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SCIENCE NEWS LETTER

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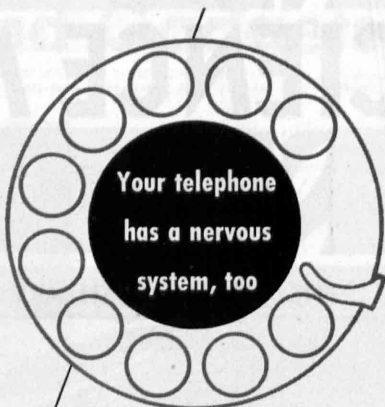
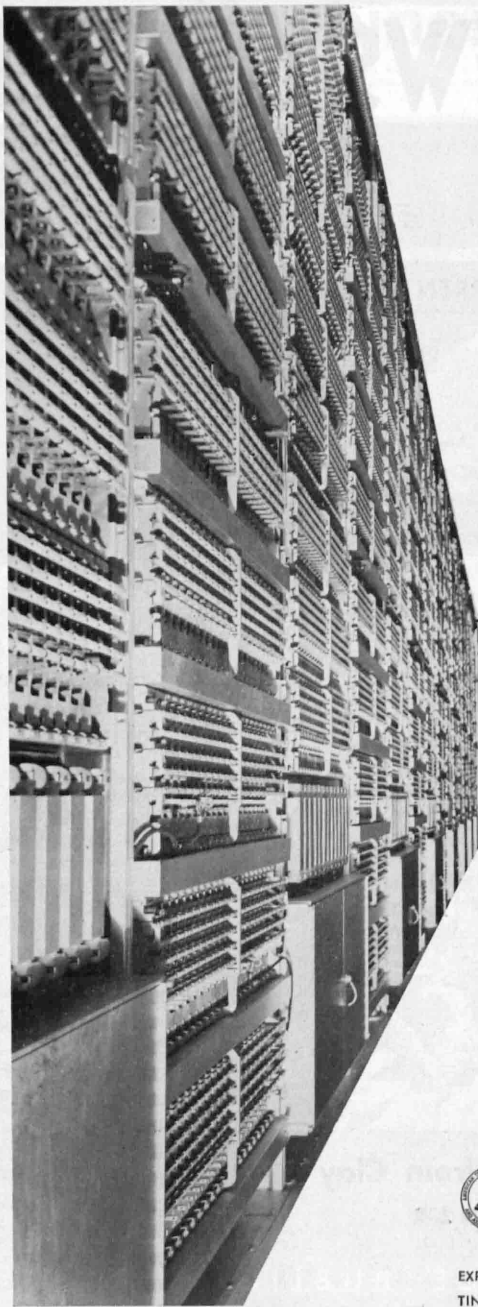
THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 10, 1947



Aluminum from Clay

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A SCIENCE SERVICE PUBLICATION



WHEN you spin the dial of the latest type of telephone system — known as “common control switching” — you order into action a giant nervous system. It sends electrical impulses through an intricate maze of circuits: more than 10,000 contacts can be opened or closed in a single dial call.

This system takes your order, remembers it, translates it into its own electrical language, throws out sensitive “feelers” to find a through route, plans how to make the connections, makes them, puts through the call—and, if the preferred paths are busy, finds an alternate route to take the call.

The complex art of telephone switching is brought to a high state of development at Bell Laboratories to serve the Bell System. Some day through “common control switching” a dial in San Francisco may set up a connection through to a subscriber in New York.

■ *Left:* Backstage on your dial telephone call —some equipment in a typical “common control switching” office.



Bell Telephone Laboratories

EXPLORING AND INVENTING, DEVSING AND PERFECTING FOR CONTINUED ECONOMIES AND IMPROVEMENTS IN TELEPHONE SERVICE

MEDICINE

Operation Relieves Pain

Pain is still present after brain operation but patients don't mind it. Feelings about pain knocked out though sensation remains.

A WAY to relieve unbearable pain and suffering that patients say is "worse than pain" has been discovered. It is a relatively simple and safe operation in which certain nerve paths in the brain are cut. It was described by Dr. Walter Freeman of Washington, D. C., at the meeting in Chicago of the American College of Physicians.

One patient, Dr. Freeman reported, was in the late stages of cancer. He was suffering hideous pain and each time the nurse gave him morphine, while the pain-killing drug was being injected, he was begging for another injection when the present one wore off.

After the operation, he never asked for morphine and lived comfortably without it until his death four months later.

A taxi driver making \$100 a week was paying \$80 a week for opiates to relieve the excruciating, lightning pains of tabes, late result of syphilis. After the operation, he got along without drugs, drove his cab regularly and when asked about the pains, said in an off-hand way, "Oh, I have twinges."

Pain that comes from mental causes as well as that from physical disease can also be relieved by the operation. Dr. Freeman cited the case of a middle-aged woman who had the melancholia or depression that sometimes comes to women of that age. She lamented almost constantly about unbearable pain from hemorrhoids which she did not have. While no physical condition to cause the pain could be found, there was no doubt that she was suffering real pain.

The day after the brain operation, in 1936, she felt fine. She returned to work and worked nine years until her retirement on her seventieth birthday. When asked about the hemorrhoids, she says she doesn't have any.

The operation relieves patients, Dr. Freeman explained, by knocking out the terror or other emotion the pain arouses. Many patients, such as those with cancer or tabes, still have pain. But they do not mind it.

Pain is made up of both sensation and feeling, he explained. A simple example is the case of a stubbed toe. The toe

hurts, but the person also feels angry or resentful or perhaps humiliated. A person who has had the brain operation, which is called prefrontal lobotomy, feels the sensation of pain but not the anger, fear or resentment. So he can bear the pain.

At the operation, the surgeon cuts through the frontal lobes of the brain. These parts of the brain are apparently essential for foresight and insight, or understanding of oneself. But the emotional charge that gives these faculties color, makes them come alive and determines how a person acts, apparently comes from another part of the brain called the thalamus.

After the lobotomy operation, the brain cortex is practically unchanged, but the thalamus, sometimes called the seat of the emotions, shrivels and dies. As a result, there is no charge of feeling about oneself or what happens to the self. In fact, many of the patients have to be re-educated, as children are trained, to take ordinary care of themselves and precautions for their safety in traffic or the like.

The operation was originally devised to relieve the depression, worry and anxiety of mental patients. Dr. Freeman sometimes used to say that the operation removed the "worry center," although no part of the brain was actually removed. All that is done is to cut through certain nerve paths.

It should, Dr. Freeman believes, be more widely used to relieve unbearable pain.

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ENGINEERING

New Fuel Atomizer Turns Heavy Oil into Fine Spray

A VAPOR-FINE spray from a new fuel atomizer that whips heavy oil into tiny droplets will speed the development of new gas turbine engines.

The atomizer is a new-type nozzle, designed by K. V. Smith, Westinghouse research engineer, that sprays oil into the engine in a miniature cyclone of oil particles averaging less than four ten-thousandths of an inch in diameter. With it, 96% of the oil is converted into heat over a wide range of speeds, at times reaching heat-producing efficiency twice that of other nozzles.

This is possible, Dr. Stewart Way, Westinghouse supervisor of combustion research, states, because the tiny wind-driven droplets vaporize and burn more readily than the spray from con-



FUEL ATOMIZER—The new type nozzle, right, sprays oil in a miniature cyclone of vapor particles. It is compared to the conventional nozzle on the left.

ventional nozzles, which produces fuel particles some 10 times larger.

