat synthesis.

## Radiation Dangers

➤ A "CRASH" PROGRAM that might extend for a decade is needed to tell whether the future of the human race is being endangered by the low level of atomic radiation now building up in the world, even without H- and A-bombs exploded in war.

Dr. T. C. Carter, of Britain's Medical Research Council and Atomic Energy Establishment, said scientists know far too little about the structure of human populations and the inducing of changes in human heredity due to radiation.

"We know enough to be apprehensive about the genetic dangers," he said, in urging a very lavish international research program be set up to discover what the world's stream of life faces in the atom.

In the civilized world, Dr. Carter said, the idea is accepted that it is permissible to do harm to a few individuals when this is the unavoidable by-product of doing good to many. For example, airlines are operated and automobiles are used even though some people are killed as a result. In these cases, however, a person has a free choice whether to expose himself to the risk.

In the case of peacetime use of nuclear power, there is no possibility of choice on the part of individuals as to whether they expose themselves to radiations that may affect their children and their children's children. The unlucky individual who suffers the genetic damage is not the one who exposed himself voluntarily to the risk.

Dr. Carter wants an extension of fundamental studies of mutations; or sudden genetic changes in the germ cells, due to radiation. This needs to be done over

long periods, considering very low doses of radiation.

What the scientists call "genetic death," or the disappearance of a family tree, is not well understood. Is it due to sterility, not wanting to have children, inability to attract a mate, susceptibility to infection or accident? Is it associated with mental defect and does it put a burden on the community through hospitals and prisons? Or is the price of being a Beethoven or a Newton likely to be genetic death?

Dr. Carter wants these questions answered along with the discovery of what the debris of atomic plants and bombs will do to the future human populations.

Reasoning from what happens in mice to what can affect man, Dr. E. L. Russell of the U. S. Oak Ridge National Laboratory warned that there may be danger to the immediate offspring of atomic energy workers even with the low weekly dose of radiation now allowed.

A total accumulated dose limit may have to be established to prevent defects in even the first generation. The scientists have been most worried heretofore by the effect on future generations through hereditary defects that hide in a person's children and appear in their descendants.

Dr. Russell's mouse experiments some months ago alarmed atomic energy operators when it was shown that animals get about ten times as much genetic damage out of radiation as do fruit flies upon which earlier estimates were based.

For flowers and other plants, radiation may be useful for producing new varieties. A team of scientists from Brookhaven National Laboratory told how white carnations were turned into a permanently red variety through heavy doses of radiation.

Dr. Knut Mikaelson of Norway found that chronic gamma radiation produced white spots on petals of red carnations. But as severe radiation is damaging or lethal for man, so does too much radiation stop or distort plant growth, changing flowers to leaves or mussing up the processes of the plant.

## Fighting Disease

➤ RADIATION TREATMENT can make the germs that cause dangerous African sleeping sickness non-infectious, Dr. Dale Jenkins of the National Research Council reported.

Describing this and other uses of both atomic and other radiation for rendering harmful insects harmless, he said that radioactive polonium, selenium and antimony have been studied as possible weapons for controlling worm parasites.

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## • RADIO

Saturday, Sept. 3, 1955, 5:00-5:15 p.m.

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Sir George Allen, secretary, British Association for the Advancement of Science, Bristol, England, will discuss the British Association for the Advancement of Science meeting at Bristol.