ASTRONOMY

Retort to Velikovsky

Dr. Payne-Gaposchkin, astronomer, in her refutation of Velikovsky's theories points out the discrepancies between scientific fact and his theories.

➤ WITH the title, "Nonsense, Dr. Velikovsky!", the first detailed scientific answer to Dr. Immanuel Velikovsky's theory that the earth stood still a couple of times around 1500 B.C. appears in the issue of THE REPORTER (March 14).

Dr. Velikovsky's theories, appearing in condensed form in articles in HARPER'S, COLLIER'S and READER'S DIGEST, will be explained in several forthcoming books to be published by Macmillan.

Drawing upon mythology, the Bible and other sources, Dr. Velikovsky maintains that the planet Venus was a comet at the time of the Exodus. He says that this "comet" passed so close to the earth that the tail of the comet rained down upon the earth and that an electromagnetic attraction was set up which stopped the earth from revolving.

Dr. Cecilia Payne-Gaposchkin, Phillips astronomer at Harvard, is the author of THE REPORTER article. She says: "The earth is a gigantic, massive flywheel. Its energy of rotation is immense. To stop its rotation the same amount of energy would have to be applied to it, and could be applied only by impact. A heavy body that merely passed by could not have more than a very small effect on the earth's rate of rotation though it might disturb its motion in space . . . What then would have been the impact of a body almost equal in mass and size to the earth, as Venus is? It would have pulverized the earth. But nothing short of impact would stop the earth's rotation."

Assuming, for a moment that the earth did stop rotating, Dr. Payne-Gaposchkin points out that all bodies not attached to the surface of the earth, including the atmosphere and the oceans, would have continued their motion, and would have flown off with a speed of 900 miles an hour in the latitude of Egypt.

If the earth did stop rotating, asks the Harvard astronomer, what started it again? She says that the same energy of rotation would have had to be reapplied. Dr. Velikovsky maintains that if the magnetic field of the sun were to govern the earth's motion, then the earth could resume its rotation. Dr. Payne-Gaposchkin points out that the magnetic fields of both the sun and the earth have been measured and that their interaction is not strong enough, in millions of years, to restart the earth's rotation.

Dr. Payne-Gaposchkin gives the scientific arguments against other of Dr. Velikovsky's theories on astronomy. She goes into detail about the chemical makeup of the tail of a comet to show that the material in the tail could not have been the Biblical manna. She says that he has a "naive" picture of the atom. She disputes Dr. Velikovsky's statement that there was no record of Venus before 1500 B.C. by citing two such records—one back in 2000 B.C.

She concludes: "The road to fame and fortune for the 20th century scholar is clear. Never mind logic; never mind the precise meaning of words or the results of exact research. Employ the vocabulary of a dozen fields of learning. Use a liberal sprinkling of Biblical phrases."

Science News Letter, March 25, 1950

NUCLEAR PHYSICS

Germanium Radiation Counter Developed

➤ A GERMANIUM counter, using a positive-negative phenomenon produced by particle bombardment, has been developed by Dr. Karl Lark-Horovitz and collaborators at Purdue University, Lafayette, Ind.

The new counter, primarily a tool for research in nuclear physics, can count radiations of alpha and beta particles and of gamma rays, and can measure the directions in which they are distributed. Made of germanium, a rare metal, it is, considering its small effective volume, more sensitive than any other kind of counter heretofore developed.

The scientists change the character of half the germanium by bombarding it with deuterons, hearts of heavy hydrogen atoms. After that, it is really the boundary between the two types of germanium that acts as a counter. This boundary is called the P-N boundary for positive negative.

Another advantage of the new counter over the scintillation type counters is its extremely small size and compact form.