Key to the new nozzle's atomizing power is a blast of air that enters through six pin-hole slots cut at an angle in the nozzle. As these separate streams of air enter the atomizer, they

set up the whirl that causes the fine spray. The device is to be used on a 2,000-horsepower oil-burning gas turbine now under experimental development. This turbine is considered promising as a possible drive for locomotives.

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CHEMISTRY

Leftover Heavy Water

Deuterium oxide from the atomic bomb project will be sold at \$15 an ounce for research. It slows down fast neutrons that "trigger" atomic bombs.

► HEAVY WATER being sold by the Atomic Energy Commission for research purposes is really a sale of leftovers from the atomic bomb project.

Deuterium oxide (that's what heavy water is chemically) is a material that slows down fast neutrons, the "triggers" of the atomic bomb or the chain reacting uranium pile. In American work on atomic energy, very pure carbon in the form of graphite was used as the "moderator" or slower-downer of the neutrons.

But the Germans planned to use heavy water for this purpose and a plant manufacturing it in Norway was the target for one of the most intensive bombing raids of the war. Evidently the Manhattan District hedged by producing heavy water for possible use as a moderator, because the scientists were not quite sure that the graphite would really work and time was more precious than money. Possibly some heavy water was used in some chain reacting piles, but details are still under wraps of secrecy.

Heavy water which has two atoms of double-weight hydrogen, called deuterium in its molecule (the rest being an atom of ordinary oxygen), will be sold to experimenters whose use of the precious stuff is approved by the Atomic Energy Commission.

An ounce will cost \$15. An ounce of the liquid can be visualized as enough to fill what a barkeeper calls a jigger. The official price list reads 50 cents per gram for the first 100 grams. Deuterium as gas can also be purchased at a dollar a liter, which is somewhat more than a quart.

Heavy water has a molecular weight of 20 compared with 18 for ordinary water. This difference in weight is sufficient to be detected by a mass spectro-

meter in which instrument the path of the heavier atom is different in the magnetic fields than the ordinary light one. Light from a discharge tube containing deuterium is different from that containing hydrogen.

Just what happens to hydrogen in the human body or other living things will be studied through the use of the deuterium which is tagged because of its higher weight.

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PSYCHOLOGY

Neurotic Patients Present Great Challenge to Doctors

► "THE NEUROTIC patient cannot cure himself," Dr. William C. Menninger of Topeka, Kans., declared at the meeting in Chicago of the American College of Physicians.

Doctors do not ordinarily expect patients to cure themselves. But medicine has for a long time "failed to aid" the neurotic, Dr. Menninger stated.

As consultant on neuropsychiatry to the Surgeon General, U. S. Army, and member of the advisory board to the Secretary of War, Dr. Menninger saw the toll which psychoneurotic conditions took of men in the armed forces.

"The picture we saw in the Army must exist in modified form in civilian life, since our soldiers were primarily civilians," he pointed out.

"In any event, it presents a major challenge to American medicine upon which the health, both mental and physical, of our people depends."

Often patients with the beginning symptoms of serious mental illness are first seen by a throat specialist, a gland specialist, a bone and joint specialist or a specialist in internal medicine. Only

when the symptoms become mentally incapacitating are they brought to the attention of the psychiatrist. Only then is their neurotic illness diagnosed primarily as such.

In many cases the first doctor the patient consulted might have checked or relieved the symptoms. In many other cases the patient might have had a better chance for recovery if he had been referred earlier to a psychiatrist. "Neurotic patients can help themselves in their recovery," Dr. Menninger said, "but only after the doctor has stepped into their environment and helped them reestablish their equilibrium."

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SCIENCE SERVICE

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ENGINEERING

Pilotless Model Planes Get High-Speed Data

MODEL PLANES of wood, without pilots or engines, are used by the U. S. Navy to secure data on flights at 600-mile-per-hour speed, it has been revealed. Carried aloft by other planes, they are freed, and attain their speed by diving.

These models are four-tenths the size of the Navy Bearcat fighter, F8F, and are exact copies in shape. Automatic controls pull them out of their dives at speeds in excess of 600 miles an hour, and parachutes lower them safely to the ground.

Each model plane carries radio telemetering equipment which transmits performance data to ground stations during their diving and pull-out flight. Radar tracking shows the path of flight, and automatic radio-transmission permits evaluation of behavior in the air.

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ENGINEERING

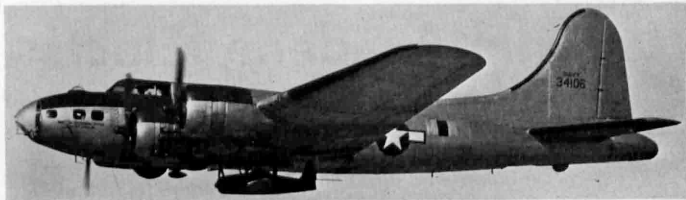
One Big Engine Is Made From Five Medium Ones

MAKING one big engine out of five ordinary-sized ones is the achievement on which two Detroit inventors, H. T. Woolson and M. L. Carpentier, have been awarded U. S. patent 2,419,305, which they have assigned to the Chrysler Corporation.

Their invention, they state, is intended primarily for use in case of national emergency, when large-horsepower units would be needed faster than our automotive industry could tool up to produce them. We normally produce engines of moderate horsepower very rapidly and in great numbers, so that a practical method for building up big horsepower by piling one small engine on another might be highly valuable.

The design described and figured in the new patent calls for five ordinary automobile engines, complete except for their crankcases, set up on a common crankcase in what might be called a semi-radial pattern. The top engine stands vertical, the next pair down form a wide V, and the bottom pair are almost horizontal. All five deliver their power to a central shaft by means of gears. Ignition and cooling systems are little changed from those of individual run engines, but the oil system has had to be considerably rearranged.

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MODEL PLANES—Model planes which reach trans-sonic speeds are dropped from a mother plane to test conditions of flying near the speed of sound.

MEDICINE

Easy-to-Treat Headache

A NEW HEADACHE, a hard one with a hard name but a simple treatment, came to light at the meeting in Chicago of the American College of Physicians.

The headache's name is "indurative" headache. Not even your doctor is likely to recognize it by that name, but he and you, too, may know it as tension headache. It seems to have been known under still another alias three centuries ago. Then it was called rheumatic headache.

In this kind of headache, the muscles of the neck and scalp are involved. The doctor, if he feels the head and neck carefully, can find tender spots in the muscles and even little lumps like knots. Along with the headache many sufferers have a slight rise in temperature in the afternoon.

This headache is being overlooked by many scientists who make a study of headaches, Dr. Herman Chor of Chicago pointed out. Injecting salt solution into the muscles will bring on pain in the head and scalp, he reported.

The treatment fortunately is very satisfactory. Massage and salicylates, best known to the laymen as aspirin, give very good results.

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Treatment for Light Bones

OLD PEOPLE'S tendency to have light bones that may break easily can be counteracted by giving them sex hormones and protein foods such as meat and eggs, Dr. Fuller Albright, Harvard Medical School professor who was awarded the College's John Phillips Memorial Medal, reported. But it is not the slowing down of the sex glands in old age that leads to the change in the bones. There is another glandular

slowing that comes with age. Unlike that of the sex glands, this glandular slowing comes at the same age in men and women. These glands are the adrenal glands.

Adrenalin is the best known of the many hormone chemicals they produce. They also, Dr. Albright reported, produce two chemicals which he labeled "N" and "S" hormones. The "N" stands for nitrogen and "S" for sugar. The "N" hormone is the important one in connection with the bones.

