

## GEODESY

## Hydrogen Atom Measures Magnetic Field

► THE PROTON, nucleus of the hydrogen atom, has been harnessed to measure the horizontal and vertical forces of the earth's magnetic field.

Rear Adm. H. Arnold Karo, director of the Coast and Geodetic Survey, has reported that a new instrument, the "proton vector magnetometer," has been successfully tested at the Survey's Fredericksburg (Va.) Magnetic Observatory.

The improved version of the magnetometer also has potential applications in such fields as oil explorations and oceanographic investigations. Earlier versions have been used in rockets and miniaturized models are scheduled for use in satellites.

The previous instruments were capable of measuring only the overall force of the earth's magnetic field, not the direction. The magnetometer, developed by James H. Nelson of the Survey staff, can measure with great precision the magnetic force in both a horizontal and vertical direction, as well as the overall intensity.

By using polarizing electric coils around a plastic cup containing about a pint of distilled water, the instrument introduces a magnetic field that causes the spinning protons of the hydrogen atoms to whirl at right angles with the earth's magnetic field, instead of in line with it as they normally do.

When the induced magnetic field is eliminated, the protons gradually return to their normal path, creating a small alternating current as they do so. The frequency of this current, which can be precisely measured, is directly related to the magnetic field strength.

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## GENERAL SCIENCE

## Antarctic Will Thrive During This Generation

► THE ANTARCTIC will be a useful, thriving continent during the lifetime of some persons living today, one of the South Pole's most widely known living explorers has predicted.

The now barren wasteland covered with ice and snow 200 feet to two miles deep will become a valuable world weather station, a "safe" generating plant for atomic energy and an almost unlimited source of pure water, Dr. Paul A. Siple, scientific director for environmental research, U. S. Army, told the National Security Industrial Association meeting in Washington.

The one-time Boy Scout who accompanied Adm. Richard E. Byrd on an Antarctic expedition 30 years ago told the assembled defense contractors that "after a few more accidents" we will start searching for a safe spot in which to operate our nuclear power reactors. He envisioned the southernmost frozen continent as ideal in the event of a reactor accident.

"In the long run," he said, "we can't trust to the foolproofness of man to prevent ac-

cidents that could be disastrous. After a few more accidents the manufacturing of atomic energy will have to be carried on in a safe place where there is a minimum of consequential life and where the waste products can be safely stored for milleniums. Antarctica has providentially been preserved for mankind to fill this need."

Dr. Siple pointed out that, in addition to providing power for the presently civilized areas of the world, Antarctic nuclear power plants would also produce for the needs there. With an abundance of power to transform the wasteland into a land of productivity, the huge continent could someday become a major civilization center.

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## MEDICINE

## Treat Strokes With Surgery Outside Brain

► STROKES are not always caused by blockage of one of the small arteries in the brain. Other arteries may be to blame.

In many cases, Dr. E. Stanley Crawford of Baylor University reported at the American Heart Association meeting in San Francisco, strokes can be effectively treated through surgery outside the brain.

X-ray studies of arteries have shown that blockage is often located in an artery of the neck or upper torso. When this happens, Dr. Crawford said, the same surgical procedures used for circulatory deficiencies in the arms, legs and elsewhere can be applied.

Normal circulation has now been restored in a majority of 50 patients suffering from paralysis, loss of speech, convulsions, and other disorders, by operating on blocked arteries supplying the brain. Best results were obtained in patients who had had small recurrent attacks and in those who were treated soon after the beginning of their illness.

"It is felt that a curative form of treatment is now available for many people with strokes," Dr. Crawford, concluded. The research team that made the study included Drs. Michael E. De Bakey, Denton A. Cooley and George C. Morris, Jr., all of Baylor University.

Dr. De Bakey also reported a "better than 90% success in restoring circulation to the lower parts of the body through surgery on clogged arteries."

Improved X-ray techniques and blood vessel grafting procedures were said to be the key to surgical success in most of the 957 patients undergoing surgery. In general, Dr. De Bakey said, best results can be expected when clogging is high up in the arterial network where vessels are larger.

According to the particular case, a surgeon may determine to use a graft, cut out a diseased segment of an artery or to remove occluding clots from the artery walls. Sometimes, where the obstruction is widespread and extends into the finer vessels rather than with open arteries sufficiently large to allow a graft to be attached, surgery may be limited to cutting certain nerves to help relieve discomfort.

