TECHNOLOGY

Mountain Bends Signals For Computer Radio Net

➤ A MOUNTAIN TOP near San Jose, Calif., is being used to bend the signals of a low-power transmitter carrying computer information at the rate of 500,000 numbers each second.

Although over-the-horizon microwave systems are being used for television and telephone nets, the power needed is very high, even several tens of killowatts, and huge antennas are required.

The experiments, conducted by International Business Machines Corporation (IBM) engineers, use power as low as 16 watts and small antennas to send great quantities of information at high speeds.

A "knife-edge diffraction" technique bounces radio signals off narrow ridges of a mountain range. The experimental link operates between Monterey and San Jose, a distance of 45 rugged miles, by bouncing signals off the 3,800-foot-high Loma Prieta ridge in the Santa Cruz mountains.

• Science News Letter, 81:200 March 31, 1962

SPACE

Astronauts Share in Each Space Flight

➤ WHAT HAPPENS to astronauts like Astronaut Donald K. Slayton if they cannot fly?

They will just "phase" away into space flight management, Col. "Shorty" Powers, chief press officer for the seven Mercury astronauts, told SCIENCE SERVICE.

The seven trained space pilots "represent an important resource upon which we can and are building in support of our future more ambitious space flight undertakings," Robert R. Gilruth, director of the National Aeronautics and Space Administration's Manned Spacecraft Flight Center, said.

The Center is the nation's only experienced management agency in the field of manned space flight research. It is currently conducting Project Mercury and has begun the development of Projects Apollo and Gemini.

The Mercury astronauts, most of whom have not had a chance to manage a spacecraft in outer space, already have had a whirl at management on earth, and appear to be good at it.

They have made a major contribution, according to Director Gilruth, to the work begun on Project Apollo, the program to get a three-man crew to the moon and back.

Project Apollo has been under way for almost two years. During this period the seven space pilots have worked with the team assigned to define, design and develop working guidelines. Their recommendations, particularly on design, have been significant.

The astronauts also are working on Project Gemini, the two-man spacecraft program named for the twin stars Castor and Pollux. The spacecraft, a larger adaptation of the Mercury capsule, will be used to develop space rendezvous techniques and for earth orbital missions lasting a week or more.

For the nearer future, they are working hard to adapt the present Mercury system for an 18-orbit flight around the earth following the three-orbit launch of Col. John H. Glenn Jr.

All seven of Project Mercury's team of astronauts are participating in the next orbital mission, including Astronaut Slayton.

The astronauts are extremely conscious of the fact that they share in a multi-billion dollar national enterprise upon which their performance on earth as well as in space may depend.

Soon the pioneer space pilots will begin to select and train additional astronauts to take over space flying should time and circumstance confine them solely to management and control.

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CHEMISTRY

Radiation and Pressure Produce New Compounds

➤ RADIATION and pressure are being used to produce new forms of chemicals at the National Bureau of Standards in Washington, D. C.

Solid compounds are being made from chemicals that normally yield oils, if they can be made to form polymers at all. (Nylon is a well-known polymer.) Carbon disulfide, used as an insecticide, has been made to polymerize at pressures many thousands of times greater than normal after exposure to radiation from cobalt-60.

The preparation of polymers was carried out by L. A. Wall, D. W. Brown and R. E. Florin as part of a program for the U.S. Army Research Office. Other chemicals made into polymers include n-perfluoroheptene-1 and alpha-methylstyrene.

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CHEMISTRY

Compounds of Fatty Acids Laboratory-Synthesized

➤ FIVE COMPOUNDS of fatty acids linked with the control of cholesterol levels in humans have been synthesized in laboratories.

High amounts of cholesterol have been blamed for causing hardening of the arteries.

Three are completely new compounds and two are identical to acids found in nature. The discoveries provide a working tool for scientists to determine whether the acids, known as unsaturates, can effectively curtail cholesterol formation.

The fatty acids were produced by Dr. Walter J. Gensler, Boston University scientist, at the university's chemical center. The naturally occurring acids, linoleic acid and arachidonic acid, are known to reduce the level of cholesterol in the blood under certain conditions.

