

TECHNOLOGY

Valuable Ashes Improve Concrete

► **INDUSTRIAL FLY ASH** from modern power stations is being mixed with cement just as volcanic ash was mixed by ancient Romans with their naturally occurring cement-forming rock.

Both kinds of ash increase the strength of the resulting concrete by combining with left-over lime.

Problems of marketing such ashes from Chicago power stations of the Commonwealth Edison Company were outlined at the American Power Conference in Chicago by Robert B. Freston of Commonwealth Edison.

Fly ash is composed of microscopic spheres of a siliceous material which results from burning coal. It is nearly white in color, and so light in weight that it flies up the smokestack unless halted by electrical precipitation devices used to control smoke and fumes.

Occurring in the same furnaces, another type of ash collected in the form of hard, glassy black slag is now being studied for as useful a market as fly ash, Mr. Freston stated. Over half a million tons of this slag are expected to be produced in 1956, compared with about 200,000 tons of fly ash, by this Chicago company alone.

Storage and handling costs must be kept low to assure economical disposal of this commonly wasted material, but experiments are under way to use the slag as a paving base material.

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MEDICINE

Find How Drugs Build Up Addiction

► **PROFOUND CHANGES** in the body chemistry, which explain tolerance to narcotic drugs, have been discovered for the first time.

The findings may explain why narcotic drug addicts have to take more and more of the drugs in order to get the desired kick, or why patients with very serious and painful illnesses may need larger and larger doses of the narcotic to relieve their pain.

They are part of studies of drugs and their effects on different animals being conducted at the U. S. Public Health Service's National Institute of Mental Health at Bethesda, Md., reported by Dr. Julius Axelrod, chief of the section on pharmacology at the Clinical Center.

The drugs under study are morphine, methadon and meperidine. These three are alike in being the most effective drugs we have for relief of pain and also for causing addiction.

They are alike in the way the body handles them. A catalyst or an enzyme in the liver attacks all three of them in the same way, removing a methyl group from the drug and transforming it into formal-

dehyde. This causes a change in the three drugs. The action of these drugs is antagonized by another drug called N-allyl-normorphine.

This morphine compound not only antagonizes the effects of the three narcotic drugs, but also prevents the action of the liver catalysts or enzymes. As an animal becomes tolerant to morphine and these drugs, so that more and more is needed to produce the same effect, so that more and more is needed to produce the same effect, the activity of this enzyme in the liver has been reduced.

It is apparently the reduction in this enzyme activity that brings on tolerance to the drug. There is also a constant interaction between narcotic drugs and the part of the body called the receptor upon which the drug acts as a key fits into a lock.

As this interaction goes on there is less and less of the receptor, or one might say, fewer and fewer locks for the drug to fit. Consequently more and more of the drug must be given to obtain the effect.

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SURGERY

Strain Brings Hernia on Necks of Trumpeters

► **TRUMPETERS** and glass-blowers sometimes strain their throats so much that a hernia-like swelling comes out on the neck, Dr. Burton J. Soboroff of the University of Illinois College of Medicine, Chicago, told members of the International College of Surgeons at a sectional meeting in White Sulphur Springs, W. Va.

The swelling is probably produced by an out-pouching or herniation of part of the lining of the voice box, or larynx. It may cause severe symptoms of marked and persistent hoarseness, some difficulty in swallowing, bouts of coughing and obstruction to breathing.

The condition, first noted in Mohammedans calling others to prayer, can be cured by surgical removal of the herniated sac. Voice and airway are then restored, Dr. Soboroff reported.

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AERONAUTICS

Jet Vapor Trails Over Scotland

See Front Cover

► **LED BY** a U. S. Air Force officer, modern British supersonic jets, the Hawker Hunters, leave vapor trails eight miles up over Scotland, as shown on the cover of this week's **SCIENCE NEWS LETTER**.

Major Ray O. Roberts of Savannah, Ga., an officer serving in Britain under the U. S. Air Force-Royal Air Force exchange program, has been put in command of Squadron 43 at the RAF Station, Leuchars, Fife, Scotland. The squadron is equipped with Hawker Hunters.