Science News Letter, November 1, 1958

# IN SCIEN

## PHYSIOLOGY

## Color Vision Studies Confirm "Sex Reversal"

► COLOR BLINDNESS studies confirm theories that some males have two "X" chromosomes and are therefore female so far as nuclear or genetic sex is determined.

The findings confirm earlier theories on the role of "sex chromatin" in determining sex. Its presence apparently indicates XX chromosome combination for female and its absence indicates XY chromosome combination for male.

Since major red-green color vision defects are genetically determined and much more common among males, scientists were able to use color vision tests to check on the genetic sex of individuals. Patients with Klinefelter's syndrome, a condition characterized by male sterility, were tested and found to have "significantly different" color vision from normal males, a group of scientists reports in *Nature* (Oct. 18).

It is difficult to draw conclusions about the sex of individuals from studies of their sex chromosomes, the scientists point out, because there can be so many chromosome anomalies or irregularities even in normal individuals. The color tests can help make correct inferences concerning the X chromosomes present in cases where there is a discrepancy between external appearances and nuclear sex.

The scientists reporting the research are P. E. Polani and P. M. F. Bishop, Guy's Hospital, London; B. Lennox, M. A. Ferguson-Smith, J. S. S. Stewart, Western Infirmary, Glasgow; and A. Prader, Kinderspital, Zurich, Switzerland.

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## PSYCHOLOGY

## "Lip" Reading Involves Entire Body, Gestures

► SUCCESSFUL LIP reading involves more than just watching the lips alone.

Facial expressions, body movements and gestures play a much more important role in face-to-face communication than has been thought.

Audible speech is only a part of an overall "sign" process that constitutes human face-to-face communication, Dr. Louis Stone, clinical psychologist at the University of California at Los Angeles, said.

His conclusions are based upon responses of UCLA students with normal hearing who were untrained in the art of lip reading. They were shown silent films in which an actor spoke while his face and torso were gradually unmasked. More information was communicated as more of the face and body was seen.

Science News Letter, November 1, 1958

# CE FIELDS

## ASTRONAUTICS

### Space Travel Propulsion Problems Being Licked

► THE PROBLEMS of providing thrust for interplanetary travel are being licked, Dr. H. S. Seifert of the Space Technology Laboratories, Los Angeles, has reported.

At least ten companies can say, "Have rocket—will travel," Dr. Seifert told a University of Maryland audience. The next problem is to develop a man-carrying rocket, which will require an as yet non-existent million-pound thrust engine.

The chemical rocket will have reached the ceiling of its performance when it has improved specific impulse by another 25% beyond today's models. For greater thrusts, an energy source such as a nuclear reactor must be used to power the exhaust jet.

Although the problems of operating a nuclear reactor to propel a space vehicle are "formidable," Dr. Seifert said, nuclear research workers believe they can be licked.

A third type of interplanetary propulsion, the ion rocket, is "clean and dainty." It will produce only a small thrust and will operate only in the near-vacuum of interplanetary space.

Dr. Seifert concluded that propulsion, which has been the limiting factor in space travel until now, may soon yield that distinction to guidance and communication.

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## MEDICINE

### Pain-Relief Surgery Increases Life Span

► SOME HOPELESSLY ill cancer patients, operated on merely for temporary relief of pain, have survived in good health for surprisingly long periods.

The results of such surgery on several hundred patients were described by Dr. H. E. Lockhart-Mummery of St. Mark's Hospital, London, at the annual American Cancer Society meeting in New York.

Concerning 268 patients who had undergone palliative operations for rectal cancer, Dr. Lockhart-Mummery said, "We were surprised to find that 24 had lived more than five years since their operations . . ."

An average survival of 20 months was achieved with another group of patients suffering from colon cancer.

Dr. Lockhart-Mummery, who with his St. Mark's colleagues has performed hundreds of such operations during the last 30 years, credited much of the success to "the improvements in surgical technique, anesthesia and supportive care which have occurred during this time."

In 1928, St. Mark's surgeons operated on only 50% or 60% of the patients with cancer of the rectum or colon. Today they find it worthwhile to operate on more than 93%.

In some cases, where the cancer has

spread to other organs, usually a sign that the patient has little time to live, surgical removal of the diseased parts of the organ have prolonged life. Dr. Lockhart-Mummery noted 16 cases in which surgeons removed parts of the liver exhibiting growths caused by the spread of bowel cancer cells. Twelve survived the operations; and their average survival so far is 2.7 years. Four patients are still living.

