

Astronomer Discovers Fastest Nebula

Astronomy

The fastest known motion in the universe for a large body has been found, in a spiral nebula that appears to be moving away from the earth with a speed of 2,348 miles every second. This has been determined by Dr. Milton L. Humason, of the Mt. Wilson Observatory, with the aid of photographs of the body's spectrum made with the 100 inch telescope, largest in the world. The nebula can only be observed with the aid of a large telescope, and is known as N. G. C. 7619, its number in the New Catalog of such objects.

Dr. Humason's work has also shown that the nebula is at the vast distance of about 25 million light years, so far away that the light from it which affects the astronomer's photographic plate now has been travelling for the last 25 million years. Every second light travels 186,000 miles and every year about 6 trillion miles.

The method used for measuring the motion of the nebula depends on the wave-like properties of light.

When a ringing bell, as on a train or fire engine, is moving rapidly towards a person, the bell sounds of a higher pitch than when it is standing still or rapidly moving away. It is due to the fact that when the bell is coming closer the sound waves are pressed together and the result is the same as if the waves were shorter in length. In the case of the receding bell, the waves are spread out and seem longer. The longer the sound waves, the deeper the pitch, and the shorter the waves, the higher the pitch.

A similar effect is observed with light. When the light from a star that is rapidly moving from the earth is examined with the spectroscope, which analyzes light, it is also found to be of a lower pitch, or more reddish, than from the same star if it remained at the same distance from the earth. This is shown up by a slight displacement of the dark lines crossing the star's spectrum. A shifting of the lines from their proper places towards the red

end indicates that the star is receding, and a shift to the blue that it is approaching.

In the case of the nebula N. G. C. 7619, Dr. Humason found that the lines showed a marked shift to the red. This shift was as much as would be caused by a motion away from the earth at a speed of 3,779 kilometers, or about 2,348 miles, every second.

That it may not be a true motion of the nebula with respect to the earth, however, is shown by the researches of Dr. Edwin P. Hubble, one of Dr. Humason's colleagues. It was Dr. Hubble who first proved that the spiral nebulae are independent systems of stars, like the Milky Way system of which our own sun, as well as all the stars we see in the sky, is part. He has measured the distances of more than twenty of these nebulae, and found their motions. The farther away they are, the more rapidly they seem to be moving. All are moving away from the earth, for the spectral lines of all of them are dis- (*Turn to next page*)

Astronomers En Route to Eclipse

Astronomy

With the sailing of Dr. Harlan T. Stetson, Harvard astronomer, to the Malay Peninsula, where he will observe the eclipse of the sun on May 9, the third American expedition is under way. Also crossing the Pacific for a similar purpose is Dr. R. L. Waterfield, an English astronomer, who prepared for the eclipse in Baltimore. He is bound for the Philippines.

The Harvard expedition, in addition to Prof. Stetson, consists of Mr. and Mrs. Weld Arnold, of the American Geographical Society, New York, and Josef Johnson, of the California Institute of Technology, at Pasadena. They will disembark at Penang and proceed by rail to Alor Star, capital of the Province of Kedah.

The purpose of this group will be to make measurements of the brightness of the sky during the eclipse, and of the corona, the outermost layer of the sun, revealed only at eclipse time. A number of photographs will be taken with different sized cameras to record the outermost parts of the corona. One novel research will be concerned with the brightness of the zodiacal light. This is a glow that appears some-

times in the sky after sunset or before sunrise, stretching upward along the ecliptic or path of the sun. It is due to a flattened cloud of fine particles, very much scattered, that surrounds the sun, and reflects sunlight to the earth. Before sunrise or after sunset, its ends are visible. It cannot be seen with the naked eye during an eclipse, but Dr. Stetson hopes to make measurements of its brightness with his photometers, and to determine whether there is any relation between it and the corona itself.

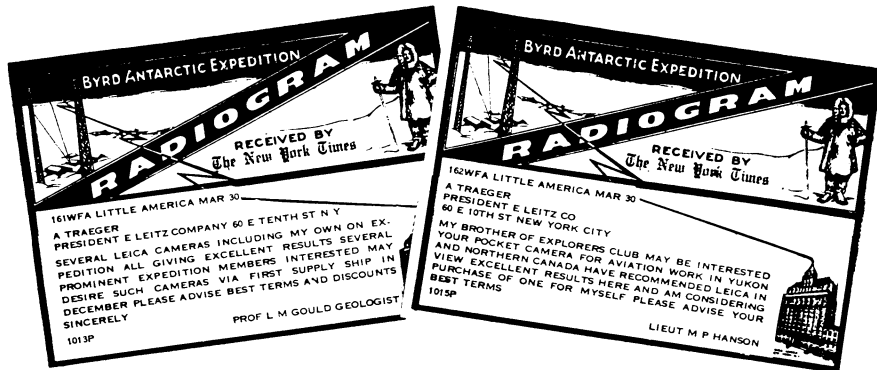
Another instrument that he will use is a camera equipped with a lens made of quartz and silvered, so that only the rapidly vibrating and invisible ultraviolet light can pass through to the sensitive plate. With this he will make photographs of the corona in ultraviolet light for the use of Dr. Edison Pettit, of the Mt. Wilson Observatory.

