ASTRONOMY

Sunspot Cycle Theory

The sunspot cycle has been found due to the different rates of rotation of charged particles on the various parts of the sun, being more rapid at the equator than toward the poles.

➤ THE SUNSPOT CYCLE of approximately 11 years, an important solar phenomenon affecting the earth's atmosphere, is due to the different rates of rotation of charged atomic particles in the sun.

This new theory advanced by Dr. Horace W. Babcock, assistant director of the Mt. Wilson and Palomar Observatories, in California, is reported in the annual report of the Carnegie Institution of Washington. The Carnegie Institution operates these observatories jointly with California Institute of Technology.

Dr. Babcock advances the idea that the sun's hot, gaseous mass of charged particles rotates more rapidly around the middle than toward the poles. The more rapid rotation in the equatorial regions draws internal lines of magnetic force into a spiral magnetic field that encircles the sun in opposite directions in its northern and southern hemispheres, creating local instabilities.

Ultimately these reach the surface, and sunspots, flares and other solar phenomena appear. At a later stage, powerful electromagnetic field lines may loop high into the solar atmosphere, sometimes passing out into interplanetary space in the direction of the earth.

After about 11 years, according to Dr. Babcock's theory, the material of the sun's equator rotates so far ahead of the other material that the field lines are again brought into the starting configuration, but now with reversed magnetic polarity. This accounts for the 22-year solar magnetic cycle, which is made up of two 11-year sunspot cycles.

The magnetic nature of sunspots was discovered by Dr. George E. Hale, first director of Mt. Wilson Observatory, in 1908, but before Dr. Babcock's work no acceptable theory had been developed that satisfactorily accounted for the sunspot cycle.

Dr. Babcock also discovered after a year's observation the strongest magnetic field yet observed in the universe, a positive 35,700 gauss in star HD215441.

• Science News Letter, 80:411 December 23, 1961

Star Compositions Differ

Many stars have chemical compositions that differ widely from those of nearby stars. Observations during the past year at Mt. Wilson and Palomar by Drs. J. Jugaku and W. L. W. Sargent showed that one star, 3 Centauri A, had four times the iron, five times the nitrogen, 100 times the phosphorus, 1,000 times the krypton, and 10,000 times the gallium of other stars in the vicinity. Distances in the universe based on brightness of stars may need to be revised as they have been determined on the assumption that stars of the same class shine alike. Discovery of different chemical composition among the stars may alter this assumption.

• Science News Letter, 80:411 December 23, 1961

Life on Other Planets

Two opinions on the possibility of life on other planets are reported. Upon Mars there exist organic molecules of living origin, Dr. W. M. Sinton of the Lowell Observatory, working at Palomar, concluded from infrared reflection spectrum of Mars. Dr. Philip H. Abelson, director of the Geophysical Laboratory, surveying planetary environments concluded that not only is there no earth-like life on the moon, Venus or Mars but these heavenly bodies cannot be contaminated by organisms carried from the earth. This will reassure future astronauts who have been fearful of spreading earthly ills to the planets.

• Science News Letter, 80:411 December 23, 1961

Earth's Crust Explored

Deep in the earth's crust there are scattered large islands or lumps of rocks differing from those around them. This was suggested by seismic observations by the Department of Terrestrial Magnetism.

Temperatures beneath the continents vary widely from place to place, Dr. S. P. Clark Jr. of the Geophysical Laboratory concluded from measurements of heat flow from inside the earth.

• Science News Letter, 80:411 December 23, 1961

Scientific Revolution

➤ SCIENTIFIC revolutions of the future will come with lightning speed as a part of total social revolution in developing new countries, Dr. Caryl P. Haskins, president of the Carnegie Institution of Washington, declared in his annual report.

"When scientific revolutions come, they come as integral and delicately balanced parts of total social revolutions," Dr. Haskins said. "The conditions for them will have been maturing for many years. Unconsciously, inchoately, continuously, there has been adjustment over a protracted period, a long approach to some critical and fateful balance. And so, when such a revolution finally occurs, it is likely to come with lightning speed."

When this happens, action must be taken and critical decisions made very quickly, he emphasized, explaining:

"All too soon, for good or ill, a pattern may become firmly set. In this brief, flexible, tempestuous, and highly vulnerable period, a new nation may write its future indelibly. In such a time wisdom in planning is priceless. So also is wisdom, as well as speed and decisiveness, in action. Once critical steps are called for, there is not long to act, and afterward it may forever be too late."

"The most significant period of a scientific revolution comes, not when science is first apprehended by a gifted few," Dr. Haskins said, "but at the moment when the vision that has already compelled them spreads to a whole people."

• Science News Letter, 80:411 December 23, 1961

GENERAL SCIENCE

Families Living in Polar Homes Within 10 Years

➤ FAMILIES will be living permanently at weather stations in Antarctica within ten years, Dr. Paul A. Siple, scientific adviser to the U.S. Army Research Office, reported.

The present "artificial situation" of pioneering by men only could not remain long. "Husband and wife teams will soon be working as a family unit in Antarctica," he said.

"However, full scale colonization of Antarctica is a long way off. People there will be dependent on the outside world for food supplies. Science is the most important thing we can take out of Antarctica at present," Dr. Siple said.

• Science News Letter, 80:411 December 23, 1961

NUCLEAR FUEL ELEMENTS—A General Electric technician checks dimensional tolerances on one of the nuclear fuel elements recently fabricated at San Jose, Calif., for Pacific Gas & Electric Company's $20 million Humboldt Bay Power Plant nuclear unit. Each element, consisting of 49 individual stainless-steel fuel rods, contains about 200 pounds of uranium.