For the period when the adrenal glands slow down in producing this hormone, Dr. Albright coined the word "adrenopause." This comes later than the menopause, when the female sex glands slow down on hormone production.

The inactivity common among old people also leads to light, porous bones.

A feeling that the skeleton is unstable is the most fundamental stimulus for the cells that lay down new bone. And of course the skeleton of an active young man or woman feels more unstable to the bone-building cells than the skeleton of grandpa or grandma, who sits by the fire all day. By the same token, keeping old people in casts when they break their bones may slow knitting of the break because the bones in a cast are stable and the bone-building cells do not get the needed stimulus to work laying down new bones.

Milk, long rated as good bone-building food, appeared in a new light in view of Dr. Albright's studies. It is not the calcium but the protein in the milk that is important. Porous, light bones have plenty of calcium but lack protein to make them normally dense.

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GENERAL SCIENCE

National Academy Elects

Twenty-eight Americans and five foreign men of science were elected to the Academy. Dr. A. N. Richards will preside over the National Academy of Sciences.

► DR. ALFRED N. RICHARDS, elected president of the National Academy of Sciences for the next four years, which is top honor in American science, was the director of America's medical research during the war under the Office of Scientific Research and Development and the National Research Council. He is vice-president for medical affairs at the University of Pennsylvania.

Elected to the Council of the Academy for a three-year term were Dr. W. Albert Noyes, Jr., chairman, department of chemistry, University of Rochester; and Dr. Donald D. Van Slyke, chief chemist, The Hospital of the Rockefeller Institute for Medical Research.

Dr. F. E. Wright was re-elected home secretary for a further four-year term.

The following new members were elected to the Academy:

Luis W. Alvarez, professor of physics, University of California.
Robert F. Bacher, U. S. Atomic Energy

Commission.

Paul D. Bartlett, professor of chemistry, Harvard University.

Jacob Bjerknes, professor of physics, University of California at Los Angeles.

Francis G. Blake, Dean of Yale University School of Medicine.

R. Alexander Brink, chairman of department of genetics, University of Wisconsin.

Ralph W. Chaney, professor of paleobotany and curator of paleobotany, Museum of Paleobotany, University of California.

Arthur C. Cope, professor in charge of department of chemistry, Massachusetts Institute of Technology.

Farrington Daniels, professor of physical chemistry, University of Wisconsin.

Arnold Gesell, director, Clinic of Child Development, Yale University School of Medicine.

James Gilluly, professor of geology, University of California at Los Angeles.

R. B. Goldschmidt, professor of zoology, University of California.

Samuel A. Goudsmit, professor of physics, Northwestern University.

C. H. Herty, Jr., research engineer and assistant to vice president, Bethlehem Steel Company.

Frederick L. Hisaw, professor of zoology, Harvard University.

Wolfgang Kohler, professor of psychology, Swarthmore.

L. G. Longworth, associate member, Rockefeller Institute for Medical Research.

Edwin M. McMillan, professor of physics, University of California.

Walter J. Meek, acting dean, Medical School, University of Wisconsin.

J. L. Oncley, director, Ultracentrifuge Laboratory, Harvard University Medical School.

Lars Onsager, professor of chemistry, Yale University.

John P. Peters, professor of medicine, Yale University.

Paul A. Smith, professor of mathematics, Columbia University.

C. Richard Soderberg, professor of applied mechanics, Massachusetts Institute of Technology.

Paul Weiss, professor of zoology, University of Chicago.

F. W. Went, professor of plant pathology, California Institute of Technology.

Robert E. Wilson, chairman of Board of Directors, Standard Oil Company of Indiana.

E. Bright Wilson, Jr., professor of chemistry, Harvard University.

New foreign associates elected are:

P. A. Alexandroff, professor of mathematics, University of Moscow.

K. Linderstrom-Lang, head of the chemical division, Carlsberg Laboratory, Copenhagen, Denmark.

J. N. Bronsted, professor and director of the Institute for Physical Chemistry, Copenhagen, Denmark.

Bjorn Helland-Hansen, director, Geophysical Institute, Bergen, Norway.

Frederic Charles Bartlett, director, Psychological Laboratory of Cambridge, England.

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PHYSICS

Pistol for Doctors Gives Shot in Arm

► IF YOU SEE a doctor coming at you, brandishing what seems to be a pistol, don't be scared. All you're going to get is a shot in the arm.

A "vaccinating gun", with pistol grip, trigger and barrel, is an interesting recently patented invention. It is covered by U. S. patent 2,417,140, granted to Francis J. Swanson, of Saratoga, Wyo.

The barrel of the pistol is simply a large hypodermic syringe, graduated for doses in cubic centimeters. The weapon is cocked by pulling back the plunger, which has a rack on its under side. This is engaged by a spring pawl mounted on a rod connected with the trigger. Pressing home on the trigger shoves the plunger a predetermined number of notches, causing a measured dose of vaccine or serum to flow through the needle into the patient's arm.

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ACADEMY MEETING—Among the scientists attending the annual meeting of the National Academy of Sciences were (front left to right): Drs. J. H. Hildebrand, University of California; J. C. Slater, Massachusetts Institute of Technology; E. U. Condon, director of the National Bureau of Standards; L. A. DuBridge, president of the California Institute of Technology; Albert W. Hull, General Electric Co.; and Vannevar Bush, president of the Carnegie Institution of Washington.

GEOPHYSICS

Water Erosion of Soil Can Be Reduced to Formulae

▶ WHEN WATER from a heavy rain-storm washes topsoil off a farmer's field, the process looks just about as chaotic and anarchic as can well be imagined; yet it is possible to express this destruction of basic wealth in terms of engineering formulae. At the meeting in Washington of the American Geophysical Union, W. D. Ellison of the U. S. Soil Conservation Service told how erosion is being made more understandable in order that it may be brought under control.

Water erosion involves two processes, detachment and transportation, he said. They are in a sense opposites: sand is easy to detach but hard to transport; clay is hard to detach but easy to transport. Loam, the most desirable type of tillable soil, is intermediate in both respects.

We commonly refer to water as a major agent of erosion, yet clean flowing water has little erosive power, Mr. Ellison stated. It is when it contains a certain amount of solid matter that water becomes able to tear loose bits of soil. Yet when water is loaded with all the solids it can possibly carry it is again relatively innocuous.

The one state in which pure water is able to initiate erosion is falling raindrops, which toss up soil particles as they splash. It is possible to measure even this kind of damage and reduce it to terms of engineering formulae, the speaker declared.

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BIOLOGY

Dr. Harrison Receives John J. Carty Award

▶ DR. ROSS G. HARRISON, professor emeritus of the Osborn Zoological Laboratory, Yale University, was awarded the John J. Carty gold medal and award of the National Academy of Sciences.

The award was made for outstanding contributions to science as an investigator, teacher and leader. Dr. Harrison discovered that tissue cells may grow outside the animal body and thus demonstrated the manner of growth of nerve fibers. He headed the National Research Council during World War II.

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TELEPHOTO LENS—With this 125-pound lens, the Army Air Forces will be able to snap large, sharp pictures from altitudes as high as 10 miles. The lens, compared in the picture to a lens like in a 16-mm. movie camera, is a foot in diameter and four feet long.

GENETICS

Cancer Cells Are Strangers

Mutations, evolutionary changes, may cause cancer cells to become strangers to the body. This may account for cancer cells' disobedience to discipline.

