MEDICINE

Unique Animals Aid Science

Mice that have fits are helping scientists study diseases of the nervous system, while dogs who broadcast their feelings help environmental and heredity studies.

By JANE STAFFORD

A CAT with four ears, a "fierce" bunny rabbit, mice that have fits when the doorbell rings, dogs that broadcast how they feel when burying a bone or chasing a stick seem like imaginary characters in a nursery tale.

Actually these strange characters are real animals. They and their ancestors and offspring and other relatives are playing an important part in man's fight against disease.

The mice that crack up when a bell rings belong to a mouse family that develops breast cancer in a high proportion of its female members. They are of a special strain, bred to develop cancer, so that scientists could study this disease in the search for better ways of fighting it.

The cancer fighters who bred these mice, however, are not just fighting cancer. They are trained to observe every little detail about their laboratory animals, and they are constantly probing into the fundamentals of cancer, particularly the genetic, or hereditary, background which influences growth of all kinds, normal as well as cancerous. So when the mice broke down and went into convulsions at the sound of a loud bell, the scientists recognized that these mice had developed a strange kind of nervous system. The mice, as they at once suspected, turned out to be valuable research animals for scientists studying diseases of the nervous system, such as epilepsy, in humans.

Jackson Laboratory

The oversensitive mice were bred at a unique mouse farm, known in scientific circles the world over, the Roscoe B. Jackson Memorial Laboratory. The Jackson Laboratory is located at Bar Harbor, Me. Neither the Laboratory nor its mice escaped the holocaust that destroyed millionaires' homes and all in its wake during the forest fire at Bar Harbor in the fall of 1947.

The original Laboratory building, the entire group of summer research buildings, two caretakers' residences, one story and a third wing of another building, 90,000 research mice, the whole laboratory, most of the equipment, all correspondence, most of the old records, all the collection of microscopic slide records, and all the current experiments of the main laboratory staff went up in smoke and flames. Other parts of the laboratory buildings were gutted, weakened and badly damaged.

Research on cancer and many other diseases was slowed in laboratories all over the world, in some cases completely stopped, because these laboratories depended on Jackson Laboratory for the mice that were helping them unravel the mysteries of disease.

The laboratory has come back, and so have the mice. Almost as soon as the flames had died away, rebuilding was begun. And, shortly after, the mice began arriving, a few from this place, a few more from another. The returning mice were descendants of those Jackson Laboratory had bred and supplied to other research laboratories. From these returned offspring, a colony of some 70,000 mice has been built up.

Between 2,000 and 4,000 mice are now being shipped from Jackson Laboratory each week to other laboratories for research use. But before the fire twice that number were shipped each week. And the demand for these inbred, standardized mice has not slackened. Right after the fire a letter arrived from a laboratory in Siam asking for mice for the first cancer research project to be started in that country. More than 150 major research laboratories in the United States besides many abroad, even in Moscow, depend on Jackson Laboratory for their mice for research not only on cancer but on infantile paralysis, influenza and other diseases.

It costs money to raise mice. Bed and board per mouse comes to about $5 per year, which sounds trifling, but when multiplied by the laboratory's present mouse population of 70,000 it is a sizable sum. This is one reason why Jackson Laboratory, although it has received generous gifts for rebuilding since the fire, continues to need money to support its work.

Breeding and supplying special, standardized strains of mice may be the most widely known activity of the laboratory, but it is in a way only a minor activity. Cancer research, after all, is the main objective of the laboratory and has been since its founding as a memorial to the late Roscoe B. Jackson. Research in cancer can be done in two ways, the director of Jackson Laboratory, Dr. C. C. Little, explains. One is through an efficient attack on problems that can be defined and organized for study. This is the method that built the atom bomb from the theory of atomic energy. It is important as a method of cancer research and is being pushed in many laboratories.

