

GEOPHYSICS

Equator Is Egg-Shaped

The earth's equatorial diameter is 1,400 feet longer when measured from certain points on the surface, an astronomer has found from satellite tracking camera photographs.

► THE EARTH'S EQUATOR is egg-shaped, not circular, an astronomer has found.

Imre G. Izsak, astronomer at the Smithsonian Astrophysical Observatory, Cambridge, Mass., used high precision photographs taken by the Baker-Nunn satellite tracking cameras to discover that the equator is elliptical.

He determined the equatorial diameter is about 1,400 feet longer from a point in the Atlantic just off the eastern tip of Brazil across to a point near the Admiralty Islands above eastern Australia than the diameter from a point on the equator below Southern California across to a point below Iran.

Mr. Izsak presented his findings to the Ohio State University symposium on Geodesy in the Space Age in Columbus, Ohio. He said the movements of satellites are affected by the elliptical shape of the equator.

Geophysicists have long suspected the equator was not circular because certain

patterns in the gravitational field indicate the elliptical shape. It was not, however, until the Baker-Nunn cameras produced satellite photographs accurate to about 1/1000 of a second in time and two seconds of arc in angular distance that the suspected effect of the shape of the equator could be proved.

The present determination is preliminary and is being refined.

The Smithsonian has 12 satellite tracking stations scattered around the world. Two are in the U.S., one in Hawaii, Curacao in the West Indies, Argentina, Peru, Spain, South Africa, Iran, India, Japan and Australia.

Mr. Izsak said photographs of the satellites Vanguard I and II were used to determine the elliptical equator. There is as yet no theory as to why the equator is egg-shaped, and the problem puzzles geophysicists.

• Science News Letter, 79:99 February 18, 1961

PHYSIOLOGY

Nature's Clocks Unaffected

► AN EXPERIMENT conducted at two South Pole stations apparently has dispelled the notion that the earth's rotation controls the biological "clocks" of plants and animals.

Dr. Karl C. Hamner, University of California at Los Angeles botanist, and two assistants showed that modifying the influence of the earth's rotation on bean plants, hamsters, fungi and fruit flies failed to alter their inner rhythms.

The experiments were aimed at clarifying the workings of the "biological clock," the system whereby plants and animals function with almost clock-like regularity. For instance, some plants fold their leaves at night and open them by day. Birds know when to migrate and bears know when to hibernate. Even man shows rhythm in his sleep cycle, and in daily variations of body temperature and blood sugar levels.

Scientists are trying to determine if this is controlled by metabolic changes within the individual organisms or by external factors such as temperature, atmospheric pressure, gravity, cosmic rays, the earth's magnetic field or rotation.

In investigating the latter, Dr. Hamner and Drs. Gir Raj Sirohi and Takashi Hoshizaki selected the U.S. South Pole and the McMurdo Sound stations because of their closeness to the earth's axis of spin.

The experiments were conducted in total

darkness on clock-driven, rotating turntables which could be run either counter to or with the direction of the earth's rotation.

Some turntables were set at time periods of less than 24 hours, others of more than 24 hours, and still others were rotated at 24-hour periods in a direction counter to the earth's rotation. The control turntables were stationary.

The hamsters, plants and other organisms all failed to show any loss of rhythm during the ten-day rotation period.

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BIOLOGY

Texan Offers Kinder Way to Kill Crabs

► YES, IT DOES HURT the live crab or lobster when it is dunked in a pot of boiling water.

Yes, there is a kinder way to kill the tasty crustaceans.

Dr. Gordon Gunter of the Texas Game and Fish Commission sharply criticized the present methods of scalding live crabs and lobsters to death, and suggested a painless process as a more civilized substitute.

Place the live crab or lobster in a pot of cool, fresh water and slowly heat it to a lukewarm 104 degrees Fahrenheit.

The fresh water has an anesthetizing

effect because it leaches salt from the body fluids. The crustacean will die "quickly and easily without showing distress" as the water is warmed, he said.

As a further kindness, Dr. Gunter reported in *Science*, 133:327, 1961, the crab can be placed in a wire basket submerged in the water. This keeps him from burning his legs on the bottom of the pot.

"Anyone who watches the violent reactions of crabs being scalded to death can see they suffer extreme pain," he said, "and fishery marketing agents have pointed out that thousands of American housewives will not cook fresh lobsters or crabs because of that fact."

Crabs and lobsters generally are sold alive as a guarantee that the animal is unspoiled. The killing is left for the cook or the commercial canner.

"There is a false idea in some quarters that crabs are not good unless they are scalded to death suddenly," Dr. Gunter said.

Using his procedure, as soon as the lobsters or crabs are dead, the heat can be turned up and the water boiled quickly. The meat of the crabs or lobsters will be as good as that of animals scalded to death.

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TECHNOLOGY

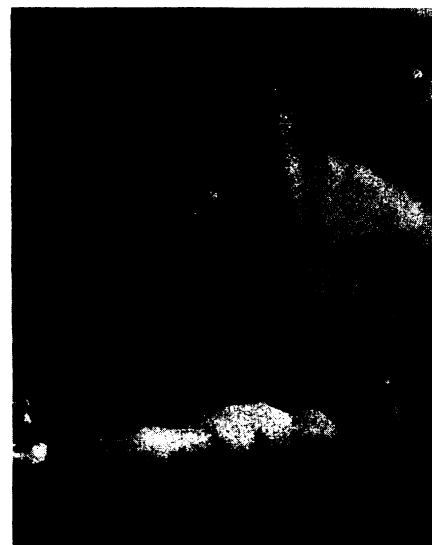
Thermoelectric Device Will Heat or Freeze

► A TINY THERMOELECTRIC device that can boil or freeze a drop of water using the power from two flashlight batteries has been developed by Hughes Aircraft Company.

The device, which is smaller than a paper clip, heats at the junction of two special semiconductor materials when a current is passed through it. It cools when the direction of the current flow is reversed by flipping a switch.

In clusters, its use could range from maintaining room temperature in a space ship to operating an instant-defrosting refrigerator with no moving parts.

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WILL BOIL OR FREEZE WATER