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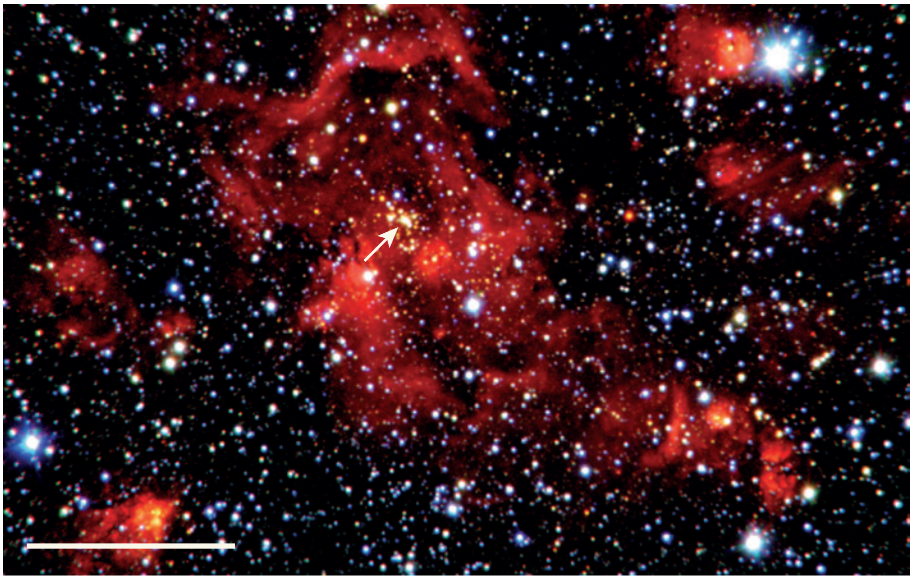

Figure 1 | Nestled in a young star cluster. The arrow indicates the location of W49nr1, a massive star identified by Wu *et al.*[1] in the central star cluster of the star-forming region W49. Scale bar, 1 arcminute.

not for the fact that the observed wavelength range contains several key spectral features (nitrogen and helium lines) that are powerful diagnostics of the temperature of the star. On the basis of the strengths of these features, Wu *et al.* find that W49nr1 seems to be one of the hottest stars known. With the temperature in hand, it is relatively straightforward to extrapolate the observed light to the total emitted light by using spectral energy distributions of well-studied massive stars.

Also crucial to the authors' assertion is an estimate of the distance to the star and of the absorbing effects of dust that lies between Earth and the object. A star might look bright merely because it is close to us, just as a nearby candle might look bright even though its power output is actually feeble. Likewise, a star might look faint simply because a large amount of interstellar dust lies between it and an observer on Earth. Wu *et al.* used an existing estimate[2] of the star's distance based on the relatively accurate method of trigonometric parallax, which had been applied to observations of radio signals, from sources called masers, that are associated with the excitation of water molecules in the star-forming region around W49nr1 (Fig. 1).

Another key requirement for this claim is that the light is emitted by a single star. In fact, the most common fate for claims that a massive star has been observed is the subsequent discovery that the light is actually produced by two or more stars, in which case the light from any individual star in the system suggests a star much less massive than proposed. One famous example is a star in R136, a star cluster in the Large Magellanic Cloud — a satellite galaxy orbiting the Milky Way. In this case, the putative supermassive star, which was predicted to weigh up to a few thousand solar masses[3,4], turned out to be at least a dozen stars[5]. However, some think that it contains several stars as massive as 150–300 solar masses[6]. If true, those stars would violate an apparent limit of 150 solar masses[7].

Another famous example is η Carinae, which is located in the Milky Way. It was once thought to be the most massive star known, but is now accepted to be composed of at least two stars. The mighty Pistol Star, near the centre of our Galaxy, is another potential heavyweight champion. It is known to be solo down to a very small distance, but it could still contain more than one star in a close binary system. There are insufficient data to determine whether the Pistol Star or any of the stars in R136 are coupled into multiple-star systems.

Taking all the uncertainties together, Wu and colleagues estimate that W49nr1 could have a mass of between 90 and 250 solar masses — quite a wide range. At the upper end, the star would be one of the few most massive stars known. The best estimate of stellar mass comes from observing eclipses in a binary system, when one star passes in front of the other, and applying Kepler's laws of orbital motion. Using this method, the most massive stars known are about 100 times more massive than the Sun[8].

As is often the case, the newly weighed star has been seen before; it lies in a massive young cluster of stars that was first reported[9,10] more than ten years ago and that is part of a star-forming region that has been studied for more than five decades[11]. It is only with new observations and a refined analysis that Wu and colleagues have been able to make their claim. Their work demonstrates once again that we know relatively little about massive stars because so few of them have been thoroughly studied. Indeed, even in regions that have been observed for more than 50 years, astronomers are still finding monster stars hiding in plain sight. ■

50 Years Ago

Chromatography in Geology. By Arthur S. Ritchie — This slight text of around 50,000 words sails under false colours. It concludes with the statement that "in theoretical geology, chromatographic processes have become recognized as being of the greatest importance" — but all that is said on this topic amounts to no more than three short pages of obscure observations on gels and colloids … From the point of view of the academic geochemist, the omission of any reference to the importance of chromatographic techniques in recent American studies on palaeo-biochemistry is equally striking. Perhaps it is understandable that no literature from the U.S.S.R. should be quoted, but to write on the role of gels in mineral genesis without even mentioning Chukrov's Russian-language monograph *Colloids in the Earth's Crust* seems strangely inadequate.

From *Nature* 7 November 1964

100 Years Ago

A further paper by Medical Inspector-General Delorme was read before the Paris Academy of Sciences on September 28, on the general subject of the treatment of wounds in war … The paper begins with a very welcome statement that the health of the French Army is excellent. "The persistent mildness of the weather since the war began, the extreme carefulness of the Government, the watchfulness of the Commands, from the lowest to the highest … the organisation and the regular methodical active working of the Army Medical Service, the great care given to the food-supply, the sites chosen for the troops — all these, up to now, have resulted in the maintenance of a perfect sanitary condition. The wounded Frenchman is a healthy man."

From *Nature* 5 November 1914