CHEMISTRY

Clue to Rubber Formation Shown by Radiocarbon

➤ CARBON 14 is breaking down another of nature's secret processes and beginning to show how rubber is made by trees.

Latex tapped from the bark of the *Hevea* tree has been successfully "labeled" with the radioactive form of carbon in research sponsored by the U.S. Department of Agriculture. The experiments in which the carbon isotope was introduced into the latex in the form of an acetate were carried out at the Federal Experiment Station, Mayaguez, Puerto Rico, by Dr. Robert S. Bandurski of the Michigan State University, East Lansing, and by Dr. Howard J. Teas of the U.S. Department of Agriculture.

About eight hours were required to incorporate the radioactive element into the chemical structure of the natural rubber, and the amount of radioactivity taken up was found to be proportional to the acetate and the latex.

An enzyme preparation brought about the transfer of labeled acetate, while in other experiments radiocarbon in sugar and in carbon dioxide were not incorporated into the latex.

Although a number of kinds of rubber-like materials have been made by man, true rubber latex comes only from the *Hevea* tree and related species.

The present discovery that one step in its chemical synthesis is through the acetate grouping may lead to understanding of nature's process and how it differs from man's. The research is described in the *Journal of the American Chemical Society*. (July 20).

Science News Letter, August 18, 1956

BIOCHEMISTRY

Foreign Bone Marrow Makes Blood Cells

➤ A MONKEY'S BONE MARROW may some day be used to save the life of a man doomed by fatal disease or atomic radiation.

If it does, it will be because the monkey's bone marrow, transplanted or injected into man's body, will go on functioning as a blood cell factory, producing monkey blood cells to circulate through the man's arteries and veins.

While the human application is in the future, at the Atomic Energy Commission's Oak Ridge National Laboratory in Tennessee, the bone marrow of a rat has saved the life of a mouse.

The rat blood cells functioned in the mouse body and saved the mouse from an otherwise fatal dose of radiation.

The finding, considered a very fundamental one, is buried in one short paragraph in the 20th semiannual report of the Atomic Energy Commission. (See SNL, Aug. 11, p. 83.)

From it may come knowledge of the genesis of radiation-caused leukemia. The bone marrow treatment will prevent this leukemia in mice if given right after the radiation, although not if given too long after.

Not all the mice given rat bone marrow survived. The scientists think those that died may have succumbed to an allergic reaction to the foreign blood cells in their bodies. Since World War II, even the man in the street knows that only the right kind of human blood can safely be transfused to humans, and that blood of another animal, even a closely related one, would be fatal if transfused to human veins.

Even mice that eventually succumbed to a probable allergic reaction to the rat blood cells being produced in their bodies were, however, tided over the immediate period after the fatal dose of radiation.

Scientists at Oak Ridge have had some success in injecting guinea pig bone marrow into mice. They are planning now to try crossing bone marrow into larger animals, such as dogs and monkeys.

The day of the crucial experiment of putting marrow from another animal into a human may be far distant. When and if the problem of which animal to use as a source of supply is solved, the method may be used to treat victims of bone marrow disease and perhaps to allow larger, more effective doses of X-rays or other radiation treatment of disease.

Science News Letter, August 18, 1956

PHYSIOLOGY

"Brain Clock" May Be Mental Health Factor

➤ A "BRAIN CLOCK" that regulates timing of messages to and from the brain may be a factor in mental health.

Dr. Norbert Wiener, Massachusetts Institute of Technology scientist now serving as a consultant to the Numerical Analysis Research program at the University of California at Los Angeles, said existence of such a clock has been established.

The "tick tock" of the "brain clock" is characterized by alpha rhythms, one of several brain waves recorded by electroencephalographs. Because EEG machines are relatively crude and record what is equivalent to electric leaks in the brain, it was difficult to establish the clock's existence.

A new MIT instrument, the correlograph, which serves as an "anti-noise filter" to weed out noises in the brain, has aided in finding the clock. Studies at MIT and the Massachusetts General Hospital are seeking to correlate the clock's function with other mental activity.

"It is conceivable that some mental disorders may be associated with irregularities of the clock," Dr. Wiener said. "If the clock is slow or fast, the timing of impulses to and from the brain is upset. This could account for some aberrations."

Dr. Wiener hopes research with the "brain clock" may have important, long-range implications in terms of mental health.

