

filtered "phage" on old type culture media Prof. Kendall obtained good growths of the germs they destroy. Bacteriophage therefore seems to be nothing but the invisible form of the germ it seems to delight in wiping out. Prof. Kendall could produce phage from germs by planting the germs in his new medium.

The behavior of germs in changing from visible to invisible is peculiar. They begin to lose sharpness of outline, growing fuzzy and dim under the microscope. At last nothing but tiny granules remain, which will pass through the fine filters, and grow back

into visible germs again. Other granules, too large to pass through the filter, appear none too anxious to resume full-fledged germ form, but in the new medium will do so.

This new knowledge of the changeability of germs can be found in patients in the early state of the disease, but not in the later, though the patients are sicker than ever. But certain puzzling granules have been found in the spinal fluid of such patients, and it now appears quite possible that these may be the half-transformed germs themselves.

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ASTRONOMY

## Comet Discovery Brings Fame To Melon Patch Worker

### While Following Hobby at Night, Japanese Foreman Finds New Visitor to Solar System

**D**ISCOVERY of a comet has lifted Masani Nagata out of his daily routine as an obscure melon patch worker in Imperial Valley of California, and caused his name to become known to astronomers throughout the world. In an exclusive interview a Science Service correspondent learned the story of this latest astronomical discoverer.

When Nagata observed the comet, which has been named after him, he notified hopefully and somewhat apologetically the famous Mt. Wilson Observatory at Pasadena. Astronomers immediately turned a telescope at the location given and verified his discovery. They sent out an astronomical telegram announcing the find.

At observatories throughout the world, where Nagata was an unknown name, the question was asked: "Who is Nagata?" None could answer. Further confusion was caused by the assumption that the comet had been discovered in Japan.

It has been found that Nagata is a foreman on a melon ranch ten miles from Brawley, Calif. During the day while Nagata directs the activities of 20 field workers, he dreams of peering into the heavens through his four month old three-inch telescope. The instrument is a portable refractor which he keeps in the house when not in use. He carries it outdoors when observations are to be made. For more than nine years he used a two-inch

telescope. After working under the sun at 110 degrees, he spends the evenings with his telescope.

This 45 year old Japanese has been interested in astronomy since childhood, but not until ten years ago was he able to pursue the study of the stars. His education in astronomy has been only a correspondence school course.

The discovery of the comet came by accident. While searching for the planet Neptune, Nagata found the comet within the field of his telescope. Fear-

ASTRONOMY

## Nagata Tells His Own Story

**I** AM PURELY an amateur astronomer. On July 15 about 8:30 p. m. Pacific Standard Time I was observing the planet Neptune with my three-inch telescope which has a thirty-diameter eyepiece of eighty millimeters and an altazimuth mounting. Near one of the stars in the constellation of Leo I found what seemed to be a nebulous hazy star. As I am very familiar with that area of the heavens I was therefore very puzzled and doubtful about what I had seen. Soon the hazy unfamiliar star faded away under the horizon.

The next evening at about 8 p. m., observing the same point, I found the

same "star" moved about one degree to the northeast. It seemed to be a comet. As I could not believe that a comet of this brilliance, magnitude seven, could have escaped the eyes of thousands of comet seekers with much more improved and more efficient instruments than mine, I inquired at Mt. Wilson Observatory if such a comet were known. They replied in the negative. Then I pointed out to them the position and . . . they answered me that two photographs they had taken showed the comet.

ing that it might be an old one, he notified professional astronomers. Astronomers at large observatories will observe Nagata's comet, compute its orbit, its future path and its distance from the earth. Because Nagata has only a three-inch telescope, he can not take photographs and carry out the intricate orbit computations. While professional astronomers search the sky from high mountain peaks, M. Nagata will continue his work in a melon patch.

The comet has a tail eight times as long as the moon's diameter. A small telescope is needed at the present time to see this visitor to the solar system. The tail is difficult to see with a small telescope, but can be found on astronomical photographs.

The latest position of Nagata's comet as determined at Mt. Wilson on the evening of July 19 is right ascension 10 hours 49 minutes and 22.3 seconds and declination north 9 degrees 58 minutes 12 seconds. It is between seventh and eighth magnitudes and its tail is reported as four degrees long.

There is no hope that Nagata's comet will become visible to the unaided eye.

Orbit computations made at the University of California's Students Observatory under the direction of Prof. R. T. Crawford show that the comet was nearest the sun on June 15. It was then one hundred million miles from the sun. It is now one hundred and sixty-seven million miles from the earth. It is receding from the earth and the sun.

The orbit shows that the comet will be four degrees south of the star Beta Leonis on August 3 and that it is moving eastward two degrees a day.

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As I am only an amateur astronomer, I have had no special study or courses