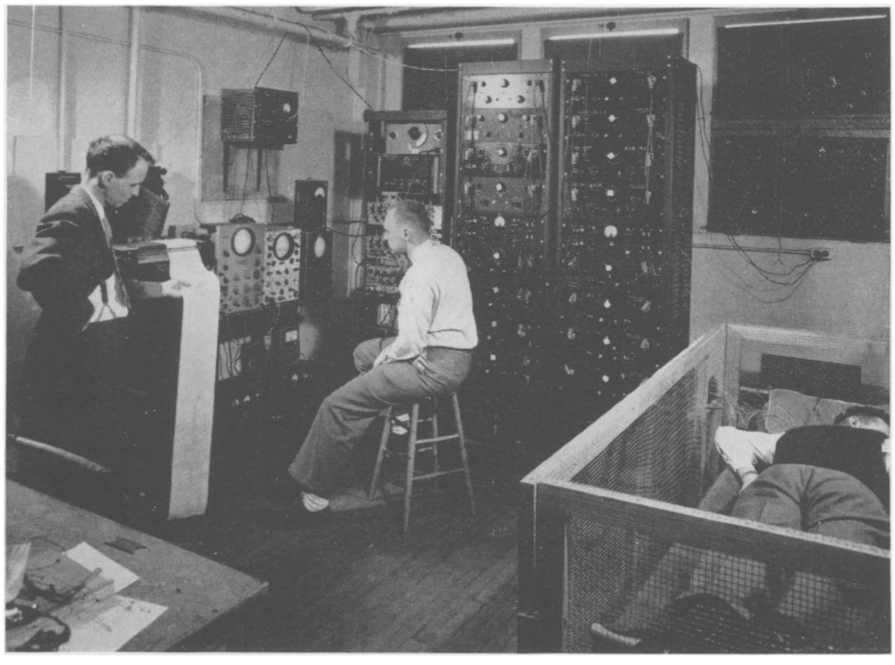
Science News Letter, March 25, 1950

ENGINEERING-PHYSIOLOGY

Radar Now Maps Human Heart and Brain

➤ THE human brain and heart are now being mapped by radar. As a result, scientists have discovered that the brain has actual waves of electrical energy with specific paths and very definite speeds. Some of these cover the entire brain and some are confined to one of its special areas.

Radar maps of the brain give a visible picture of overall brain activity. They differ from electroencephalograms heretofore used to measure electrical activity of the brain because the electroencephalograms show ac-



BRAIN MAPPING BY RADAR—Visual and printed records of electric waves in the human body are made by this equipment in the laboratory operated by Dr. Stanford Goldman and graduate student, W. F. Santelmann, Jr.

tivity of the "brain waves" only at specific points of the brain.

How the radar maps of brain and heart are made was described by Dr. Stanford Goldman of Syracuse University at the meeting in New York of the Institute of Radio Engineers. Dr. Goldman was formerly research associate at Massachusetts Institute of Technology where the equipment for radar mapping of brain and heart was first developed.

"Results already obtained," Dr. Goldman said, "indicate that the pictures will be useful for the diagnosis of disease in the heart and brain and in studying the physiology of these organs."

The equipment picks up the tiny electrical impulses which accompany the action of both heart and brain and converts them into a constantly moving map-like picture similar to those made by World War II radar sets. The "pick-ups" are nothing more than small wires held against the skin with adhesive tape. The patient feels nothing, not even a needle prick.

Science News Letter, March 25, 1950

PHYSICS

Californium Element 98

➤ CREATION of the 98th and heaviest chemical element through atomic bombardment in the University of California 60-inch cyclotron has been made known.

It has been christened californium, honoring the university and state where the six heaviest trans-uranium elements, including plutonium, have been manufactured and discovered in the past decade.

Production of minute and fast-disappearing quantities of the new element 98 follows close upon the announcement of element 97 last January.

The team of scientists engaged in Atomic Energy Commission research which produced californium included Dr. Stanley G. Thompson, Kenneth Street, Jr., Albert Ghiorso, and Dr. Glenn T. Seaborg, with Dr. Joseph G. Hamilton making the bombardments with alpha particles of the isotope 242 of curium which was transmuted into the new element.

Living only a short time before it decays by emitting an alpha particle half of an amount of californium will disappear in 45 minutes.

The amount of californium so far made is infinitesimally small, since the bombarded curium, itself very rare, weighed only a few millionths of a gram. The identification of the new element was based on its chemical separation and its predicted half-life.

No use for the new element is suggested, except that it adds a chemical building block to the universe. It cannot be used for bombs or power.

