

GEOPHYSICS

Forerunners of Satellites

➤ **SIX GOLD-PLATED MAGNESIUM** spheres, forerunners of the actual satellites to be launched during the International Geophysical Year, have been received by the Naval Research Laboratory.

Final outer coatings of the spheres are now being applied at the Research and Development Laboratories of the Army Corps of Engineers at Fort Belvoir, Va. The shiny globes, 20 inches in diameter with a skin .032 of an inch thick, were built by Brooks and Perkins, Inc., Detroit, under Navy contract.

Four coatings go over the gold-plating: an adhesive layer of chromium, a separating layer of silicon monoxide, next a layer of highly reflecting aluminum, and a thick, final layer of silicon monoxide. The outer coat is to absorb infrared rays and emit heat, thus protecting the aluminum.

The coating is done in vacuum vats in which the vaporized coating material is deposited on the spheres by condensation. The finished globes will be given a mirror polish.

When the satellite gets into its orbit, it will be about as visible optically as a shiny golf ball traveling at the speed of sound at 60,000 feet, the Naval Research Laboratory reports. Therefore, scientists will try to track it initially by radio, using a small 10 to 50 milliwatt transmitter called the Minitrack.

In case the radio fails, however, teams of volunteer observers will attempt to spot it with especially-designed optical equipment.

To detect the weak radio signal, only a millionth as strong as a standard radio broadcast, special receivers are being built. One of these is now in operation at NRL's satellite tracking station, Blossom Point, Md. Eleven more are being built by Bendix Aviation Corporation.

The position of the earth-circling satellite will be computed by measuring the minute differences in time required for the radio signal to reach each one of several ground antennas, spaced as much as 500 feet apart.

A computer to determine the exact moment when the third stage of the launching vehicle will be fired, injecting the satellite into its orbit, has been completed and tested by Air Associates, Inc., under a sub-contract with the Glenn L. Martin Company. It is known as a "coasting time computer," the Office of Naval Research reports in *Research Reviews* (March).

The first stage of the three-stage rocket that will fire the satellite into space will use a special grade of kerosene called Shell UMF Grade B as fuel. It is produced by Shell Oil Company through close control of refining operations to obtain the particular characteristics needed for rocket fuel.

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tion have shown that engineers give a favorable "over-all" verdict on their companies, but they are critical on several crucial points, Mr. Rusch reported.

They give the following complaints most frequently and spontaneously when discussing their relations with company management, he said.

Seventy-seven percent say "Engineers are given too much routine work." Seventy-six percent say "Pay is not high enough compared with other positions requiring the same or less ability." Sixty-one percent say "Engineers are not kept properly informed of company policy."

In another part of the general survey, the majority of engineers showed a strong aversion to forming unions for collective bargaining. This sentiment against unions varied widely from company to company, though, indicating that management's handling of a particular engineer can be a very important factor in his thinking about unions, Mr. Rusch said.

Two things are needed if engineers and management are to make the most of their relationship, he concluded.

"Management must understand what the engineer expects, and know that his expectations are high. But the engineer must also learn to view his own job as management is forced to see it, in the light of the complex requirements of the entire business, which must prosper as an organization if its various members—engineers included—are themselves to grow in stature, be prosperous, and be happy in their work."

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BIOPHYSICS

Check 40-Year-Old Food

➤ **CANNED FOODS** that were packed in sawdust and left in Antarctica more than 40 years ago will be brought back and checked for radioactivity, John L. Harvey, deputy commissioner, U. S. Food and Drug Administration (FDA) in Washington reported.

The preserved food will be used to complete the FDA collection of authentic samples of canned foods packed before 1945, the "year one" of the atomic age. They will provide the base measurements in a study of radioactivity of common foods which the FDA has started and will continue.

There is no significant radioactivity in this country's food supply today, Mr. Harvey pointed out.

"This is only a scientific study which will help us to evaluate any future increase in radioactivity, should that become necessary," he said.

Samples of the foods will be obtained from their "refrigerators" at two camp sites in Antarctica. One is at Cape Royds, built and occupied by the British Antarctic Expedition in 1908-9 under Sir Ernest Shackleton. The other camp site is at Cape Evans, established by Capt. Robert Falcon

Scott, Royal Navy, during his expedition from 1910 to 1913.

Large stores of foods remain at both camps and most of them appear to be in perfect condition, Capt. Richard Black, USNR, who visited the sites in 1956, reported.

The food is being made available by the cooperation of the U. S. Antarctic Programs and the British and New Zealand governments.

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ENGINEERING

Management Has Trouble As Engineering Grows

➤ **THE ENGINEERING PROFESSION** has grown tremendously since World War II, but it has not done so without trouble between engineers and the management of the companies they work for, Hugh L. Rusch, Opinion Research Corporation, Princeton, N. J., told the American Institute of Chemical Engineers meeting in White Sulphur Springs, W. Va.

Interviews with engineers across the na-

BIOCHEMISTRY

Need Vitamins to Make Antibodies to Fight Ills

➤ **VITAMINS** are vitally needed by the body if it is to develop antibodies for fighting infection, Dr. A. E. Axelrod, professor of biochemistry, University of Pittsburgh, Pittsburgh, Pa., told the National Vitamin Foundation meeting in New York.

Animal experiments with diphtheria toxoid, used in man to produce immunity against diphtheria, show that an adequate supply of vitamins must be present in the body at the time the toxoid is injected if a satisfactory number of antibodies are to be produced by either the first injection or by future "booster" injections, he reported.

This booster reaction is applied in the vaccination schedule of three injections used with the Salk vaccine for polio.

Rats who received diets lacking in some of the B-complex vitamins were unable to produce antibodies after a single dose of the diphtheria toxoid. Similar results were found in rats fed on a diet lacking in tryptophane, an amino acid found in protein, Dr. Axelrod reported.

The secondary or booster response was also inhibited in rats lacking the vitamins. Neither vitamin supplements nor stimulation by the toxoid in this secondary stage could help antibody response.

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