

GEOPHYSICS

Earth Smaller Than Thought

Army Map Service reports new value for earth's radius, 420 feet shorter than previously thought. Study is based on more than a century's work.

► NEW KNOWLEDGE of the earth's size, important in defense and in tracking earth satellites, was reported to the American Geophysical Union meeting in Washington.

A study by the Army Map Service, which rests on a foundation of more than a century's work, shows the true radius of the earth at the equator is 420 feet smaller than has been thought. The new figure is 6,378,260 meters, or about 3,963.26 miles, Bernard Chovitz and Irene Fischer of the Map Service said.

The 420-foot difference, although it appears slight, will make possible more exact predictions of the orbits of artificial satellites. It will also enable scientists to locate more exactly any object on the earth's surface, including targets for long-range artillery and guided missiles.

Another result of the survey is a more accurate pinpointing of many mountain peaks, especially in the Andes in western South America.

The investigation is part of a larger study of the earth's size being made by the Map Service. The object of the program is to get as complete a picture as possible of the size and shape of the earth and the geographical relationships between the Eastern and Western Hemispheres. Deadline for completing the program is 1960.

The first step in the long investigation can be traced back 100 years to a Russian astronomer named Wilhelm Struve, who measured out an imaginary line, or arc, over the earth's surface large enough to calculate the size of the entire globe.

Since Struve's work, the arc has been generally used to measure large areas of this planet. The new, smaller figure for the earth's radius was obtained by using much bigger arcs than had ever been employed before.

During the past two years map makers have been plotting two of the longest arcs ever constructed. One spans the entire American continent, from northwestern Canada to southern Chile. The other reaches from northern Scandinavia to the southern tip of South Africa.

The largest arc previously used was half the size of these. Map makers know that using an arc twice as long gives results four times as accurate.

The two arcs extend into the Southern Hemisphere for the first time. Former determinations were based solely on measurements made in the Northern Hemisphere.

In constructing the arcs, scientists used many of the most modern devices available and penetrated some of the most primitive country known to man.

Radar was used to draw a line across the Mediterranean Sea, long a missing link in the Afro-European arc. Without computing machines to perform the new calculations and repeat old computations, it is doubtful if the study could have been made.

Meanwhile, map makers were forging through little known country in Africa and laboriously penetrating the world's densest jungles in South America. During the dry season in Africa's Sudan, the smoke from grass fires was frequently so dense observations were seriously hampered. Dinka tribesmen, native Africans who worked with the party from the start, once went on strike because of the threat of boredom.

The European section of the arc was completed in 1951.

A third arc, which will run from Scotland through Iceland and Greenland to Labrador, will give an even more accurate figure for the earth's size. The only part not completed is the Greenland ice cap area, and scientists expect to complete that by summer's end.

The subject of exact size of the earth has fascinated man since ancient times. Eratos-

thenes, about 200 B.C., made the first serious attempt to determine the earth's size by measuring an arc in Egypt about 500 miles long. By coincidence, the Eastern Hemisphere arc used by the Map Service includes part of roughly the same territory covered by Erathosthenes.

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BIOCHEMISTRY

Way to Make Calming Chemical Synthetically

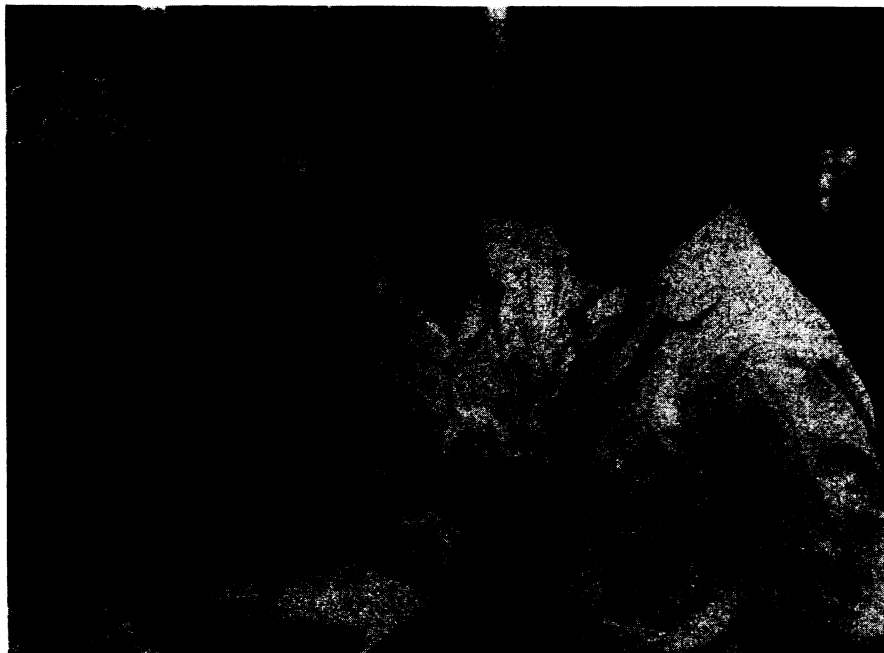
► A WAY to make synthetically the calming drug, reserpine, used to treat persons with high blood pressure and mentally sick patients, is seen by medical scientists at Squibb Institute for Medical Research, New Brunswick, N. J.

Drs. Frank L. Weisenborn and Patrick A. Diassi report their method for performing a key reaction in the synthesis in the *Journal of the American Chemical Society* (May 5).

Reserpine is a substance extracted from the crude root of the plant, *Rauwolfia*. *Rauwolfia* and its chemical relatives are being used to an ever-increasing extent to treat patients with hypertension, anxiety and tension states, and other mental disturbances.

Discovery of a method leading to synthesis of reserpine gives the United States a way to make the drug and closely related chemicals in case supplies of crude *Rauwolfia* root are cut off.

The Squibb scientists and Dr. Oskar



MAN-MADE CALMING DRUG SEEN—The scientists who developed a method of arriving at synthetic reserpine, the calming drug widely used to treat patients with high blood pressure and mental illnesses, Dr. Frank L. Weisenborn, left, and Dr. Patrick A. Diassi, are shown here in the Squibb Institute for Medical Research Laboratory, New Brunswick, N. J.