

PHYSICS

Cook With High Pressure

Scientists have found food can be cooked at room temperatures under very high pressures. Rubber and plastics broke down into elements and simple compounds.

► UNITED STATES scientists have found that eggs and steak will cook in 10 minutes at room temperature under very high pressures found 100 miles beneath the surface of the earth.

At the National Academy of Sciences meeting in Washington, D. C., Dr. Willard F. Libby, director of the University of California Institute of Geophysics and Planetary Physics and the 1960 Nobel Laureate in chemistry, reported that two giant hydraulic presses, built to exert pressures up to 60,000 and 100,000 atmospheres, have been used to cook foods at room temperatures.

By using pressures under 10,000 atmospheres, potatoes and carrots were cooked in an hour, while steak and egg yolk took only 10 minutes. The foods were cold, as well as completely sterilized, but otherwise as tasty as food normally prepared, Dr. Libby said.

The presses were designed to produce

pressures up to 100,000 atmospheres, or more than a million pounds per square inch, roughly equal to the pressure found 1,000 miles below the earth's surface, the scientist explained.

Common polymeric materials, such as rubber and plastics, exploded under 20,000 atmospheres pressure, and broke down into their elements and simpler compounds.

It is expected that a new form of high-speed chemical reaction will occur above 100,000 atmospheres, where most elements and compounds probably change into metals. Dr. Libby suggested that during such a reaction a compound may totally change into another compound in one-hundredth to one-thousandth of a second, after passing through an intermediate metallic stage.

The research reported by Dr. Libby is an extension of experiments done by Prof. P. W. Bridgman of Harvard.

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some young children could be due to similar irregularity.

In experiments with laboratory mice, he found that when the serotonin content of the brain was increased, their ability to learn to make the correct turns in a maze was temporarily reduced. When the serotonin was decreased, the learning ability of the mice was greatly increased.

It is not yet known, Dr. Woolley pointed out, whether the learning ability of humans can be similarly changed.

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DR. FREDERICK SEITZ—New president of the National Academy of Sciences.

New President Elected

► THE NATIONAL Academy of Sciences elected a new president at the annual meeting in Washington, D. C. Dr. Frederick Seitz, head of the department of physics, University of Illinois, Urbana, will succeed Dr. Detlev W. Bronk on July 1.

Dr. Bronk, who is president of Rockefeller Institute in New York, announced he would not be available for a fourth term.

Dr. Seitz, a 50-year-old native of California, said one of the most important projects in support of research in this country is getting young people interested in science. The goal of science achievement set by science fairs accomplishes much toward this end, he said.

Motivation cannot begin too early, he indicated. Good teachers are needed, however—the kind that will notice the interest of students in science and encourage it.

“Good science students should be encouraged to continue their work as far as they can go,” he said. “No one should be deprived of a chance to study and do research in science.”

New members of the Academy's Council are Dr. Roger Revelle of the University of California, San Diego, and Dr. W. Barry Wood Jr. of Johns Hopkins University.

The National Academy of Sciences, although a private organization, was founded

MEDICINE

Cancer Cause in Tobacco

► “YOU MIGHT as well ask a person if he believes the earth is round as to ask him if he is one of those who believes cigarettes cause cancer,” Dr. Charles B. Huggins, director of the Ben May Laboratory for Cancer Research, University of Chicago, told SCIENCE SERVICE.

Dr. Huggins, who spoke at the 99th annual meeting of the National Academy of Sciences in Washington, D. C., said that certain compounds of tobacco tar fitted into the geometric pattern of cancer-causing hydrocarbons.

Sixty known cancer-causing compounds have been tested at the Ben May Laboratory, where Dr. Nien-Chu Yang, associate professor of chemistry at the University of Chicago, working with Dr. Huggins, has built a transparent plastic box in which cancer-causing aromatic hydrocarbons show a similar geometric structure to growth-promoting steroid and base pairs of nucleic acid.

Two components of deoxyribonucleic acid—guanine and cytosine—were made into a molecular model and a plastic frame was constructed to surround it. In this frame, Dr. Huggins showed, in slides, how all known cancer-causing aromatic hydrocarbons fit neatly. Also similar atomic models of the steroids testosterone (male hormone) or progesterone or estradiol (female hormones) fit.

But steroids are not cancer-causing in relation to mammary glands of rats.

It would appear that they are excluded, Dr. Huggins explained, because steroids are not flat and because of their thickness.

Solid geometry rather than plane geometry is involved, he pointed out, adding that to “induce cancer, hydrocarbons must resemble base pairs of nucleic acid in solid geometry and must be electron donors, that is, function in charge transfer of an electron or a part of an electron to a recipient as yet unidentified but most probably nucleic acids.”

Dr. Huggins gave credit to the Hungarian-born Nobelist, Dr. Albert Szent-Gyorgyi, for the references he made to the electronic factor in induction of cancer by hydrocarbons. The steric factor, or relation to steroids, is the new contribution made at the Ben May Laboratory.

These discoveries may be applicable in the future to cancer-causing additives in foods, Dr. Huggins said.

