

ASTRONOMY

Stars Flare Up

Geysers of flaming gases shoot out into space from five dying stars in heavens. Within a few minutes, stars may even quadruple in brightness.

By **MARTHA G. MORROW**

► **GREAT GEYSERS** of flaming gases are shot out into space not just by our sun, but by other stars in the heavens. So brilliant are these fiery outbursts that within a few minutes the stars double, triple or even quadruple in brightness, then in an hour or two again return to normal.

To date five stars have been discovered to flare up. One was caught in the actual act and the change in brilliance studied as it occurred. For another star, 50 such flare-ups within the past quarter century have been photographed.

No "new" stars or novae these, but tired old stars that flare up for a half hour or so as if to prove to the universe that there is some life left in the old things yet. On a bright star an eruption of this magnitude might be unnoticed, but these stars are so faint that such flaring geysers of blue-hot hydrogen gas markedly increase their total brightness.

Our nearest neighbor star, Proxima Centauri, has had 50 such flare-ups within the past 25 years, Dr. Harlow Shapley, director of Harvard College Observatory, recently reported to members of the American Association of Variable Star Observers. Until this time less than a dozen flare-ups had been recorded on any one star.

"Proxima Centauri is a little cool star, presumably on its last legs before cooling off into eternal obscurity," Dr. Shapley said. "I have just found that it has brief spurts of radiant life during which it almost doubles in brightness," he reported.

Far Out in Space

This peculiar star, although our nearest star neighbor, is far out in space. Whereas it takes light from the sun, 93,000,000 miles or so away, only eight minutes to reach the earth, light from this red dwarf requires 4.3 years to come to earth.

Credit for being the first actually to observe a flare star and carefully measure its brightness with photoelectric equipment during the act of flaring goes to Dr. and Mrs. Gerald E. Kron of Lick Observatory of the University of California.

Within 15 minutes last year quite by accident, they saw the star flare to twice its normal brightness and fade back to near-normal brightness. The star is fainter, redder and smaller than our sun, a rather ordinary star, and Dr. and Mrs. Kron calculate that only a small hot spot about the

size of the earth was involved in the outburst.

In order to cause the two-fold increase in light received from the star, they figure the amount of light emanating from the affected spot must have increased 2,000 times, its temperature rising from 6,000 degrees to 20,000 degrees Centigrade.

Other Flares Found

Less than two years ago a similar flare was found on the earth's second nearest star neighbor. At the time the star was discovered by Dr. W. J. Luyten of the University of Minnesota, who used photographs from Harvard's South African station, he noted within 20 to 30 minutes it flared up to ten times its normal brilliance, then subsided again. Seven other flare-ups have been spotted since by Harvard observers.

The first stars known to have such short periods of great brightness, stars that obviously were not double or novae, were discovered less than a decade ago by the late Dr. Adrian van Maanen of Mount Wilson Observatory. On each of two not-so-bright stars he spotted a single puzzling flare.

Bright clouds of hydrogen and calcium gases were identified in the atmosphere, surprising for stars of such low temperature. But his observations failed to indicate that the brightness was due to a small but violent outburst on the star!

The flare stars so far discovered are all reddish, very dwarf both in light and size. They are relatively cool bodies, with the atoms packed tightly together, and until these flares were discovered in a few near-by stars of this type, astronomers had supposed their light is dying out. Their radiation was believed to be decreasing slowly but steadily so that eventually they would entirely fade from sight.

But these blow-ups show there is life in the old stars. Bright hydrogen lines during the explosion appear in the spectrum of the star, but an hour or so afterwards the stars seem to be plugging along as usual with more or less normal spectra.

For decades pictures of these repeated flares on Proxima Centauri have lain unnoticed in Harvard Observatory files, awaiting discovery. About 15 years ago, Dr. Shapley recalls, he wondered if this star wasn't double, with one member eclipsing the other periodically. But no eclipses were detected when the star was studied closely and its light charted—only one discordant observation out of 70 bothered him.

Then early in October this year he again began to think of this near star and wonder if it perhaps was one of these new-found variables known as flare stars. A glance at his old measures, buried in the files, indicated that a flare-up really had occurred long before flares on stars were heard of. Examination of 592 plates in the Harvard collection showed 50 instances when the star brightened a bit, then rapidly returned to normal. From this Dr. Shapley realized that flaring is probably pandemic with such stars.

Flares on our own sun are not infrequent. The area near a sunspot sometimes suddenly increases in brightness to such an extent that within ten minutes it becomes much the brightest spot on the sun. Such flares never last more than a few hours and usually disappear almost as rapidly as they develop: that part of the sun soon looks much as it did before the flare appeared.

