

ASTRONOMY

Pluto Theories Crumble

Pluto is neither an escaped moon nor a stray object from interstellar space, according to computations indicating a stability in its orbit for two million years—By Ann Ewing

► THE ORIGIN of the most puzzling, far-flung planet in the sun's system, Pluto, remains a mystery.

New calculations have thrown cold water on the two most popular theories concerning Pluto's beginning—for the last two million years, at least. They show that:

1. Pluto is not a satellite moon that escaped from Neptune, the next most far-off planet in the solar system.

2. Neither is it an object that became a planet circling the sun after being captured when it strayed into the solar system from interstellar space.

The orbit of Pluto for the last two million years shows no indication of any catastrophic changes that would account either for its escape or capture, two scientists from the U.S. Naval Weapons Laboratory reported in Washington.

If there had been any drastic changes in Pluto's orbit during the last two million years, the calculations made by Dr. C. J. Cohen and E. C. Hubbard on the Naval Ordnance Research Calculator at Dahlgren, Va., would have indicated them. The computations did not.

In the sense that Pluto is now an object revolving around the sun, it is a planet. However, astronomers and others concerned

with the birth and growth of the solar system consider the original status of Pluto questionable.

Despite its tremendous distance from earth, Pluto is believed to be much more like the planets near the sun—Mercury, Venus, earth and Mars—than the four giant planets. Why it should be so, yet still so far from the sun, is an enigma.

Evidence that had previously thrown suspicion on Pluto's true place as a member of the solar system included the high inclination and eccentricity of its orbit, and its mass and diameter. This far-away planet's mean distance from the sun is 3,670 million miles.

Pluto's orbit as it circles the sun cuts inside that of Neptune. When large objects, such as planets in the solar system, revolve around a much more massive object, such as the sun, the motions of each affect the others. The amount of this effect depends on the mass of each.

Since Neptune is about 17 times larger than Pluto, it should have considerable effect on Pluto's motion. However, when the orbits of the two objects as they revolve around the sun are considered together in relationship to the sun, their paths have now been found to be extremely stable.

Any violent changes occurred a very long time ago, the calculations of Dr. Cohen and Mr. Hubbard have shown.

Their computations also show no indication of any variation that would signal an instability hundreds of thousands of years prior to their cut-off time.

The closest Pluto ever comes to Neptune is 1,674 million miles, according to the calculations they reported in *Science*, 145: 1336, 1964. However, this close approach of the two planets occurs when Pluto is farthest from the sun, and this is the reason that the orbits of Pluto and Neptune are so stable.

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ENGINEERING

British Reactor to Test Wear of Gear Wheels

► WEAR of gear wheels and machine tools and the fundamental properties of engineering materials, including plastics, glass and cement, will be investigated with a new 100 kilowatt nuclear reactor installed in Lancashire, England, by the Universities of Manchester and Liverpool.

Prof. W. B. Hall, professor of nuclear engineering at Manchester University, expects that investigational work for industrial companies would be flowing into the reactor in early 1965. The reactor cost more than one million dollars.

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AERONAUTICS

American Model Plane Beats Soviet Record

► AN AMERICAN SCIENTIST has set a new world record for continuous flying of an airplane, without even being in the plane.

Maynard L. Hill, president of the National Academy of Model Aeronautics, kept a radio-controlled model plane, carrying only four and a half pounds of fuel, in the air for 8 hours and 52 minutes over a field near Washington, D.C.

His record, set by a homemade craft with a seven-and-one-half-foot wingspan, topped the previous model record of 6 hours, 13 minutes, set by A. Malenkov of the Soviet Union in 1960.

Mr. Hill is a metallurgist with Johns Hopkins Applied Physics Laboratory, Silver Spring, Md.

He used a gasoline-based fuel instead of an alcohol-based fuel, since the plane consumed alcohol fuels more than 10 times as quickly as gasolines. The result was that the 11-pound plane was the epitome of economy, giving 350 miles per gallon.

The plane carried its fuel in wing tanks, instead of in the fuselage as is usual with model aircraft. This insured proper weight distribution, a critical factor when the fuel weighs more than the plane itself. In addition, it permitted smooth gravity-feed of the fuel, to keep the engine running evenly.

Mr. Hill is also holder of the world's altitude record, 13,320 feet, which was also previously held by Mr. Malenkov.

• *Science News Letter*, 86:213 Oct. 3, 1964



Fremont Davis

A LONGER THAN THOU ATTITUDE—Maynard L. Hill shows his homemade 7½-foot-wingspan model plane that set a new world's record for model plane endurance, 8 hours and 52 minutes, beating the old record held by Russia's A. Malenkov by over two and one-half hours. Mr. Hill made the radio-controlled flight on Sept. 18.