ORNITHOLOGY

Albatross "Beats the Heat"

➤ STUDIES of "how to beat the heat" have been aided by the albatross, the good luck symbol of ancient mariners and the "gooney bird" of the Pacific.

Drs. Thomas R. Howell and George A. Bartholomew, University of California, Los Angeles, zoologists, have made a special study of the big birds on Midway Island in the Pacific. These albatrosses are extremely tame and make good scientific subjects, they report.

The UCLA scientists have investigated how albatrosses and their young survive the extreme temperatures of their desert island sanctuaries. They have found that the birds lay their eggs (one to a nest), hatch them and rear the infant birds during Midway's mild season before the intense summer heat sets in.

The young albatrosses are equipped with a number of mechanisms for adapting to heat as the summer approaches. One such mechanism is in the webbing of their feet. This relatively thin membrane contains a large number of tiny blood vessels from which heat in the blood can be dissipated.

The birds sit on their heels with their webbed toes in the air (to keep the webbing off the hot sand) and shade their feet with their bodies to make the most effective use of this heat-dissipating mechanism.

The young get their water from squid fed to them by their parents. The water from the squid is quite salty, but the birds have an unusual mechanism in their nostrils for excreting salt. Adequate water is thus made available for evaporative cooling of the body.

The adult birds drink sea water most of the time. They have been observed to peck at raindrops while nesting. They may obtain some water in this manner while brooding since they refuse to leave the nest for the sea during this period.

• Science News Letter, 80:34 July 15, 1961

TECHNOLOGY

Aid New Nations' Needs

➤ COMPETENCE SHOWN by the United States in developing new technologies for space conquest should be applied to helping the world's underdeveloped areas as well.

But each step in a development program should be geared specifically to actual conditions and needs of developing economies now emerging from traditional societies. In early stages, "power dams and steel mills" place too large a burden on low-level economic conditions and limited skills.

This approach to U.S. assistance for young nations comes from Jack Baranson, research associate with the Committee for Economic Development in Washington, D.C. He suggests how several technological innovations might be "tailored to national levels and aspirations."

New products, such as high-protein flours made from fish, could help solve critical food supply problems.

New industrial processes could give developing economies "competitive advantage in selective markets"—for example, producing reinforced plastic to replace steel as a structural material.

Many developing areas, Mr. Baranson points out, are just as cut off from "civilization" as orbiting satellites. They need self-sustaining, long-life products and equipment. New systems and designs also would foster local pride and prestige—"no small factor in emerging nationalism."

Technicians responsible for solar batteries in space satellites might apply their ingenuity to developing low-kilowatt generators for small-scale industries in remote villages. A thermoelectric coupling could be used, for example, to convert heat from kerosene lamps into electricity.

Low-cost nylon bearings, requiring no lubrication, could be installed on ox carts and other simple vehicles.

Communications satellite systems offer possibilities for educating "vast numbers of illiterates in remote regions." World-wide TV channels could furnish developing areas with latest medical techniques or agricultural and industrial extension services.

Mr. Baranson suggests allowing private firms to bid on research contracts "just as aerospace firms do for the National Aeronautics and Space Administration." In time, some firms would be familiar enough with situations in particular countries to specialize in their technological development. And the funds provided to create new technologies would greatly increase the individual country's own ability to produce needed food and materials.

Each country's "deep-rooted cultural and psychological affinities" should be considered, he said. National tastes may overshadow economic necessity. In certain Asian countries, for example, people were so accustomed to eating rice that it was necessary "to simulate the taste, texture, and even the shape of rice grains" in order to make wheat flour acceptable.

As used in existing foreign aid programs, advanced technologies have only made the gap separating have and have-not nations more obvious, rather than narrowing it, Mr. Baranson believes.

A revised program "compatible with the interests and yearnings of new nations" would provide bold, imaginative help for emerging nations in Africa, Asia and Latin America, he said.

A preliminary statement on Mr. Baranson's report appears in the Harvard Business Review (July-Aug.).

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METALLURGY

Supersonic Wet "Bullets" Fired Into Thick Metals

➤ RESEARCHERS are firing "bullets" of water into metal targets at supersonic speeds to study the erosive action of water droplets, an American Society of Testing Materials symposium learned in Atlantic City, N. J.

