ASTRONAUTICS

Design Space "Sailboat"

➤ A SAIL one ten-thousandth of an inch thick, larger in area than the Pentagon, yet "blown" by less than one-half pound in solar energy has been advanced as the cheapest, simplest and lightest means of propulsion for the exploration of space.

Dr. T. C. Tsu, aerodynamicist at the Westinghouse Research Laboratories, Pittsburgh, reported the sail would be attached by shroud lines to a gondola carrying a payload and crew. The whole ship would resemble a huge, flat-top parachute.

The sail would be made of aluminum foil or lightweight plastic, and be propelled by the extremely slight amount of pressure the sun is known to exert when it shines on a body.

Dr. Tsu, developer of the sail, estimates the weight of such a sail would be about 800 pounds if the weight of the payload were 1,000 pounds. Not only could the sail serve as a means of propulsion but it could be used as a long-range radar antenna and a radiation sweeper to remove radioactive materials found in space.

The solar sailboat would have to be launched from the earth by means of a conventional rocket. Once in orbit, however, the rocket would be discarded, the sail could be unfurled and space travel would continue with no further dependence on fuel.

Trips to nearby planets would be faster for such a sail ship than it would be for chemical rockets, Dr. Tsu claims. This is because a chemical rocket exerts a large force for a short time, whereas a solar sail is pushed by a small force for a long time.

Thus, a one-way trip to Mars, according to Dr. Tsu, would take 118 days by solar sail, but 260 days by chemical rocket. A solar sailboat could get there quicker despite the fact that it would take it several weeks to escape from the earth's gravitational pull and an additional few weeks to penetrate the gravity of Mars.

Travel to distant planets, however, would be slower as the solar sailboat would be delayed en route by having to revolve around the sun.

The solar boat could sail into the sun or away from the sun in much the same way as an ordinary sailboat can move into or away from the wind.

Science News Letter, November 1, 1958

ENGINEERING

Motor Works at Fiery Heat

➤ AN ELECTRICAL insulation material enabling motors, transformers and other electrical equipment to be operated and do useful work at literally red-hot temperatures was demonstrated at the Westinghouse Research Laboratories in Pittsburgh.

A motor heated to a temperature of 1,200 degrees Fahrenheit and giving off a steady bright red glow was operated for several minutes at 1,800 revolutions per minute. Other motors built with the new insulator have been operated at temperatures ranging from 950 to 1,000 degrees for appreciable lengths of time, one of them for more than 100 hours. These are believed to be the first workable motors able to withstand such high heat without artificial cooling.

The insulating substance, called "Hot Rock," is inorganic, has good thermal stability, and consists of Fiberglas impregnated with a phosphate material. It is flexible and easily placed.

The material was developed by a team of four Westinghouse scientists headed by Dr. E. J. Croop. The others were C. H. Vondracek, D. C. Westervelt and C. F. Hoffman. They believe Hot Rock is "a candidate for space age insulation."

The insulating material could have widespread application in supersonic jet flights, missiles and rockets. It could also be used in household appliances such as refrigerators and washing machines to prevent the motors from burning.

Even higher temperatures than 1,200 degrees could be withstood by Hot Rock, the scientists believe, but such temperatures might cause breakdown of the metals involved. Iron, for instance, loses its magnetic properties at 1,300 degrees Fahrenheit.

The demonstration motor was equipped with special bearings wound with pure silver wire to eliminate the oxidation and other deteriorations such high heat would inflict on conventional copper wire.

Science News Letter, November 1, 1958

FIRE "BATH"—Electric motor performs even in searing heat from jets of burning gas.

● RADIO

Saturday, Nov. 8, 1958, 1:35-1:45 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Dr. Theodore Puck, professor of biophysics of University of Colorado School of Medicine, Denver, Colorado and an Albert Lasker Award Winner for 1958, will discuss "Cell Genetics."

AERONAUTICS

Air Commuting With Turbo-Prop Engine

➤ A TURBO-PROP engine that can be fitted into existing American two-engine airplanes, would allow departures every 20 minutes on the busy New York-Washington route.

Sir Archibold Hope, director of Napier Engines, a subsidiary of the English Electric Co., made this prediction in announcing the new engine. He foresees the elimination of costly ticketing and baggage-handling procedures.

"Under this plan," Sir Archibald said, "passengers would pay their fares as they board, carrying their own baggage, and the loaded airliners would be weighed automatically before departure. This type of operation, exploiting the benefits of the turbo-prop aircraft, would permit fares lower than present air-coach rates. The turbo-prop aircraft permits higher payloads and thus more passengers, permitting seating arrangements in aircraft similar to those in typical city buses."

The Napier Eland turbo-prop engine, specifically designed for air transport, has four replaceable self-contained units: reduction gearbox, compressor and main support plate, combustion system, and turbine. The Eland is a single shaft turbo-prop developing 3,500 E.S.H.P. for take-off.

Science News Letter, November 1, 1958

ENGINEERING

New Rocket Missile Tests Parachutes

➤ A ROCKET missile nicknamed the "Cree" has been developed by the Air Force to test parachutes at speeds of more than 3,000 miles per hour and at altitudes of 26 miles above the earth.

The missile will enable Air Force engineers and scientists to study performances of first-stage parachutes for manned aircraft escape capsules, missiles and drones. Previously, checking characteristics of these 14- to 48-inch parachutes was limited to ground level experiments at speeds of 1,216 miles per hour.

The Cree was developed for the Air Research and Development Command's Wright Air Development Center, Dayton, Ohio. Three parachutes are tested at one time by a cluster of three test missiles that are mounted parallel and propelled by a ground-to-air missile booster unit.

Science News Letter, November 1, 1958