

The Orbit of Mars

Bob Hayward

Astronomer/Educator

Pisgah Astronomical Research Institute

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Mars has always fascinated us. In ancient times it was associated with agriculture and thus was thought to be the home of the god of agriculture. But its distinctive red color also reminded the ancients of blood and it became known as Ares to the Greeks or Mars to the Romans, i.e., the god of war.

In more modern times we have books that speculated on possible living critters on Mars, perhaps the most well-known *The War of the Worlds* by H. G. Wells in 1898 and dramatized by Orson Welles in his 1938 Halloween season radio theater. There was also Edgar Rice Burroughs' John Carter on Mars series that started with *The Princess of Mars* in 1917 and *The Martian Chronicles* by Ray Bradbury in 1950. In 1906 Percival Lowell published his *Mars and Its Canals* which was a detailed speculation regarding the "canals" detected some years earlier by Giovanni Schiaparelli. Schiaparelli, of course, never intended his observations to be interpreted as implying construction by sentient beings. But, until the 1964 observations of Mars by the Mariner IV fly-by satellite, canals on Mars were not completely ruled out.

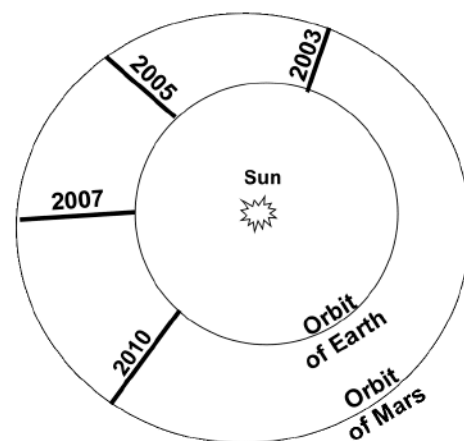
While intelligent life (but not all life) on Mars has certainly now been ruled out, we still find ourselves fascinated by this planet. Thus, the so-called "Mars Hoax" of recent years. Actually, this is not really a hoax at all because it was true (almost) at one time.

What is the "Mars Hoax"? First, let's go back to the great day of August 27, 2003. That was the day that Mars and the Earth came closer together than they had in almost 60,000 years. (It was also this author's birthday – a bit less than 60,000 years, however.) To understand the significance of this event we need to understand the orbits of the Earth and Mars.

Both of these planets revolve around the Sun, of course. The Earth makes this trip once every year, 365.2422 days to be exact. But Mars, being farther from the Sun than the Earth takes 687 Earth days or 1.88 Earth years to make the trip. These are like two cars on a racetrack with Earth in the inner lane and Mars in the outer lane. Because it is moving more rapidly, Earth passes or laps Mars every 780 Earth days or approximately 26 months. As the Earth passes by the red planet there comes a point at which it lies directly on a line between Mars and the Sun. Thus, observed from the Earth Mars is directly opposite the Sun in the sky and we say Mars is at *opposition*.

Now, if the orbits of these two planets were perfect circles with the Sun at the center, every 26 months when Mars came to opposition, Mars would be at its closest point to the Earth. But things are not so simple in the astronomical world. The orbit of the Earth is slightly eccentric, i.e., non-circular. The orbit of Mars is decidedly eccentric. Thus, if Mars were to come to opposition at the point in its orbit when it is nearest the Sun, called *perihelion*, it would be closer to the Earth than if it came to opposition at some other point in its orbit. This is what nearly happened on that fateful day in 2003. Mars reached opposition on August 28 and perihelion on the 30th. Thus, we say that in 2003 Mars came to a *perihelic opposition*. Because of the orientations of the orbits of both Mars and the Earth, their closest approach was actually on August 27 at

**Recent/Upcoming
Oppositions of Mars**



August 28, 2003	34 million mi.
November 7, 2005	43 million mi.
December 24, 2007	55 million mi.
January 29, 2010	57 million mi.

a distance of 55,758,006 km or 0.373 a.u. (The average distance of the Earth from the Sun is about 93 millions miles; astronomers call this figure an *astronomical unit* or a.u.) For many days both before and after this event Mars was particularly bright in the evening skies and, *through a 75-power telescope*, appeared as large as the Moon. Then what happened? Well, astronomically nothing unusual happened. The Earth gradually drew ahead of Mars in their eternal race around the Sun and they went on their merry ways. But, in the summer of 2004 what should appear on the Internet but a chain letter warning everybody to prepare for the closest approach of Mars in 60,000 years on August 27, 2004!! This false warning pointed out that Mars would be particularly spectacular and would appear as large as the Moon *to the naked eye!!* People receiving the letter started calling their local planetariums and observatories and some newspapers even published it. The truth was, of course, that by this time the Earth had left Mars far behind and it was not even visible in the evening skies.

On November 7, 2005, Mars once again came to opposition but this time it was not a perihelic opposition and it was 0.470 a.u. from the Earth. Nevertheless, that letter appeared on the Internet again in the summer of 2005 alerting people that Mars would be the closest to the Earth in 60,000 years on August 27, 2005. The chain letter, by now dubbed the "Mars Hoax," appeared again in 2006 and 2007 (when Mars reaches opposition on December 24 at a distance of 0.600 a.u.) And it will probably appear again next summer and the one after that and....

When will Mars again reach another perihelic opposition? The next one, at a distance of 0.386 a.u. will occur on July 27, 2018. As you can see, that is a bit farther away than in 2003 but once again Mars will be spectacular in the evening skies and very fascinating through a telescope...but **not** as large as the Moon to the naked eye!

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[Elizabeth Snoke Harris](#), Editor