

ASTRONOMY

Nova Herculis Is Again Increasing in Brilliance

Famous Exploding Star, First Brilliant At Christmas Time, Reaches Eighth Magnitude After Waning To 13th

NOVA Herculis, the newly discovered nova star whose peculiar astronomical antics have caused wide-spread interest within the past few months, is again increasing in brilliance, Leon Campbell of the Harvard College Observatory staff announced.

Rallying after it reached its faintest magnitude, 13, early in May, the star has now reached the eighth magnitude, has undergone marked spectrum changes and has definitely passed into what is usually termed the nebular stage, he said.

"It now looks as if the nova had passed through its stages of marked, and irregular, activity and that it will soon settle down to a point where it will slowly, but surely, decrease to the magnitude it was before its sudden outburst in December last," Mr. Campbell said. "The return to normal may require several years."

The star was discovered Dec. 13, 1934, by the English meteor observer, J. M. P. Prentice, and at that time was of the third magnitude, having flashed up from the fourteenth magnitude, probably, within a very few days, according to Mr. Campbell. (*SNL*, Dec. 22, 1934). From then until Dec. 22 the light of the nova steadily increased, with slight fluctuations, and on Dec. 22 the star reached the magnitude of 1.4 and was exceeded in brightness only by brilliant Vega.

Until April 1, the star was easily seen with the naked eye, varying between the second and fourth magnitudes, and then in two days it faded away at the rapid rate of about a magnitude and a half a day. After April 3 the decrease was more gradual, according to Mr. Campbell, until in early May it reached its faintest magnitude, 13, where it was seen only with the greatest difficulty with powerful telescopes.

The star is now clearly visible in small telescopes at any time throughout the night, passing through the zenith about midnight.

"Practically all the changes in brightness have been accompanied by changes in spectrum," Mr. Campbell said. "Dur-

ing the early stages, the nova was of a distinctly bluish color, indicating that it was then an extremely hot star.

"When first photographed, the nova showed a spectrum containing strong absorption lines of hydrogen, with the lines of the metals bordered by intense emission lines. As the nova became brighter the emission lines faded away and the star had a spectrum closely resembling that of the supergiant star, Gamma Cygni.

"After maximum light was reached, the emission lines flashed forth with customary nova brilliance, this indicating that the nebulous shell surrounding the star had become partially transparent. Later, the well-known green auroral lines appeared as have been found in many other novae.

"Since the comeback in the star's light, marked spectrum changes have occurred. The nova has definitely passed into what is usually termed the nebular stage. The spectrum is outstanding in many ways, even among novae, and therefore difficult of interpretation at this time.

"How bright will nova Herculis get? Judging by its prototype, Nova Aurigae 1891, probably it will not attain naked eye visibility but it will be visible in moderate sized telescopes."

At any rate, most of its activity is probably over, Mr. Campbell said, and it will soon settle down to a point where it will slowly decrease to the magnitude it was before its sudden outburst last December.

Science News Letter, July 13, 1935

ASTRONOMY

Strange Behavior of Nova Baffles Scientists

THAT Nova Herculis has science baffled in trying to explain its behavior, is the outstanding conclusion of a symposium, held in connection with the meeting of the Pacific division of the American Association for the Advancement of Science.

But while now puzzled, the astrono-

mers are going to do something about it. New instruments are being planned which will carefully scan the sky for the appearance of similar nova outbursts in the future and find them quicker. With the anticipated increase in observations of novae, the physical laws which govern their apparent erratic behavior may become known.

The astronomers who have been observing Nova Herculis for the last seven months have watched it wax and wane in brightness. A check on the "life histories" of former nova stars revealed that it has behaved like none of them.

All the astronomers can agree on now is that there is no standard behavior for an exploding star. Each is unique and a law unto itself. They all flash up quickly and then die down more slowly, but not in uniform fashion. Their antics cannot be predicted with knowledge now at hand.

It is the lack of knowledge which has led to plans for "nova finders" which, while still in the "paper" stage, may soon bring science out of its ignorance in the study of exploding stars.

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PHYSICS

Extra High Voltage Not Needed To Cause Lightning

THE ENORMOUSLY high electric voltage which science has always associated with lightning bolts appears to be unnecessary.

Lightning progresses through a series of steplike jumps, and each jump requires only a part of the millions of volts potential necessary to jump from a high cloud to the ground.

Dr. B. F. J. Schonland, D. J. Malan and H. Collins astounded the learned Royal Society of London with the experimental proof so upsetting to science's previous conceptions of lightning's behavior.

Eighty-year-old Sir Charles V. Boys, inventor of the special high-speed camera which Dr. Schonland and his colleagues used in the new work, said the discovery was "an amazing phenomenon which could never have been predicted." (*See SNL*, Mar. 17, 1934, for report of former experiments.)

It is found that when a multiple lightning flash occurs there comes first a slow-moving "stepped leader," which precedes the first flash. Compared with subsequent happenings in the lightning stroke, this preliminary "leader" is slow, lasting as long as a fiftieth of a second. It is possible to overlook this action when the Boys camera runs at its fastest speeds.

The leader starts as a small spurt of light covering from twenty to 200 yards at a jump.