He said most surgeons now agree that removal of the bowel tumor is advisable where possible, even when the outlook is hopeless because of the cancer's spread. This operation, he suggested, will in many cases relieve painful symptoms, prevent other symptoms that might end life, give psychological benefit, improve general health and well-being, and prolong life.

Science News Letter, November 1, 1958

## SURGERY

### Stress in Pregnancy May Cause Birth Defects

► MATERNAL STRESS during pregnancy appears to be a more important factor than heredity in the cause of birth defects in the infant.

This opinion was expressed by Dr. Lyndon A. Peer of St. Barnabas Rehabilitation Center in Newark, N. J., speaking at the American Society of Plastic and Reconstructive Surgery meeting in Chicago.

Efforts to prevent defects, such as cleft lip and palate, have been hampered in the past by the belief that heredity was the sole cause, Dr. Peer said. Birth defects may occasionally be prevented, he said, if stress factors, such as insufficient oxygen, exposure to X-ray, virus infection, vitamin deficiency and the overproduction of adrenal cortisone, could be discovered and eliminated.

Dr. Peer reported hereditary influences could be traced in about one in every four infants born with a cleft palate and lip. In the other three-fourths, hereditary tendencies are probably reinforced by one or more stress factors.

His own experiments have shown Dr. Peer that administration of large amounts of the vitamins folic acid and B-6 prevented cleft palate in mice. As a result, he has administered these vitamins to pregnant patients who have previously given birth to babies with cleft palates, in order to determine the vitamins' ability to prevent the defect from recurring.

Although it is still too early for significant results, thus far all offspring of these mothers have been normal.

Animal experiments have revealed that the type of deformity in the infant depends on what organs are being formed at the particular stage of pregnancy in which the maternal stress occurs.

In another address at the society's meeting, Dr. Thomas Ray Broadbent of Salt Lake City reported on a palate lengthening operation called a pharyngeal flap, in which a flap of soft tissue from the throat wall is attached to the back of the soft palate. The reason for lengthening the palate is to produce better speech in many children born with cleft palates or abnormal short palates.

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## MEDICINE

### New Fluoroscope Screen Is Brighter and Safer

► A FLUOROSCOPE screen, which gives a much brighter image than conventional screens and decreases the patient's exposure to X-rays, has been developed by Georges Destriau, consultant to Westinghouse Electric Corporation and a professor at the University of Paris.

It is now possible for the physician to fluoroscope his patient, remove him from the apparatus, and then make the image reappear on the screen by turning on the X-ray again. The screen can retain the image for 17 hours. During this time the physician can make the image reappear once for one-half minute. On reexamining the screen in the absence of the patient, the X-ray can be turned on with greater intensity, thus resulting in an image at least twice as bright as on conventional screens.

Similarly, a reappearing image of conventional brightness can be obtained after fluoroscoping a patient with reduced radiation, thereby lessening the danger of over-exposure to the patient.

The screen's image retention is possible because an electric field made to pass across the surfaces of two glass plates in the screen affords more light. In the past, response of fluoroscopic screens to X-rays has been impaired rather than improved by simultaneous application of an electric field.

Since the patient does not stand by the screen during the image's reappearance, the new screen is mainly useful for viewing non-moving parts of the body. Then the brighter image permits viewing in a lighted room and greater perception of detail. Also, the relatively high intensity of the image might make the screen useful with an industrial type TV system where remote viewing is desired.

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## ASTRONOMY

### If Comet Hit Earth: Equal to Million A-Bombs

► A COMET HEAD colliding with earth would generate energy equivalent to a million or more atomic bombs exploding simultaneously.

This estimate of Dr. Harold C. Urey, Nobelist of the Scripps Institution of Oceanography, La Jolla, Calif., was reported to support his theory of a comet source for tektites. Dr. Urey's report appears in *Nature* (Oct. 18)

Dr. Urey believes tektites are associated with the impact of material from comets. Comet heads should occasionally collide with earth, he suggests, producing effects resembling the glass formed from the sands of Alamogordo, N. Mex., when the first atom bomb was exploded.

He said such collisions would "result in a flame-like mass of gas at a very high temperature capable of volatilizing the comet head." Bits of melted terrestrial materials (tektites) would be scattered over large areas by the high pressures developed by the impact.

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