Ten years of research were required by Dr. Gensler to synthesize the five compounds.

• Science News Letter, 81:200 March 31, 1962

IN SCIEN

MEDICINE

Reduced Blood Flow Weakens Cancer Drugs

➤ A REDUCED BLOOD FLOW through cancerous tumors has been blamed for the inefficiency of cancer drugs.

Experiments with transplanted tumors in rats and mice have disclosed that much less blood flows through the tumors than formerly thought. Drugs administered to cancer victims are therefore received by the tumor in weakened doses, Dr. Pietro M. Gullino and Flora M. Grantham of the National Cancer Institute's biochemistry laboratory, Bethesda, Md., reported in the Institute's Journal.

The scientists estimated that less than five percent of a drug injected into the body to treat a cancer tumor reaches the cancerous site.

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BIOCHEMISTRY

Cancer Immunity Related To Calcium in Bones

➤ THE AMOUNT of calcium in a person's bones may influence his immunity to cancer, a British radiologist said in London.

Calcium is believed to be the key metal affecting radio-sensitivity, and experiments have shown that increased frequency of X-ray causes abnormality of chromosomes, the hereditary part of the cell nuclei, when there is lack of calcium in irradiated material.

Dr. A. Elkeles of the Prince of Wales's General Hospital, London, pointed out in Nature, 193:1089, 1962, the British journal, that "the stabilizing effect of calcium on chromosomes is a factor which influences not only radiosensitivity but may also have a similar effect on carcinogenic (cancer-producing) agents."

Leukemia, or blood cancer, is frequently found among patients receiving X-ray treatments for arthritis of the spine (ankylosing spondylitis), Dr. Elkeles said.

In this condition calcium is removed from the vertebral bones and deposited in the spinal ligaments. The radiologist said it was "feasible to assume" that X-ray radiation of the calcium-depleted vertebral bodies may predispose the patient to leukemia.

No explanation has so far been found for increased leukemia in such patients.

Cancer is significantly less common, he pointed out, in persons over 50 years old who have marked "calcified" atherosclerosis or hardening of the arteries, than in those without it.

Dr. Elkeles has previously suggested the theory that individuals whose tissues show affinity for calcium are relatively immune to cancer.

• Science News Letter, 81:200 March 31, 1962

CE FIELDS

DENISTRY

Control of Tooth Decay Hinges on Protein Origin

➤ A MEANS TO CONTROL tooth decay and certain diseases of the mouth hinges on whether or not some of the many proteins found in saliva are formed by the salivary glands or filtered from the blood.

The proteins in question were probably derived from blood, Dr. George H. Wyshak of the Harvard School of Dental Medicine reported at the 40th General Meeting of the International Association for Dental Research in St. Louis, Mo.

The question of origin of salivary proteins has long been asked by scientists interested in the chemistry of the mouth.

Dr. Wyshak's research on anesthetized female rabbits indicated that rabbit salivary glands, and probably those of humans, permit the passage of large protein molecules, but certain salivary glands selectively filter the blood proteins, and most of the proteins in saliva may come from serum.

Dr. Wyshak was associated in his research with Dr. David Weisberger of the Massachussets General Hospital, Boston, and Miss V. A. Williams, research assistant.

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CONSERVATION

National Park Programs Slowed by Many Interests

See Front Cover

➤ THE FEDERAL GOVERNMENT'S attempt to preserve everything from dinosaurs to dams, historic monuments and wilderness areas is being blocked by strong pressures on Congress.

The increasing needs of an industrial society for more and more land and resources are frequently forcing legislators to either bypass or make fast and difficult decisions on land and water conservation.

The Administration's dynamic program for conservation and parks, explained by President Kennedy and Secretary of the Interior Udall, calls for new ways of procuring, financing and managing lands that would not otherwise be enjoyed by future generations of Americans. The Administration called for swift action in order to save the fast-decreasing open spaces.

But many pressures are confronting legislators and conservationists. Individual landowners do not understand the legal implications of the bills. They feel they are being forced from their homes, or subjected to undue stresses. The lands, however, are generally zoned to keep others from settling in the areas.