Californium has a place in the actinide series of elements that corresponds to dysprosium, element 66, in the lanthanide series. It has been customary to name the members of the two series in a similar way. Dysprosium means "hard to get", so Dr. Seaborg, leader of the element-discovering group, explains that California was hard to get to about a century ago in the gold rush days.

Element 97 was named berkelium, in honor of the city of Berkeley.

Science News Letter, March 25, 1950

PHYSICS

Missile's Speed in Water

See Front Cover

➤ COULD a missile such as a torpedo travel at supersonic speeds through water? The Navy is trying to find out.

Naval ordnance experts revealed they have fired small steel balls into water at speeds up to 7,000 feet per second (more than 4,770 miles per hour). Sound in cold water travels approximately 5,000 feet per second, nearly five times as fast as in air.

Shown on this week's cover of SCIENCE NEWS LETTER is a picture of what happens to a small steel pellet, moving along at 6870 feet per second, more than 4500 miles an hour, when it strikes the water.

This photograph is actually a shadowgram of the entry into water of a one-eighth inch steel sphere. It shows the straight shock waves in the air, and the semicircular shock waves in the water stirred up by such high speeds. The central cavity and the splash created when the sphere entered the water can be seen, but the sphere itself is hidden behind the shock front at the lower end of the cavity.

The Navy's pellets slow down fast. A decelerating force 2,000,000 times the force of gravity has been tabulated, Dr. J. Howard McMillan of the Naval Ordnance Laboratory in White Oak, Md., indicated. Scientists call the force of gravity "g". When a diving plane pulls out sharply, pilots sometimes experience a force nine or 10 times the force of gravity.

At White Oak the Navy has opened a new laboratory devoted to scientific destruction of its own weapons.

More than 500 top scientists and military leaders were invited to see the new $4,000,000 installation. From submarines to gun projectiles, naval weapons will be strained and battered under exaggerated field conditions. Savings in government development work in millions of dollars are expected.

A giant pressure tank will be able to subject midget submarines to half-mile-deep pressures. High speed movie cameras will record what happens to tiny models of torpedos, mines and depth charges when they enter the water at tremendous speeds. An air gun 100 feet long can simulate the impact of a torpedo striking a ship or the jolt on a fuse fired from a gun.

Under Secretary of the Navy Dan A. Kimball dedicated the new Ordnance Environmental Laboratory on March 23. It was part of a two-day Armed Forces National Shock and Vibration Symposium in Washington.

Science News Letter, March 25, 1950

CHEMICAL ENGINEERING

Waves Remove Fine Dust, Chemical Mists from Gases

➤ PURE air and pure water received the attention of the American Institute of Chemical Engineers in Houston, Texas. Air and gas purification and waste disposal to prevent water pollution were number one subjects on the program.

Sonic dust and mist collection was discussed by Harold W. Danser, Jr., Ultrasonic Corporation, Cambridge, Mass. Fine particles suspended in a gas are caused to vibrate, collide, adhere and agglomerate together as the gas travels for a few seconds through a vessel in which is created a sonic field of high intensity.

The sonic field contains sound waves of the type too high in pitch to be recognized as sound by the human ear. These so-called ultrasonic waves are now being used for many purposes ranging from killing bacteria in milk to cleaning clothes.

Sonic agglomeration, he said, permits the collection of fine particles whose mass is otherwise too light to permit their ready collection by customary cyclones or separators used in removing larger, heavier particles from gas.

Sonic collectors were described which have been used successfully for the recovery of sulfuric acid fog, carbon black and oil mist.

Equipment for generating ultrasonics was described by W. H. Janssen, General Electric, Schenectady, N. Y. Even though the art of generating ultrasonic energy is not new, developments stimulated by World War II have resulted in increased activity in the field, he stated.

Pollution abatement and industrial water management was the subject of discussion of C. F. Hauck, Hall Laboratories, Pittsburgh, Pa. For lowest total water costs, industrial waste problems must be studied with full consideration for the many interrelationships among problems of water procurement, usage and disposal.

Science News Letter, March 25, 1950