NUCLEAR PHYSICS-BIOLOGY

Radiation Produces Freaks

Mice with stomachs which burst from swallowed air are produced by irradiation of mothers. Abnormalities vary with the age of the embryo at irradiation.

➤ BABY mice whose stomachs blow up like balloons and burst from swallowed air, because their deformed mouths do not allow them to nurse normally, are among the abnormal types produced by irradiation of their mothers.

Such effects of radiation, whether from radioactive materials produced in the atomic pile or from X-rays, are being studied as part of the research program of the Biology Division of the Oak Ridge National Laboratory.

Comparison with the effect on human babies whose mothers received X-ray treatments during pregnancy is not possible as yet. Not enough is known about abnormalities which could be traced to such a source nor about comparative doses of radiation in humans and in mice.

Studies at the Oak Ridge National Laboratory suggest, however, that treatment with X-rays at any stage of pregnancy is attended by grave risks to the developing child. The Oak Ridge geneticists find that there is no threshold below which X-rays do not produce some effect. The only question is whether the effect is so slight as not to handicap the offspring, or so severe as to produce a monster incapable of developing into a normal human being.

Damage such as the piece broken off the gene by a passing neutron is being studied. Other damage under study is the cumulative effect on future generations from mating of apparently normal individuals carrying injury inherited from irradiated parents and grandparents.

Abnormalities of development occur when developing embryos are irradiated, and the type of abnormality is found in these studies to be determined by the prenatal age of the baby. An X-ray dose on the ninth day after conception may spoil the formation of the mouth so that only air is swallowed when the newborn mouse tries to nurse. The same dose on a different day may result in an entirely different kind of malformation, such as fusion of the elbow joint to make the forelegs stiff and useless. Milder types of abnormalities result in mice with forked tails, mice without hair, and even mice with defective skins.

Effects of irradiation of parent mice are followed through many generations of offspring in the studies, which are expected to furnish information never before gathered on the results of rays, whether from accidental exposure to radioactive sources or from medical treatment. Abnormalities which have been found so far are of the same type that occur among mice not known to have been irradiated. They seem to occur more frequently among the descendants of animals exposed to such rays.

Science News Letter, March 4, 1950

AGRICULTURE

Water for Crop Irrigation From Man-Made Snow Drifts

➤ ELEVEN-FOOT drift fences which mound up large catches of snow at high altitudes in the Western mountains may increase valley stream flow sufficiently to add nearly half a month to the irrigation season.

This extension, amounting to some 12 days, would come during the parched days of July when the extra irrigation would be most welcome.

The possibilities of high altitude "snow dams" are being explored by Foresters H. W. Lull and H. K. Orr of the U. S. Department of Agriculture, who are experimenting with drift fences on the catch basin of Ephraim Creek, high in the Wasatch Mountains of Utah.

They have been setting up drift fences of the familiar slatted kind used along highways. They find that a seven-foot fence is ineffective, but that 11-foot fences caught deep drifts which remain unmelted for as long as 12 days after undrifted snow has disappeared.

The drift fence experiment is designed to prolong the period of useful moisture in areas where it is uneconomical to build a reservoir for the purpose. Ordinarily snow melt provides irrigation water during the spring, with an over-abundant flow during May and June.

If the snow can be successfully held in the mountains for an additional period, the farmers of the arid valleys would benefit materially.

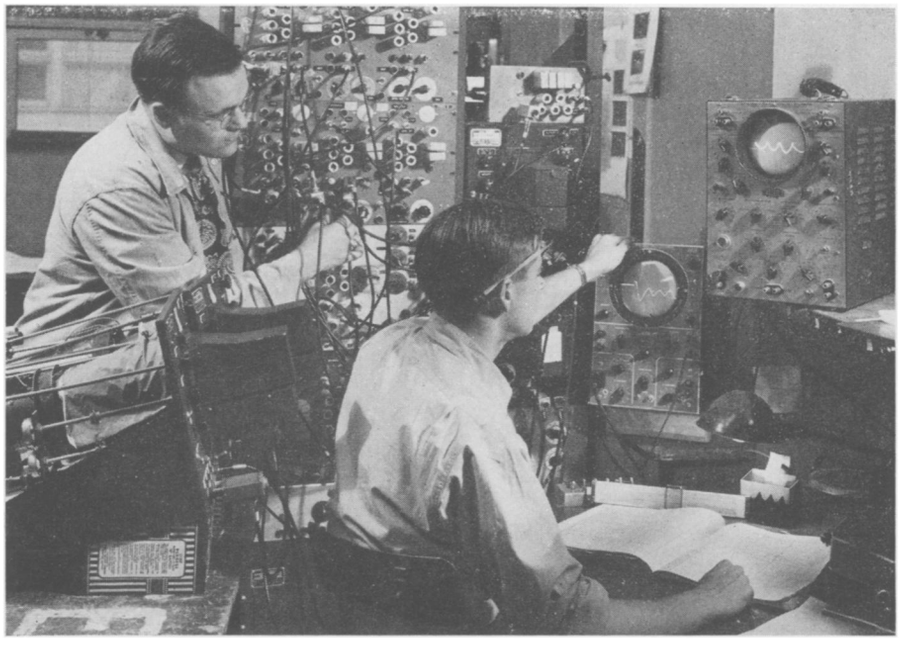
Science News Letter, March 4, 1950

MATHEMATICS-ENGINEERING

Baby "Brain" Gives Quick Answers for Big "Brother"

➤ A BABY "brain" that quickly solves problems so that its big "brother" can do further work on them was announced in Cambridge, Mass.