Water jets, traveling at velocities up to 3,400 miles an hour are released when a lead pellet is fired by compressed air into a small sealed reservoir. The jet then strikes the test metal. It can leave a sizable dent in thick slabs of copper and stainless steel.

S. M. DeCorso and R. E. Kothmann of the Westinghouse Electric Corporation's research laboratories, Pittsburgh, Pa., said the tests are aimed at finding ways to prevent erosion in turbine blades from water drops in moist steam. Similar erosion affects airplane and missile surfaces when they hit raindrops during high-speed flights.

Stellite (a cobalt alloy) and tungsten carbide have shown the greatest resistance to water bombardment in metals tested to date, they reported.

A side effect of their scientific shooting expedition has yet to be explained. Photographs show that a burst of light, lasting less than one-millionth of a second, is given off by the water as it crashes into metal. No one knows why.

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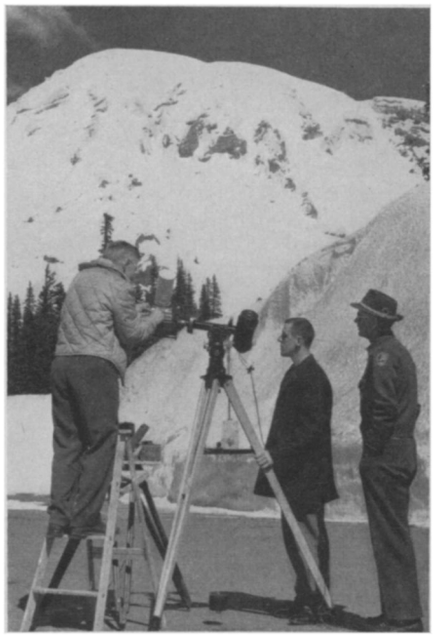

POWER FROM SUN—The Somor concentrator, adapted for solar cells in satellites, is expected to increase the amount of electricity from sunlight by 45%. Researchers of the Boeing Company, Seattle, Wash., produced intensity of more than 100 watts a square foot in studies made on the haze-free slopes of Mt. Rainier, Washington.

SPACE

A-Powered Satellite

The first nuclear-powered satellite, Transit IV-A, can be pinpointed at all times and will provide more information about the earth's gravitational field, Tove Neville reports.

➤ THE NEW TRANSIT IV-A satellite is the first navigation satellite up high enough for scientists to figure out exactly where it is and will be at all times.

Transit IV-A, which is the first nuclear-powered, three-in-one satellite pockage, is now circling the earth at 550 miles at the closest point and 629 miles when farthest away.

The position of Transit IV-A is much easier to calculate than that of earlier Transit satellites because there is no air drag at this high altitude. Transit will also supply more information about the earth's gravitational field. (Gravity is the pull on all objects towards the earth's center.)

The rocket was launched at a 66-degree angle from the equator, so that the Transit can be used twice a day from most of the earth's surface to determine position. The satellite takes 104 minutes for the trip around the globe.

The future Transit system will consist of four satellites enabling ships and aircraft to find their position anywhere on earth every half hour. They are expected to have nuclear batteries. Transits will also be important for defense since submarines carrying Polaris missiles can use the Transit to find their position for purposes of shooting missiles to target.

Transit IV-A is powered by a nuclear battery containing the radioisotope plutonium-238, expected to last many years. Greb III and Injun were launched with the Transit. The two companion satellites are designed to collect information for studying radiation effects, necessary for planning manned space travel.

The operational Transit system satellites are scheduled to go up sometime in 1962 after two or more test shots. The Transits sent up so far are experimental, designed to test the memory device that receives information from earth and sends it back when needed, to test time signals, and to improve techniques for calculating the orbits of satellites. Nuclear batteries are being tested because chemical batteries would not have a long enough "life."

