

DENTISTRY

Tooth Decay Reduced By Penicillin Pills

➤ **LESS TOOTH DECAY** was found in school children given a penicillin pill each day over a long period than in a group that did not have this treatment.

The reason for giving the penicillin pills was to prevent recurrence of rheumatic fever, but the treatment afforded a good chance to see if the penicillin was as successful with human teeth as with the teeth of laboratory animals. Previous studies have shown convincingly that tooth decay in animals is inhibited by antibiotics.

Penicillin and other antibiotics have been used experimentally in toothpastes and mouthwashes with little effect on cavities. But Dr. Norman W. Littleton of the National Institute of Dental Research, Bethesda, Md., told *SCIENCE SERVICE* the failure could be due to the brief period the "topically" applied antibiotics were in contact with tooth surfaces.

The weight of evidence is that bacteria cause decay of teeth, so it is possible that higher concentrations of germ-killing antibiotics applied for longer periods could counteract decay.

"With new antibiotic compounds being constantly developed," Dr. Littleton said, "new application methods and efficient testing should be developed to try out the theory."

Seventy-three children taking oral penicillin as outpatients at Children's Heart Haven Hospital, Lancaster, Pa., were compared with 362 public school children at Landisville, Pa., near Lancaster.

Carl L. White, also of the Dental Institute, worked with Dr. Littleton in the research, reported in the *Journal of the American Dental Association*, 68:520, 1964.

• *Science News Letter*, 85:248 April 18, 1964

CHEMISTRY

Months Underwater Seen For Non-Atomic Subs

➤ **NON-ATOMIC SUBMARINES** that can stay underwater for months at a time were seen as a result of a new design for a hydrogen generator reported to the American Chemical Society meeting in Philadelphia.

The hydrogen would be consumed in fuel cells to provide power for the submarine when it is submerged. Such an underwater craft could be built in any size and would be less expensive.

Conventional submarines have to surface frequently to recharge their storage batteries.

The hydrogen generator was designed to be lightweight and take up as little space as possible, W. H. Heffner of the M. W. Kellogg Company, New York, said.

In the proposed generator, wood alcohol and steam are changed by a catalyst into hydrogen, carbon monoxide and carbon dioxide. These gases then go into a coil made of palladium and silver that allows only the hydrogen to pass through its walls. The resulting pure hydrogen is fed to the fuel cell.

The carbon monoxide and other waste gases are burned with oxygen to provide the heat necessary to operate the generator at 525 degrees Fahrenheit. Oxygen is also necessary for operating the fuel cell.

The generator will supply 20 pounds of hydrogen in an hour under normal conditions and 70 pounds an hour under forced draft, Mr. Heffner reported.

Dr. G. T. Skaperdas and Arthur C. Veverka, also of Kellogg, collaborated in the design study.

• *Science News Letter*, 85:248 April 18, 1964

AUTOMATION

Computer System Mixes Science, Business Tasks

➤ **A NEW COMPUTER SYSTEM**, with operating speeds measured in billionths of a second, is designed to turn out more business and scientific work than any computer has done before.

Called System/360 by the International Business Machines Corporation which developed it, the system eliminates the traditional distinction between computers for commercial and for scientific use.

Users will be able to process both business and scientific problems, or a combination of the two, with equal effectiveness. This is because System/360 has the ability to process work through binary, decimal or floating point arithmetic facilities. The programmer thus is free to choose which of these can handle his problem best.

The main computer can communicate simultaneously with up to 248 terminals in other parts of the country or the world. The system's monitor program automatically handles inquiries to the computer at any time—even when a batch processing job is being run.

The system's machine cycle time—basic pulse beat of a computer—ranges from one millionth of a second to only 200 billionths of a second.

System/360 also makes a significant dent in the "memory fence," the restriction in the number of facts a computer can store. A key development provides eight million characters in bulk core storage—each character available in eight millionths of a second and each at the direct command of a computer programmer.

Monthly rental fees for System/360, which will be available late next year, will range from \$2,700 to \$115,000, depending on how complex its task will be.

• *Science News Letter*, 85:248 April 18, 1964

SPACE

Hot Pebbles in Globe Aid Space Studies

➤ **SPACE TEMPERATURES** are simulated in a vacuum sphere by electrically heating a bed of alumina pebbles which in turn warms up the gas passing through them. By controlling the pebbles the gas temperature is controlled. General Applied Science Laboratories, Westbury, L. I., N. Y., uses the 40-foot-diameter globe to study aerospace vehicles in high-altitude conditions.