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PUBLIC HEALTH

Cancer Cure Rate Triples in Ten Years

► **CANCER** is now being cured at more than three times the rate of a decade ago, Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, told the American Academy of General Practice meeting in Washington.

"Through early diagnosis and adequate radiological and surgical therapy, the rate of cure in all cancer cases has increased in the past ten years from 15% to more than 50%," he stated.

He called developments in research on chemical treatment of cancer "encouraging" and said this work is "being stepped up."

"Drugs and hormonal substances are gaining increasing value in the treatment of the leukemias and the more common cancers," Dr. Scheele reported. "Some lives are being prolonged and the patients are more comfortable."

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HORTICULTURE

Future Flower Festivals On Schedule Each Year

► **SPRING FLOWER FESTIVALS** may soon take place on schedule, even if the season has been unusually cold.

Experiments with controlling the time of budding by chemical methods have had wide success. However, such techniques have not yet been perfected enough for commercial use, according to Dr. Paul C. Marth, senior plant physiologist at the Department of Agriculture's experimental plant station, Beltsville, Md.

Horticulturists now can delay the fall of cherry blossoms by spraying them with a solution of naphthalene acetic acid when the first petals are out. The treatment keeps the blossoms on the trees one week longer than would be expected.

A naphthalene acetic acid solution is also used to delay the drop of fruit from trees at harvest time. On the other hand, if the chemical is sprayed on fruit trees earlier in the season, it will cause fruit to drop early.

Trees and plants of tomorrow may be made to bloom with a chemical called sodium thiocyanate. Although this product is not yet marketed for horticultural use, it has been successful in field experiments.

Scientists speculate that sodium thiocyanate affects a tree's enzyme system so that it converts stored material into material that can be more easily used for growth.

Attempts to delay budding have been less successful.

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CE FIELDS

ENGINEERING

Nation's First Mobile Gas Turbine Power Plant

► THE NATION'S FIRST mobile gas turbine power plant was described in Portland, Ore.

Designed by the U. S. Army, its development means that, in a time of emergency, towns and cities in the country can be supplied with temporary power quickly while the permanent power source is being repaired.

Mounted in two 54-foot-long railway cars, the gas turbine 5,000-kilowatt plant can be put into operation in five hours by a crew of ten men.

The use of the gas turbine as the prime mover offers several advantages over other types of power plants, Harry H. Rupp and William N. Hornberger of the Westinghouse Electric Corporation told the American Society of Mechanical Engineers meeting in Portland, Ore.

It is light and compact, can be put into service and loaded quickly, needs no water for cooling purposes, and provides good heat efficiency.

In certain areas, the Westinghouse engineers stated, this semi-permanent power plant introduces a new concept to power generation, since the power plant can be moved to the fuel source, rather than transporting the fuel to the power station.

The Army's new portable power plant is expected to find its widest use in cases of service interruption because of enemy attack, local disaster, flood, fire, drought in hydro power regions or under other emergency conditions.

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MEDICINE

See Bright Future for Live Polio Virus Vaccine

► THE DAY is coming when children will drink milk shakes or swallow capsules of live polio virus safely and get protection against the disease, in the opinion of seven researchers reporting in *Journal of the American Medical Association* (March 17).

Altogether 225 nonimmune persons have now swallowed doses of one or the other of two live but attenuated virus strains. All have developed antibodies against the viruses. None has gotten polio or suffered any ill-effects that could be laid to swallowing the viruses.

Most of the 225 were children. Two groups were in state institutions for mentally defective children. Permission to give the virus was obtained from each child's parents.

Health authorities have opposed use of

live polio virus vaccines because of fear that the viruses living in the intestinal tract may spread the disease. This point was tested in some of the trials now reported. A set-up was arranged so that viruses could be spread from immunized to nonimmunized children. Only five of 15 got the viruses and then under "the most intimate of circumstances." None of the nurses became infected.

