

## GEOPHYSICS

# Moon Captured by Earth

A new moon-earth theory advanced by a Swedish physicist changes the present ideas of the early history of the earth and its satellites—By Watson Davis from Stockholm

► THE MOON was once a planet of the sun, like the earth, but was captured by the earth. Then it broke up and dumped about half of its matter on the earth to form the continents.

This new theory of the moon and earth, advanced by Dr. Hannes Alfvén, director of the physics laboratories of the Royal Institute of Technology, Stockholm, changes ideas of the early history of our globe and its satellite, now the goal of space exploration.

The cataclysmic events that so changed the face of the earth and demoted the moon occurred about three to four billion years ago. This timing fits the datings for the earliest layers of the earth determined by geology and radioactivity.

An ignored scientific paper by a German girls' school teacher, H. Gerstenkorn, was the starting point of the new moon theory. Published in 1955 in the *Zeitschrift für Astrophysik*, the Gerstenkorn research calculated the way in which the earth seized the then planet, when it came near it and swung it into a very eccentric, retrograde orbit. The moon moved around the earth in an opposite direction from now and closer in. Then gravitational forces pulled upon the combination of earth and moon until the moon moved over the poles instead of more nearly over the equator.

Tides on earth were tremendous, rising eight kilometers (five miles) high and traveling around the globe in six hours, "polishing" the surface. The moon began to transfer its angular momentum to the earth in such a way that the earth began to rotate in the same direction as the moon.

The moon filled more of the sky then, dominating the heavens. It may have been twice as massive as now.

The most dramatic events in the existence of the earth occurred when the moon came closest to the earth and experienced a tremendous breaking up. It reached what is known as the Roche limit. Half or more of the moon, as it was then, is believed to have fallen down on the earth.

The smash-up formed the continents, if this idea is correct. The crust of the earth, unlike its more solid core, is similar in density to the moon. This supports the speculation of the break-up of the moon. The late Sir George H. Darwin, a son of the great father of evolution, based his hypothesis upon this fact of the origin of the moon by ejection from the earth by a tidal wave.

The Moho project, being undertaken in the United States to bore down into the interior of the earth through the crust, becomes more important. It will discover whether there is a large difference between the densities of the exterior and the interior of the earth. If the interior is more solid

than the crust, as believed, we may be living on the same kind of material as will be found on the moon when astronauts explore it a decade or less in the future. The new moon origin hypothesis will be sustained if the densities turn out as expected.

Dr. Alfvén thus favors pushing ahead on these two gigantic American explorations:

1. Delving into the interior of the earth by drilling many miles through the bottom of the Pacific to reach the junction of the earth's crust and core known as the Mohorovicic discontinuity.

2. Putting scientists on the moon to find out what the moon is made of—the conquest of the moon to which the U. S. has pledged some four billion dollars.

When the moon broke up with great violence, so much material came to earth that not just the continents but all the crust of the earth may be moon-stuff. But some fragments were exploded into space. Much of this material fell down upon the moon, producing the craters, whose origin is so much discussed. Other fragments were whirled about in space and even now are arriving on earth as meteors.

In the turbulent conditions of the impact of the moon's material into the earth, some of the substance of the earth itself was projected into space, reaching the moon or existing as meteors. Since there was life on

earth at the time of the moon break-up, very primitive earthly life may have been flung into space or even exported to the moon in this manner.

Recently organic material that had living origin has been claimed as detected in meteorites, "stones from the sky," analyzed in the United States. The moon break-up theory offers an explanation of how evidences of life can be contained in meteorites, without assuming that life began independently of the earth in other parts of the solar system.

The German school teacher, in his late 40's, unknown in world science circles, whose paper inaugurated the present inquiries, visited Stockholm at Dr. Alfvén's invitation this winter. Never before outside of Germany where he teaches in a Hanover "gymnasium" for girls, he developed his earth-moon theories mathematically, and independently, without support of scientific institutions. The work of H. Gerstenkorn promises to rank with that of the British scientists, Sir George Darwin and Sir Harold Jeffreys, and that of Dr. Alfvén himself, who has published extensively on the origin of the solar system.

Dr. Alfvén's bringing to light of Gerstenkorn's theory is similar to the discovery at the turn of the century of Mendel's original work on the laws of heredity, which was also ignored when first published.

An advanced research group at the Swedish Royal Institute of Technology is headed by Dr. Alfvén, who is a world authority on magnetohydrodynamics, the branch of physics that deals with plasma or clouds of gas. The possibility of harnessing for power production the fusion or thermonuclear reaction of the hydrogen bomb is contained in plasma research, which is being undertaken on large scale in the U.S. and USSR.

Since the reactions in the sun and stars, as well as space, are like the tremendous happenings in the thermonuclear bomb, the basic experiments in the Royal Institute's laboratories duplicating phenomena of the great streams of radiation from the sun and in space are important steps toward understanding how to duplicate the cosmic forces here on earth.

Dr. Alfvén's paper is published in *Icarus* 1:357, 1963, and further studies on the solar system are to appear in the *Astrophysical Journal*.

• Science News Letter, 83:291 May 11, 1963



General Electric

**NEW FUEL CELL**—Diesel oil is combined with air in a new fuel cell that generates electricity directly to power the motor shown at the right. Pouring the fuel is Dr. Thomas Grubb (right) with Dr. Leonard Niedrach, developers of this fuel cell.

## TECHNOLOGY

## Computer Discovers New Prime Number

► A COMPUTER has discovered a new prime number. It is the biggest prime number ever proved—2,917 digits long. Proof that the number could be divided evenly only by itself took the Illiac II high-speed electrical computer a mere 85 minutes. In this time it did three-quarter billion multiplications and additions. By hand, the calculations would take 80,000 man years.

Prof. Donald B. Gillies of the University of Illinois Computer Laboratory, Urbana, Ill., developed the program for the computer.

• Science News Letter, 83:291 May 11, 1963