

ASTRONAUTICS

Plan Guide for Astronauts

Invisible magnetic fields may provide astronauts with navigation system within the solar system. A device that will measure weak and strong magnetic fields is being developed.

FUTURE ASTRONAUTS may use invisible magnetic fields in space for emergency navigation within the solar system.

There is a "distinct possibility" that magnetic fields, like the one that makes compass needles point north on earth, could supplement astronomical and inertial navigation systems.

But before scientists can know the extent to which a magnetic navigation system could be of value, they first must determine what magnetic conditions exist in space.

With this goal in mind, the National Aeronautics and Space Administration has contracted for development of a "rubidium vapor magnetometer" by Varian Associates, Palo Alto, Calif. The sensitive magnetometer, which can measure weak as well as strong magnetic fields, ultimately will be put aboard a space-going rocket. It will radio back to earth the magnetic field conditions it encounters on the flight, especially around the moon. This space experiment probably will not be conducted this year.

Results of the flight may tend to confirm or disprove a current theory that solar flares, associated with sunspots, fling out plasma

which in some parts of the solar system trap magnetic fields. In other parts of the solar system, especially close to the earth, the plasma tends to blow away magnetic fields.

The rubidium vapor magnetometer, which recently was improved in sensitivity to weak fields by T. L. Skillman of NASA and Dr. Peter L. Bender of the National Bureau of Standards, is to be carefully checked at the Fredericksburg (Va.) Magnetic Observatory and Laboratory.

The Observatory has a room containing electric coils 18 feet in diameter. They can simulate magnetic conditions anywhere on earth. By adjusting the controls carefully, even the earth's magnetic field can be cancelled out, yielding a small area having effectively no magnetic field.

New controls are being installed, financed by NASA, to compensate automatically for changes in the earth's magnetic field, especially during magnetic storms. These controls will help scientists achieve a constant field intensity during the instrument's check-out period.

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SPACE TEST—Miniaturized instruments developed by the Boeing Airplane Company are shown on a life-size model. The 15-pound metabolism measuring instrument held by Dr. Irving Streimer was trimmed down from the normal 100-pound device.

ENGINEERING

AEC to Exploit Thorium In Hunt for Atomic Power

IN ITS SEARCH for sources of nuclear power the Atomic Energy Commission has begun a long range program to exploit the energy of thorium.

The Oak Ridge Operations Office of the AEC will develop thermal breeder reactors to change thorium into fissionable uranium-233, the AEC has announced. Thorium is inserted into the reactor fueled with uranium-233 or uranium-235. The uranium sustains a nuclear chain reaction in which the reacting neutrons are slowed down to thermal (heat) energies.

The slow neutrons are captured by the thorium to form some new uranium-233, fissionable material which may be used to replace the old uranium in the reactor. The reactors are called breeder reactors because they produce more fissionable material than they consume.

Thorium is more abundant in the earth than natural uranium but reserves exploitable for commercial use are less extensive. Thorium, a dark gray metal, is found in monazite sand in North and South Carolina and in Brazil and India.

The breeder reactor will convert thorium to fissionable material at a doubling time of not more than 25 years. Enough fissionable material will be produced in 25 years to start a new breeder reactor.

In the initial phases, the thorium breeder reactor program will be a basic research project. It will also evaluate reactor technology to determine the best-suited thermal breeder reactor.

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BIOLOGY

Plants Yield Serum

A report from Yugoslavia describes what may be the first reaction of a plant to human antigens, a response that appears to be the reverse of known plant-animal reactions.

PLANTS GIVEN human red blood cells have reacted to the injection "like people," producing serum containing antibodies.

This is believed to be the first reported reaction of a plant to a human antigen.

A Yugoslav medical researcher, Aleksandar Mitrovic, reports having successfully obtained serum artificially from living plants. According to a brief abstract which appears in *Scientific Information Report* (July 17), the serum will be sent for testing and study to scientists in Europe and America.

Red blood cells of group "O" were injected into the "trunks of ten plants," the translated report reads. Some plants died, others lost their leaves. After one month, sap from the living plants was extracted and seven and one-half liters of serum were obtained.

Hundreds of samples of human blood were then tested with the serum. "A very sensitive method of testing" showed that the plant extract "behaves in the same way as reagent obtained from humans," the Yugoslav scientist reports.

The Central Intelligence Agency translates these unevaluated research reports from Yugoslavia and Iron Curtain countries which are then distributed as semi-monthly publications by the U. S. Department of Commerce.

If true, this report will have important scientific significance, Dr. Geoffrey Edsall of Walter Reed Army Medical Center told SCIENCE SERVICE.

For some time now, Dr. Edsall pointed out, scientists have shown that plant juices will react with blood serum. However, the Yugoslav research appears to be a reverse of this, Dr. Edsall explained.

"To the best of my knowledge," another Walter Reed researcher said, "this is the first reported reaction of a plant to a human antigen." A practical application might be its use as typing serums for testing human blood. For example, Col. Joseph H. Akeroyd said, it might provide a relatively cheap source of Rh serum. All that used now is of human origin.

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