

## RADIO

**Best Frequencies for Space Communications**

THE BEST FREQUENCIES to use for communications between earth and space vehicles are between 70 and 6,000 megacycles, a scientist of the National Bureau of Standards has calculated.

George W. Haydon of the Central Radio Propagation Laboratory, Boulder, Colo., based his selection of possible frequencies on the properties of the earth's atmosphere and other technical factors affecting radio communications. His results are reported in the *Journal of Research*, 64D:105, 1960, a publication of the National Bureau of Standards.

The frequency on which many United States satellites are tracked and information relayed earthward is 108 megacycles.

With the 70- to 6,000-megacycle band, Dr. Haydon reports, the best frequency to use will depend upon the specific communication service required. The frequency selected will be a compromise between the largest practical size for the antenna, the beam-width needed to track the satellite, and the background radio noise.

Science News Letter, June 11, 1960

## PSYCHOLOGY

**Hypnosis May Reduce Boredom of Space Flight**

SPACE TRAVELERS might be helped by hypnosis, Prof. Roy M. Dorcus of the department of psychology at the University of California, Los Angeles, told a symposium in San Antonio, Tex.

He said hypnosis might implant ideas for reducing fear and anxiety and might be used to reduce boredom. He said spacemen could be trained in self-hypnosis so "that they may bring about sleep when desired and awaken at any time in an alert condition."

Prof. Dorcus spoke at a symposium on psychophysiological aspects of space flight arranged by the Southwest Research Institute and sponsored by the School of Aviation Medicine at Brooks Air Force Base.

Science News Letter, June 11, 1960

## INVENTION

**Safety Belt, Teaching Aid And Life "Belt" Patented**

A NEW safety belt for automobiles was patented by David Oppenheim of New York City. The ends of the belt are attached to sliding tracks on the car's doors.

When a door is opened, the belt slides up and out of the way. The belt also features strips that divide the long belt into two or three seating areas.

These strips go through the seat to the automobile's frame. The belt received patent No. 2,937,882.

A new teaching machine, patent No. 2,937,455, was invented by Norwood Kenneth Perkins, Bernard E. Toben and Horace S. Beattie all of Lexington, Ky. The patent

was assigned to International Business Machines Corp.

One of the machine's tapes displays questions. The other gives the student a choice of answers. If the proper answer is chosen, a light activates a photoelectric cell.

Only then will the machine advance to the next question.

An unusual life preserver, patent No. 2,937,387, was invented by Herbert H. Boynton Jr. of San Diego, Calif., who assigned 49% of the patent to Wayne J. King of Palos Verdes, Calif.

The preserver may be worn deflated about the neck. In an emergency, a stricken swimmer may inflate the preserver by releasing compressed gas from a container in the preserver. A special neckband is designed to prevent strangulation of the swimmer by the swelling preserver.

Science News Letter, June 11, 1960

## ASTRONOMY

**Faint Comet Reinmuth Returns After Six Years**

THE COMET REINMUTH, visible from earth every six years, has been rediscovered by Dr. Elizabeth Roemer at the U. S. Naval Observatory, Flagstaff, Ariz.

The comet is of 19th magnitude, too faint to be seen except by photography with a large telescope. It is expected to brighten only to 15th magnitude by fall, still too faint to be seen without telescopic aid. It is located in the constellation Sagittarius which is low in the southeastern sky.

News of the comet's rediscovery, at 5:35 a.m., EDT, May 22, was sent from Harvard College Observatory, clearing house for astronomical information in the Western Hemisphere.

Science News Letter, June 11, 1960

## AGRICULTURE

**Sugarbeet Hybrids Offer Hope Against Pests**

SUGARBEET VARIETIES resistant to the sugarbeet nematode, an extremely destructive worm, may result from crosses between cultivated sugarbeets and related wild species.

Mrs. Helen Savitsky of the Beet Sugar Development Foundation produced the hybrids at Salt Lake City, Utah, under U. S. Department of Agriculture's Agricultural Research Service supervision.

In crossing the plants she increased the number of chromosomes in the sugarbeet. Instead of the usual two sets of heredity-bearing chromosomes, plants with four sets, or tetraploids, were produced.

Most previous attempts to transfer nematode resistance from wild species to cultivated sugarbeets have been unsuccessful. The hybrids either died before flowering because of poor root development, or were completely sterile.

Because of the increased number of chromosomes in the hybrids produced by Mrs. Savitsky, the chance of developing a sugarbeet that has the chromosome segment carrying resistance to the worm pests is reported promising.