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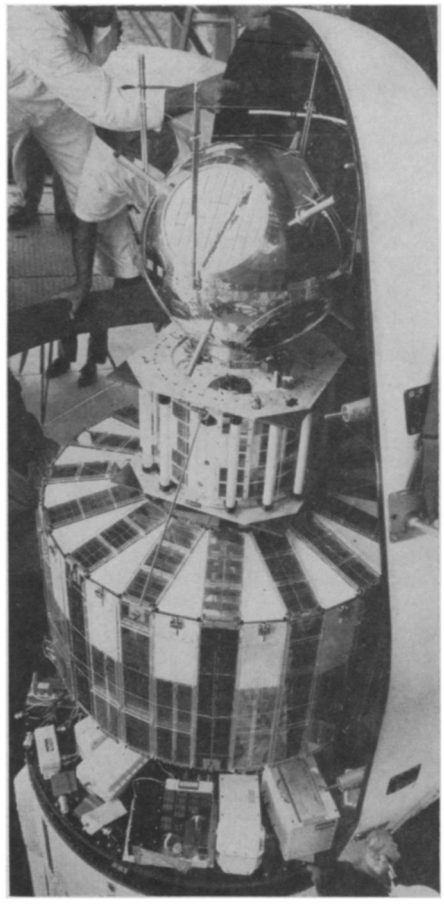

THREE-IN-ONE—Transit IV-A and two companion satellites are being installed in the nose cone of the launch rocket, a Thor-Able-Star, at Cape Canaveral, Fla. Transit IV-A (bottom) is a forerunner for operational navigation satellites. The space probe Injun (center) was designed to study radiation of the Van Allen belts and aurora borealis, or Northern Lights. The sphere (top) is the Greb-III stellite that is measuring solar radiation.

ANTHROPOLOGY

Space Men Predicted

➤ NOW THAT MAN has been put briefly into space and scientists are seriously planning to send men to the moon or nearby planets, anthropologists are speculating on what the first visitor to earth from space may be like.

Not much stock is placed in the comic books' picture of the visitor from space. It is of "little help," says Dr. William Howells, professor of anthropology at Harvard University. The comic books show only flying saucers manned by "flabby little web-footed goblins with knobs on their heads."

Dr. Howells has built up a scientific picture of the first men from space, based on the course of human evolution.

"I will lay a small bet," he said in Discovery, 22:237, 1961, "that the first men from Outer Space will be neither bipeds nor quadrupeds, but bimanous, quadrupedal hexapods" (two hands, four feet, six limbs).

Look for the space visitor to have one head and two sexes, Dr. Howell recommends.

"Two heads are not better than one; making up a single mind is more than most of us can do, as it is."

Look for plenty of fingers on the ends of two arms.

"Two arms; not three, because the creatures should be symmetrical like us; and not four, because coordination would probably be too difficult for efficiency. Centipedes have to run their arms in teams."

"Five fingers seems like a good number, perhaps a minimum."

Perhaps, if our space visitor does have two hands with five fingers, we may expect that he will have developed a decimal system of numbers as we have.

We can surely expect hands and fingers on any intelligent being from space.

"If we can learn anything from our evolution," Dr. Howells explains, "it is that we had to be able to do things to become human. And our whole struggle was the getting and freeing of hands to do them with. Surely, we would not have had large brains without them."

After speculating what the intelligent being created by evolution on a distant world would have to be like, Dr. Howells wonders whether the chain of evolution that produced man could ever be repeated.

"Supposing, in a moment of idiot progress, we really killed ourselves off. Would *Homo* rise again?"

The ancient ancestors of man are all gone, "man has competed them into the grave."

There are still the apes, but they are probably too specialized to turn to freer use of the hands. Monkeys might do if something made it worth while for the species to stand up. In this case, the new men might have tails. But, in fact, the monkeys have made no move to mimic human ancestors during about 35,000,000 years.

No other higher mammals of this earth will serve to start man's evolutionary line.

"Horses, dogs, elephants, all are deeply committed to being what they are." The next try, Dr. Howells concludes, would have to come from a tree shrew, laboriously repeating all of primate history. But, before the little tree shrew could start the evolutionary line now, the world would have to be swept clean of the kind of competition which might overwhelm the shrew's descendants. This means getting rid of most higher mammals, above all rats, cats, and monkeys.

"All in all, our hopes for repetition are not good, and we had better stay the hand that drops the bomb."

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