• *Science News Letter*, 85:248 April 18, 1964

IN SCIEN

ZOOLOGY

Glue Used to Bait Destructive Porcupines

➤ **THE PORCUPINE'S** appetite for glue is getting him into trouble.

Foresters are testing glue as bait to lure the prickly animals into poisoned salt stations. Porcupines have a pesky habit of destroying thousands of tender young trees by eating the bark.

In an effort to decrease the number of these pests and save the forests, researchers at the Oregon State University forest research laboratory are testing using sodium hydroxide and soda ash, both components of plywood glue, to entice porcupines into sticking around and tasting the poisonous salt.

• *Science News Letter*, 85:248 April 18, 1964

BIOTECHNOLOGY

Mumps Gland Could Tell How Astronaut Fares

➤ **AN ASTRONAUT'S** mumps gland could be used to determine his physical fitness during space travel.

Analysis of the fluid from the parotid gland, which puffs up when a person has the mumps, could show how an astronaut was withstanding weightlessness, Dr. Thomas B. Weber of Beckman Instruments, Inc., Fullerton, Calif., reported at the American Chemical Society meeting in Philadelphia.

Because future space flights will last several days or weeks, Dr. Weber noted, there is an increasing need for continuously monitoring a man's reactions throughout the mission. Since fluid from the parotid gland flows constantly into the mouth, it could be collected and tested.

A device smaller than a dime would be fitted over a duct inside the cheek to collect the fluid, which contains salts, proteins, hormones and other metabolic products.

The fluid could be analyzed for some 50 body constituents, including sugar and salt balance, proteins and enzymes. The astronaut could do the analysis himself or the data could be telemetered to earth for evaluation, Dr. Weber reported.

He noted that in research studies at Beckman Laboratories, the parotid secretions of persons in simulated space cabins were monitored successfully for periods up to 14 days.

Metabolic processes to be evaluated can be classified as:

1. Maintenance of respiratory and acid-base balance.
2. Electrolyte concentration and nitrogen metabolism.
3. Enzyme concentration.
4. Hormonal changes due to stress and possible space vehicle pollutants.

• *Science News Letter*, 85:248 April 18, 1964

CE FIELDS

OPTICS

Human Eyes 'See' Only Three Colors

► THE WONDERFUL WORLD of color is visible to us through tiny receptors in our eyes that are sensitive to only three colors—blue, red, and green.

Teams of scientists at Johns Hopkins University and Harvard University have measured the wavelengths of light absorbed by the individual color-sensitive units in the eye. It is a major breakthrough in the understanding of color vision.

The eye's retina is made up of tiny rods and cones. The rods are used in night vision, and see only shades of gray. The cones enable us to see color.

Reasoning that all colors could be created by mixing light beams of the three primary colors, an 18th century scientist, Thomas Young, believed that the eye would have receptors for just these three colors.

The Johns Hopkins University scientists, W. B. Marks, W. H. Dobbelle and Dr. Edward F. MacNichol Jr., reported that they had found evidence of blue and red receptors in human retinas, and a green receptor in the monkey retina.

Paul K. Brown and Dr. George Wald of Harvard University reported in *Science*, 144:45, 1964, that they had found evidence of all three colors in the human eye, finally proving Young's theory.

They found that individual cones contain primarily one color pigment, although they may be mixed somewhat in each cone.

When light hits one of these visual pigments, it bleaches the pigment by splitting it into its two parts—one a derivative of vitamin A and the other a protein. Enzymes later put the two back together.

Somehow in this chemical reaction, the light impulse is transmitted into impulses that travel the nerve to the brain.

Probably in the brain, the amounts of each color sensed are blended to produce the myriad of shades and mixtures that we see.

• *Science News Letter*, 85:249 April 18, 1964

GEOLOGY

Mysterious Glass Bubbles Found on Small Island

► STRANGE, tiny glass bubbles have been found in the rocks of Great Swan Island, a small Caribbean island.

These fragile bubbles, each about one one-hundredth of an inch in diameter, contain freshwater. And inside each water drop is a vapor bubble which is practically a vacuum. They are apparently volcanic in origin.

As far as is known, these tiny bubbles have not been described or seen before in

any other part of the world, Dr. Edwin Roedder of the Geological Survey, U.S. Department of Interior, told the Geological Society of Washington.