Science News Letter, June 11, 1960

**IN SCIEN**

## INVENTION

**Simpler Fuze Patented To Detonate Missiles**

A HEAT FUZE, patented recently, sets off a missile by utilizing the predictable heat caused by air passing about the missile.

James M. Meek of Silver Spring, Md., and Raymond W. Warren, of McLean, Va., assigned their invention, patent No. 2,937,596, to the U. S. Army.

Usually a missile warhead is detonated at a predetermined point by complex and expensive proximity fuzes, but Mr. Meek and Mr. Warren believe they have a better way.

They have designed a "relatively simple thermal fuze which is activated by aerodynamic heat created by the flight of the missile."

A thermal motor converts the skin heat into motion to close a switch and detonate the missile. Since the heating of a missile from air friction can be predicted accurately, the heat fuze can be set to operate at a precise moment.

Science News Letter, June 11, 1960

## MEDICINE

**Birth Control Chemical Puzzles British Scientists**

A CHEMICAL that has the earmarks of an oral contraceptive has been tested on rats and it works. But here is the catch:

Scientists have not been able to find out in which sex the drug acts.

Dr. W. G. Spector of the University College Hospital Medical School in London has found that fairly high doses of the drug in the drinking water of rats would prevent all pregnancies.

Not only the females but also the males drank the water since they had to be in the same cage at the same time to test the pill's effects.

The biggest problem at the moment seems to be finding a way to separate the drinking water supplies without handling the animals so much that their normal mating behavior is disturbed.

It may be safe to say the drug, 1-methyl-2-phenoxyethyl hydrazinium, acts in the female, Dr. Spector reports in the *Journal of Nature*, 186:720, 1960. It is capable of constricting blood vessels and such an occurrence would prevent the uterine wall from preparing for pregnancy.

On the other hand, there is also reason to believe that the drug may affect the hormone balance associated with fertility in the male or pregnancy in the female.

Regardless of how and where the drug acts, it is safe. Dr. Spector reports it had been given to rats in doses twice as large as the effective dose for several months, and there were no detectable side effects.

Science News Letter, June 11, 1960

# CE FIELDS

## MEDICINE

### Aspirin Tablets Differ In Side Effects Produced

ALL UNBUFFERED ASPIRIN tablets do not behave in the same way, even though they are made of the same chemical substance, two pharmacists have found.

Dr. Gerhard Levy and Barbara A. Hayes of the University of Buffalo School of Pharmacy discovered that six different brands of aspirin show a rather wide variation in the time required to dissolve in stomach acid. The times vary from a little more than eight minutes to nearly 14 minutes.

The dissolving time of aspirin is believed to be an important factor in the upset stomach feeling produced by small amounts of the drug, chemically known as acetylsalicylic acid. Upset stomach is probably due to irritation of the stomach wall, produced by bits of aspirin that stubbornly refuse to dissolve.

The pharmacists, reporting in the *New England Journal of Medicine*, 262:1053, 1960, also studied the dissolving time for buffered aspirin and found it to be less than five minutes. But the disintegration time, during which the pill falls apart into little pieces but does not dissolve, is longer for buffered aspirin than for plain aspirin.

Apart from the gastric effects of these small aspirin doses, large doses prescribed for rheumatic fever and arthritis patients often result in nausea and vomiting that is mostly due to drug action on parts of the brain, rather than on the stomach wall.

Science News Letter, June 11, 1960

## MEDICINE

### Part of Brain Controls Body's "Waterworks"

DAMAGE to the hypothalamus, a part of the brain, results in an unquenchable thirst and incessant urine excretion, two major symptoms of the disorder known as diabetes insipidus.

Drs. Eduardo Gaitan and Joseph F. Dingman of the Tulane Medical School in New Orleans studied 12 patients with disorders of the hypothalamus or the adjoining "master gland," the pituitary. They found that seemingly minor damage to the hypothalamus causes the body's "waterworks" to function improperly.

This is how it works. The hypothalamus rests on the pituitary gland and is connected to it by blood vessels and nerves. When there is too much salt in the normal person's system, the hypothalamus releases ADH or anti-diuretic hormone. This substance seeps down to the pituitary which then releases another hormone that travels via the blood to the kidney. When the kidney gets this hormone signal, it starts retaining water to dilute the salt. The normal per-

son with excess salt in his system gets thirsty, drinks a lot of water and excretes a strong salt solution. Nicotine causes the same response.