This machine is an electronic differential analyzer. Although it solves problems quickly, it is not as accurate as the larger



THE ANSWER—The answer to a complicated differential equation solved on the new bantam electronic differential analyzer in the Research Laboratory of Electronics at Massachusetts Institute of Technology is read by Robert H. Cannon, Jr., instructor in mechanical engineering (right). Ragnvald Maartmann-Moe (left) operates the machine. The round screen in front of Mr. Cannon shows how a hypothetical speedboat would actually move through sea waves of the type portrayed on the screen at the right of the picture.

machines, Prof. Albert G. Hill of Massachusetts Institute of Technology's Research Laboratory of Electronics stated.

The machine uses radio circuits exclusively and presents its answers on an oscilloscope. An oscilloscope has a screen that looks rather like a television screen, except that the background usually resembles graph paper and the pictures are a series of wavy lines.

These lines are the answers to the problems that are fed into the machine. To keep the picture bright and clear, the machine repeats its solution to every problem 60 times per second. It continues to repeat this information until new instructions are given.

The bantam-sized brain occupies no more space than an ordinary office desk. Even though it is less accurate than the larger machines, it can be used to find preliminary solutions and to indicate the kind of answer to be expected. This saves a considerable amount of time and money, since the larger machines are expensive to operate.

Science News Letter, March 4, 1950

NUCLEAR PHYSICS

Simple Radiation Counter

➤ AN ACCURATE, pocket-sized radiation indicator, so simple that the man-in-the-street can interpret it after a few minutes instruction, has been developed at the University of California Atomic Energy Project, Los Angeles, Calif.

It measures radiation by a color change of chemical solutions in small vials. These chemicals are inexpensive and it is estimated that the device could be produced very cheaply.

The handy instrument was developed by Dr. George V. Taplin and Clayton Douglas of the U.C.L.A. Medical School's atomic energy medical research staff.

The small vials are contained in a plastic case about the size of a pack of paper matches which may be worn around the neck like "G.I. dog tags." They may also be adapted to a pencil-like container for pocket wear.

The new radiation indicator was specifically designed to measure large doses of gamma and X-rays. It lends itself to the development of important peacetime applications, Dr. Taplin says.

For example, it could be useful in calibration of radiation equipment, such as fluoroscopes and X-ray machines. In the treatment of hyperthyroidism by radio-iodine, the amount of radiation in the thyroid gland could be measured by wearing the device around the neck. It might also be adapted to a small capsule for use in measuring radiation received internally in treatment of abdominal tumors.

The principle of the device was developed from a fact long known to science. This fact is that chloroform, when irradiated, releases small amounts of acid. The amount of acid produced is directly related to the quantity of radiation received. In the small vials of the devices are chloroform and a purple dye which turns yellow in the presence of a certain amount of acid.

The chemicals in each vial are adjusted to react to a prescribed level of radiation. Thus the amount of radiation is immediately evident upon noting this color change in a particular vial.

Existing measuring devices are somewhat complex, Dr. Taplin points out. They require either electronic equipment or photographic facilities and special training to read and interpret them. Also they are highly susceptible to the effects of jarring and temperature changes.

Advantages of the new device lie in its simplicity and the fact that its chemicals ordinarily are not affected by these factors.

Further investigations are being carried out to evaluate the accuracy of the device and to study its stability under the most adverse field conditions.

Science News Letter, March 4, 1950

Question Box

GENERAL SCIENCE

Is a certain family pattern necessary for producing boys and girls talented in science? p. 135.

MEDICINE

What kind of blood plasma may prove to be a weapon against arthritis? p. 139.

Which of the wonder drugs cures scrub typhus? p. 130.

NUCLEAR PHYSICS

How does the new simple radiation counter measure radiation? p. 132.

Why would the H-bomb not end life on earth as we know it? p. 133.

NUCLEAR PHYSICS-BIOLOGY

Why do the stomachs of the baby mice burst? p. 131.

POPULATION

What may be our population in the year 2000? p. 141.

PSYCHOLOGY

What type of personality shows less race prejudice? p. 140.

Photographs: Cover, U. S. Fish and Wildlife Service; p. 133, Piasecki Helicopter Corporation; p. 135, USAF Air Materiel Command; p. 138, 139, Harvard College Observatory; p. 144, Tennessee Eastman Corporation.

● RADIO

Saturday, March 11, 3:15-3:30 p. m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Dr. R. G. Breckenridge of the United States Bureau of Standards will talk on "Electrical Compounds of the Future."

SCIENCE NEWS LETTER

VOL. 57 MARCH 4, 1950 No. 9

50,800 copies of this issue printed

The Weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C., NOrth 2255. Edited by WATSON DAVIS.

Subscription rates: 1 yr., $5.50; 2 yrs., $10.00; 3 yrs., $14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change, please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C. under the act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago. STAte 4439.