

PHYSICS

Rocket Probes Magnetism

AN "OPTICAL PUMP," capable of measuring highly attenuated interplanetary magnetic fields, has been recommended for inclusion in instrument packages of future rocket probes.

It can measure extremely weak fields at great distances from their sources with precision unmatched by any other known instrument, Dr. Arnold L. Bloom, a physicist with Varian Associates, Palo Alto, Calif., reports in *Naval Research Reviews*.

Although the instrument bears no physical relationship to the familiar water, compressed air and vacuum pumps, it holds one principle in common with the others. It raises substances to a permanent condition of higher potential energy.

Using a light beam, it pumps new energy into atoms.

Dr. Bloom says the optical pump uses quantum mechanical principles.

Every atom is capable of assuming a number of possible quantum states or total energy. With each change in total energy, there is a subsequent change in some properties of the atom.

In the pump, when a specific wavelength of light is directed at, for example, sodium vapor, the energy of the sodium atoms increases. It jumps from what might be called state "A" to state "C."

However each atom tends to revert back to its lower energy state. It is equally probable the reversion will be back to state "A" or to state "B."

State "B" is not excited by the same wavelength of light. The atoms assuming state "B" are "trapped." The light causes state "A" atoms to continue their energy jumps up to "C" and back down until virtually all of them eventually are trapped in the "B" state.

The transparency of the sodium vapor increases as more atoms reach the "B" state. Thus, success of the pumping is measured by intensity of the light passing through the vapor.

Magnetic fields impressed on the vapor affect its energy level. Measurements of energy level changes reveal the strength of the magnetic field.

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National Committee on Radiation Protection and Measurements.

Health officials in Washington, however, expressed the belief these newly detected high levels are not dangerous. Available evidence indicates that the amount of strontium-90 appearing in milk is considerably less than the amount of strontium-90 in the cow's diet. Yet, health officials say they do not know exactly how much of the dangerous isotope travels to the milk and meat of the cow.

When asked about foods that are grown in these areas and consumed directly by humans, Food and Drug physiologist Dr. Edwin Laug said that normal processing, that is, washing and blanching of vegetables, should remove most of the radioactivity.

However, the exact amount that is removed by this method has not been determined. The U. S. Public Health Service plans to examine the radioactivity of 473 samples of 50 varieties of food grown throughout the country.

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CHEMISTRY

Strong New Plastic Challenges Metals

A TOUGH, RESILIENT plastic that will substitute for many metals has been developed. It is called Delrin and is the product of Du Pont scientists in Wilmington, Del.

Plastics heretofore have not been strong enough to compete with metals in many applications. Now, Delrin promises to be usable for car door handles, dashboards of cars, fuel pump and carburetor parts, and showerheads. More than 75% of its potential applications, which number more than 500, involve replacement of steel, brass, aluminum and zinc.

The reason for Delrin's excellent properties lies in its chemical structure. It is formed from formaldehyde, a relatively simple molecule. The formaldehyde is polymerized, or joined together in long, tightly-packed chains. These unbranched chains form into very dense crystals giving the plastic its strength and unique ability for long wear.

The first usable polymer of formaldehyde that has been developed to any great extent, Delrin is being commercially manufactured by E. I. du Pont de Nemours & Company. It required 300 man-years of experimental work to develop a stable form of the polymer, and the development costs exceeded those spent by the company to produce nylon.

Delrin cannot replace metals completely, however. It cannot be easily cemented, and is discolored by ultraviolet rays, a characteristic of most plastics. Whether Delrin will be practical for very large shapes is not yet known. A garbage can liner is the largest thus far successfully made and tested.

Many companies are already interested in Delrin as a metal replacement, and polyformaldehyde seems to be on the brink of assuming considerable industrial importance.

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GYNECOLOGY

Fetal Sex Still Unknown

EXPECTANT MOTHERS still face the ancient and perplexing problem of whether to knit blue or pink booties, despite the advances of this scientific age.

Although scientists appear to be near to perfecting a reliable method of predicting the sex of unborn babies, the present "wait and see" policy remains the best.

One of the latest scientific methods, which could be the answer to the problem, involves analyzing the amniotic fluid of the pregnant woman. No claims have yet been made as to its accuracy, however.

Scientists and pseudo-scientists have engaged in one of the most frustrating guessing games in the past 4,000 years of history.

The superstitions relating to the prediction of fetal sex illustrate in fascinating manner the credulity and skepticism of mankind, its bondage to tradition, and its flights of rationalization and imagination, Dr. Thomas R. Forbes of the Yale University School of Medicine reports in the *Proceedings of the American Philosophical Society*.

The oldest method on record goes back 4,000 years to the Egyptians. They recommend, in writings on ancient papyrus, that a mixture of dates and sand be placed in two flasks. Add barley or spelt to one, wheat to the other, after soaking each in the urine of the pregnant woman. If the wheat sprouts first, a son will be born, if barley, a girl.

Even Hippocrates, the father of medicine, got into the guessing game by describing both tests and physical signs for determining fetal sex. He believed that boys develop on the right side of the uterus and girls on the left. Therefore, if the fetus were a boy,

the right eye of the mother would be brighter and clearer and her right breast larger. If a girl, the opposite side would show these signs, he said.

The persistent belief that the male baby would be brighter or stronger or more active during pregnancy dominated the thinking of people down through the ages. Even today there is the saying that an active fetus will be a boy.

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PUBLIC HEALTH

Strontium-90 Level Soars Above Safe Amount

SAMPLES OF ALFALFA hay grown in Minnesota and South Dakota have been found to contain more than 10 times the maximum permissible level of strontium-90.

These figures, and others, were released by the Department of Health, Education and Welfare. They are based on samples tested in October, 1958.

Other samples of strontium-90 levels showed that alfalfa hay grown in Nebraska contained one and one-half times the permissible level, and those grown in Maryland almost eight times the permissible level.

Samples of the beta radioactivity of alfalfa hay and ensilage were studied in 19 states. Only the above four were studied for their strontium-90 count.

The maximum permissible level of strontium-90 has been set at 80 micromicrocuries per liter or kilogram in the entire diet over a lifetime. This standard was set by the