Science News Letter, August 18, 1956

IN SCIEN

BOTANY

Algae in Rice Fields May Increase Yields

➤ RICE FIELDS of the future may look like stagnant ditches.

Use of algae, the lowly forms of plant life that fix nitrogen from the air, to transmit food to rice plants and other crops of economic value is advocated by Dr. Mary Belle Allen, chemist associated with the laboratory of plant physiology at the University of California.

Dr. Allen has succeeded in cultivating a group of nitrogen-fixing organisms known as blue-green algae, formerly believed difficult to maintain in the laboratory. She has proved that, under greenhouse conditions, these organisms can promote growth of rice plants that would not thrive without them.

Dr. Allen planted rice in sand wet with a solution of nutrient chemicals, but found that the plants would not grow without the photosynthetic help of the nitrogen-fixing algae. She believes that the possibility of improving rice crops by flooding rice fields and inoculating them with blue-green algae would be worth exploring.

Dr. Allen describes her work in *Scientific Monthly* (Aug.). She first reported her work with the algae at the Conference on Solar Energy at Tucson. (See SNL, Nov. 19, 1955, p. 325.)

Calcium, molydenum, cobalt and sodium are necessary for growth of the blue-green algae, Dr. Allen found, but with these nutrients, the organisms are more tolerant of heat and sunlight than had been believed by earlier investigators.

Science News Letter, August 18, 1956

PUBLIC HEALTH

"Tri-Jags" Lead to Red Faces With Beer or Not

➤ RED FACES in beer drinkers do not always come from too much beer. They may come from "tri-jags," especially if beer has been drunk while having a "tri-jag."

"Tri"" is short for trichlorethylene, an industrial solvent. A group of Michigan workers who were exposed to more than tolerable limits of "tri" on their jobs found themselves blushing after only a couple of beers.

Detective work by the Michigan Department of Health turned up the cause of the red faces and protection against "tri" exposure was installed.

Reporting the matter in *Industrial Medicine and Surgery* (July), the journal's editor, Dr. Carey P. McCord, points out that alcohol exaggerates the "tri-jag."

Science News Letter, August 18, 1956

CE FIELDS

BIOCHEMISTRY

Report "Breakthrough" On How Brain Works

➤ A "BREAKTHROUGH" for learning how the brain is organized and functions, how drugs affect it, and what chemical brain stimulation leads to different kinds of behavior may have been found.

This advance is suggested from a technique developed by Dr. Alan E. Fisher of the University of Wisconsin, at Madison.

Male rats can be driven to fast, compulsive maternal behavior, such as building nests and retrieving and grooming the young, by injections of male hormone into one spot in the brain, Dr. Fisher has found, using the new technique.

Injections of the same hormone into another spot in the brain induces sexual behavior.

Responses similar to symptoms of mental disorder, such as obsessive-compulsive acts, tics, generalized excitement, and states of over- or under-sensitivity to pin pricks or other sensory stimuli, often occur during chemical stimulation of the brain with the new technique.

In one case, maternal and sexual drives were activated simultaneously, the male rat attempting to mate with a female not in heat while a newborn rat pup he was retrieving to a nest was still in his mouth.

The male hormone may have multiple properties, the findings suggest.

How the hormones produce different kinds of behavior, whether through nerve circuits or a nerve center, should be learned through further studies, Dr. Fisher suggests in *Science* (Aug. 3).

Brain wave records from the animals while being stimulated through the new technique also promise to show more about the brain's response to different chemicals.

Science News Letter, August 18, 1956

OCEANOGRAPHY

"Hot" Pebbles Used to Study Beach Movement

➤ "HOT" PEBBLES have been used in England for the first time to learn how beaches drift underwater.

The hot pebbles are stones into which scientists have placed a radioactive material, enabling them to follow or track the pebbles as they are swept along the ocean floor.

Experiments with the radioactive stones by three British scientists show that in ordinary weather, where there may be a few squalls but no major storms, pebbles move along the sea floor.

The hot pebbles used in the experiment measured two inches in diameter and were round. A hole one-half inch deep and one-eighth inch in diameter was drilled into the pebbles and the radioactive tracer barium-140 placed in the cavity.

The radioactive pebbles were then dumped 500 yards seaward off Scolt Head Island in Norfolk, in water varying in depth between 12 and 25 feet, and tracked with three Geiger counters.