Then the streak disappears entirely for about fifty millionths of a second. Next a new dartlike streak starts at the point of cessation of the first streak and travels about as far as the first. Thus, the lightning "leader" reaches the ground in a series of from eighteen to twenty jumps.

With the atmospheric path thus clear-

ed by the leaders, the first real flash occurs, which jumps upward from the ground to the cloud with a velocity of about 31,000 miles a second (one-sixth the velocity of light). This is the flash seen by the eye.

The leader streaks constantly vary their direction and may even go two ways at once. This is the origin of the irregular path of lightning.

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PSYCHOLOGY

Happy Marriages Run in the Family, Survey Reveals

MARITAL happiness runs in families. Those lucky people who are happy in their marriages are so because they have inherited or acquired a disposition just a little more amiable and affectionate than those whose marriages go on the rocks. This is reported as "the most reasonable explanation" of facts revealed by a survey of California marriages by Drs. Lewis M. Terman and Paul Bутtenwieser. (*Journal of Applied Psychology*, May).

If you want to be happy in marriage, therefore, pick out a good mother-in-law. Of the 99 marriages for which these figures were available, 83 per cent. reported that the wives' parents had average or more than average happiness in their marriages. And 88 per cent. of the husbands came from happy homes. Nearly 87 per cent. had happily married parents on both sides of the family.

Can June-November marriages be successful? The California scientists found that traditional prejudice against age differences between husband and wife is strongly challenged by the facts. The age differences among the couples studied varied from one case in which the husband was 7 years younger than his wife to three others where the man was 15 or more years the senior. No relation was found between age difference and happiness.

Children in the home are not a guarantee of bliss. Although the presence of children may prevent divorce in some cases, this survey indicated that they have no effect upon the happiness of the parents.

Of considerable importance, however, is the agreement of husband and wife on whether or not they want children.

Nearly a third of the happily mar-

ried couples reported that all of their interests outside the home are shared by the husband or wife. The other two-thirds, with very few exceptions, told of some outside interests held in common with the other member of the marriage. The unhappy couples, by contrast, included only 10 husbands and wives who reported such harmony on all their outside interests.

The boy who grows up tied to his mother's apron strings is not prevented by this from making a happy marriage, so far as this study reveals the facts. Happily married persons, both men and women, report more affection for both father and mother and less conflict with

them, than is reported by the unhappily married. This fails to confirm the psychoanalytic theory that excessive attachment to the parent of the opposite sex interferes with a later happy adjustment to married life.

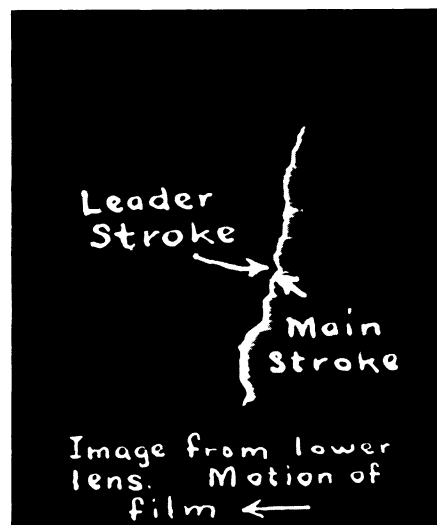
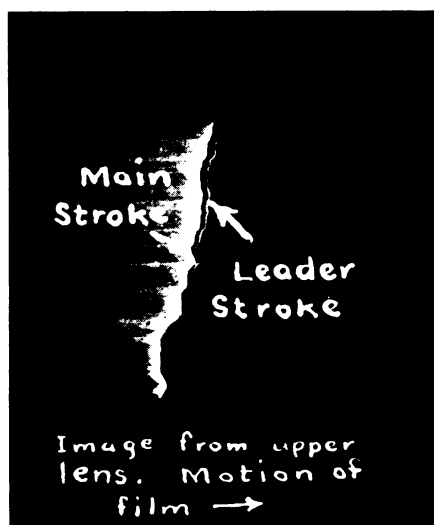
"The conclusion must be either that the theory lacks foundation or that a questionnaire of the type used in this study fails to obtain the facts it seeks to uncover," the scientists comment.

"It might be argued that parent-child relationships become so overlaid by rationalization and compensatory phenomena that the true facts can only be brought to light by psychoanalytic procedures, never by casual questioning. We do not feel competent to pass on this point, but would venture two alternative explanations. . . .

"It seems to us that the most reasonable explanation is that members of the happy group are by inherited or early-acquired disposition a little more amiable and affectionate, on the average, than the members of the unhappy group. This disposition would account for the satisfactory relationship both with parents and with spouse.

"Another possible explanation is that the mere fact of present marital happiness or unhappiness tends to affect the subject's report of his relations to his parents . . . as though these states were colored glasses lending their own distinctive hues to whatever is seen through them."

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LIGHTNING DOES STRIKE TWICE

How a special high-speed camera, invented by the veteran British scientist, Sir Charles V. Boys, "sees" a lightning stroke. Many "strikes" in the same place within a fraction of a second is one finding which annuls the old saying that "lightning never strikes twice in the same place." These photographs were taken with a Boys camera owned by Alfred P. Loomis, of Tuxedo Park, N. Y. General Electric scientists W. L. Lloyd and W. A. McMorris obtained the pictures, which are similar to earlier photographs made by Dr. B. F. J. Schonland in his South African lightning experiments.