

## Small Radio Navigation Pinpoints Position

► **MORE PRECISE** joint air-ground military operations will be made possible by a miniature, electronic navigation device that will tell the American foot-soldier in combat "his exact position."

The new equipment, called Man-pack Loran, is a compact radio navigation receiver developed by Sperry Gyroscope Division in Great Neck, N. Y. The unit, using Lilliputian-size microcircuits, was designed to be light and small enough to be carried by one man.

In battlefield use the new Loran receiver will permit small ground forces to accurately determine their positions and communicate this information to other ground or air units, also using Loran, enabling them to carry out coordinated close air support, air drop and fire support operations, day or night and in any weather.

Loran, developed during World War II, works on the principle of electronically measuring the arrival time at a receiver of precise radio signals broadcast simultaneously from two or more transmitters located at different geographical points.

These time differences provide an exact position reference that can be converted into latitude and longitude. Loran-A and -C systems (frequency designations) have been used for a number of years on Coast Guard, Navy and commercial ships, in military aircraft, and as part of the navigation system aboard Polaris submarines.

## GENERAL SCIENCE

## Public Health Service To Reorganize, Expand

► **SECRETARY** John W. Gardner of the Department of Health, Education, and Welfare has approved the plan for reorganization of the Public Health Service submitted to him by Surgeon General William H. Stewart.

In announcing the reorganization, called for by President Johnson's Reorganization Plan No. 3 of 1966, Secretary Gardner said, "I believe that this plan will create a stronger Public Health Service, tuned to the health needs of our time and organized to deliver its full measure of the Federal commitment to health."

The new organization of the Service is expected to go into effect on or about January 1, 1967, upon completion of the necessary administrative changes related to funds, personnel, and delegations of authority. It replaces the three operating Bureau structure which has been in effect since 1944.

Commenting on the plan, Surgeon General Stewart said:

"We have reorganized for the future. In the years ahead, the Service must provide leadership and support in delivery of high quality health care, in the control and prevention of disease and environmental hazards, in biomedical research, and in the development of health manpower. I believe this plan will help us meet these goals in an orderly and efficient manner."

The Secretary, who has approved an overall five-Bureau structure for the Public Health Service based on a year-long study by experts from within and outside the Federal government, has now received more detailed plan prepared by the Surgeon General assigning the existing and new Divisions of the Service within the five Bureaus.

The five Bureaus, and their newly-assigned Divisions, are:

A Bureau of Health Services, combining the direct medical care programs of the Service with its activities related to the development of health facilities and the delivery of community health services.

A Bureau of Health Manpower, which will bring together programs of support for the education and training of urgently needed health professionals and supporting personnel.

A Bureau of Disease Prevention and Environmental Control, combining the Service's activities in the control of communicable and chronic diseases, injuries resulting from accidents, and hazards of the modern environment.

The National Institute of Mental Health, made a Bureau to provide a strong central resource for research community services designed to conquer mental illness.

The National Institutes of Health, the primary biomedical research arm of the Federal government, which will be augmented by the addition of a new division of environmental health sciences to spearhead research on environmental threats to health.

Coordination and directing these programs, and setting overall policy for the Public Health Service, will be a strengthened and expanded Office of the Surgeon General.

## TECHNOLOGY

## Mining Industry Will Use Nuclear Energy

► **NUCLEAR** energy may provide the basis for the next technological revolution in the mining industry.

Nuclear gauges may pave the way for controlling many processes which have resisted automation, according to H. C. Dittmar of the Nuclear-Chicago Corporation. Speaking before a meeting of the Society of Mining Engineers the American Institute of Mining, Metallurgical and Petroleum Engineers, Inc., Mr. Dittmar outlined several applications within the industry for nuclear gauges.

# IN SCIENCE

## SURGERY

## Isotope May Replace Knife in Neurosurgery

► **TREATING** certain brain tumors by cutting them out—a delicate and often unsuccessful procedure—may become obsolete if a Swedish professor's method is adopted.

By injecting the tumors, called "cystic craniopharyngiomas," with yttrium isotopes and common salt, Prof. Lars Leksell successfully treated 16 patients. Yttrium is a rare metal first discovered in Sweden.

Prof. Leksell spent six years in collaboration with another scientist to develop the method, which he said is less risky than surgical removal.

It is used on tumors that develop between brain tissue and the pituitary gland, which lies at the base of the brain.

The gland's secretions have an effect on most basic body functions.

The tumor usually develops in children and may produce dwarfism, visual defects and severe headaches.

Prof. Leksell previously developed a proton radiation technique for "bloodless" brain operations.

## ZOOLOGY

## Cows Fed Metal Screws To Improve Diets

► **AUSTRALIAN COWS** are being fed metal screws to keep them healthy.

Thousands of cattle in Australia would now be sickly if someone had not stumbled on the screw trick. Some years ago the Commonwealth Scientific and Industrial Research Organization started feeding cobalt pellets to cattle to combat certain diet deficiencies.

But it was found that in the cow's stomach the pellet became encrusted in a hard casing of lime.

This prevented the cobalt from being released into the cow's system.

Some old grub screws salvaged from derelict farm machinery have solved the problem.

The cows were fed screws in the hope that as their stomachs worked on their food, the screws would keep chipping the hard lime from the cobalt pellets.

It worked. Thousands of cattle on farms throughout Australia are now keeping fit by "rattling when they walk."

# CE FIELDS

## DENTISTRY

### Brown Sugar Inhibits Tooth Decay in Hamsters

► DENTISTS in Sweden have found that brown sugar inhibits tooth decay in hamsters.

