Wanted: Early Planet Photographs

Astronomy

They Would Help Tell its Orbit

WITH the discovery of the planet beyond Neptune, by Lowell Observatory astronomers, many months of observation will be needed before even an approximate idea can be obtained of the orbit in which it is moving. A planet like this moves in the ecliptic, the plane in which the earth itself revolves around the sun, and to determine just where this path is four different observations, giving its direction from the earth upon four different occasions, are needed. If it were not moving in the ecliptic, three would suffice, as they do for orbits of comets.

The farther apart the positions of the planet at the times of these observations, the more precisely can the calculation be made. All the planets move in ellipses, nearly circular. To the mathematician, by the way, a circle is an ellipse in which the long and short diameters happen to have the same length. Eclipses might differ widely in shape, and yet over a small segment be very similar. Therefore to determine their shape with any accuracy, rather a good sized piece must be known.

The new planet is moving very slowly through space. Probably it takes nearly three hundred years to travel once about the sun, so that in even a year it would cover only about a three hundredth of the total path. Observations made of it during the next few months, therefore, will give only a rough idea of its orbit. A range of several years, at least, will be required before astronomers can get a really accurate orbit, for there is no way of hurrying it.

But there is one chance of getting an orbit sooner, and that is if a search of photographic plates made in past years should happen to show it. Photographs of the heavens have been made for about half a century, and while the early ones do not reveal objects as faint as the planet, of the fifteenth magnitude, some made a quarter of a centry ago probably would. If it should happen that some astronomer, in some part of the world, took a plate in 1905, for instance, that showed the planet with a swarm of stars, then a much shorter time would be required to determine its orbit. If two or three such observations should be discovered, then the orbit could be accurately calculated within a few weeks. Then astronomers would know in fact, whether this really is the ninth planet, or whether, indeed, it is the tenth planet, the ninth yet remaining for discovery.

The cover photograph shows the new planet (in circle) as it appears in the sky viewed by the 42-inch reflector at Lowell Observatory, where it was discovered. Dr. C. O. Lampland operated the telescope when the photograph was made. The bright star at the bottom is delta Geminorum, the four "points" being diffraction effects caused by the supports holding the second mirror in the telescope.

Something similar to this happened in connection with the discovery of Neptune, the last major planet to be discovered before this year. Neptune was first located in the sky on September 23, 1846. Then it was found that Joseph Jérome le Francois de Lalande, a French astronomer at the Paris Observatory, had observed it and recorded its position in May, 1795, more than fifty years before, without noticing that it was not a star. This observation at once provided a long range, and an accurate orbit was soon calculated.

Science Radio Talks

FOUR prominent scientists will address the nation over a country-wide network of the Columbia Broadcasting System during April, under the auspices of Science Service. The talks will be given from 3:45 to 4:00 p. m. every Friday. Following is the program:

April 4—Dr. Paul R. Heyl, physicist, U. S. Bureau of Standards—"Weighing the Earth."

April 11—Dean Edward W. Berry, paleontologist, Johns Hopkins University—"The Ancestry of Our Trees."

April 18—Dr. C. G. Abbot, astronomer, secretary, Smithsonian Institution—"The Sun and Ourselves."

April 25—Dr. Arthur H. Compton, physicist, University of Chicago and Nobel Laureate—"What is Light?"

Additional Observations

As soon as the discovery of a new planet was announced, observatories throughout the world began to look for it, seeking to be among the first to see this new addition to the sun's family. But to find it is not an easy task. It does not differ in appearance from a faint star, so even with a telescope powerful enough to reveal objects as faint as the fifteenth magnitude it might be seen but not identified. What is needed is a map showing its position, and as no such maps are yet available, an observatory must make its own by photography. No general star maps show objects so faint.

The first thing to be done, therefore, is to take a photograph of the region of the sky, giving an exposure long enough to record a fifteenth magnitude star, perhaps of several hours. Then, on the following night, another such photograph is made. By comparing the two the planet is found, because it is slowly moving and is in a slightly different place in each photograph. An instrument called a "blink-microscope," used in many observatories, facilitates the comparison, because first one plate, then the other, can be seen in rapid succession. The stars stand still as the observer watches through the eyepiece, but the moving planet dances to and fro in a most conspicuous manner. This in fact was the way the planet was discovered. Then, when the planet has been identified on a photograph, this may be used at the telescope as a map to locate it visually.

The Steward Observatory, at the University of Arizona, Tuscon, was one of the first to find it, using this method. About the same time it was located at the Yerkes Observatory of the University of Chicago. Later it was observed at the Naval Observatory, Washington, at the Harvard College Observatory, Cambridge, at their station in South Africa; and in Europe at the Königstuhl Observatory, Heidelberg, and the University of Berlin's observatory at Neu-Babelsberg. It is still in the constellation of the Twins, Gemini.

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