Dr. Waterfield's expedition includes, besides himself, Wyndham E. B. Lloyd, of Cambridge University, England. He will locate in the Philippines at Iloilo, near the site of the party from the U. S. Naval Observatory in Washington. The chief instrument will be a camera 11½ feet

long with a lens 7 inches in diameter. One picture will be made with this, on a very sensitive photographic plate, and with a rotating shutter. This will permit the faint outer reaches of the corona to be photographed without overexposing the much more brilliant inner part. The shutter consists of four aluminum vanes, which will revolve immediately in front of the plate. The outer part of the corona will be exposed for about 200 seconds, nearly the whole duration of the eclipse at Iloilo, while the inner and brighter part will only be exposed for a half second.

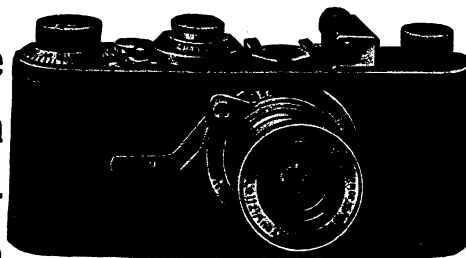
With smaller cameras, they will make photographs of the corona with infra-red light, consisting of waves too long to be visible. As the light of the sky is weak in infra-red, it is hoped that in this way the farthest expansions of the corona may be recorded. But before sailing Dr. Waterfield pointed out that this may not be successful, for the corona itself, like the sky, may turn out to be poor in infra-red also. With a five inch diameter lens in a camera six feet long, ordinary photographs of the corona will be (*Turn to next page*)

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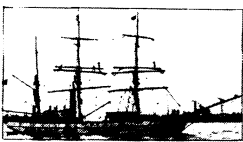
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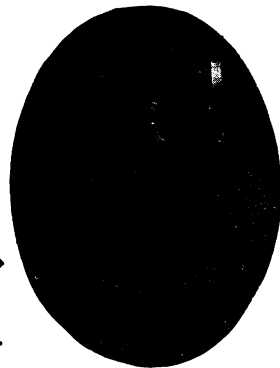
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Science News-Letter, April 20, 1929

Since the price of liver has soared, due to its use as an anemia treatment, fish hatcheries have found that fresh-water shrimp is a suitable substitute for ground liver as fish food.

Fastest Nebula—*Cont'd*

placed to the red. Dr Hubble has not measured the distance of N. G. C. 7619, but judging by the relation between distance and apparent motion, it is about 25 million light years from us. Its apparent motion is the fastest of any known nebula, taking the speed record away from N. G. C. 584, which Dr. V. M. Slipher, of the Lowell Observatory at Flagstaff, Arizona, found to be receding at the rate of 1,118 miles a second.

At least part of the great apparent speed may be due to the structure of space itself, as suggested by the Dutch physicist De Sitter. Like Einstein, he has suggested that space is curved, something like the surface of a sphere, and according to his views vast distances would cause an apparent slowing down of the light vibrations, or lengthening of the waves. He also supposes that there is a definite tendency of material bodies to scatter in space, which would also partly account for the great motions.

Science News-Letter, April 20, 1929

Eclipse—*Continued*

made with various exposures, and also photographs in color may be tried. This will be done with a new English method of photography in natural colors.

With a large grating which, like a prism, breaks light up into its constituent colors, photographs of the spectrum of the eclipse will be taken. These will be made of the flash, when the last glimpse of the outermost visible layer of the sun appears just before the opaque moon covers the inner parts, and of the corona itself, in the long wave, infra-red part of the spectrum. Previously few successful photographs have been made of the eclipse spectrum in the long wave, infra-red light, so Dr. Waterfield hopes to reveal some new lines in the spectrum that reveals so much to the astronomer.

The coming eclipse is a very remarkable one because of its length. In Sumatra and on the Malay Peninsula, it will last about five minutes, and nearly three in the Philippines. An expedition from Swarthmore College, Pennsylvania, is located in Sumatra, besides the Naval Observatory party at Iloilo and Dr. Stetson's at Alor Star. Two other English expeditions have gone to the Malay Peninsula. Another group, from the Hamburg Observatory in Germany, has also settled in the Philippines.

Science News-Letter, April 20, 1929