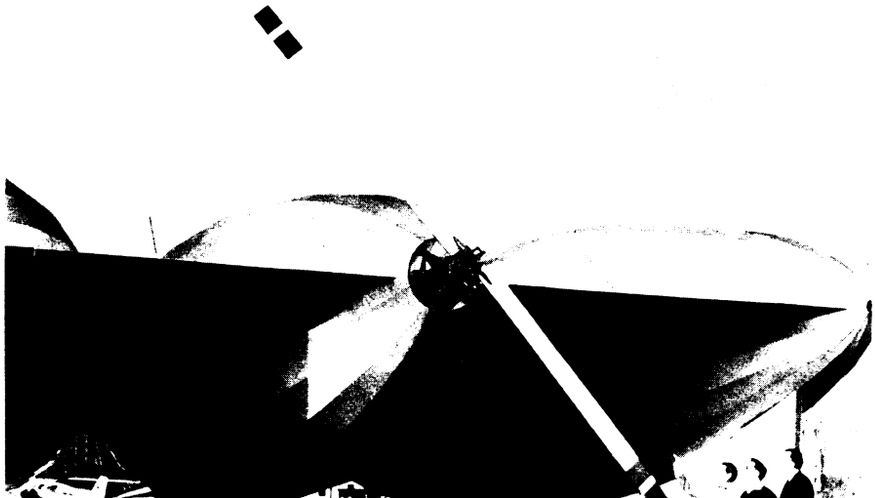

Aereon

RIGID AIRSHIP—The multiple-hulled Aereon, an experimental lighter-than-air craft, is powered by a helicopter-type rotor mounted at the stern of the center hull. The dirigible incorporates new aerodynamic concepts, structural innovations and modern-day materials. Looking on are (left to right) Carl A. Beck, John R. Fitzpatrick and Monroe Drew Jr. of Aereon Corporation, King of Prussia, Pa.

PHYSICS

Power Direct From Fission

A one-step process that generates electricity directly from atomic fission, especially useful in space travel, may soon replace the procedure of present-day atomic power plants.

➤ THE DAY SEEMS to be approaching when electricity will be generated directly from atomic fission instead of using the roundabout three-step, heat-steam turbine-generator procedure now used in commercial atomic power plants. The new method would be especially effective in space travel.

Beginning as early as 1956, Dr. George Safonov of the Rand Corporation, Santa Monica, Calif., developed designs and experiments exploring the one-step process.

First the Air Force and then the Atomic Energy Commission sponsored the Rand Corporation project, which last year was turned over to a new group, Advanced Concepts Technology, Milpitas, Calif.

An attempt now is being made to lead to a full-scale reactor that produces electricity directly.

Atomic fragments or particles are shot off from uranium bombarded by neutrons produced in the fission process. The fission-electric cell, which is the heart of the reactor, consists of two basic electrodes made of magnesium.

A cigar-sized electrode is coated with a small amount of uranium. This is centered in a quart-sized vacuum chamber which constitutes the second electrode. Fission occurs when the uranium on the central electrode is exposed to neutrons.

The electrically charged fragments, yielded by fission, speed from the central electrode to be intercepted by the vacuum-chamber electrode. In this manner, the two-electrode system is internally charged by fragment electricity which may be discharged into electrical machines to do useful work.

The essence of the concept is the immediate conversion of a newborn nuclear fragment's energy of motion to the electrostatic energy of a condenser-like electrode system. The field set up by the two electrodes decelerates the fragment as it speeds from one electrode to the other.

As the fragment's kinetic energy decreases, the electrostatic energy of the condenser system increases. Thus, one may visualize a fission-electric cell as a condenser-like device that may usefully discharge electrical energy that is continuously resupplied by charged fission fragments born within the system.

Maximum potentials of several million volts are theoretically developable by the fragment-electricity generators. This high potential capability of one-step converters comes from the inherently high energy of the fragments yielded by nuclear fission.

Useful conversion efficiencies require operation at some 100,000 volts, and maximum efficiencies would result from operations near a million volts. The generation of such high voltages under irradiation conditions requires the development of special materials preparation and vacuum technologies.

Conventional atomic power plants employ a three-step scheme for converting fissile fuel energy into electric energy. Fission-fragment energy is first converted to heat energy which produces high-temperature steam. Second, a steam turbine converts the heat to mechanical energy. Third, the turbine drives a generator, and mechanical energy is converted to electricity.

Two-step schemes, under active development by several industrial laboratories, first degrade fragment-energy to heat and thence convert the heat into electricity. One-step conversion would aim to use electrically charged fission-fragments directly.

More than a million kilowatts, enough electrical power to supply the needs of a million and a half people, is being produced now from conventional nuclear power plants in the United States, of which there are 17 producing electricity.

Twelve more of considerable size are under construction and the U.S. Atomic Energy Commission expects larger sized plants, now being considered, to achieve competitive nuclear power in those parts of the country where fossil fuels are high.

The useful atomic power in the near future will be produced by nuclear reactors of the operating type, developed through Government and utilities cooperation.

But there is hope that the powerful reaction of the H-bomb, in which by fusion of light elements energy is produced, can be harnessed.

Research to this end continues to be a major Atomic Energy Commission project, but progress has been slower than was hoped earlier.

• Science News Letter, 85:117 Feb. 22, 1964

PSYCHOLOGY

Vision, More Than Touch, Influences Men's Minds

➤ WE ARE INFLUENCED more by what we see than what we feel.

A series of experiments at the department of psychology at Yeshiva University, New York, revealed that people are impressed by what they see, even though the visual image is not the same as what they correctly feel with their fingers.

In the experiments, each person was shown an object whose visual shape was changed by means of optical distortion. At the same instant he grasped the object from behind, through a black silk cloth, so that he could not see his hand. This see-and-touch part of the experiment lasted for five seconds.

The person was then asked to express his impression of the object—a white square made of hard plastic—by drawing it or by matching another object with it.

With surprisingly consistent results, the people drew rectangular shapes—the shape they saw rather than felt. This indicates that vision was completely dominant, Irvin Rock and Jack Victor reported in Science, 143:594, 1964.

• Science News Letter, 85:117 Feb. 22, 1964