

## PSYCHOLOGY

## Hypnosis No Mystery Anthropologist Says

► HYPNOSIS is mysterious only because scientists do not know enough about the ways in which humans communicate.

Some types of communication may seem extraordinary, as though they were achieved without use of the senses until they are studied, Dr. Ray L. Birdwhistell, an anthropologist at Temple University Medical Center, Philadelphia, told the American Society of Clinical Hypnosis meeting in Chicago.

Superstitions surrounding hypnosis and extra-sensory perception have hindered research, he said. Scientists mistakenly shy away from extraordinary phenomena because they believe the subjects not quite respectable. This myth, Dr. Birdwhistell said, has hindered studies of the subtle methods people use to communicate with each other.

Hypnosis is no mystery to Dr. Birdwhistell. It is only a concentration of poorly understood communication cues, he believes.

From his work with body motion and touch, he reported one case involving a mother and son who communicated words without speech. On the surface it seemed to be ESP, or mental telepathy, but further study indicated they communicated by touch, Dr. Birdwhistell said.

Although the son had not spoken since childhood, he was able to write out words the mother had seen in a dictionary. The two held hands while the son wrote on a slate. Films of the incident show movement in the mother's body and hands. Dr. Birdwhistell is convinced words were passed by hand contact not telepathy.

He does not know how unusual communication by touch is. It is possibly quite common, especially within families, but unobserved by scientists.

Another instance of this subtle form of communication is the muscle reading of crystal gazers. A fortune teller, holding hands with her client while she asks questions, is able to pick up sensitive cues from hand muscles, Dr. Birdwhistell believes.

"We need to learn a great deal more about our sensory channels before we throw everything we do not see or hear into the pot of mysticism," he stated.

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## BIOTECHNOLOGY

## Milk From Coconuts Used To Produce Electricity

► ENGINEERS experimenting with producing electricity from coconut milk have operated a transistor radio for 50 hours during a period of 45 days.

By letting certain bacteria called *Aeromonas formicans* break down the palm tree milk into formic acid, engineers at the Thompson Ramo Wooldridge, Inc., Redondo Beach, Calif., have operated a biochemical battery with the electrical current formed in the acid.

Sugar cane, fruits and yams also can

produce this formic acid. Scientists are hoping to find that ordinary leaves and grass may also be a source of electricity. The coconut electrical system, known as a biochemical fuel cell, can produce 150 watt-hours per pound of milk if operated for 1,000 hours or longer, the engineers found.

The research, performed for the U.S. Army Electronics Command, is described in a technical report called Biochemical Fuel Cells, available through the U.S. Department of Commerce's Clearinghouse, Washington, D.C.

The Army is interested in such a natural battery for military missions to remote places. It may also hold much promise for persons in newly developing countries, particularly in jungle areas where there is much lush vegetation but few conventional sources of electricity. The fuel cell system might prove useful in more populated areas during emergencies.

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## ASTRONOMY

## Large Radio Telescope In Use in West Virginia

See Front Cover

► A NEW, FULLY STEERABLE radio telescope, 140 feet in diameter, is now in operation at the National Radio Astronomy Observatory in Green Bank, West Va.

The telescope was dedicated to fundamental research in radio astronomy on Oct. 13. Dr. Leland J. Haworth, Director of the National Science Foundation gave the principal address.

The new telescope, seen on this week's front cover, can be pointed at a location in the sky to an accuracy of better than 10 seconds of arc, the diameter presented by a dime at a distance of 400 yards.

One significant observation has already been made during the testing stage of the antenna. On July 9, Bertil Hoglund, a Swedish radio astronomer, and Peter Mazger, an NRAO staff member, detected a radio emission line from excited hydrogen gas in the Omega Nebula, a Milky Way nebulosity, at a frequency of 5009 megacycles per second. Since then, the line has been measured in more than 10 other nebulosities.

This observation confirms the prediction in 1959 by a Soviet astronomer, N. S. Kardashev, that excited hydrogen gas should emit bright lines in the radio range. It also confirms the announcement in 1964 of the detection of two similar lines by two Soviet radio astronomy groups. The discovery opens up new areas of research.

