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Figure 1 **Clash of giants — the colliding Antennae galaxies, observed with the Hubble Space Telescope[12]. The patchwork of blue knots are star bursts, where tens of thousands of massive stars are forming. The existence of possibly hundreds of supermassive stars drives the highly violent events associated with star bursts. To fully understand such observations, we need to know the maximum possible mass of a star. This image conveys events similar to those that shaped our present-day galaxies shortly after the birth of the Universe.**

highly significant, the uncertain age of the cluster leaves some room for arguing that it could be old enough for more massive stars to have already exploded as supernovae. However, the absence of hot, expanding gas bubbles does not support this scenario. In addition, observations in the similarly young and massive R136 cluster located in a neighbouring galaxy — the heavy-element-deficient Large Magellanic Cloud — support Figer's analysis, as here also no stars more massive than about 150 solar masses were found[11].

These results suggest that the upper limit for the mass of a star may be unrelated to the heavy-element content of the star-forming gas. This could in turn imply that radiation pressure is not the physical mechanism that limits how massive stars can become. Environments that are rich in heavy elements are dusty, and radiation pressure is particularly efficient at blocking the infall of dusty gas, so we might have expected the heavy-element-poor environment of the Large Magellanic Cloud to have allowed stars with higher mass to form through accretion.

Whereas the physics of faint, low-mass stars transcending into brown dwarfs is well understood[4], there is no clear explanation for why stellar masses should be limited to near 150 solar masses. And a nagging uncertainty remains: the details of supernova mechanisms are not fully understood, and it may be that stars more massive than 150 solar masses did exist, but have already imploded to black holes in the Arches and R136 clusters, leaving little trace except a hole in space-time accompanied by a brief burst of neutrinos and gravitational waves. ■

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NATURE

100 YEARS AGO

Prof. A. H. R. Buller, writing from the University of Manitoba, describes some striking electrical effects due to the dryness of the atmosphere at Winnipeg… When the thermometer is low, ranging as it often does for a week or more at a time from 0° to −40° F., very little friction, such, for instance, as may be produced by walking along a carpet, causes a person to become charged with sufficient electricity to produce a visible and audible spark on touching an iron bedpost, the radiator, the gas-tap, or any other conductor. It is a favourite amusement of some children to take sparks from each other's noses after running about a carpeted room… Many ladies have considerable difficulty in combing their hair; for during the process it becomes so charged with electricity that it stands out in the most astonishing manner… It is quite easy to light the gas with a spark from the finger when matches are not handy by merely shuffling a few paces over the carpet and then holding a finger to the burner.
From *Nature* 9 March 1905.

50 YEARS AGO

"Scientific Progress and Security Regulations." … Dr. Hildebrand insists that positive achievement and progress, not the negative policy of restriction and security, provide the only firm basis of security… Security-screening programmes are a means to an end, not an end in themselves. Their role in defence policy is negative rather than positive. They may deprive a potential enemy, at any rate temporarily, of information about armed forces or the development of new weapons; but they create no new weapons themselves… What has now to be recognized is that, with the essential dependence to-day of military strength upon science, the security practices used in the past to safeguard military information are no longer fully valid. Scientific knowledge cannot be kept secret by such means. Progress in science is a cumulative process in which each scientist builds upon what is known, and national boundaries and security systems cannot contain this process of extending knowledge without so discouraging the spirit of inquiry that the state of learning and of technology as well as the rate of scientific progress are adversely affected. At best, among advanced nations, security measures can provide an advantage of time: there is no such thing as a permanent scientific secret.
From *Nature* 12 March 1955.