

## BIOPHYSICS

**Prove Chromosome Has Two Unlike Strands**

► THE CHROMOSOME, the unit within the cell that transmits heredity from one generation to the next, has been shown to consist of two unlike strands, wound spirally around each other, Dr. Herbert J. Taylor, department of botany, Columbia University, told the Biophysical Society meeting in Cambridge, Mass.

Last year, Dr. Taylor was able to show by means of labeling with tritium, the radioactive heavy isotope of hydrogen, that the chromosome was composed of two and only two strands of DNA (deoxyribonucleic acid). In addition, these strands usually remain intact when the chromosome splits during cell reproduction. Each strand then replicates, or produces another strand to form a double spiral chromosome again.

took advantage of the fact that occasionally in the work reported now, Dr. Taylor took advantage of the fact that occasionally the two strands do break and exchange segments. By growing successive generations of chromosomes in, first, nutrient solutions containing tritium and then in ordinary nutrient, Dr. Taylor was able to produce chromosomes containing one tritium-labeled and one unlabeled strand.

Analysis of the types of exchanges between strands indicated that the two strands in one chromosome are structurally different.

This result supports the theory that the two strands are complementary structures that separate during replication. Each strand is then able to determine the formation of a new, complementary structure by acting as a sort of template.

Science News Letter, February 22, 1958

## MEDICINE

**Use Radioactive Test For Pernicious Anemia**

► THE USE of a new radioactive test to distinguish between pernicious anemia and other anemia has been announced by the Veterans Administration, Washington.

In the test, doses of radioactive vitamin B-12 are administered to patients and traced to find whether the vitamin is absorbed by the body, Dr. W. Edward Chamberlain, chief of the VA atomic medicine program, reported.

Pernicious anemia is a severe type of anemia in which vitamin B-12 cannot be absorbed normally by the body. People suffering from it lack what is known as "intrinsic factor," a substance secreted in normal human stomachs which enables the body to use the vitamin. Because of the severity of the disease, doctors sometimes begin treatment on the basis of symptoms without extensive diagnostic tests.

But once the patient has been treated with vitamin B-12 or liver extract his blood returns to normal and the usual diagnostic blood tests cannot be used.

The new test is then used to see if the person actually does have pernicious anemia

and needs to be maintained on medication for life.

If the first dose of radioactive vitamin B-12 is not absorbed, then a second dose is given, this time along with "intrinsic factor." If the second dose is then absorbed, it indicates that pernicious anemia is present.

Tracing the vitamin in the body is done with an instrument called a scintillation counter which detects radioactivity and is similar to a Geiger counter.

The test is also useful in stomach surgery cases to show if enough of the stomach remains to produce the needed "intrinsic factor."

Science News Letter, February 22, 1958

## GEOPHYSICS

**Sunspot Cycle Thought Now Past Its Peak**

► THE PRESENT high level of sunspot activity, one result of which are brilliant auroral displays, may have passed its peak about August 1957. (See SNL, Dec. 7, 1957, p. 355.)

A "hint" to this effect is seen by experts at the National Bureau of Standards in tallying the number of sunspots seen daily on the solar surface. The number has dropped below 200 for the first time since the International Geophysical Year.

Science News Letter, February 22, 1958

## METEOROLOGY

**Weather's War Role Remains Unreported**

► WEATHER'S ROLE in war is not included in the official, final report, in two volumes, of the President's Advisory Committee on Weather Control.

Volume One contains the sound scientific findings, saying in effect considerably more research into what makes rain and atmospheric physics in general is needed before any kind of weather control can even be considered. (See p. 124.)

It also contains a notice that Volume Two is not part of the official recommendations of the committee. Volume Two consists of summaries of claims and experiments concerning what happens when silver iodide and other chemicals are thrown into clouds to produce rain, to prevent lightning or hail, or for other effects.

Submission of the final report to President Eisenhower climaxes a seven-year battle concerning what Government agency should have the final say over studies of "rain making" and other weather modification methods. Volume One recommends that future studies be directed by the National Science Foundation, and the House is expected to act during the current session on a bill to authorize this.

Volume One also contains the result, previously reported, that there has been a significant increase in precipitation over that expected naturally when clouds on the windward slopes of western mountain regions were seeded. These results, however, apply only to the specified conditions and do not include seeding over flat lands.

