Evidence for Planet X Evaporates in Spotlight of New Research

By MALCOLM W. BROWNE

ASTRONOMERS can quit looking for the elusive "Planet X" because it is not there, a new study of solar system measurements has concluded.

For a half century stargazers have hunted for Planet X, the solar system's hypothetical 10th planet. Its existence was inferred from what appeared to be irregularities in the orbital motions of several known planets. But a new study of the outer planets indicates that the long chase, based on presumed wobbles in the orbits of Uranus and Neptune caused by a planet, was based on erroneous observations and calculations.

The apparent death blow to the Planet X theory was published in the May issue of The Astronomical Journal by Dr. E. Myles Standish Jr., an astrophysicist at the Jet Propulsion Laboratory in Pasadena, Calif. His analysis, which includes significant corrections of the expected orbits of Uranus and Neptune, is the first to make use of an extremely accurate measurement of Neptune's mass made by Voyager 2 in 1989.

New Look at Data

His recalculation of the motions and masses of the outer planets shows that they are moving just as one would expect if there were no planet beyond them exerting a gravitational tug on their orbits.

Despite the longstanding reluctance of a few theorists to abandon the Planet X hypothesis, Dr. Standish concludes, "There remains no need to hypothesize the existence of a 10th planet in the solar system."

Dr. Brian G. Marsden of the Smithsonian Astrophysical Observatory in Cambridge, Mass., who heads the international clearinghouse through which astronomical discoveries are reported, expressed relief. "I'm delighted to see that we can finally put this Planet X thing to rest," he said. "Despite the persistent views of a few astronomers, I've never believed in it myself."

But for many years, many astronomers tentatively accepted the Planet X hypothesis, because the type of evidence that seemed to support it had earlier led to two landmarks in astronomy: the discoveries of Neptune and Pluto.

Discoveries of Planets

The modern history of planet searching began in 1781 with the discovery of Uranus by William Herschel. For the next 60 years, astronomers were puzzled by the orbital motion of Uranus, which at first seemed too fast and then too slow to accord with Newton's laws of gravitation and motion. Scientists finally concluded that the irregularities in the Uranus orbit could be explained only by assuming that a large unknown planet was exerting a gravitational pull.

Observers eventually began looking for this planet at a position calculated by the theorists, and on Sept. 23, 1846, guided by these calculations, astronomers at the Berlin Observatory discovered the planet: Neptune.

But even allowing for Neptune's estimated mass, the motion of Uranus still seemed to deviate slightly from its calculated orbit, and astronomers postulated the existence of yet another undiscovered planet. Once again, astronomers looked for something at a point in the sky where the unknown planet was believed to be, and in 1930, Clyde Tombaugh at the Lowell Observatory in Arizona discovered tiny Pluto.

But Pluto proved to be such a small chunk of planetary debris that astronomers realized it could not in itself explain the irregularities in the Uranus orbit. The search for Planet X resumed, and has continued to this day. Within the last year, two papers have been published in astronomical journals, one in Italy and the other in the former Soviet Union, predicting that Planet X would be found.

Report of Calculation Error

But Dr. Standish's analysis shows that traditional calculations assumed a mass for the planet Neptune that is now known to have been wrong by about five-tenths of 1 percent. Moreover, Neptune takes 164 Earth years to complete a single orbit of the Sun, and this has made the task of calculating its ephemeris, or predicted positions, much more prone to error than it is for planets that circle the Sun more rapidly.

When the mass of Neptune measured by the Voyager 2 flyby is reckoned in, the anomaly in the orbit of Uranus largely disappears, Dr. Standish said. He also tracked down an error that resulted from faulty observations of Uranus made by the United States Naval Office from 1895 to 1905, but which remained unchallenged over the years. Other probable errors cited by Dr. Standish as having contributed to the myth of Planet X included one by Galileo himself.

Presumed wobbles in planetary orbits were based on faulty calculations.

In 1613 Galileo sighted Neptune with his small telescope, and although he did not realize it was a planet, he recorded its position. The place and time he recorded for the object seemed to later astronomers to support the Planet X hypothesis. But Dr. Standish has found that Galileo's notes on that observation are ambiguous, and that another of Galileo's observations of Neptune places it right where it would have been without the influence of any Planet X.

There are still many objects that remain to be found beyond the orbit of remote Pluto, astronomers believe. Since last September, two little chunks of planetary debris no more than 160 miles in diameter have been sighted from 3.4 to 5.5 billion miles from the Sun, and many more may lie at about the same distance. But calculations show that when all such "planetesimals" are taken into account, their combined mass is no more than a few tenths of the Earth's.

Although Dr. Standish's analysis leaves little room for belief in a Planet X, it does not address another issue that has intrigued some planetary astronomers for the last decade: the possible existence of a companion star of the Sun. In 1984, a group of astronomers, paleontologists and statisticians proposed that such a star (which they named "Nemesis") might occasionally approach our outer planetary system closely enough to dislodge comets from the "Oort Cloud," a hypothetical belt of long-period comets beyond the planets.

Comets and Mass Extinctions

Comets pulled from their remote orbits by the gravitational pull of Nemesis might then hurtle toward the Sun, bombarding Earth along the way and causing mass extinctions. If these cometary showers occurred periodically with each visit of Nemesis, they could have caused periodic mass extinctions, which a few paleontologists believe have occurred at fairly regular intervals in Earth's history.

The Nemesis theory is still alive, although it has lost scientific support in recent years because there is no direct evidence of the existence of Nemesi, and because the statistical evidence that mass extinctions are truly periodic is very weak. But Dr. Standish does not believe his new analysis bears on the Nemesis question, one way or the other.

"If Nemesis exists it is presumably very far away at present, perhaps a couple of light years," he said. "This is too far for it to have an appreciable gravitational effect on Uranus."