

# Astronomers Acclaim New Planet

*Astronomy*

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THE report from Flagstaff of the discovery of a faint, slow-moving object which can most reasonably be interpreted as a ninth major planet of the solar system again emphasizes man's ability to see beyond his power of vision and to grasp what lies beyond his reach. Astronomy is rich in similar feats of prediction, but probably no prediction, except the forecasting years in advance of the exact place and time of a total solar eclipse, appeals so much to the average man as this extension of the bounds of our own solar system.

The existence of the companion of the bright star Sirius was known from theory long before it was first glimpsed with a powerful telescope. Many stars vary in brightness in such a manner that mathematical analysis demonstrates the existence of companions that never have been seen.

The most famous astronomical prediction was, of course, the one that led to the discovery of Neptune in 1846, in much the same way as Lowell's computations of fifteen years ago now lead to the detection of a body that may be a major member of the sun's family.

Professor Percival Lowell and Professor William Pickering of Harvard have been the most active among the many astronomers who have felt certain that the residual irregularities in the motion of the outer planets were definite proof of the existence of one or more outlying companions.

To astronomers, the discovery is most significant in its bearing on theories of the origin of the planetary system and on the past history of the sun.

## *Other Planets Foreseen*

By Dr. Frank Schlesinger  
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The detection of a planet beyond Neptune constitutes one of the greatest discoveries in the history of astronomy. If this planet was found near the place predicted by the late Percival Lowell the discovery constitutes a great triumph for him and also for the present staff of the Lowell Observatory.



Clyde W. Tombaugh, discoverer of the new planet

To find so faint an object is an extremely difficult task and reflects great credit on Dr. Lampland and Dr. Slipher. It is easy to predict that other planets still farther from the sun remain to be discovered but their detection will be exceedingly difficult because it is to be expected that they will be fainter than the object now announced by the Lowell observers.

## *The History of Planets*

For the third time in the history of the world, the research of astronomers has revealed a new member of the solar system—the family of bodies, large and small, that revolve around the parent sun from which they were born many ages ago. To Professor Percival Lowell, born in Boston on March 13, 1855, belongs the credit, though he died on November 12, 1916, and now rests in a stone mausoleum at the observatory he founded, close to the dome of the great telescope with which he did his work. At this observatory, at Flagstaff, Arizona, his successors, under the leadership of Prof. V. M. Slipher, have located the new planet, close to the place in the heavens where the founder's researches predicted that it would be.

Curiously enough, Prof. Lowell was born on the 74th anniversary of the first modern planetary discovery—that of Uranus by Sir William Herschel on March 13, 1781. With a peculiar sense of the fitness of things, Dr. Slipher chose March 13, 1930, 75th anniversary of Lowell's birth and 149th anniversary of the discovery of Uranus, to announce to the world that Prof. Lowell's prediction had been correct.

September 23, 1846, brought the eighth major member of the solar system to the attention of astronomers, and from that time to now, no additions have been made. But this is probably not the last. The failure of Uranus to move exactly as expected led astronomers to explain the discrepancies as due to the gravitational attraction of an unknown planet beyond. From these studies the position of Neptune was predicted and the planet was found. As many more years of observations of Uranus became available, still other discrepancies appeared, discrepancies which Lowell studied and used, as we now know, to such good advantage. As Uranus, Neptune and the new planet itself are studied in more detail, and have moved farther in their slow plodding course, other discrepancies, which are now vaguely glimpsed, will appear and still other planets—the tenth and perhaps the eleventh and twelfth, will be discovered. But each will be more difficult than the last, and it may be that the most distant planets will forever continue to move around the sun, unsuspected by earthly man.

Sir William Herschel was a musician at fashionable Bath, in England, when he became interested in astronomy. He made a number of telescopes, all reflectors, with dish-shaped mirrors to bring the rays of light to a focus. Finally, on the night of March 13, 1781, he came home from a concert and, according to his habit, went out to the back of his house where he and his sister Caroline swept the skies. Then he was using a little telescope with a mirror only seven inches in diameter. Sweeping through the constellation of the twins, now high in the western sky, and the same group (*Turn to page 186*)

## Trans-Neptunian Planet—*Continued*

in which the Lowell planet has appeared, he saw something strange. Instead of a tiny point of light, like the thousands of stars that flashed across his view, this was a disk of light. Always modest, he did not suppose that he had found a new planet, the first such discovery ever recorded, but suggested that it might be a comet. But as the object was watched and watched, its character as a planet was established. This brought fame to Herschel as an astronomer, King George III, then on the throne, gave him a pension, and requested that he move to Slough, near Windsor Castle. Herschel gave up his music, devoting his life to a study of the stars and becoming one of the greatest astronomers of all times. The discovery of Uranus made this possible.