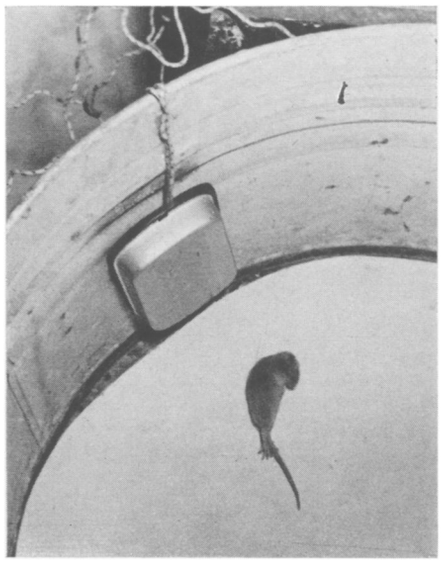
The second method of cancer research is to use man's creative power and imagination to "bring from the unknown new knowledge for the benefit of mankind." This second method is the one followed at Jackson Laboratory. It is one which all connected with the laboratory hope will lead to the conquest of cancer, but which may instead lead to quite unforeseeable but equally important results.

That is the story back of the four-eared cat. She was contributed to Jackson Laboratory by Mrs. George Wood, of Ashtabula, Ohio. Mrs. Wood recognized that the cat was an oddity, but she was not content, as many a person might have been, to let it go at that. She suspected such an odd cat might have value to scientists of the kind working at Jackson Laboratory.

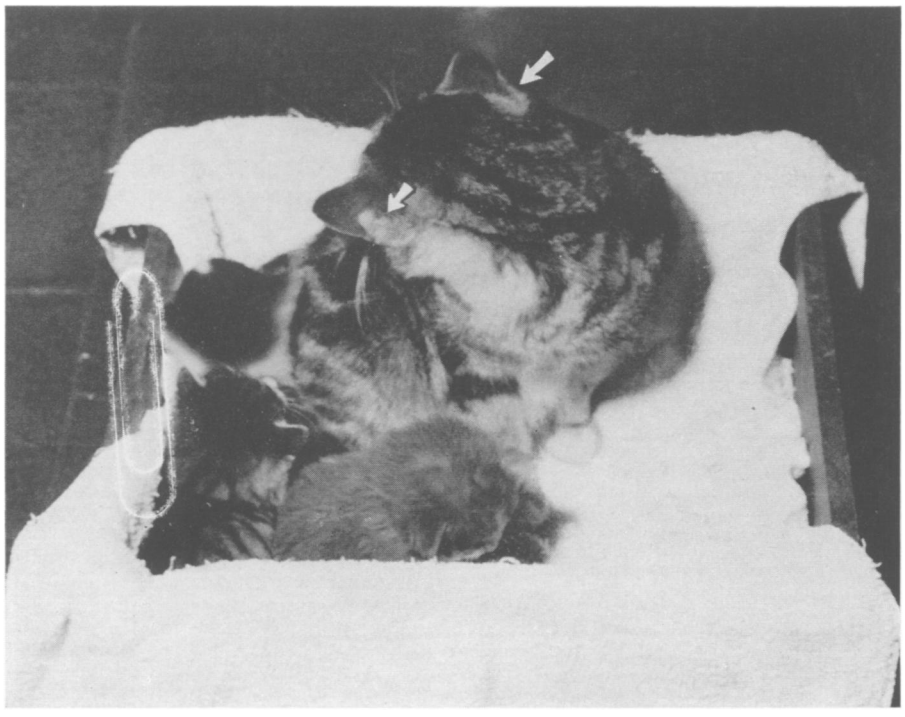
Four-Eared Mutation

The geneticists at the laboratory knew that the four-eared condition was a mutation, and they were curious as to what kind of a mutation it was. Would all of Mistress Four-Ears' descendants have four ears, too? So they bred the cat, and after two and a half years, Dr. Little and Research Assistant Edna DuBois have succeeded in getting Mrs. Four-Ears to bear four-eared offspring. The extra ears on mother and kittens, they say, are actually an overdevelopment of the lower ear lobes. The trait appears to be inherited recessively.