Baking the brown sugar, which is unrefined or partially refined sugar, into bread did not remove its cariostatic properties, and combining it with phosphate produced a cooperative action so that the two worked together to inhibit caries.

The researchers, at the University of Umea, assume that the unknown substances in the sugar responsible for inhibiting tooth decay are formed during sugar manufacture, since the primary source of sugar, sugar beets, has no cariostatic properties. Refined sugar is well known for actively promoting decay.

Future research will be aimed at finding the exact fraction of the brown sugar that has cariostatic ability and the precise stage in manufacture where the ability develops.

## ENGINEERING

### India Gets Low-Cost Windmill for Farmers

► INDIA'S need for low cost power to improve its rural economy will be aided by a simple, inexpensive windmill developed by a University of Cincinnati professor and two Indian colleagues during the past summer.

Dr. Herbert C. Preul, Cincinnati university associate professor of civil engineering, while on a U. S. Agency for International Development mission last summer in India, helped design and construct the unique windmill for demonstration at Punjab Engineering College in Chandigarh. Dr. Preul was at one of the AID's 94 summer institutes held this year in India.

Working with him were Dr. K. D. S. R. Somayajulu of the Indian Institute of Technology at Kharagpur and K. D. Mannan of the Punjab Agricultural University at Ludhiana.

Although it looks complicated, the new windmill is easy to fabricate. Its sails are made of thin plywood. Future models, however, will be made of indigenous materials such as bamboo mats, with bamboo poles for the horizontal and vertical shafts.

Bamboo materials are readily available in the rural areas, and, with a little help, farmers can make their own windmills, using this design, at small cost. The wind energy is free and plen-

tiful in Punjab and other parts of India, Dr. Preul noted.

Most conventional windmills, such as those used in the United States, rotate on a horizontal shaft with curved blades. Dr. Preul and his colleagues constructed their windmill with a vertical shaft with large vanes or sails which alternately catch the wind and cause the mechanism to rotate.

Punjab College engineers will study the windmill's characteristics to determine its usefulness under varying wind conditions in the area. Later, it will be coupled to a well pump. In addition to pumping water, it may also be able to generate small amounts of electric power for Indian farmers.

## PLANETARY SCIENCES

### Solar Wind Seen Cause Of Red Glow on Moon

► THE RED glow reported seen from time to time on the moon could be caused by the steady bombardment of the solar wind during the lunar night.

The energy from the protons in this ever-blowing solar breeze is stored in the meteoric dust particles strewn over the lunar surface when it is dark and cold, then released when the sun's rays hit them.

This suggestion to account for the moon's self-made light comes from two scientists at Westinghouse Research Laboratories. Drs. H. K. Sun and J. L. Gonzalez tested their theory on meteorites supplied by the Smithsonian Institution and the American Museum of Natural History.

To simulate the solar wind during lunar night, they irradiated the meteorites with high-energy electrons at the temperature of liquid nitrogen, 320 degrees below zero Fahrenheit. Then the samples were warmed by removing the liquid nitrogen and heating them electrically.

"As the samples are heated," Dr. Sun reported, in *Nature*, 212:23, 1966, "one sees the sporadic glow of blue and red light emitting and fading from various regions. The colors are rather vivid."

Another proposed theory to account for the moon's luminescence is that it is caused by solar flares, the huge electrical "storms" that erupt now and then on the sun's surface. Electrically charged particles, mostly protons, stream outward from the flare and bombard the lunar surface, as well as earth's atmosphere.

The protons strike stony meteorites on the lunar surface. The meteorites glow under proton bombardment for much the same reason that an ordinary fluorescent lamp emits light.

In contrast to the high-speed protons produced by flares on the sun, the solar wind consists of relatively low-energy protons that are continuously generated by the sun and drift outward through interplanetary space.

## PSYCHOLOGY

### Tepid Beer Has 'Soup Image' to Britons

► THE BRITISH like their beer at room temperature because it subconsciously bears an image very close to that of "soup," a psychologist reported.

Eighty people were subjected to depth interviews and psychological "quizzes."

"Group discussions" were carried out in 10 bars.

People questioned spoke of beer as getting the "fog" out of their system, restoring their strength after a day's work, putting blood in their veins.

Hunger means a general state of emotional tension, strong enough in primitive man to stimulate the hunt and the kill, and it is more powerful as motivating factor than sex," said William Schlackman, an American-born industrial psychologist who has been in Britain for six years, in a survey made for a British brewery.

"That primitive tension is what the beer drinker feels as opening time approaches. In civilized man, as in primitive man, it may outweigh the sex drive."

"Oblique" probing revealed a liking for the softly lit, carpeted drinking lounge among people over 35, in spite of their expressed preference for "spit and sawdust."

### Drought Shrinks Lakes on Long Island

► THE SEVERE shrinkage and even disappearance of some permanent lakes on New York State's Long Island during the past year are definitely related to the Northeast's five-year drought.

The "shrinking lake" problem is rather general throughout the island, a survey of observation wells by U.S. Geological Survey hydrologists has shown.

Some bodies of water, however, such as Lake Success in Nassau County, have withstood the drought very well.

Bruce L. Foxworthy, Survey hydrologist in charge of the Long Island office, said that the drying up of Long Island's lakes, ponds and streams is directly related to declining ground water levels."

The reason the water level of Lake Success has not dropped drastically is that its bottom is not generally connected to the underlying ground water.

Most of Long Island's lakes, however, are so situated that their margins represent places where the water table, which is the top of the shallow ground water, intersects the depressions that form the lakes.

Through a series of observation wells, the Geological Survey keeps a watch on ground water levels not only on Long Island but elsewhere around the country.