Among the investigations to be carried out using the new telescope are detailed measurements of hydrogen radiation from the Milky Way galaxy and from extragalactic objects; the determination of the intensity of radio sources at various points in the spectrum; the detection and measurement of radio radiation from the moon and planets, and the determination of the position and brightness distribution of radio sources when their radiation is cut off as the moon passes in front of them.

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# IN SCIENCE

## SPACE

## Space Observatory Successfully Launched

► AN ORBITING geophysical observatory was launched from Vandenberg Air Force Base in California.

The satellite is flying on a polar orbit around the earth, close enough to collect data on near-earth phenomena.

Satellite OGO-C is the second geophysical observatory sent into space by the National Aeronautics and Space Administration. The first was classified a failure when it was unable to orient itself properly to the earth. However, the "failure" has been sending data during the past year, which will be correlated with new information from OGO-C.

Near-earth data being collected by OGO-C include global mapping of the earth's magnetic field and measurements of charged particles in its atmosphere. OGO-C will also pick up information on the sun's ultraviolet and X-ray emissions.

The spacecraft has more than 100,000 separate parts and looks like an insect with a plethora of antennas, booms and solar panels. During launch, the appendages were jackknifed against the box-shaped main body.

Early calculations showed its orbit is 938 miles from earth at the farthest point, 257 at the closest. The first satellite's orbit was highly elliptical—93,000 miles from the earth. Five more satellites—three with elliptical orbits and two with polar orbits will complete the program.

The OGO spacecraft was developed by TRW Systems, Inc., Redondo Beach, Calif., under the direction of the Goddard Space Flight Center, Greenbelt, Md.

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## AGRICULTURE

## Virus vs. Mites Warfare Saves Citrus Fruit Trees

► GREAT BATTLES are being waged in the microscopic world to save the lives of lemon, orange and other citrus fruit trees.

Agricultural scientists are marshalling doses of virus disease to infiltrate the bodies of citrus red mites, the most destructive pests of California's thriving citrus industry.

The mighty midget warfare is being investigated by entomologists J. E. Gilmore and Francis Munger of Agriculture Research Service, part of the U.S. Department of Agriculture.

The scientists spread the virus disease by spraying natural field populations of mites with water suspensions containing ground-up infected mites. They also released live infected mites into the field, a practice especially effective in places where mite populations are low.

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# E FIELDS

## PUBLIC HEALTH

### Causes of Low Back Pain To Be Studied in Movies

► MOTION PICTURES showing the behavior of persons with low back pain compared with the activity of those without back pain are to be made at Yale University School of Medicine.

Individuals studied will be picking up an object from the floor, getting into or out of a chair, or making other motions that may cause, increase or decrease low back pain.

Comparison of the pictures is expected to demonstrate some of the movements that cause pain, thus giving the doctor an additional tool to use in diagnosis and treatment.

The Yale project will be partially supported by the Vocational Rehabilitation Administration of the U.S. Department of Health, Education and Welfare, which has approved a first-year grant of approximately \$32,000. The university will provide about \$14,000 for the same period.

It is planned that the Vocational Rehabilitation Administration will invest \$13,500 and the university, \$10,000 the second year. Dr. Robcliff V. Jones Jr., associate professor in the department of medicine at Yale, is project director.

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## PUBLIC SAFETY

### Majority of Lives Lost In Crashes Can Be Saved

► SIXTY PERCENT of the lives lost in crash accidents, or about 36,000 persons a year, can be saved and thousands kept from being maimed.

The most important cause of death in an automobile or airplane crash are head wounds. Most of them are "needless", the Federal Aviation Agency found in tests conducted at the Civil Aeromedical Research Institute in Oklahoma City.

A human skull is extremely tough, far stronger than was previously suspected, said Dr. Stanley Mohler, director of the Oklahoma facility.

As a whole, it can stand an impact of 300g's, or a force equivalent to that produced by 3,600 pounds resting on the head.

However, a far weaker force hitting a small area will punch through the skull to the brain and bring death, Dr. Mohler said. This means that protruding knobs, angles, heavy doorposts, sharp instruments and hard dashboards are as fatal to a man when he is flipped forward from a seat belt, as a bullet in his temple.

Dr. Mohler credits the FAA experiment, conducted by John J. Swearingen, as being the first to demonstrate that humans can take 300g's and survive.