The theory that cancer, or a tendency to it, is an inherited trait has been the subject of extensive research at Jackson Laboratory



UNCOMMON MOUSE—When the bell rings this mouse has fits. Scientists hope to learn more about human epilepsy by studying this phenomenon in such animals.



MRS. FOUR-EARS—This family of four-eared cats may lead to new discoveries about heredity.

and elsewhere. It was here that the maternal influence on the development of breast cancer was first detected in mother's milk (mouse—not human). This "influence" is now known as the milk factor which causes cancer in mice nursed by the female carrying it, but not in her offspring if they are foster-fed.

In studies of hereditary factors, in cancer or other conditions, factors of environment must also be considered and ruled out, if possible. So some of the work at Jackson Laboratory has turned to studies of environment as well as studies of genetics, or heredity as the layman terms it.

This is where the broadcasting pups come into the picture. How much of a dog's characteristics are due to his breed and how much to his environment? Is a wire-haired terrier lively and nervous because he is a wire-hair or because he has learned that behavior from his mother as a puppy? How does a dog feel when he sees another dog, or his master? Does his heart beat faster? Taking a dog's pulse and blood pressure in the laboratory give one kind of information, but the Jackson Laboratory scientists wanted to know about a dog's reactions under more natural conditions. So Dr. John L. Fuller and co-workers developed an instrument, the radio-inductograph, to get such information. It is a compact shortwave radio set through which a dog can broadcast his emotional and physiological experiences while free and leading a normal existence. What the animals will tell on these records may be important for dogs, dog-owners and other animals and humans generally.

Science News Letter, July 2, 1949

CHEMISTRY

Plastic for Photo Film

➤ OLD-FASHIONED gelatin, made from skin of calves, may in the future give way to a synthetic plastic as the emulsion material that coats photographic film and carries the chemicals that are affected by light and make the picture.

The replacement of conventional gelatin by a synthetic polymer resin in a Du Pont color printing film suggests that synthetic material may eventually be used in more photographic films.

Color film emulsions using gelatin have a chemical put into them which makes the dyes stick to the silver image, called a color former. The new film uses the synthetic polymer to replace both the color former and the gelatin binder, thus making the one substance do the work of two.

Because the new color former plastic is only swollen by water, the dyes in the resulting picture are deposited in place and keep the picture sharper than by the older method.

The new color film announced by Du Pont is for professional 35 mm motion picture projection. The film consists of three emulsion layers superimposed on one side of standard cine film base. Each layer contains the sensitive silver salts suspended in the new color former plastic.

In each emulsion the amount of dye in the final print is proportional to the amount of silver deposited by the first exposure and development.

The gelatin now in use for photographic films is made from the skin of calves. The quality and impurities of gelatin have a great effect on the sensitivity of the photographic emulsion. The plants that the animals eat affect the gelatin made from their skin. Two drops of mustard oil per ton of emulsion is enough to increase the sensitivity of a gelatin emulsion.

The synthetic resin can be made under controlled conditions and should be more uniform. The physical characteristics of some of the synthetic plastics may be better than that of gelatin. It may have better dimensional stability.

Science News Letter, July 2, 1949

Words in Science— TRANSONIC-ULTRASONIC

➤ TRANSONIC is a word used to describe the speed of very fast airplanes and projectiles which travel at or about the speed of sound. The speed of sound at sea level is about 760 miles per hour. Speeds from about 90% of sound's speed to 120% of it come within the range known as transonic. Speeds higher than that are called supersonic.

Ultrasonic is not used in connection with aviation speeds. It is the word applied by scientists to sound waves of very high frequencies, with pitch beyond the limit of human hearing. Ultrasonic waves have various uses such as the testing of metals for flaws, killing of bacteria, and elimination of smoke.

Science News Letter, July 2, 1949