

# 660 Light Years to Earth and a Memorial Day Mars

Howard L. Cohen  
Assoc. Professor Emeritus of Astronomy  
University of Florida  
June 2016

*A wide-field photograph of brilliant Mars shining through a tree canopy serendipitously reveals more than just the “red planet”*

**D**uring late May 2016, Earth approached Mars closer than these two planets had been in more than ten years. Even so the small Martian disk only appeared about one percent of the Moon’s diameter on the sky. Therefore, a moderate sized telescope and high magnification were needed to resolve the Martian disk.

However, the brilliancy and color of Mars still made a fine sight for naked eyes during evening skies in Florida. Here (**Fig. 1**) we see Mars on 2016 May 27 shining through a canopy of trees in a photo taken with just a “normal” or “standard” camera lens of 50 mm focal length.<sup>1</sup>

*Nevertheless, the picture shows more than at first meets the eye.*

Here Mars is near the upper part of *Scorpius*, to the right of the scorpion’s right claw and very close to the scorpion’s boundary with *Libra* or the “The Balance,” a relatively faint constellation. (*Libra* is above and to right of Mars and mostly hidden by trees on the right.)



**Fig. 1. Mars in Scorpius shines through a tree canopy.** Mars is toward right, Saturn toward left and Antares toward bottom. What seems to be clinging to the left side of Mars? (See text.)

**A large image** of this and all other photos in this article, including labeled versions, are on the web.

**See Appendix for each web address.**

Three stars to the upper left of and down to the lower left of Mars mark the right claw of the scorpion: Beta<sup>1</sup> (pronounced Beta One), Delta and Pi Scorpii.

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<sup>1</sup>**Photo Details:** Canon EOS 5D II on fixed tripod mount. Exposure 8 sec. at f/2, ISO 1600 with 50 mm, f/1.8 lens. Date: 2016 May 27 at 1:14 a.m. EDT (05:14 UT).

To the left of Mars is bright Saturn in *Ophiuchus*, “The Serpent Bearer.” Down to the right of Saturn is the bright star Antares in the “heart of the scorpion.”

The orange tinted color of Antares, like Mars, gives this star an alternate name — “Rival of Mars.” Iron rich soils produce the color of Mars but the color of Antares results from surface temperatures cooler than our Sun’s surface.<sup>2</sup>

**However, this photo shows more than just Mars and neighboring celestial objects.**

Look very, very closely just to the left of Mars and see why. A small, faint, orange-colored “star” seems to be clinging to the left side of Mars! (See **Fig. 2** for an enlargement.)

Is this one of the two known Martian satellites, Phobos or Deimos, or a yet unknown satellite of this planet? The former is unlikely since these two Martian moons shine at about magnitude +12 and the estimated limiting magnitude for this photograph is about +11. (I still find this remarkable for a basic, standard camera lens). Furthermore, Phobos and Deimos always remain less than one arc minute away from Mars, much closer than this faint object. Finally, a newly discovered satellite is unlikely since a satellite this bright and far from Mars would surely be known.

Could it possibly be an image defect, perhaps several “hot pixels,” or something else?



**Fig. 2. Enlargement of Fig 1.** A dim star appears to cling to the left side of Mars. What is it? (See text for answer.)

But, the enlarged image of Mars (**Fig. 2**) distinctly shows not hot pixels but the image of a dim star mimicking the color of Mars! So, if a star, which one?

At the time of this photograph, stellar atlas software shows a faint star of apparent visual magnitude +7.6 only about 20% of a Moon diameter away (5.6 arc min)! In addition, this star, named HD141466 (also designated by other catalog numbers as SAO 183837), has the color and classification of a *cool giant* (spectral type **K0 III**). Indeed, this type of star produces a color remarkably similar to the orangy tint of Mars!

Although cooler in surface temperature than the Sun (about 70% as hot), the large diameter of HD141466 (about 15 solar diameters) would produce a visual luminosity approximately 30 times greater than the Sun. However, here we see this star appearing 7,200 times fainter than Mars (magnitude -2.0).

*Why so faint?*

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<sup>2</sup>In **Fig. 1** the image of Mars is overexposed giving it a slightly whitish color.

### Distance, of course.

Astronomers estimate the light from this orange colored giant has taken about 660 years to reach Earth while light from “nearby” Mars took but four minutes!<sup>3</sup>

So, *serendipity* played a role on the night this photograph was taken. If taken a few hours earlier, this star would have blended with Mars. If taken a few hours later this star would have been well separated from Mars in this picture. Nevertheless, accidentally we have here two similarly colored celestial objects, one near and one far, appearing to touch each other.

### A Memorial Day Mars — A Colorful Display

Finally, the planet Mars reached its closest distance to Earth *Memorial Day, 2016 May 30*. Appropriately, this planet, also named for the Roman god of war, had its close approach on the same day that we remember those who died while serving in our military.



**Fig. 3. Memorial Day Mars.** Both brilliant orangy Mars (top) and Antares (bottom and glowing from behind clouds) shine over southern Florida skies. Saturn is to left of orange Antares. Just below Mars, in an approximate line, are Beta<sup>1</sup>, Delta and Pi Scorpii. Tau Scorpii, a blue-white hot star, is down to the right of Antares. (Large versions of all figures, both unlabeled and labeled, are on the web. See Appendix.)

<sup>3</sup>Properties listed for HD141466 are approximate due to uncertainties in data.

**Figure 3** again shows a wide-field image of Mars (top center) and its surrounding but now better shows the planet's brilliance and color.<sup>4</sup>

Antares, the bright star that rivals Mars in color, is directly below Mars shining through some clouds. (Yes, these are earthly clouds and not an interstellar nebula!) Meanwhile, Saturn is to the left of Antares just beyond the cloud's edge. Contrast the color of cool Antares with the blue-white color of Tau Scorpii, a hot star, that is down to the right of Antares.

Mars will continue to shine brightly with its distinctive orangy color in our evening skies during coming summer months. Look for it if you haven't already. ☼

## APPENDIX

Figures in this article are best viewed in large sizes on the web  
either in unlabeled and labeled versions

**Figure 1.** Mars Through Tree Canopy.

- **Unlabeled:** <http://goo.gl/GmI9zC>
- **Labeled:** <http://goo.gl/KmQOHj>

**Figure 2.** Enlargement of Fig. 1.

- **Unlabeled:** <http://goo.gl/Nlv2eG>
- **Labeled:** <http://goo.gl/wt7OYQ>

**Figure 3.** Memorial Day Mars.

- **Unlabeled:** <http://goo.gl/aPbZU7>
- **Labeled:** <http://goo.gl/GUqMSP>

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<sup>4</sup>**Photo Details:** Canon EOS 5D II on equatorial driven mount. Exposure 10 sec. at f/2.8, ISO 2000 with 50 mm, f/1.8 lens. Date: 2016 May 29 at 11:01 p.m. EDT (May 30, 03:01 UT).