▶ A CANCER may not be, as commonly explained, a mass of the patient's own cells gone wild and growing anarchically. The diseased cells, although originally flesh of his flesh, may have in a dreadful sense become strangers to the body in which they dwell, through one of those sudden, leaping evolutionary changes known as mutations. Had such a change occurred in one of the reproductive cells, the resulting child (if it lived) would be a freak of some kind, unrecognizable as the offspring of its parent.

This lack of real genetic kinship between the patient's normal body-cells and the cells of his cancer may account, among other things, for the refusal of the cancer to obey the commands of the growth-regulating chemicals, or hormones, that keep the normal parts of the body properly disciplined.

Striking new evidence bearing on this theory was presented before the meeting of the National Academy of Sciences in Washington by Dr. M. Demerec, head of the genetics department of the

Carnegie Institution of Washington. Dr. Demerec has succeeded in producing mutations in fruitflies, classic experimental material of geneticists, by exposing parent insects to atmospheres in which continuous aerosol mists of cancer-causing chemical solutions were maintained.

He had his first success with a wargas that never saw action, one of the nitrogen mustards. When he found that this would produce both mutations and chromosomal rearrangements, he tried other cancer-causing chemicals, and found that he could produce mutations with four of them: dibenzanthracene, methylcholanthrene, benzpyrene and beta-naphthylamine. He tried 19 other chemicals that do not cause cancer in laboratory mice, and none of them produced mutations in his fruitflies. He regards the fact that mutations arise in response to treatment with cancer-causing chemicals, and to them only, as highly significant in its bearing on the mutation theory of cancer origin.

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GEOPHYSICS

Young Volcano Generates Electricity When It Erupts

➤ A YOUNG volcano can be a very active generator of electricity when it is in eruption, if the newest of all volcanoes, Mexico's Paricutin, can be taken as a fair sample. O. H. Gish of the Carnegie Institution of Washington reported before the meeting of the American Geophysical Union on observations on the electrical conditions in Paricutin's eruption clouds.

The electrical charge in the cloud increases as the eruption activity grows, but its nature seems to depend on what is coming out. Clouds of steam and fumes have negative charges, ash clouds carry positive charges. Lightning-like discharges occurred only during heavy ash eruptions, and were of two sorts: long flashes, of about 1000 feet, and very short ones only about 10 feet long. This volcanic "lightning" does not contain as high energy charges as the real lightning flashes that occur during thunderstorms.

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MEDICINE

New Drug for Epilepsy Helps Where Others Fail

➤ MESANTOIN, a new drug in the treatment of epilepsy, is proving helpful where other drugs fail and may be superior, according to evidence presented at the meeting of the California Medical Association.

Dilantin, a cousin of mesantoin, has been considered the most useful drug in epilepsy in the past few years. However, it is relatively toxic, which prevents its use in many patients; further, many patients fail to respond to it.

Dr. Robert B. Aird, associate professor of surgery in the University of California Medical School, presented a study of 75 patients treated with mesantoin who had failed to respond to dilantin or for whom that drug has been toxic.

He said mesantoin was particularly effective in controlling seizures of the violent type. Eighty per cent of grand mal seizures, 79% of Jacksonian seizures, and 79% of psychomotor seizures were benefited. Of those benefited, more than half were greatly improved, while the remainder were only moderately helped.

The physician said it was particularly

significant that only 9% of those given mesantoin had toxic reactions. Forty-seven per cent of the group had experienced toxic effects to dilantin.

He indicated that even more striking effects may be achieved in treating the general run of epilepsy patients where there has been no selection on the basis of toxicity to dilantin.

Dr. Aird warned that while mesantoin is relatively low on toxicity, it must be used with care since it is capable of producing alarming toxic effects.

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MEDICINE

Artificial Kidney Removes Poisons from Bloodstream

➤ EIGHT PERSONS doomed to almost certain death from kidney failure have been saved by an artificial kidney developed by a Dutch doctor during the war.

First detailed account of the artificial kidney was given to American doctors by its inventor, Dr. W. J. Kolff, at a meeting at Mount Sinai Hospital, in New York. Dr. Kolff is chief of the department of medicine at the Municipal Hospital at Kampen, Holland.

In this tiny Dutch town Dr. Kolff worked in secrecy during the Nazi occupation, often having to hide his apparatus so the Germans would not take it away from him.

The artificial kidney consists of a drum on which is wound a cellophane tube. The entire affair, drum and 50 yards of tube, is immersed in a bath containing a salt solution. The radial artery in the forearm of the patient is connected with the tube and the blood flows through it and diffuses out into the salt solution. There the poisonous substances from the kidney which are threatening to kill the patient are removed. The blood is then returned from the cellophane tube into a vein in the patient's body.

The artificial kidney is used for conditions in which the kidney does not work but in which there is hope that it might recover its ability to function in a few days if the patient could be kept alive that long. Cases of poisoning with bichloride of mercury, toxic reactions to sulfa drugs, reactions after blood transfusions and occasional kidney poisoning after operations are the type in which the artificial kidney would be used.

Irrigation of the peritoneal cavity in the abdomen has been tried in this country for the same purpose.

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IN SCIENCE

PHYSICS

Click Is Not Music Because It Has No Tone

➤ IS A CLICK music? The answer is no, Drs. J. M. Doughty and W. R. Garner of Johns Hopkins University told the Eastern Psychological Association meeting in Atlantic City, N. J. A click has no tone.

A click is short, a tone is longer.

With a click you can't tell whether the sound is low or high in pitch. If the sound is just a little longer, it still sounds like a click, but you have an idea as to whether it is a high click or a low click.

If it lasts longer, you hear the pitch. Then the sound is definitely a tone.

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PHYSICS

Swedish Telephone Has Dial In Flat Base of Handset

➤ A HANDSET telephone instrument that doesn't need any cradle is the newest thing in compact means of communication; it is covered by U. S. patent 2,419,388, issued to two Swedish inventors, Knut H. Blomberg of Appellviken and Ralph A. G. Lysell of Midsommarkransen.

The dial and necessary signalling apparatus are in the lower part of the instrument; when not in use it stands on the dial. A projecting button in the middle of the dial, pressed in by the instrument's weight, keeps the speech circuit open.

To use, the instrument is either picked up in the left hand or tilted over on the square rear edge of its base while the number is dialed. The receiver is at the top of the instrument's upward-sloping column; the transmitting microphone is concealed within the front side of the base, behind a slotted grill. At the close of the conversation you "hang up" by merely setting the telephone down.

Rights in the patent are assigned to the Swedish firm, Telefonaktiebolaget L. M. Ericsson of Stockholm.

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E FIELDS

FOOD TECHNOLOGY

Radiant Heat, Hot Gases Used in Food Dehydration

➤ **VEGETABLES** can be dehydrated more rapidly and keep their appearance and flavor better if treated with a combination of radiant heat from electric elements and a current of very dry, very hot air or other gas at the same time, claims Clarence Birdseye of Gloucester, Mass., pioneer of the frozen-foods industry who is now entering other fields of food processing. Three new U. S. patents, 2,419,875 to 2,419,877, have been issued to him on this combination, which also includes the use of high-frequency electromagnetic waves.

Two things are necessary during the process, Mr. Birdseye points out: the vegetable slices or dice must be of fairly small dimensions, and they must be kept constantly agitated as they are carried through the dehydrating cabinet on a series of conveyor belts.

Dehydration and quick-freezing are combined in the third patent; it has been found advantageous to remove part of the water from some fruits before freezing them in syrup.

Science News Letter, May 10, 1947

MEDICINE

Streptomycin Treatment Cures Rabbit Fever

➤ **STREPTOMYCIN** can save life even before the doctor knows precisely what ails the patient. And it can practically wipe out deaths from rabbit fever pneumonia if given early.