Implications are that automobile and air-

plane interiors need to be redesigned, Dr. Mohler said.

Knobs and bars should be eliminated from cars and pilot cabins. Dashboards should be made of soft metal, possibly aluminum, padded with one or two inches of some crushable material such as styrofoam, as should instrument panels and passenger seats in an airplane.

Dr. Mohler emphasized that death is prevented when most of the impact force is taken up in the padding, not the head. A material capable of crushing into a permanent imprint of the face would be suitable.

Present auto dashboards, if they are padded at all, have no more than one-half inch covering over hard metal. In an accident, the skull fractures readily on the unyielding dashboard, if not already cracked by some stray object.

Another method of cutting down the death toll is to build cars of metal flexible enough to crumple on impact, Dr. Mohler said. Although airplane passenger seats are soft, they are springy. Any person hitting one is bounced around, and in the process uproots the chair in front. Dr. Mohler said the seats collapse like dominoes and people are killed.

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## GENERAL SCIENCE

### Anna Freud Receives White House Award

► ANNA FREUD, daughter of Sigmund Freud, was presented the First Dolley Madison Award for Outstanding Service to Children by Mrs. Hubert H. Humphrey at the White House.

Before receiving the award, Miss Freud moderated a seminar in Washington, D.C. on the mental health of children, in which many colleagues from her early days in Vienna participated.

The 70-year-old analyst stands at the head of first-rate child psychiatrists. Her work has provided the basic concepts and techniques of child psychiatry, drawn from her father's principles of psychoanalysis. Still making fresh contributions, Miss Freud published "Normality and Pathology in Childhood" this year.

In 1938 Anna Freud fled Austria with her father, then in his 80's. They settled in London where she administered a foster home for young children of bombed-out families. From this grew the Hampstead Clinic, where Miss Freud still serves as director.

Her visit to Washington was prompted by an invitation to attend the 150th anniversary of the Hillcrest Children's Center—one of the few facilities in the country equipped to provide in a single setting all psychiatric services needed by disturbed children.

Participants in the Hillcrest seminar presided over by Miss Freud were Drs. Milton Senn, Yale University; Anny Katan, Western Reserve University, Cleveland; Erik Erikson, Harvard University; Fritz Redl, Wayne State University, Detroit, and Leo Kanner, John Hopkins University, Baltimore.

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## TECHNOLOGY

### Speech Research Progress Aided by Computer

► A COMPUTER recited part of Hamlet's soliloquy before an august gathering of scientists, and earned their applause by singing in tune, if with a somewhat mechanical voice, a chorus of "Daisy."

The significance of this performance by a computer was that it synthesized speech. It actually spoke and sang. It did not merely repeat or play back as the tape recorders do.

Dr. Peter B. Denes of the Bell Telephone Laboratories used a tape recording of his computer's voice to dramatize to an International Business Machines Corporation scientific symposium in Yorktown Heights, N.Y., how computers have become "one of the most important tools in speech research."

With computers, Dr. Denes said, "we have been able to generate artificial speech from its basic building blocks, called phonemes, which are somewhat like letters are to written language. What makes speech infinitely more difficult to analyze, however, is that the phonemes change when put in different contexts."

Dr. Denes told the 150 scientists attending the computer seminar at the Thomas J. Watson Laboratories that because "we all produce and perceive speech with so little effort, we instinctively feel that it must be an unusually simple process. On close examination it defies explanation and seems almost miraculous."

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## PUBLIC HEALTH

### Food Production Lags Behind Birth Rate

► PEOPLE ARE STILL producing children faster than food in many countries.

Although spectacular results in agricultural technology have been achieved during the last 10 years, the gains in food production are often wiped out by the rapidly growing population, a report by the Food and Agriculture Organization of the United Nations (FAO) headquarters in Rome reported.

The report reviews food and agriculture in the second decade since the end of World War II.

New agricultural methods have made little impact upon developing countries, partly because inadequate government services fail to transmit information that would help farmers.

On the brighter side, farmers in advanced countries have been able to increase production sometimes beyond the level of demand. Estimates show the increase of food production per person in developed lands to be about 14%, but only one percent in developing areas.

As FAO celebrates its 20th birthday this month, the organization calls for more regional and world planning to increase the world's food supply and coordinate better trading agreements.

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