

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.

Science News Letter, May 12, 1956

BIOCHEMISTRY

Way to Make Calming Chemical Synthetically

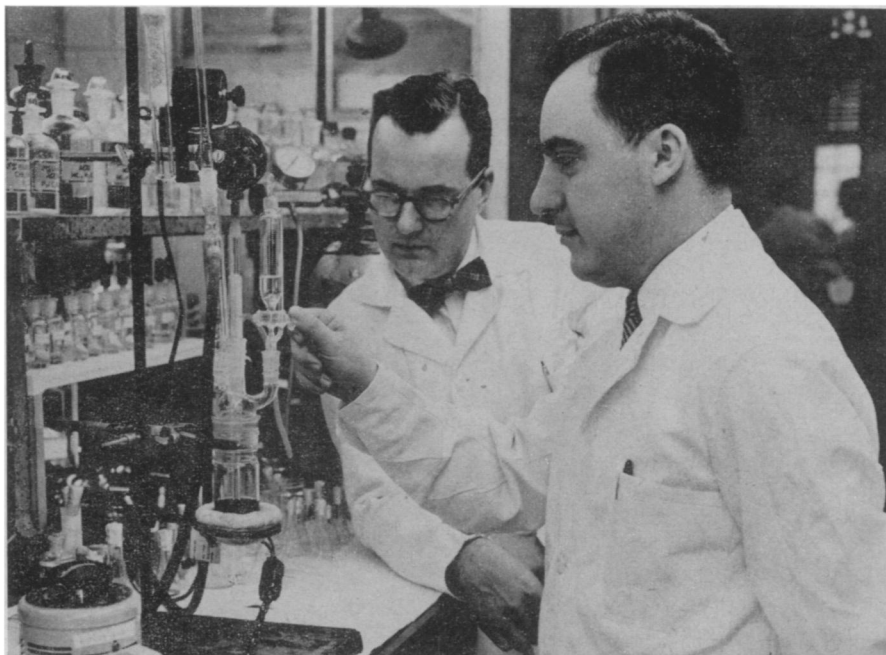
► A WAY to make synthetically the calming drug, reserpine, used to treat persons with high blood pressure and mentally sick patients, is seen by medical scientists at Squibb Institute for Medical Research, New Brunswick, N. J.

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.

Wintersteiner, director of the Institute's division of organic chemistry, spent several years pursuing the secrets of complicated reserpine-like substances. They have a chemical structure that can take 64 forms differing from each other only in the spatial arrangements of their atoms.

Only one of these forms, that found in nature, is known to be active. One critical problem was to introduce a certain hydrogen atom in the same spatial arrangement it is found naturally.

The reaction reported by the Squibb scientists solved this problem. The development is applicable to a wide variety of synthetic approaches to reserpine and similar substances starting from readily available chemicals.

Sales of calming drugs have reached an estimated \$30,000,000 to \$35,000,000 in this country. The *Rauwolfia* plant is now obtained in the U. S. from various overseas areas where embargoes, and transportation and other difficulties pose continuous supply problems.

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PSYCHIATRY

Mental Illness Spotted

► BRAIN WAVE RECORDS made while the patient is under the influence of a drug called alpha-chloralose may help to identify a special kind of mental sickness and to diagnose it.

The sickness is one in which the patients have "spells" when they may break up the furniture, tear their clothes off, have hallucinations of people calling them names, grow confused and not know where they are.

After the "spell," the patients may have no memory of it, or only a hazy one. They are depressed and remorseful.

Such patients in the past have been thought to have a kind of epilepsy or a kind of schizophrenia or a disorder termed "hysterical acting out." The label given these patients has depended somewhat on whether the doctor was a neurologist, a psychiatrist or a psychoanalyst.

Discovery of the same kind of brain wave record in such patients was announced by Drs. Russell Monroe, George Jacobson and Frank Ervin of Tulane University School of Medicine, New Orleans, at the meeting of the American Psychiatric Association in Chicago.

The characteristic brain wave record showed up when the patients were given the alpha-chloralose. This drug acts to stimulate the thinking part of the brain, the cortex, while at the same time having the opposite effect of depressing the brain stem. Patients under the influence of this drug not only showed a characteristic brain wave pattern but showed rage and had "spells."

The psychiatrists were surprised to find that 48 of 65 mental hospital patients showed brain wave changes while under the influence of this drug, although normal per-

BIOCHEMISTRY

Liver Found Rich in B-12

► ANTI-ANEMIA vitamin B-12 is found in the liver in abundance.

This organ can supply the body for up to three years in cases where B-12 absorption has been impaired, scientists at the University of California at Los Angeles and Los Angeles Veterans Administration Center reported.

Actual measurements of B-12 content of liver obtained from 132 autopsies were made. It was found that liver stores of the vitamin were not depleted in old age or cancer as has been suspected.

It was also shown there was enough B-12 in liver tissue to fulfill body requirements for at least three years without a "refill." This means that, in cases of surgical removal of the stomach and other gastrointestinal problems known to impair absorption of the vitamin, a B-12 deficiency state

would not be expected to appear for several years.

B-12 liver stores were found to be very low in cases of cirrhosis of the liver. Anemia associated with this disease may result from depletion of B-12, Miss Elizabeth Hvollboll and Drs. Marion Swendseid, Peter M. Lewis and James Halsted said.

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sons did not.

The findings, the Tulane group said, should spur further studies of brain waves in mental patients under the influence of such drugs. The findings should also lead to search for anti-convulsion drugs that might be used with psychiatric treatment for patients with these spells.

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MEDICINE

Drop of Blood for Early Heart Attack Diagnosis

► A DROP of the patient's blood and a new instrument the doctor can carry in his bag will help diagnose a heart attack as soon as four hours after it has happened instead of the 24 hours it may take before the electrocardiograph picks up changes.

The new method was reported by Dr. Warren Wacker of Harvard Medical School and Peter Bent Brigham Hospital, Boston, at the meeting of the American Society for Clinical Investigation in Atlantic City, N. J.

It is based on the discovery that, shortly after a heart attack, two metal enzymes in the blood increase their activity in dramatic fashion while at the same time the amount of zinc in the blood serum decreases.

The enzymes are: 1. lactic dehydrogenase, which is a zinc enzyme that oxidizes lactic acid; 2. malic dehydrogenase, which oxidizes malic acid and is also presumed to be a metal enzyme. Both enzymes play a part in the burning of sugars in the body.

The sudden surge in the activity of the two enzymes is reversed almost as rapidly in the first two days after a heart attack.

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