These striking facts about the famous remedy extracted from microbes living in the soil were presented to members of the American College of Physicians meeting in Chicago by Dr. Hugh J. Morgan of Vanderbilt University Hospital, who took office recently as president of the college.

The pneumonia that may come with rabbit fever, or tularemia, used to kill between 20 and 40 of every 100 patients. In a group of 27 patients treated with streptomycin, only one died, Dr. Morgan reported. That death was not due to the tularemia pneumonia but to another condition.

One symptom of tularemia is an ulcer at the spot where the germs got into the body. Enlarged lymph nodes, called "kernels," are other signs of the disease.

In more than half the patients with tularemia pneumonia, however, there may not be any ulcers or "kernels." In that case the doctor could not be sure what disease he was treating until he had the results of laboratory tests. These tests take about two or three weeks. In some cases the patient may be dead days before the tests show that he had tularemia.

Streptomycin is a cure for tularemia with or without the highly fatal pneumonia that may accompany it. But to save the patient with tularemia pneumonia, it must be given early.

Dr. Morgan warned fellow physicians that patients critically ill with pneumonia of undetermined cause, if they are in a region where tularemia occurs, should be given streptomycin at once, without waiting for results of tests.

Science News Letter, May 10, 1947

GENERAL SCIENCE

Disastrous Errors May Stop U. S. Scientific Advances

➤ **AMERICA** may make disastrous errors in its scientific future similar to those that prevented the Germans from developing the atomic bomb, Dr. S. A. Goudsmit, Northwestern University physicist, warned the American Physical Society.

America's advance in science may be stopped by:

1. Complacency.
2. Lack of interest in "long-haired" science among our youth.
3. Political influence in administrative control of science.

These dangers that Dr. Goudsmit believes may have a fatal effect on our scientific progress correspond to these failings in Nazi Germany:

1. Extreme conceit of German scientists that made them certain their work was ahead of ours.
2. Clash between Nazi dogmas and science that reduced the number of students interested in pure science and drove many capable scientists into exile.
3. Administrators of science who got their jobs because of party connections and did not have confidence in the scientists.

Another reason for break-down of German research was hero worship of individual scientists and lack of team play through fierce clash of scientific opinion.

Science News Letter, May 10, 1947

GENETICS

Podophyllin Can Replace Colchicine at Less Cost

➤ **COLCHICINE**, the old-fashioned gout medicine that became a potent chemical to work radical evolutionary changes for plant breeders, now has a rival in podophyllin, an old-fashioned liver medicine. Podophyllin, which is a resin extracted from the rootstocks of the may-apple plant, can do the same things that colchicine does, and costs only a small fraction as much.

A lot more needs to be learned about podophyllin, report Drs. B. J. Sullivan and H. L. Wechsler, Fordham University biologists, in *Science* (April 25). Its single name implies that it is a single substance, whereas it contains at least four distinct organic compounds, and it is not known which of the four has the colchicine-like effect of stopping cell division half-way and thereby producing giant varieties of plants. This is what the two Fordham biologists are undertaking to do.

First to notice the effect of podophyllin on cell division were two men who were at the time in the medical service of the Army, Maj. Lester S. King and Maj. Maurice Sullivan. Podophyllin, though no longer on the approved list as an internal medicine, is useful in one type of skin ailment, and it was their observation on what it did in clinical use that led them to a more careful examination of its effects on the division process in animal cells.

Science News Letter, May 10, 1947

CHEMISTRY

Suburban Atoms Determine What Happens in Molecule

➤ **IF CHEMICAL** molecules are thought of as cities, it is the suburban atoms in them that determine what happens. This in essence is what Dr. J. H. Hildebrand of the University of California reported to the National Academy of Sciences after experiments on liquids whose molecules vary greatly in size. The atoms on the outside of the molecules are the main centers of attraction in the molecular world, and the buried atoms contribute but little. Molecules, the smallest combinations of atoms, are practically all too small to be seen with even the most powerful microscopes. They determine the properties of matter, however.

Science News Letter, May 10, 1947

CHEMISTRY

Aluminum from Common Clay

U. S. chemical process of getting light metal from clay beneath our feet was "impossible" to Germans. Hydrochloric acid is reagent used.

See Front Cover

By HELEN M. DAVIS

➤ THEY SAID it was impossible because it required too much energy. In addition, the Germans had tried it and failed. That clinched it. Nobody could extract aluminum from clay.

Everybody knew that untold quantities of the light, tough metal lie at our feet, locked up in that commonest of minerals, hydrated aluminum silicate—common clay. Most chemists, following the dictum of some old-timers, were content to resign themselves to the idea that there it would remain forever.

Not so Dr. James I. Hoffman of the National Bureau of Standards. When ships loaded with bauxite, the sole practical ore of aluminum, were regularly setting out from foreign ports during the war, only to end their voyages in the depths of the sea, the War Department called upon the government scientist to "do something."

Dr. Hoffman, trained as an analytical chemist, is accustomed to pursuing elusive metals through cycles of alternate solution and precipitation. He knows how aluminum salts behave in test tubes. "Why not," he asked, "use these laboratory methods on a pilot-plant scale and take out the aluminum in a form in which we can feed it into the commercial reduction process and get the metal?"

"Couldn't Be Done"

There were plenty of experts who dogged Dr. Hoffman's footsteps whining that it could not be done, but with the help of a small but devoted crew of fellowworkers a pilot plant was rigged up. They built it in an abandoned garage, which was once a stable. Their three-story Herreshoff furnace where, as the final stage in the process, the precipitated chloride is ignited to change it into the oxide, alumina, rises from the floor of the one-time stalls to the gable-peak of the hayloft.

The group assembled rather than built the equipment. A replaced and ob-

solescent boiler from the Bureau's power plant was a lucky find. Bit by bit, under the skillful hands of Herbert Lowey, their instrument maker, the plant took shape. With Dr. Hoffman worked Dr. Robert T. Leslie, George Derbyshire, Willard Hubbard, Wilmer A. Hemminger and Lewis J. Clark, aided also by Dr. Hoffman's son, John Drake Hoffman, who has now returned to finish his graduate work at Princeton. During part of the time H. J. Caul, on loan from the American Dental Association, also worked with the group.

Any Clay Can Be Used

For raw material these scientists can use almost any kind of clay, but the kind they are working on at present is rejected as too coarse by the factories that make fine china dishes. It is white to pale yellow in color, the yellowish tints betraying the presence of iron. Such clay is shown on the cover of this SCIENCE NEWS LETTER.

Iron was a stumbling block to one of the suggested methods for solving the aluminum from clay problem. In that method the materials not wanted were removed, and it would take a lot of removing to get rid of all the iron in the red clays of our southern seaboard states.

While Dr. Hoffman prefers the white clay to the red for his pilot plant, the presence of iron does not trouble him. In his process the aluminum compound, which he does want, is taken out of solution, and the rest of the material runs off in the liquid squeezed out of the filter.

The reason chemists for over a century have been saying that aluminum from clay is an impossibility is the fact that the light metal is there found combined with silicon and oxygen in a form which requires energy to break up. The amount of energy required was believed to be so great that it would never be possible to sell the finished metal for enough money to pay for its manufacture.

Several other processes for obtaining

the light metal from sources other than bauxite have been tried out on an experimental scale. Three of them use sulfuric acid or a sulfate mineral, whereas Dr. Hoffman's is the only process using all hydrochloric acid. The other type method employs the chemically opposite alkaline reaction, known in general as the Bayer process.