The Tulane scientists found that the responses of the 12 patients to salt water or nicotine depended on the kind and degree of damage to the hypothalamus or to the pituitary.

In general, if the hypothalamus and the nerves to the pituitary were normal, the patients showed normal release of ADH. If the hypothalamus or the nerves were damaged, the responses were abnormal.

Some patients with pituitary damage excreted too little urine and they became water-logged. This was traced to under-functioning thyroid and adrenal glands. When adrenal and thyroid hormones, which apparently oppose the effect of ADH, were administered, these patients improved.

The release of ADH is influenced by the central nervous system's response to emotion or cold, chemicals, like alcohol, which inhibit release, or chemicals, like nicotine and morphine, which promote release of the hormone.

Science News Letter, June 11, 1960

## MATHEMATICS

### Mathematical Model to Tell When to Sell Cattle

A MATHEMATICAL MODEL that cattle breeders can use to tell when to breed or sell their stock has been reported to the National Academy of Sciences.

Drs. Richard Bellman and Robert Kalaba of Rand Corporation, Santa Monica, Calif., devised the method to show how modern mathematics and high-speed computers can be of practical help in agricultural problems. The new mathematical system on which their method is based is called dynamic programming and was developed to control defense and industrial processes.

The scientists' formula for determining how to obtain the most money from a given head of cattle of known ages is reported in the *Proceedings of the National Academy of Sciences*, 46:718, 1960.

Science News Letter, June 11, 1960

## ASTRONOMY

### First Guest Astronomers To Visit Kitt Peak Soon

THE FIRST visiting astronomers will start arriving in June at nearby Kitt Peak National Observatory, where a 36-inch telescope is now in operation.

For the following six months, Kitt Peak will be the focus for astronomical research programs by guest scientists, whose studies will range from the light curves of variable stars to spectrograms of emission nebulae in the nucleus of the Milky Way galaxy in which the sun and its planets are located.

Kitt Peak National Observatory, some 40 miles southwest of Tucson, Ariz., on the Papago Indian reservation, is operated for the National Science Foundation by the Association of Universities for Research in Astronomy, or AURA.

Science News Letter, June 11, 1960

## BIOCHEMISTRY

### Nuclear Medicine Facility Designed for Atomic Age

IT LOOKS LIKE the steel vault of a bank, but it is a unique new nuclear medicine facility that will be available for emergency monitoring of victims of nuclear accidents or of space travelers just back from a trip through hazardous radiation belts.

This is the total-body radioactivity counting room in operation at the University of California, Los Angeles.

Designed for a study of the medical and biological problems of the atomic age, the facility was built with funds provided by the Atomic Energy Commission. Dr. Norman S. MacDonald of the Department of Biophysics and Nuclear Medicine at UCLA is director of the facility.

The unusual laboratory consists of an eight-by-eight-by-eight-foot vault with six-inch thick steel walls, ceiling and floor and a battery of some of the most sensitive radioactivity detecting devices and recording instruments.

The heavy steel of the vault shields its interior from practically all background radiation, permitting the sensitive radiation counters within to detect the total radioactivity present in the human body.

Clinical studies will be carried out with the new total-body counter in collaboration with the radiology department and other Medical School departments. These will include: 1. Studies of the more subtle phase of body chemistry involving metal ions. 2. Bone studies involving calcium and strontium. 3. Work on new diagnostic procedures requiring only infinitesimal amounts of radioactive materials.

Science News Letter, June 11, 1960

## ENTOMOLOGY

### Poisoned Peanut Butter Lures and Kills Fire Ants

A MIXTURE of peanut butter and kepone, a new slow-acting stomach poison, promises to rid the South of the fire ant.

Scientists F. S. Arant and Sidney Hays of Alabama Polytechnic Institute at Auburn, Ala., have been 100% successful in field trials of the method of stamping out this insect scourge.

The Alabama scientists say the cost of the method is low.

In the tests, soda straws were packed with the mixture. The straws were then cut into thirds and scattered over pastures infested by the ants. Within 24 hours the pests cleaned out the straws and carried the poisoned mixture into their mounds.

They said the advantage of the short-length straws is that they do not tempt livestock.

Less than one man-hour is needed to prepare and distribute about six pounds of the material to the acre, which is effective treatment.

The fire ant is a destructive insect that has even been known to kill small animals. Its bite causes a stabbing pain similar to that of a bee's sting.

Science News Letter, June 11, 1960