Science News Letter, February 22, 1958

**IN SCIEN**

## GEOPHYSICS

**U. S. Satellite's Birth Officially Announced**

► THE EXPLORER'S birth has been officially announced to the world by the director of the Smithsonian Astrophysical Observatory, Cambridge, Mass.

Dr. Fred L. Whipple said the instrumented U. S. earth satellite will be known as Satellite 1958 alpha. It was placed in orbit at 10:55.5 p.m. EST on Jan. 31 at a point approximately 25.84 degrees north and 73.61 degrees west.

The U. S. satellite was launched by a U. S. Army Jupiter C rocket on Jan. 31 at 10:48 p.m. EST from Cape Canaveral, Fla., at 28.5 degrees north and 80.6 degrees west.

Including the empty rocket casing of the last stage, the satellite weighs about 30 pounds, is cylindrical in shape with a length of 80 inches and a diameter of six inches. It contains two radio transmitters, one of which no longer operates. For about 11 days it made amplitude modulated transmissions at 108.3 megacycles with a power of 50 milliwatts. The still operating transmitter sends a phase modulated signal at 108.0 megacycles with a power level of 10 milliwatts.

Information gathered by instruments in the satellite is being radioed back to earth by the low power transmitter. Scientific experiments include cosmic ray observations, meteoric impact and temperature measurements.

The satellite's surface is white and may be visible with binoculars under good conditions.

Science News Letter, February 22, 1958

## ASTRONOMY

**Sun Has Magnetic Halo For Storing Cosmic Rays**

► THE SUN has a magnetic halo for storing cosmic rays produced by solar flares, giant tongues of gas exploding from the sun's surface.

Cosmic rays are mysterious atomic particles ceaselessly bombarding earth from outer space. Some come from the sun, but the origin of most is not known. One of the largest solar flares ever recorded on Feb. 23, 1956, resulted in a tremendous increase in cosmic ray intensity, more than 2,000 times the normal level.

From studies of the exact times at which this increase occurred around the world, Drs. J. A. Simpson and R. Lust of the University of Chicago found the high energy cosmic rays arrived on earth about nine minutes ahead of the low energy ones. A magnetic envelope around the sun could account for this storage effect, they suggest in *Physical Review* (Dec. 15, 1957).

Science News Letter, February 22, 1958

# CE FIELDS

## LANGUAGE

### Longer Words Found Easier to Understand

► LONGER WORDS to identify letters of the alphabet are more easily understood than shorter ones, two scientists report in *Science* (Feb. 7).

They suggest the familiar Able, Baker, Charlie, Dog, and so on should be replaced with longer words to increase their intelligibility. A person named Sedgwick, for instance, might explain the spelling of his name this way: "S as in 'student,' E as in 'examination,' D as in 'department,' G as in 'grandmother,' W as in 'welcome,' I as in 'industry,' C as in 'companion,' K as in 'kindness.'"

Drs. Mark R. Rosenzweig and Leo Postman of the University of California, Berkeley, have surveyed factors governing intelligibility of words. They found frequency of use and length were the most important. They suggest identifying words for the letters of the alphabet should be chosen from a pool of words that are both frequently used and long.

Science News Letter, February 22, 1958

## ASTRONOMY

### Martian Atmosphere Has Very Little Water Vapor

► ALL THE WATER vapor on Mars equals that found in a box of earthly air two feet wide, two feet long and ten feet high.

If this vapor were condensed to liquid water, it would form a film only one three-hundred-eighteenth of an inch thick over the entire planet.

This is the final conclusion of the most delicate examination yet made of the Martian atmosphere. The studies were done by four National Bureau of Standards scientists, Dr. C. C. Kiess and Mrs. Harriet K. Kiess, and C. H. Corliss and Mrs. Edith L. R. Corliss.

They found the upper limit of water vapor surrounding Mars by examining photographs of sunlight reflected from the planet when the light was spread out into its rainbow colors, or spectra. Their observations were made from both Mauna Loa, Hawaii, and Georgetown College Observatory, Washington, D. C.

The Martian spectra were compared with those of the moon taken at the same time. This was done because the moon is known to be essentially without an atmosphere and because the same sunlight is reflected from the moon as from Mars.