Variants of this alkaline process use lime or lime-soda, with which the clay is roasted until it glows, or sinters. Water-soluble aluminum salts are then leached out by washing. Such processes have been worked out by Dr. Connolly and associates at the U. S. Bureau of Mines, by Dr. Wells at the Bureau of Standards, by Monolith Portland Cement Co. in Wyoming, by the Ancor Corporation at St. George, S. C., and probably by Alcoa.

Economically, these processes depend upon the lucky occurrence of lime and clay of the proper quality in neighboring locations. The Anaconda Copper Co. put a process through the pilot plant stage in which they started with hydrochloric acid but ended with the Bayer method.

Sulfuric Acid Processes

Of the sulfuric acid processes, one was worked out by TVA at Wilson Dam, Ala. A modification of this method, known as the Kalunite process, has been worked out for getting aluminum from the sulfate mineral, alunite. A third kind of similar process using ammonium sulfate was developed by the Chemical Construction Co. in the Pacific Northwest.

Naturally, the men who worked out these processes are each proud of success in doing what "could not be done." None of these experimental processes can at present compete economically with the standard bauxite method. But "the availability of all the foregoing processes," according to Dr. Hoffman, "affords good insurance for an abundant supply of aluminum in the United States in the future."

The all-hydrochloric acid process which Dr. Hoffman has demonstrated has the advantage of producing pure alumina, ready for electrolytic reduction. It gets rid, in its first step, of the silica half of the clay. This is the step long believed theoretically impossible. Many

metallurgists had resigned themselves to the idea that silica-free alumina from clay could never be a paying proposition.

But Dr. Hoffman and his associates have found conditions otherwise in their process. They first heat the clay to about 1300 degrees Fahrenheit which, as industrial processes go, is a rather mild temperature. This is not hot enough to bake the clay into refractory brick, but it furnishes enough energy to break the connection between the aluminum and the silicon in the molecule. The silicon then comes out as so much inert white sand, or silica, which takes no further part in the chemical process.

Dissolved in Acid

After the first roasting, the clay is dissolved in a solution of hydrochloric acid and filtered off from the silica. From this point the object is to get out of the solution only a compound of the aluminum, which is desired, and to leave everything else in solution.

It is here that Dr. Hoffman's special knowledge of the behavior of aluminum compounds stood him in good stead. He knew that if more hydrochloric acid, in the form of a gas, is led into a concentrated solution such as he gets by boiling down the liquid that comes from his filter, the aluminum and nothing else in it will turn into a fine white powder and collect at the bottom of his tank. And as a special bonus, the chemical action gives out heat, which helps on the fuel bill.

Here again, the wiseacres said "It can't be done. The crystals that fall through the liquid trickling down your precipitation column while the acid gas bubbles up through it, will cut your pumps to pieces."

But Dr. Hoffman knew he had a fantastic corrosion problem to face when he started out. He presumed that it was the impossibility of preventing hydrochloric acid from eating away their metal tanks that had made the Germans give up the process years before. But with modern materials available, Dr. Hoffman built his plant with plastics and glass in place of metal, and defied the abrasion of the crystals and the acid vapors. Besides, he can watch the liquids circulating through the glass pipe sections and see how the process is coming on.

The vapors take their revenge on the scientists by destroying their clothes. Anything made of cotton soon falls into shreds in this experimental plant, so



IN SOLUTION—Silica and other insoluble matter are removed from the aluminum by a filter press.

that even the window cords have either to be replaced by gaudy-colored decorators' cords of synthetic material or abandoned in favor of old-fashioned props.

Coming to work, the scientists hang their street clothes on glamorous plastic hangers, designed for evening gowns but impervious to acid. They shut the garments away behind heavy wooden doors, and put on tattered old clothes which can stand the gaff.

Dressed like beggars, these keen-eyed men figure on economies that will run into millions of dollars when their process is put into full commercial operation even though, as a government development, their pioneer work is available to any manufacturer with the foresight to take advantage of it.

The cost problems now being studied are the usual ones of chemical production: economical use of power and recovery of usable materials from waste. At present the price of metal from nearby clay by the Hoffman process is about twice that from bauxite brought in from abroad.

Many factors may operate to change that cost ratio in the future. What the Bureau of Standards scientists have done is to work out in practical terms the answer to an old laboratory problem. They have proved that commercial extraction of aluminum can be done.

Now these chemists are going on to details of economical operation of the

plant, and by-product recovery. They are confining and re-using the acid vapors. They point out that many of the elements that occur in the clay are all in solution in the filter water, if anyone can use them. Iron is there, certainly, although it would not pay to take it out. Other valuable materials, such as potash, may be present in some clays.

It might pay to recover some of them, although, says Dr. Hoffman, "this is hardly likely to be the case in the first 190 billion tons of clay that we will use." One hundred ninety billion tons of clay will yield nearly 38 billion tons of aluminum metal by the Hoffman process. Aluminum, being one of the lightest as well as most abundant metals, gives us more sheet metal to the ton than any other common structural material.

Science News Letter, May 10, 1947

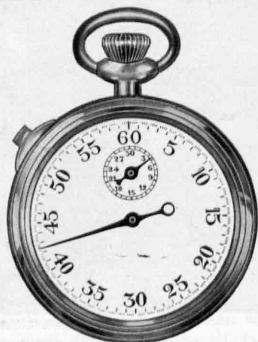
CHEMISTRY

Steam Recovers Fluoride

➤ HYDROGEN FLUORIDE used as a catalyst in oil refining is recovered from the spent condition by treatment with superheated steam, in the process on which James D. Gibson of Bartlesville, Okla., has received patent 2,419,558, which is assigned to the Phillips Petroleum Company. The fluorine comes out as hydrofluoric acid, which may be concentrated to the anhydrous condition.

Science News Letter, May 10, 1947

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MEDICINE

Dr. S. A. Waksman to Get Passano Foundation Award

► DR. SELMAN A. WAKSMAN, microbiologist at the New Jersey Agricultural Experiment Station and discoverer of streptomycin and other antibiotics, will receive the \$5,000 Passano Foundation award.

Dr. Waksman will receive the award at a dinner June 12, during the centennial meeting of the American Medical Association at Atlantic City. The Passano Foundation, which is making the award, was established in 1943 by the Williams and Wilkins Company, medical publishers in Baltimore.

Science News Letter, May 10, 1947

MEDICINE

Moths, Mice Are Bred To Aid Human Health

► RED-EYED meal moths and kinky-tailed mice are being bred in a Wesleyan University laboratory as aids to better health for humans.

The kinky-tailed mice with some distant cousins that have forked tails or no tails at all will, it is hoped, lead to methods for eliminating deformed spines in new-born babies.

X-raying the expectant mother mouse at a certain period of pregnancy will cause her offspring to be born with tail deformities, Dr. Ernest W. Caspari of Wesleyan has discovered. Mouse tails, he explains, are nothing but elongations of the spinal column and therefore provide a good tool for studying hereditary defects of the spine.

Dietary improvements may be the contribution to health made by the red-eyed meal moths in Dr. Caspari's laboratory.

Meal moths are meal mill pests and ordinarily have dark brown eyes. The red-eyed strain is extremely rare and the deformity is apparently caused by a lack of hormones. The larvae of one of the strain spin silk when kept out of the light and under carefully regulated temperatures. Perhaps due to the extraction during the milling process of some chemical necessary for the proper balance, Dr. Caspari has found it impossible to create the spinning condition by feeding the moths home-ground meal, but can do so with commercially ground meal.