Tied in with Blackouts

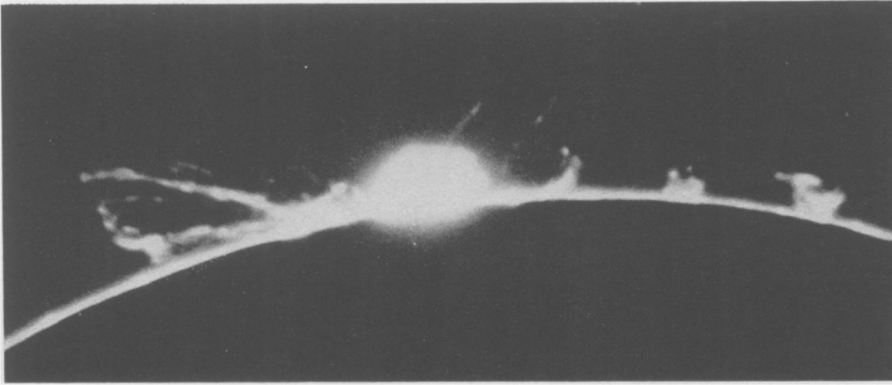
These flares are of particular interest to us here on earth as they are often tied in with blackouts of shortwave radio broadcasts. Often when a sizable flare bursts forth on the sun, immediately shortwave radios "go dead."

Shortwave broadcasts may be completely blacked out over paths in the daylight side of the globe for the duration of the flare. The blackout is believed to be caused by a sharp increase in the ionization of the lowest layers of the radio roof due to a sudden flood of ultraviolet radiation from the sun.

Astronomers, now they know flares do take place on stars other than our sun and occur quite often, are wondering about their significance. What causes these ex-



DR. HARLOW SHAPLEY



SOLAR FLARE—Shown surrounded by prominences in this photograph of the sun's limb made at the High Altitude Observatory of Harvard University and the University of Colorado at Climax, Colo.

plosions or fiery geysers, they ponder. In what manner do they affect the surrounding space? And most important of all, do they affect us here on earth and how? Many

more flare-stars must be found—and luck will have much to do with their discovery—before these questions can be solved.

Science News Letter, December 2, 1950

GENERAL SCIENCE

TV Channels for Education

Top educational groups urge that certain wavelengths be set aside for educational programs. Unlimited possibilities foreseen.

➤ **SETTING** aside certain of the limited number of available television channels for educational-type programs was urged by a joint committee of seven top educational groups.

These organizations banded together as the Joint Committee on Educational Television to present their views on education in television at hearings by the FCC.

With only a limited number of channels available for TV broadcasts, it is "imperative for the national welfare that the FCC take decisive steps now to insure that there will be at least one television channel for educational use in each large city and each important educational center," Brig. Gen. Telford Taylor, the committee's counsel, stated.

"There is only room for about 300 television broadcasting stations on the channels now available for this purpose. Of these, only 107 are now in operation and there are numerous competing applicants for the remaining 'slots,'" he continued.

Gen. Taylor stated that television had virtually unlimited possibilities in medicine, in agriculture and in all phases of adult education and community extension work.

Educational groups sponsoring the Joint Committee on Educational Television include: The American Council on Education, the Association of Land Grant Colleges and Universities, the National Association of

Educational Broadcasters, the Association for Education by Radio, the National Association of State Universities, the National Council of Chief State School Officers and the National Education Association.

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INVENTION

Ground Cotton Picker Salvages Droppings

➤ **HALF** the cotton now wasted, droppings from the plant to the ground, is expected to be salvaged with a machine recently invented which can be run through the cotton field after picking is completed to gather up this present waste.

Some 10% to 15% of the annual crop is now wasted, being dropped to the earth by the elements or in picking whether by machine or hand. Until now, no economical way has been found to salvage this waste. This new machine will gather up even partly or wholly buried cotton, it is claimed.

The machine is the invention of a Texas physician, Dr. William Rambo, assisted in part by Roy Hanna of the Oklahoma Tulsa Tribune. A patent has been applied for and is now pending. The machine is not yet in production but will be soon, it is expected.

The machine, 14 feet long, can be drawn through the cotton field by tractor, jeep or

a pair of horses. It has a rotary drum three feet in diameter which is equipped with spring steel teeth that dig into the earth.

The teeth snag the cotton fibers and drag them up to a rotary brush which cleans the cotton from the teeth and throws it back into a receiving bin. Important to the machine is a tooth-harrow which loosens up the soil ahead of the rotary drum. The overall result is that good clean cotton is salvaged. All the droppings are not gathered but tests already made show that at least half of them are.

Science News Letter, December 2, 1950

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