ASTRONOMY

If Sun Were Hotter

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➤ THE WHOLE human race and all life on earth would be wiped out, but the earth itself would suffer only superficial burns if the sun were to become a brilliant and hot "new star" or nova, as other stars have been known to do.

The American Astronomical Society, meeting in Philadelphia, was presented computations by its secretary, Dr. Dean B. McLaughlin of the University of Michigan Observatory, which show that if the sun increased about 100,000 times in brilliance and held this heat for 10 days, the crust might be melted to a depth of seven to eight miles but the continents and oceans would not be extensively altered.

New stars, which are seen to flash from comparative obscurity to great brilliance in just a few days, sometimes become temporarily millions of times brighter than normal, but Dr. McLaughlin assumed rather less spectacular but more frequently observed, increase of about 100,000 times. His theoretical study allows the star to shine at this terrific rate for 10 days, with its radiation partly intercepted by a planet at the same distance from it as the earth is from the sun. The planet is like the earth in size and composition and during the 10 days it receives a total of 3,800 trillion trillion (3,800,000,000,000,000,000,000,000,000) calories of heat from the blazing nova.

Contrary to popular belief this tremendous energy would be far from enough to vaporize or even to melt a planet like the earth. The mass of the earth is 6,000 trillion trillion (6,000,000,000,000,000,000,000,000,000) grams. Thus, the energy received is only 0.6 calories per gram, or enough to heat the entire earth's crust through only 300 degrees centigrade, assuming the earth's crust to have only 1/100 the mass of the whole earth.

Because of poor conductivity of the crust, however, the actual melting effect would be even more limited, Dr. McLaughlin estimated, probably affecting only the surface layers, to a depth of about seven or eight miles. The heat would then be sufficient to raise the siliceous rocks to the melting point of about 1,500 degrees centigrade. The surface of the planet would boil and bubble and the rocks turn into liquid and vapor, but only while the nova could keep supplying the needed energy.

Soon after novae reach maximum brilliance they begin to fade. On the average, the sun as a nova could maintain the boiling of terrestrial rock only about a month, after which a return to normal would begin for both planet and star.

Science News Letter, July 8, 1944

Defect Detects Stars

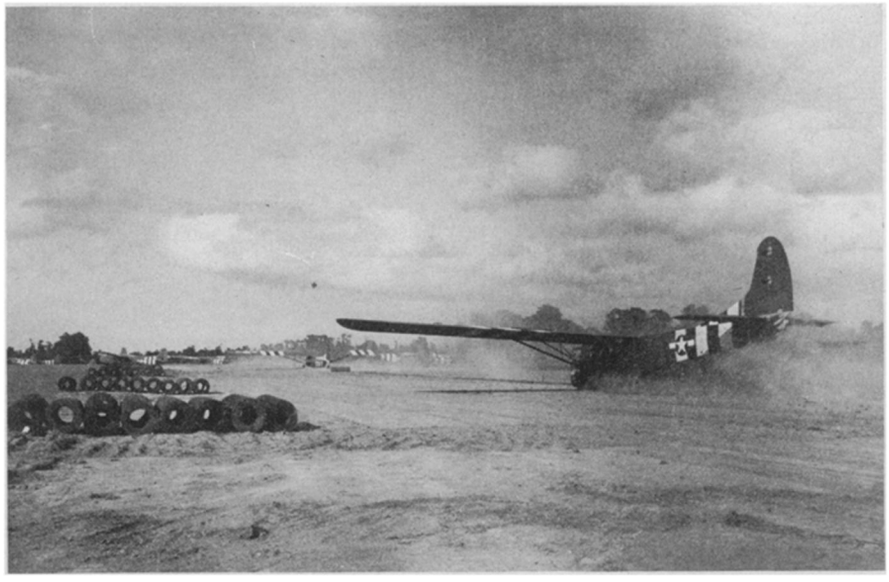
➤ EIGHT STARS of remarkable redness, one of them blazing 500 times as brightly on red-sensitive photographic plates as on ordinary blue-sensitive emulsions, were reported to the Society by a young Mexican astronomer, Guillermo Haro, of the new National Astrophysical Observatory at Tonanzintla.

The first of these to be discovered by Senor Haro on the photographs taken by him with telescopes at the Oak Ridge, Mass., station of Harvard Observatory, where he did his researches, has a magnitude of 8.10 when measured on red plates. On ordinary plates sensitive to blue and green light it would rate only 14.75, making it quite inconspicuous. (Stars achieve naked eye detection at about 6th magnitude.)

The Haro star is apparently a giant, millions of times larger in volume than our sun. Like the famous red giant stars, Betelgeuse in Orion's shoulder and Antares in the Scorpion's heart, it is a sort of huge bubble of such low density that it can be visualized as a luminous vacuum. It is cool as stars go, with a surface temperature of only about 1500 degrees centigrade. A variable star, it has a range of 1.5 magnitude, which means that it varies about four times in brightness.

Even the best glass lenses of astronomical telescopes cannot bring blue and red light to a focus at exactly the same place. This optical defect in refracting telescopes was used by Senor Haro in his continued search for red stars in the Hercules-Vulpecula region of the Milky Way.

An ingenious method of detecting red stars was developed some years ago by Dr. V. M. Slipher of Lowell Observatory and Dr. G. Z. Dimitroff of Harvard Observatory. It consists in taking photographs alternately at the blue and red focuses of the telescope, using panchromatic plates which are sensitive to red as well as blue light. At the blue focus, blue stars appear normal with small round images, but red stars appear as tiny black dots surrounded by halos.



NO WAITING—Although only partially completed, this airfield somewhere in France is already in use for gliders loaded with supplies for troops.