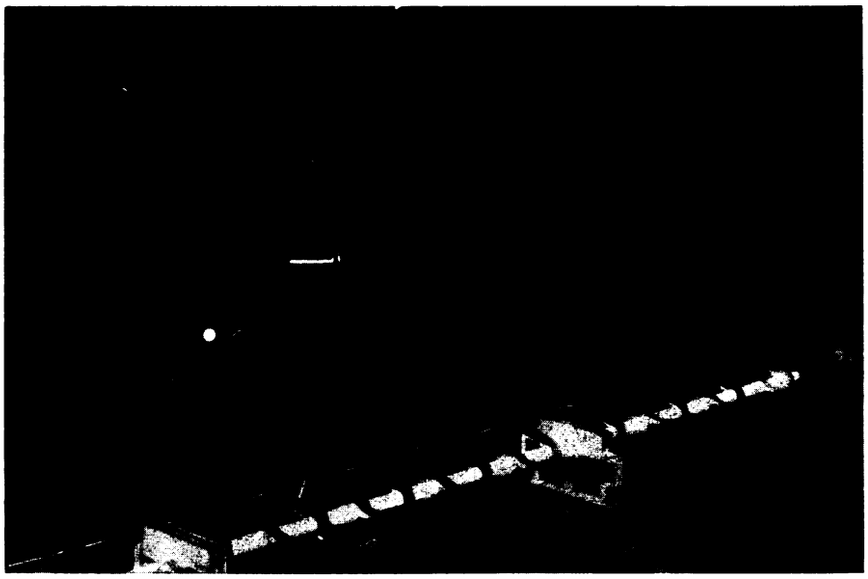

PEAK LASER POWER—The output from this pulsed gas laser developed at Martin Company's Orlando, Florida, Research Center reached a peak of over 300 watts. This highest power yet obtained from a laser of this type was in a single spectral line at a wavelength of 1.117 microns.

ASTRONOMY

Telescopic Power Tripled

Electronic "image tubes" that can triple the light-recording power of a photographic telescope are being distributed to observatories around the world.

➤ A SIMPLE DEVICE to photograph stars electronically, making any telescope the equal of one three times its size, will soon be distributed to 20 observatories around the world.

Development of a practical electronic "image tube," used routinely to give triple power to any telescope, promises a revolution in astronomy.

Considering the discoveries already made with the 200-inch Hale telescope on top of Mt. Palomar, routine use of the image tube may bring discoveries revising man's theory of how the universe was born and is growing.

The image tubes, which triple the effective light-recording power of a photographic telescope, will be distributed by a joint committee of the Carnegie Institution of Washington and the National Science Foundation.

Use of an image tube increases the rate of recording information from the heavens by a factor of ten over the best photographic emulsions.

The five-inch-long device does this by intensifying starlight internally by electronic means.

The receiving end is attached to the focus of the telescope's optical system. The display at the other end, a new and much brighter image, can be photographed by conventional means.

Two practical types of image tubes have been developed so far.

The one to be distributed, known as the "cascaded image intensifier," is particularly useful in the blue part of the rainbow of light most frequently used by astronomers. The other, called the "mica-window converter," is especially suited for infrared work.

The cascaded image tubes are made to very rigid specifications and cost about $5,000 each to produce. They are completely sealed and self contained, and have proved to be reliable and stable under actual observing conditions for very long periods of time.

They were developed during ten years of work by the Carnegie Image Tube Committee, a joint effort of Carnegie's Department of Terrestrial Magnetism, Mt. Wilson and Palomar Observatories, Lowell Observatory, the U.S. Naval Observatory and the National Bureau of Standards, and are being built by Radio Corporation of America. International Telephone and Telegraph Company was one of the industrial firms in this country collaborating in the research.

Dr. Merle A. Tuve, chairman of the Carnegie Image Tube Committee, said that exposures of many hours can be made without difficulty.

Committee members are Dr. W. A. Baum of Mt. Wilson and Palomar Observatories, Dr. John S. Hall, director of Lowell Observatory, and Dr. L. L. Marton of the National Bureau of Standards.

• Science News Letter, 86:342 November 28, 1964

ASTRONOMY

Astronomical Sleuthing Finds Two Star Nova

➤ ASTUTE DETECTIVE WORK by two astronomers in Pasadena, Calif., has shown that one close-by exploding nova actually consists of two stars connected by a bridge of hydrogen gas.

The flare-ups of the nova are believed to occur when part of the hydrogen-rich material in a ring surrounding the smaller star—a white dwarf poor in hydrogen—falls into the star itself and becomes ignited. The ring is formed by gas continually flowing from the larger star, which is too faint to be observed.

Nova Sagittae briefly flared up to 2,000 times its normal brightness in 1913 and again in 1946. It is of particular interest to astronomers because it may provide the first opportunity to test that part of Einstein's theory predicting the existence of gravity waves.

The detective work done by Dr. Robert Kraft of Mt. Wilson and Palomar Observatories and Dr. W. Krzeminski of the Polish Astronomical Institute, was reported in the Astrophysical Journal.

Nova Sagittae is only 150 light years, or 90 million million miles, away. Drs. Kraft and Krzeminski have calculated that the entire object measures less than half the diameter of the sun. The larger, less massive star, which is too faint to be seen, is about the diameter of Jupiter, or 88,000 miles. Some 150,000 miles from it is the smaller, brighter and much denser white dwarf companion with a diameter of about 15,000 miles.

Because the dwarf contains more material, it has a greater gravitational attraction than its companion. Hydrogen therefore rushes in a stream from the larger star to feed the luminous ring around the dwarf. Heat from the dwarf causes the gas to glow shortly before it reaches the ring and to continue glowing in the ring.

The two stars revolve about a common center so fast, every 81 and a half minutes, that they should radiate gravitational waves, if such waves exist. These waves would carry away energy, and decrease the period of revolution.

The astronomical sleuthing consisted in coaxing a great deal more information from the light of the object than could be obtained from a photograph, using the techniques of photometry and spectroscopy.

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TECHNOLOGY

Semiconductor Devices Made More Easily

➤ A NEW STRUCTURE that is expected to simplify the building of semiconductor devices such as transistors and diodes has been developed.

The structure uses strong electrical leads that give both mechanical support to the semiconductor and make electrical connections. Bell Telephone Laboratories in New York City developed the new structure.

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