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Change Learning Ability

► LEARNING ABILITY can be lowered or increased to an unusual degree by regulating the amount of the hormone serotonin in the brain—of mice, that is, Dr. D. W. Woolley, biochemist of Rockefeller Institute, New York, reported to the National Academy of Sciences meeting in Washington, D. C.

It has been known for several years, Dr. Woolley said, that signs of mental disease can be produced temporarily in normal people by changing the amount of serotonin in the brain. That led Dr. Woolley to wonder whether some of the idiocies afflicting

by Abraham Lincoln in 1863. It now comprises over 650 members of the nation's most distinguished scientists elected from all branches of the natural sciences. In an Act of Incorporation passed by the U.S. Congress at the time of its founding, the Academy was specifically called upon to be the official adviser, upon request, to the

U.S. Government in all matters of scientific and technical interest.

Dr. Seitz will maintain his relationship with the University of Illinois but will give full time to his new office, at least for the next two, and probably for the next four years.

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MEDICINE

Pain in Internal Organs

► THERE ARE TWO KINDS of pain. While injuries to the skin are immediately painful, internal organs such as the brain, heart, stomach and intestines are relatively insensitive unless stimulated by chemicals. Internal organs can be cut, crushed or burned without causing pain, Dr. Robert K. S. Lim of Miles Laboratories, Elkhart, Ind., told the 99th annual meeting of the National Academy of Sciences in Washington, D. C.

The aches, cramp, piercing or burning pain that man suffers internally is associated with inadequate blood flow, inflammation or disease, Dr. Lim explained.

He described work with certain chemical substances formed in the body, such as histamine, acetylcholine, serotonin and bradykinin. Each chemical was injected into animal arteries supplying the skin and various organs, with resulting "vocalization" and other signs of pain. No pain occurred when these chemicals were injected intravenously.

Dr. Lim said that the difference was due to the fact that substances injected into

arterial blood reach nerve endings, or receptors, in a high enough concentration to cause stimulation.

Bradykinin, or a similar substance, was the most powerful of the chemicals. It can cause the principal signs of inflammation, namely heat, redness from congestion of blood vessels, swelling from increased permeability of the capillaries, and pain from increased sensitivity and stimulation of the receptors.

Working with animals, Dr. Lim and his associates used bradykinin as a visceral pain provoker, then showed that the narcotic drug morphine alleviated pain by "blocking" it in the central nervous system, regardless of the location of the nerve endings.

Aspirin, which is not narcotic, blocks both the nerve endings in the central nervous system and in the periphery. The peripheral action is somewhat greater.

"Aspirin is important as a pain reliever as well as an anti-inflammatory agent," Dr. Lim said.

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MEDICINE

Doctors Are Reading—

► PRECANCEROUS lung conditions are being detected by a relatively new technique called the sponge biopsy. Biopsies of this kind are advised for chronic coughers, especially if there is a change in their cough habits, two Arlington, Va., pathologists reported in the *Journal of the American Medical Association*, 180:248, 1962.

Cigarette smoking, they said, will not disappear from the American scene in spite of reports incriminating it as a cause of lung cancer, which now causes more deaths among men than any other form of cancer.

The sponge biopsy technique, formerly used only during autopsy, is now believed superior to the Papanicolaou technique, whereby bronchial washings are stained. The sponge is inserted by a flexible carrier that gets at hard-to-reach areas.

Drs. John J. Nolan and William F. Enos of the Northern Virginia Doctors Hospital reported the study, which included a report of sponge biopsies from 100 bronchoscopic examinations, none of which showed lesions with X-ray or ordinary bronchoscopic examinations.

Unusual Fingerprints

Patients with schizophrenia, the most common form of mental disease, have a

high incidence of unusual fingerprints, Dr. Theophile Raphael and Louise G. Raphael of the Ypsilanti, Mich., State Hospital reported (p. 215).

Increased whorls, lines that make almost complete circles, and arches, lines that rise to a peak (particularly the sharper peaks), were revealed in a comparison of fingerprints of 100 male patients with fingerprints at Scotland Yard.

The investigators believe their findings raise the possibility of detecting vulnerability to various abnormalities and disorders.

Polio Vaccine for Infants

Infants should be immunized against polio when other immunization procedures are being performed, at six weeks, 12 weeks and 18 weeks of age, two Vanderbilt University researchers recommended in the *AMA Journal*. An additional dose of trivalent vaccine would then be given later.

Live weakened poliovirus vaccine (Sabin) was given to 90 infants, six weeks old, in study groups reported by Drs. Randolph Batson, Amos Christie and William J. Cheatham of Vanderbilt University School of Medicine, Nashville, Tenn. (p. 193).

The researchers pointed out that although the effectiveness of Sabin vaccine in pre-

venting polio is generally accepted, the need for all possible information with regard to the use of this vaccine in young infants is important. Infant response to antigens may be different from that of adults, and the "placentally transferred maternal antibodies" might influence active immunity.

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Lettuce plants in Salinas Valley, Calif., where rainfall is very low, are provided with a moist environment by the regular occurrence of fog.

Hexafluorobenzene is probably the most stable organic fluid since it is resistant to radiation, oxidation and temperatures higher than 1,200 degrees Fahrenheit.

Phosphors luminesce when acted upon by beta radiation from tritium.

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