The glass bubbles were found in a layer of soft mudstone about ten feet above sea level on the tree-covered island, which lies about 100 miles north of Honduras. Formerly, this sediment layer lay deep under the sea.

Apparently the bubbles were created by volcanic action in an era about 12 to 40 million years ago. They are formed of colorless volcanic glass, fragments of the volcanic froth called pumice which was formed as the magma, or molten rock deep inside the earth, erupted to the outside air.

The presence of freshwater inside these bubbles is still unexplained. Dr. Roedder believes that outside seawater diffused into the bubble vacuum, passing through the thin glass walls in such a way that the ocean salts, sodium and chloride, were strained out and only the pure water entered.

The thin-sided bubbles, which can break with a touch of a needle, are spherical or egg-shaped, Dr. Roedder said. They were formed among larger bubbles which since have broken, leaving fragments or splinters of glass on the tiny bubbles where they had been attached.

There are about 500 of these tiny bubbles per cubic inch of the mud sediment.

• *Science News Letter*, 85:249 April 18, 1964

GEOPHYSICS

Glorious Red Sunsets Will Return in Fall

► GLORIOUS RED SUNSETS caused by dust thrown high into the atmosphere by the eruption of the Indonesian volcano Agung on Bali a year ago will be visible again this fall.

The spectacular sunsets are now on view from the Southern Hemisphere, Dr. Aden B. Meinel, director of the University of Arizona's Steward Observatory, said. The swing of the dust belt from the Northern to the Southern Hemisphere and back again takes about a year.

The shift in position of the globe-girdling dust band shows that the earth's high atmosphere, some 170,000 feet up, undergoes a yearly fluctuation.

The long-lasting red sunsets are the outstanding feature of the dust belt. However, astronomers measure the band's position accurately by charting how its dust dims the light from stars. Next fall's sunsets will not be as conspicuous as they were in 1963, Dr. Meinel told *SCIENCE SERVICE*.

Weathermen look forward with great interest to the new information about motions in the upper atmosphere being gathered from astronomical observations of the dust band's positions. Only scanty knowledge is now available about such high-level shifts between hemispheres, which may well affect weather at the surface.

Dr. Jurgen Stock of the Inter-American Observatory near La Serena, Chile, is collecting information on the dust belt's positions from observatories around the world.

• *Science News Letter*, 85:249 April 18, 1964

PSYCHOLOGY

Old Folks' Memory Related to Health

► HEALTH IS MORE important than age in determining how well a person remembers, a New York psychologist believes.

The notion that old people have bad memories and that most of them can remember childhood experiences better than recent events could be wrong, Dr. Irene Hulicka of the State University of New York at Buffalo feels. She suspects that many of the healthy elderly can remember just as well as healthy young people.

In one experiment, Dr. Hulicka gave five sets of material to young college students and to volunteers whose age ranged from 50-69 years. The older people did better than the young ones on four out of five "recall" scores.

If young people have the same brain diseases as older ones they will have the same memory disorders. Most old people about whom things are written are sick, many of them with diseases that affect the brain.

Research with hundreds of elderly people has led Dr. Hulicka to believe that those who have good memories for long past events have, as a general rule, adequate memories for recent events as well. Those who cannot remember where they are, the names of their children or their occupation, on the other hand, rarely have clear memories of childhood events.

Older people tend to have learned already what is necessary for them to know, and no longer may be interested in impressing others with a stockpile of useless information, Dr. Hulicka points out.

As for memory of childhood events, she says there is always the possibility that the person may not be reporting accurately, or that he may have had the event described to him many times over the years.

Dr. Hulicka is a research psychologist at the Buffalo Veterans Administration Hospital, and is cooperating with psychologists at other Veterans Administration Hospitals to develop a memory scale that will enable scientists to reach more trustworthy conclusions about memory functioning.

• *Science News Letter*, 85:249 April 18, 1964

PUBLIC HEALTH

New Technique Detects Pesticides in Blood

► A NEW FAST and precise technique for detecting the amount of pesticides within the blood has been developed, the U.S. Public Health Service announced amid growing concern over the effects of pesticides on the health of wildlife and people.

The method, used so far only on fish, will be tried soon on human blood.

Based on recent developments in gas chromatography, the technique was developed by Dr. Mary Schafer, a chemist at Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, a branch office of PHS. The method can detect pesticides in a concentration range of 10 to 40 parts per billion from 10 grams of blood in an hour.

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