Mining, oil and forestry interests are fighting against the restrictions on their industries in public lands also. And since their taxes help support the government, their needs must be considered. Other important interests include farmers who need land for agriculture.

On the other side of the table are conservationists, naturalists and sportsmen who feel the need for open, publicly-owned land. But even here the pressures differ. Sportsmen want the lands open to hunters and fishermen. The purist conservationists want them closed.

The President in his conservation message mentioned 10 of the areas now in legislation for national parks. Seen on the cover is one of the areas, a dune site on Lake Michigan. There are, however, more than two dozen areas now being considered by Congress.

The areas range from seashore recreation facilities and from historic sites to rugged glacial reserves and canyonlands. They are located from Maine to California and from Texas to Michigan.

To finance these and other recreational areas, the President proposed the creation of a Land Conservation Fund, to be supported by admission fees and other sources. These fees are presently channeled into the general funds of the government only to be reappropriated for the purchase of land.

This fund proposal, and the $500 million loan suggested for it, must also pass Congress before many of the direly needed lands can be purchased by the government.

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BOTANY

Work on U.S. Wildflowers From 1884 Returns to U.S.

➤ A UNIQUE WORK, containing illustrations of 463 U.S. wildflowers painted before 1884, has been returned from England after many years exile.

The manuscript, now bound in three volumes, has never been published or reproduced. It was recently found in a private library in London by a Washington book dealer, Nada Kramar. She said the owners of the work sold it with the idea that it would be returned to the United States where it belonged.

The artist-botanist who with loving care painted the pictures in exact reproduction of the wildflowers was Mary White. She used water color as her medium and indexed by hand each illustration, which is a work of art as well.

The work is considered of historical importance. "No work as monumental and complete as this has ever been made in color of American wildflowers," Miss Kramar said.

A work of 400 wildflowers in color was finished in 1929. The artist painting the originals was Mary Vaux Walcott. A special secret process was used to reproduce the paintings.

Miss Kramar feels the artwork in Mary White's drawings is very beautiful and comparable to the Walcott work which is now considered the definitive volume on American wildflowers.

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PSYCHOLOGY

Alcoholics, When Sober, "Compulsively Efficient"

➤ WHEN SOBER, many alcoholics are compulsively efficient and are valuable employees.

This is the belief of Dr. David Greiner, University of California, Los Angeles, psychologist who is engaged in a research project on the career patterns of alcoholics.

Dr. Greiner has worked with scores of problem drinkers during 10 years of research in the field. About 300 recovered alcoholics have been interviewed in the current project.

The research program is under the direction of Dr. Jean S. Felton, department of preventive medicine, with the assistance of research associate Julia P. Newman.

The aim of the project is to find out how former alcoholics adjust in their present careers and the nature of their occupational histories before and during their drinking days. Researchers also want to determine if there is a relationship between satisfying work and recovery from alcoholism.

Many more subjects are needed, Dr. Greiner says. "We would like to interview at least 600."

The project is concerned with non-Skid-Row alcoholics who 1. have been sober for a year or more, and 2. are employed or have a history of gainful occupation. Former alcoholics desiring to participate should write Dr. Felton at the UCLA Medical Center, Los Angeles 24.

Subjects have ranged from factory hands to corporation executives. They have arrived for interviews in everything from buses to Rolls Royces.

Dr. Greiner says his observations indicate that alcoholics frequently push themselves on their jobs when they are sober. One of their problems may be that they set too high levels of expectation, increasing their frustration.

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NATURAL RESOURCES

Nuclear Power Plants To Produce Fresh Water

➤ LARGE ATOMIC power plants that will simultaneously produce electricity from the atom and fresh water from the sea can now be built.

These plants will help reduce the cost of desalting sea water to help meet the world's growing water shortage, Gwilym A. Price, chairman of the board of Westinghouse Electric Corporation, predicted.

Mr. Price spoke at ceremonies dedicating the new Point Loma sea water conversion plant at San Diego, Calif., built by Westinghouse for the Office of Saline Water, U.S. Department of the Interior. The plant's million-gallon-a-day output of fresh water, distilled from the Pacific by a flash evaporation process, is being added to the city of San Diego's regular water supply.

Such a plant is now being considered by the Office of Saline Water.

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