Capsules are considered the best way to give the live virus for vaccination. With these, the mouth and throat are by-passed, so that only the lower end of the digestive tract can be a source of contagion. Simple personal hygiene may completely prevent transmission of the viruses from this source.

The scientists reporting the trials are Dr. Hilary Koprowski, Thomas W. Norton and Mrs. Doris J. Nelsen of Lederle Laboratories, Pearl River, N. Y.; Dr. George A. Jervis of Letchworth Village, Thiells, N. Y., Dr. Thomas L. Nelson of Sonoma State Hospital, Eldridge, Calif., and Drs. David L. Chadwick and Karl F. Meyer of the University of California School of Medicine, San Francisco.

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PUBLIC SAFETY

A-Bomb Survivors Due To Lose Quarter of Life

► THOSE who "just" survive radiation injury from accidents or bomb explosions are due to lose about one-fourth of their normal life spans, according to findings on animals.

This premature aging or shortening of the life span is one of the permanent effects of radiation, Dr. Henry A. Blair, director of the Atomic Energy Project at the University of Rochester School of Medicine and Dentistry, Rochester, N. Y., reports.

The exposure limit recommended for personnel in atomic energy plants, three-tenths of a roentgen per week, would not, however, shorten life by more than 2.5% even in 20 years of maximum exposure, Dr. Blair said.

With an average life span for Americans of over 60 years, this would mean a shortening of approximately a year and a half.

This would be "very difficult to detect," Dr. Blair said, "and is probably not highly significant in view of other hazards to life."

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TECHNOLOGY

Device Warns Pilots To Lower Plane Wheels

► AN ANNOYING BUZZ will soon sound in the headgear of pilots coming in for landings. Its purpose is to remind pilots to lower their wheels.

The device, invented by John W. Teegarden of the Wright Air Development Center, will replace the currently used horn, difficult to hear.

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PSYCHOLOGY

Crime Increases But Sex Crimes Show Little Rise

► THE VOLUME OF CRIME has been steadily increasing but sex crimes have not increased significantly, Dr. Manfred S. Guttmacher, chief medical officer of the Baltimore, Md., Supreme Bench, reported at the meeting of the American Academy of General Practice in Washington.

Almost two-thirds of all arrests involve repeaters. Sex offenders, however, show a low rate of repeating, or recidivism. Serious sex crimes are not generally committed by persons previously convicted of a sex offense. They are more often committed by a person who has previously been guilty of burglary.

Every five minutes, someone is feloniously assaulted or killed, Dr. Guttmacher stated. He urged physicians to make every effort to prevent the development of defective personality structures.

Sex offenses do not all involve sex deviates, Dr. Guttmacher pointed out. Most homosexuals are not anti-social. Sex offenders, he added, do not graduate from minor to major sex offenses. Many are readily treatable.

Offenses that do not appear sexual often have a sexual basis.

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MEDICINE

Smear Gives Quick Skin Cancer Test

► A SKIN CANCER TEST that takes 15 minutes compared to as much as 48 hours for the conventional test has been devised by Dr. Frederick Urbach, Dr. Herbert Traenkle and Eugene M. Burke of the Roswell Park Memorial Institute, Buffalo, N. Y.

The test is an adaptation of the famous Papanicolaou smear technique now widely used for detecting cancer of the uterus.

A sample of tissue, removed from a suspicious area, is cut across the center and the cut surfaces rubbed on a glass slide. Cancer cells frequently will adhere to the slide and can readily be seen under a microscope. As cancer develops, the cells become less and less sticky. These loose cancer cells lend themselves to microscopic study.

The finding is of value in determining whether a very small lump or sore is malignant. Sometimes the lesion is too small for formal tissue study. A trained pathologist, however, can diagnose cancer if only a few cancer cells are smeared on a slide.

Of 140 tiny specimens examined by this technique only four were erroneously called benign. Of 360 benign tissues, only two incorrectly were called malignant. This compares favorably with the results of the conventional pathological examination called biopsy. The findings were announced by the American Cancer Society.

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