Three days after the pebbles were dropped, some had moved as much as 200 feet toward shore from the original position. Later checks showed the pebbles were moving steadily and slowly inshore.

The scientists, who report their findings in *Nature* (Aug. 4), suggest that the action of the current together with the waves might cause the pebbles to move along the sea bottom.

C. Kidson of the Nature Conservancy, D. B. Smith of the United Kingdom Atomic Energy Authority and J. A. Steers of the department of geography at the University of Cambridge say that "this experiment was designed to work out a technique for the use of radioactive tracers in determining underwater movement of coarser beach material. If the method can be perfected, it will give a very important aid to coastal physiographical study."

Science News Letter, August 18, 1956

PALEONTOLOGY

Smithsonian to Show Ancient Seascapes

➤ THE BOTTOMS of ancient seas will be vividly reproduced in the Smithsonian Institution's hall of invertebrate paleontology, to be started in Washington in 1958.

The seascape models, which visitors will be able to see through glass, will depict marine plants and animals as they existed on earth hundreds of millions of years ago.

The scenes will be livened by huge, squid-like animals with shells 15 feet in diameter and a foot thick at the ends. Octopus-like creatures the size of cartwheels will be seen poised amid colorful sea plants. Lifelike starfish, clams and sea lilies will add realism to the displays.

The sea bottoms of former ages were similar to those of today. The same kinds of animals lived then as live now, but details of their structures were different.

Scientists have been able to reconstruct these ancient seas by studying the fossils of small shelled creatures called brachiopods. About 350,000,000 years ago brachiopods, similar to worms, were perhaps the most abundant animals on earth. Called the Ordovician period, this age had few if any land animals.

During the millions of years in which sea bottom mud was compressed into rock, the brachiopods, which had attached themselves to objects on the sea bottom, became embedded in the rock formations.

A few species of brachiopods still survive. Scientists have been able to deduce much about the nature of ancient seascapes by studying the modern brachiopods' habits.

Science News Letter, August 18, 1956

TECHNOLOGY

Electronic "Eye" Aids Blind Phone Operators

➤ BLIND OPERATORS of private telephone switchboards can now use an electronic "eye" weighing less than an ounce to detect incoming calls.

The light-sensitive device, developed by Bell Telephone Laboratories, New York, fits the index finger's tip and is the only additional equipment a blind operator needs.

When the signal for an incoming call sounds, the blind operator finds the light indicating the correct line by using the electronic "eye" attached to the index finger. On reaching the lighted lamp, the transistor device is activated and the operator hears a signal through the headset. It is so tiny the cord connection can be held in the same hand.

Science News Letter, August 18, 1956

VETERINARY MEDICINE

Two Tigers Born With "Upside-Down Stomach"

➤ TIGERS as well as humans can be born with diaghragmatic hernia, a condition publicized some years ago as "upside-down stomach."

Two cases in tigers have been seen at the Philadelphia Zoological Gardens. They are the first cases of the condition in any animals at the Philadelphia Zoo, where more than 6,000 mammals have been examined post mortem.

Both cases were in female Siberian tigers. They were two of four littermates born at the Copenhagen Zoo and received at the Philadelphia Zoo when five-month-old cubs.

One died about two weeks after its arrival. This animal and its three littermates had all suffered a severe stomach and intestinal upset after a very heavy meal.

Examination after death showed the animal had a defect in its diaphragm with a hernia sac into which part of the stomach and intestines had risen.

About a year and a half later the second female tiger, which with its other two littermates had had numerous attacks of indigestion and diarrhea, lack of appetite and depression, died. Examination after death showed that it, also, had a gross deformity of the diaphragm with the stomach and spleen in the diaphragm hernia sac.

The first animal had died because of strangulation of a loop of intestine in the hernia sac. The second died of multiple complications of the diaphragmatic hernia. In both cases, the findings pointed to the hernias being congenital.

The cases are reported in the *Journal of the American Veterinary Medical Association* (Aug.) by Dr. Robert S. Brodey of the University of Pennsylvania School of Veterinary Medicine, where the second tiger was taken when it got sick, and Dr. Herbert L. Ratcliffe of the Penrose Research Laboratory, Zoological Society of Philadelphia.

Science News Letter, August 18, 1956