Science News Letter, May 10, 1947

Do You Know?

Stones of the familiar apricot are used in the cosmetics industry.

Flower seeds do best in a loose soil containing humus that will not pack.

Industrial dusts of many kinds, from flour to metal powders, are explosive as well as coal dust in mines.

The hippopotamus, which may weigh four tons or over, has a hide almost two inches thick which sometimes weighs a quarter of a ton.

The cycle from eggs to larvae to adult houseflies requires 12 to 14 days.

Dried green bananas are sometimes ground into flour which, mixed with wheat flour, makes an excellent bread.

Silicon carbide, or carborundum, made in electric furnaces from sand and carbon, is a promising ceramic for use in the high temperatures at which gas turbine blades must work.



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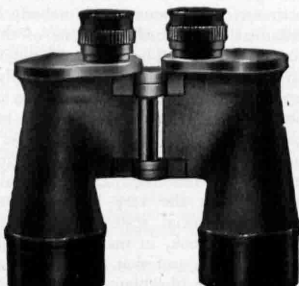
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by Frank Thone



Useful Citizens

➤ **MUSHROOMS**, puffballs, bracket-fungi, even the repulsive stinkhorns, as well as the host of lesser, mold-like fungi that as a rule we never notice at all, are among the most useful citizens of the outdoor world. We commit an injustice when we half-resent their elfin intrusion into the dainty society of spring wildflowers. If it were not for the fungi and myriads of humble beings like them, there might not be any wildflowers—or for that matter any towering forest trees.

The gay, bright assembly of wildflowers depends on the silent, mostly unregarded ministrations of the fungi and other decay-organisms as the gay, bright upper strata of human society depends on scullions and street-sweepers, garbagemen and gravediggers. Without a corps of workers, however uncouth, to dispose of wastes and to bury the dead, there could be no gracious living, whether by columbes or countesses.

The organisms of decay, of which mushrooms and other fleshy fungi are only the most noticeable examples, are many and varied. They run the whole gamut of fungi and bacteria, and that strange half-world between the two, the actinomycetes, about which nobody but botanists ever heard until one of them turned in that all-but-universal remedy, streptomycin. On the animal side there are insects of all kinds, but especially beetles, termites and ants; strange little nameless mites that are half-cousins of insects; worms of all sizes and degrees; microscopic one-celled creatures called protozoa. At the very bottom of this scavengers' social scale are the slime-molds, that look, in mass, like splashes of wet paint, and that are individually in some ways like plants, in other ways like lowly animals.

This motley and complex array develops last year's fallen leaves, dead logs and stumps, the petals of flowers as they wither and fall, the dead bird that a weasel has slain, the weasel himself when death at last overtakes him. All body wastes, all waste bodies—these are their assignments.

Like all good morticians and waste-disposal squads, they do their work quietly and unobtrusively. They operate mostly from undersides and insides; usually they shun the light, and therefore they can carry on by night as well as by day. Only occasionally do they advertise their presence by such manifestations as mushrooms or Indian-pipe flowers. And before you fairly realize it, what were fallen leaves and dead sticks have lost their shapes and identities and have become soil-enriching humus.

And on this dark fare, prepared in silence and secrecy, our loveliest and most delicate spring flowers thrive.

Science News Letter, May 10, 1947

METEOROLOGY

Most Cold Waves Come When Sun Is Spottiest

➤ **COLD WAVES** sweep down out of the North most often during the winters when there are most spots on the sun, Irving I. Schell, consulting meteorologist of Boston, stated before the meeting of the American Geophysical Union. He made a statistical study of 15 winters, six of which were in the years of great increase of sunspot numbers and nine in low sunspot years. There were 71 cases of high-pressure areas originating in the northwest quarter of North America and bringing cold waves during the six "spotty" years, as compared with only 21 cases during the nine winters when the sun had few spots.

Science News Letter, May 10, 1947

CHEMISTRY

Copper and Nickel Alloy Makes Fluorine Container

➤ **MEDIEVAL** alchemists seeking for the "universal solvent" were stumped by the question: "But what will you keep it in if you find it?" Nearest modern relative of this mythical fluid is the gas fluorine, related to chlorine but far more corrosive, which has recently been found exceedingly useful in industry.

The container problem was solved by two Bronxville, N. Y., chemists, Homer F. Priest and Aristid V. Grosse, who found that in cylinders of copper, nickel, or an alloy of both, the fluorine quickly forms a coating of a compound which protects the rest of the metal from further attacks. All valves and other fittings have to be made of the same metal.

The patent, No. 2,419,915, has been assigned to the U. S. government through the Office of Scientific Research and Development.

Science News Letter, May 10, 1947

YOUR

HAIR

AND ITS CARE

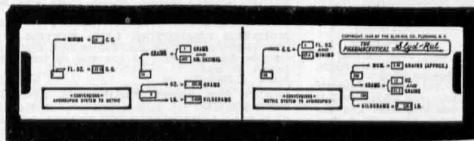
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Books of the Week

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AMATEUR RADIO BUILDER'S GUIDE—*Rad-craft Publ.*, 64 p., illus., paper, 50 cents. This phase of the Radio-Craft Library has wiring diagrams for receivers and transmitters beamed at the amateur.

AMERICAN WILD FLOWERS—Ethel Hinckley Hausman—*Garden City*, 534 p., illus., \$2.49. Careful cross-indexing enables the reader to find flowers under any one of the common names, while the guide to flower families aids in identification of unknown specimens.

ANNUAL REPORT OF THE DIRECTOR OF THE MINT FOR THE FISCAL YEAR ENDED JUNE 30, 1946, INCLUDING REPORT ON THE PRODUCTION OF PRECIOUS METALS—*Govt. Printing Office*, 96 p., paper, 30 cents.

ASTRONOMY FOR BUSY PEOPLE—A. L. Bedell—*publ. by the author*, 31 p., illus., paper, 75 cents. An accumulation of frequently used data, together with the author's 13 star maps and circular sky map.

BUTYLASTIC POLYMERS; Their Preparation and Applications; A Treatise on Synthetic Rubbers—Frederick Marchionna—*Reinhold*, 642 p., \$8.50. A technical book with references at the end of each chapter and the complete listing of U. S. patents on this subject.

THE COMPLETE HOME DECORATOR—Catherine Klock—*Cadillac*, 334 p., illus., \$2.95. Complete with color harmonizing guide and room plotter with reproductions of tiny pieces of furniture, this decorating book should make it pleasant and easy to have a lovely home.

EXPERIENCES WITH FOLIC ACID—Tom D. Spies—*Year Bk. Pubs.*, 109 p., illus., \$3.75. A survey of the field of folic acid therapy in the treatment of macrocytic anemia useful to the physician, biochemist, biologist and nutritionist.

FLOWER ARRANGEMENT FOR EVERYONE—Dorothy Biddle and Dorothea Blom—*Barrows*, 192 p., illus., \$2.50. The simple text makes it easy for all to enjoy this outlet for creative ability.

GUIDE TO HEALTH ORGANIZATION IN THE UNITED STATES—Joseph W. Moutain and Evelyn Flook—*U. S. Pub. Health Service*, Misc. Publ. No. 35, 71 p., paper, 20 cents. An overall survey of the many agencies and facilities which render health services in our nation.

THE INFLUENCE OF ISLAM ON A SUDANESE RELIGION—Joseph Greenberg—*Augustin*, Monograph of the American Ethnological Society, No. 10, 72 p., \$2.50. The region chosen was one in which Moslem influences had been at work long enough for their effects to be judged. It had also a pagan rural population which remained uninfluenced and authentic historical records.