Incidentally, the name that Herschel proposed for the planet was not Uranus, but "Georgium Sidus," in honor of the king. English astronomers later suggested that it be called Herschel, and this name was actually used for a time in England. Finally, however, the suggestion of the German astronomer, Johann Elert Bode, prevailed, and it was named Uranus, thus according with the mythological names given the inner planets.

Great as was Herschel's discovery, Uranus was literally waiting to be picked up by some keen eye. Bright enough to be just visible to the naked eye under good conditions when one knows just where to look, it could not have long avoided discovery as telescopes became more numerous. But the next discovery was of a different kind, for before it was seen in the sky, it was detected in a mass of figures in a long and involved calculation.

Uranus had only been observed a few years when it was found that it did not move as it should, according to Newton's laws. The pull of Saturn and Jupiter, its nearest and largest brother planets, were allowed for, but even so there was a discrepancy. By 1845 this was about two minutes of arc—about a fifteenth of the moon's diameter. This was the difference between where Uranus should be and where it was actually observed. A number of suggestions were made, one—a rather obvious one—being that it was due to the gravitational pull of a farther and unknown planet. But that anyone

could figure out from the discrepancy the location of the unknown planet seemed to many to be a hopeless task.

A 35-year-old French astronomer, Urbain Jean Joseph Leverrier, decided that he could do it. In September, 1846, he completed his laborious computations and wrote to Johann Gottfried Galle, then an assistant at the Observatory at Berlin, the following:

"Direct your telescope to a point on the ecliptic in the constellation of Aquarius, in longitude  $326^\circ$ , and you will find within a degree of that place a new planet, looking like a star of about the ninth magnitude, and having a perceptible disk."

On the night of September 23 Galle turned his telescope to this point. He had an accurate map of the stars in this region, so all he had to do was to check each on the map against those in the sky. The extra one in the heavens, then, must be the planet. Within half an hour after he started looking, he found the stranger within 52 minutes, less than a degree, of the place that Leverrier had indicated. The telescope that he used is today preserved in the great German Museum at Munich. Galle lived to the age of 98 and died as recently as 1910.

Though Leverrier and Galle were the first to make the planet known to the world, an Englishman, John Couch Adams, deserves just as much credit as the Frenchman. In the autumn of 1845, this young student at Cambridge, then 26, completed his calculations, with no suspicion of Leverrier's similar efforts across the Channel. He called at the Greenwich Observatory, in London, to present his results to the Astronomer-Royal, Sir George Airy. But that gentleman was at dinner when he called, and the butler declined to disturb him. Adams left his paper, which Sir George acknowledged, but then pigeon-holed.

By July, 1846, however, after Leverrier had published two preliminary papers on the subject, Sir George became interested, and asked Prof. Challis, at Cambridge, to look for the planet. Challis, however, had no maps of the region and so he had to measure the position of a number of stars, night after night, to determine which was moving, for the planets move among the stars. But he had started too late, and while

he was still searching, Galle won the race, and Adams, through no fault of his own, lost the honors that might have been his. Then it turned out that Challis had actually measured the new planet twice, the first time early in August, but had not analyzed his observations to determine which object was the planet. Further checking of older records showed that another French astronomer, Lalande, had actually noted it 50 years earlier, without knowing what it was.

The planet was named Neptune by the French, with a touch of sarcasm, it has been said, because England ruled the seas, and they were jealous of the apparent attempt of England to take their honors away from them by pushing the claims of Adams.

Neptune revolves once in its orbit around the sun in 165 years, so that since its discovery it has made just half a revolution. Uranus, however, with a year equal to 84 of ours, has made about two revolutions. If there were to be any gravitational pull by still another planet, the more rapidly moving planet would show it best. Sure enough, a slight discrepancy was noticed in the motion of Uranus that could not be explained by the attraction of any known body. It is only about 5 seconds, a twenty-fourth as large as it showed in 1845. Lowell took advantage of this discrepancy but his was a task far more difficult than that of Leverrier or Adams.

The observations were not so easy, either. Lowell died in 1916. Finally, last year, after various delays, the Lowell Observatory obtained a new telescope, furnished by his brother, Dr. A. Lawrence Lowell, president of Harvard University. This has a photographic lens 13 inches in diameter with a focal length of 63 inches, so that it is really a huge camera. Covering a wide area of the sky, it is especially adapted to the search for a planet, and after a year of study of photographs made with it, the planet was found. C. W. Tombaugh was the astronomer who first actually observed it, but to the entire Lowell Observatory staff, including its director, Dr. V. M. Slipher, his brother E. C. Slipher, Dr. C. O. Lampland, K. P. Williams, T. B. Gill, G. H. Edwards and J. C. Duncan belongs the credit for the third planetary discovery.