To aid in detecting Martian water vapor and distinguishing it from that in the earth's atmosphere, the spectra photographs were taken both when the planet was moving toward the earth and moving away from it during 1956.

Most of the measurements were made in the infrared, the invisible region beyond visible red when sunlight is broken down into its various components. The scientists recommend that future studies be made even deeper in the infrared.

Although their results are relatively negative, the scientists concluded from visual observations of the planet that Mars does have an atmosphere, and that there is exchange of water vapor between the northern and southern polar caps. As the thin frost at one cap covers a larger area, the area at the other cap shrinks.

They found no evidence for carbon dioxide in the Martian atmosphere.

The Hawaiian phase of the scientists' studies was supported by the National Geographic Society.

Science News Letter, February 22, 1958

## METEOROLOGY

### See Advance Storm Warning

► DETECTING the formation of hurricanes and predicting the paths of these giant tropical storms for several days in advance are foreseen in a report issued by the Smithsonian Institution.

R. C. Gentry and R. H. Simpson of the Weather Bureau's National Hurricane Research Project, West Palm Beach, Fla., reported meteorologists are now making "considerable progress" in understanding the basic mechanisms of hurricanes. They believe some day it may even be possible to put "power brakes or steering wheels" on the great storms.

Doing this, however, means obtaining control of as yet unknown forces in hurricanes themselves. The natural force of the great storms is so much stronger than anything man can ever hope to bring against it that control by any external means probably will always be impossible.

Radar and storm-plunging reconnaissance planes are two fruitful sources of hurricane information.

The discovery of spiral rainbands is among the recent findings concerning the tropical storms. Most of the heavy rain in hurricanes, the second greatest factor in loss of life and property damage, occurs in rainbands that spiral inward toward the storm's center. Between these bands, rainfall is relatively light and near the outer edges there frequently is no rain at all.

Most hurricanes, it is now known, have several centers that may or may not be the same.

There is the center of wind circulation, the point of lowest air pressure and also the point around which the spiral rainbands, or "cloud streets," rotate. Location of these centers may differ by as much as 20 miles.

Hurricanes frequently move along an irregular path that wanders back and forth across the relatively straight path the storms were previously believed to have followed. Some of these oscillations have a short period of three to six hours, some a period of 12 to 36 hours.

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## ENGINEERING

### Army Using Invisible Light to Carry Messages

► INVISIBLE rays of infrared light are being used to transmit voice messages over considerable distances by Army Signal Corps engineers at the Electronic Proving Ground, Fort Huachuca, Ariz.

The "invisible light" waves can be made into a very narrow beam which can only be intercepted or stopped by physically coming into the beam. Once perfected, the communication system will find wide application on the battlefield, since an enemy would not even be aware the light beam existed without special equipment.

Radio or wire messages are fed electrically into the infrared transmitter, and the output at the receiving end can be put on a telephone line, radio transmitter or public address system as desired.

The range of the communication system can be extended by putting relay stations on hilltops to take advantage of the line-of-sight characteristics of the wave, similar to television signals.

The communication systems now commonly used by the Army, such as radio and wire, have certain drawbacks that the new system may be able to overcome.

In time of conflict, radio traffic is so congested that it may become inadequate, while wire-laying is time consuming and the wire is vulnerable to cutting.

Science News Letter, February 22, 1958

## PHYSIOLOGY

### New Technique Studies Heart Muscle "in Action"

► A TECHNIQUE of studying the heart muscle "in action" may provide science with a better understanding of the intricate mechanism of the heartbeat.

Designed by Dr. William J. Whalen of the University of California at Los Angeles Medical School, the method makes possible simultaneous physical and biochemical measurements of heart muscle action.

Tiny strips of human and animal heart muscle are suspended in a small chamber in which is circulated a physiological solution. Highly sensitive strain gauges measure changes in the muscle strip's length, tension, and rate of contraction.

Simultaneously, chemical changes in the solution reflect oxygen consumption of the tissue, thus giving an indication of biochemical activity associated with the muscle action.

Various types of drugs can be put into the chamber to test their effects on heart tissue.

Through the use of this technique it is hoped that the precise biochemistry of the heartbeat may be eventually established and, perhaps, some chemical changes associated with heart failure, Dr. Whalen says.

The work is described in *Circulation Research*, and is being supported by the Los Angeles County and American Heart Associations.

Science News Letter, February 22, 1958