INJECTION MOLDING OF PLASTICS—Islyn Thomas—*Reinhold*, 534 p., illus., \$10. A specific and detailed coverage of the field of injection molding. Up-to-date methods are carefully described and me-

thodically illustrated with over 500 detailed plates showing each phase of the operations.

AN INTRODUCTION TO ENGINEERING PLASTICS—D. Warburton Brown and Wilbur T. Harris—*Murray Hill Bks.*, 276 p., illus., \$4. Written to help engineers and industrial designers make the best choice and use of plastics for their purposes, this book also contains plant and equipment data, design and commercial tolerances, trade names of the plastics, their applications and manufacturers, and recommended tolerances for phenolic and urea moldings.

THE MAMMALS OF MICHIGAN—William H. Hurt—*Univ. of Mich. Press*, 288 p., illus., \$3.50. This first authentic book on the wild mammals of Michigan in historic times contains a simple illustrated recognition key for identification either from animal or skull. Maps show the distribution of sixty-seven species in the state and in North America, and tables give size, life span, etc. and dental formulae.

MASTERWORKS OF SCIENCE—John Warren Knedler, Jr., ed.— *Doubleday*, 637 p., \$4. Digests of thirteen classics; authors represented are Euclid, Archimedes, Copernicus, Galileo, Newton, Dalton, Lyell, Darwin, Faraday, Mendel, Mendeleyev, Curie, and Einstein.

MODELING FOR MOTHERHOOD—Doris Hale Heinz and Katherine Smith Bolt—*Wiley*, 74 p., illus., \$2. How to keep up your posture and your morale and have fun waiting for the baby.

A NEW NOTATION AND ENUMERATION SYSTEM FOR ORGANIC COMPOUNDS—G. Malcolm Dyson—*Longmans*, 63 p., \$1.75. This new notation is placed before chemists in the hope that it may solve the difficulties of increasingly difficult chemical nomenclature; to test it, five volumes of Beilstein have been ciphered and indexed successfully.

PREHISTORY AND THE MISSOURI VALLEY DEVELOPMENT PROGRAM: SUMMARY REPORT ON THE MISSOURI RIVER BASIN ARCHAEOLOGICAL SURVEY IN 1946—Waldo R. Wedel—*Smithsonian*, Misc. Pubs. Vol. 107 No. 6, 17 p., paper, 15 cents. A statement of the necessary archeological program to salvage information of the important sites here located before they are obliterated by the flood control program.

THE PROBLEM OF REDUCING VULNERABILITY TO ATOMIC BOMBS—Ansley J. Coale—*Princeton Univ. Press*, 116 p., \$2. Prepared under the direction of the Committee on Social and Economic Aspects of Atomic Energy of the Social Science Research Council, this treatise recommends the reduction of vulnerability to all nations, feeling that considerations of the problem may lead to stable agreement.

REHABILITATION THROUGH BETTER NUTRITION—Tom D. Spies—*Saunders*, 94 p., illus., \$4. Monograph for the physician to aid him in achieving the goal of full re-

habilitation of patients with nutritive failure.

THE ROCKEFELLER FOUNDATION: A REVIEW FOR 1946—Raymond B. Fosdick—*Rockefeller Foundation*, 64 p., paper, free. An analysis of the year's work of this organization by its president, in which he emphasizes the need for more trained personnel in medical sciences, more study of the humanistic sciences and thorough investigations in the field of human relations.

THE RUBBER INDUSTRY—Josephine Perry—*Longmans*, rev. ed., 127 p., illus., \$2. Including both natural and synthetic rubbers, this description of their processing and preparation will materially aid in understanding the complexities of this vast industry.

SEARCH FOR GLORY—Kevin Guinagh—*Longmans*, 220 p., \$2.50. A biography of Pilatre de Rozier who was, in turn, pharmacist, tent-maker, research scientist, and courtier. He finally achieved the fame he sought by being the first man to fly in the Montgolfier brothers' hot-air balloon.

A TEXTBOOK OF SYSTEMATIC BOTANY—Deane B. Swingle—*McGraw-Hill*, 3rd ed., 343 p., illus., \$3.50. This revision of a well-known text contains a discussion of the newer species concept and the experimental method in taxonomy as well as meeting the demand for a textbook approaching the subject through genetics, ecology, cytology and geography.

TEXTILE FIBERS—J. Merritt Matthews, ed. by Herbert R. Mauersberger—*Wiley*, 5th ed., 1133 p., illus., \$12.50. This excellent text has been brought up to date by the editor and a technical advisory review board. It is a practical reference to the entire textile industry and deals exhaustively with the physical, chemical and microscopical properties of both natural and synthetic fibers.

WOOD DISTILLATION—Northeastern Wood Utilization Council—*publ. by the Council*, 60 p., paper, \$1. Four articles dealing with modernization of hardwood distillation, resumé of research in Quebec, recent developments in the production of charcoal and its by-products, and activated carbon as a wood product yield valuable technical data. Statistics of production and export are included.

Science News Letter, May 10, 1947

The name *Pennsylvania* is still appropriate for that state because it is now approximately 53% woodland.

by
W. H. GEORGE

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✿ **AIR BULB**, attached to an automobile fender, warns the driver when the fender is about to touch a curbing, wall or adjacent car. It is a squeeze bulb and the air pressure created by contact against an object works a simple electric switch, causing a warning signal.

Science News Letter, May 10, 1947

✿ **HARDWOOD** table tops, uninjured by hot plates, alcohol, coffee pots and lighted cigarettes, are made with a thin sheet of aluminum under the outside veneer of wood. Cold-bonding adhesives bind the two together and a new heat-resistant varnish protects the veneer.

Science News Letter, May 10, 1947

✿ **CARDMASTER** is a device for the card table which permits a player of gin rummy or other games to draw out one card only at a time. The cards, backs up, rest on a sloping face so arranged that one at a time can be drawn out under side pieces by the tips of the fingers. A drawer beneath provides storage space for a deck.

Science News Letter, May 10, 1947

✿ **CLEANING** attachment for phonograph records, recently patented, is fixed to the cabinet adjacent to the turntable, and carries a wiper arm and wiper over the record disk. The record rotates under the wiper blade, which extends radially on the disk.

Science News Letter, May 10, 1947

✿ **ELECTRIC MIXER** for home kitchens has a light plastic case easily



grasped in one hand, as shown in the picture. Thumb pressure on a knob at the top operates the switch that turns the current on and off.

Science News Letter, May 10, 1947

✿ **MINIATURE** central heating system, for trailer coaches where 110-volt, 60-cycle, alternating current is available, burns automotive gasoline in a sealed stainless steel chamber. It is equipped with automatic electrical ignition, and by forced ventilation circulates fresh air drawn in from the outside.

Science News Letter, May 10, 1947

✿ **PLAY RACK** for baby is suspended across the crib in a swaying position where its contents can be reached by the youngster. Made of a tough, smooth plastic, it contains a yellow duck that tilts in various positions, a teething ring swinging from the center, and marbles that roll back and forward, or can be spun in their racks.

Science News Letter, May 10, 1947

✿ **WALLBOARD**, made from sawdust and shavings from lumber mills, may soon be available, manufactured by an inexpensive process developed by Polytechnic Institute of Brooklyn. The natural lignin in the wood, activated by a special chemical, is the bonding agent, the slabs being formed under heat and pressure.

Science News Letter, May 10, 1947

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