MARS OPPOSITIONS By Dick Suiter

[slightly edited Dec 2017]

A lot of excitement has been generated by the statement that this opposition of Mars is the best in many thousands of years. Let's look at the oppositions for the seventy years between 1940 and 2010 and see if it's extra special.

If the orbits of the planets were perfect circles, no near approach would be any better than any other. The orbits of the three inner planets are pretty good circles, so we seldom hear about a favorable approach to Venus. (Of course, a near approach is the worst time to observe a planet between us and the sun, so we are unlikely to hear about it in any case.) The orbit of Mars, however, is greatly elliptical, so the possibility exists of reaching opposition near the point when Mars is on the inner side of its ellipse.

Mars reaches opposition every 2 years plus a couple of months, so the point where the Earth catches it changes throughout the years. This was not guaranteed; the possibility also existed for it to be precisely two years (possibly from a tidal lock with Jupiter), but such is not the case.

Figure 1 shows the opposition diameter of Mars as the years go by. It follows a roughly cycloidal form resulting from Mars spending more time on the outer side of its orbit. A big Mars means a close opposition. The 2003 opposition is a large one at 25.1 arcseconds, but we had nearly as large a view at the 1956 and 1971 oppositions, so Mars gets fairly large far more often than indicated in the hoopla.

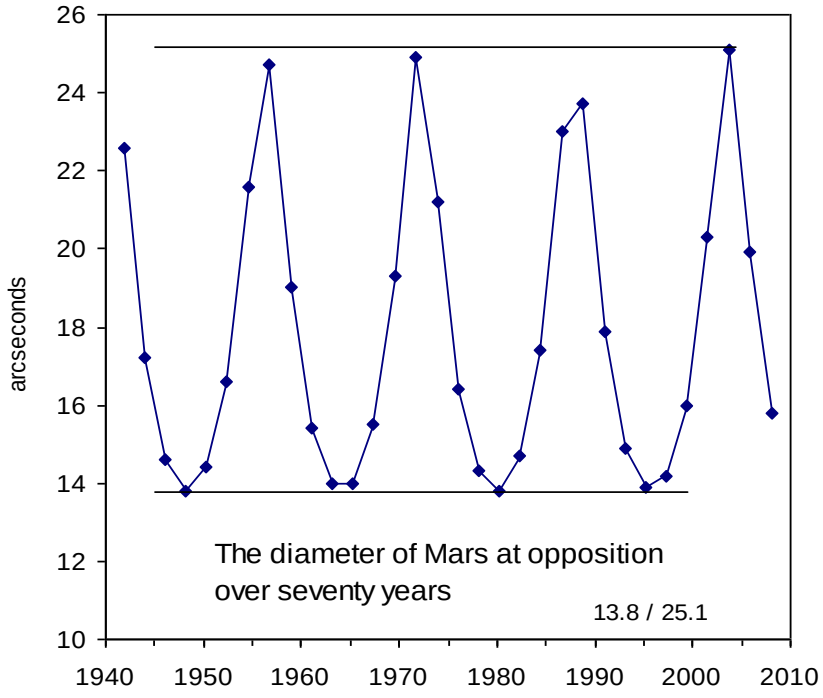

Figure 1. Maximum diameters over 70 years.

Nevertheless, the close oppositions happen only about every 15 or 16 years, so they are not exactly common. The last opportunity in the late 80's marked a dry spell, as the oppositions neatly jumped the closest point in Mars' orbit.

We can also look at the way the diameter changes with time in Figure 2.

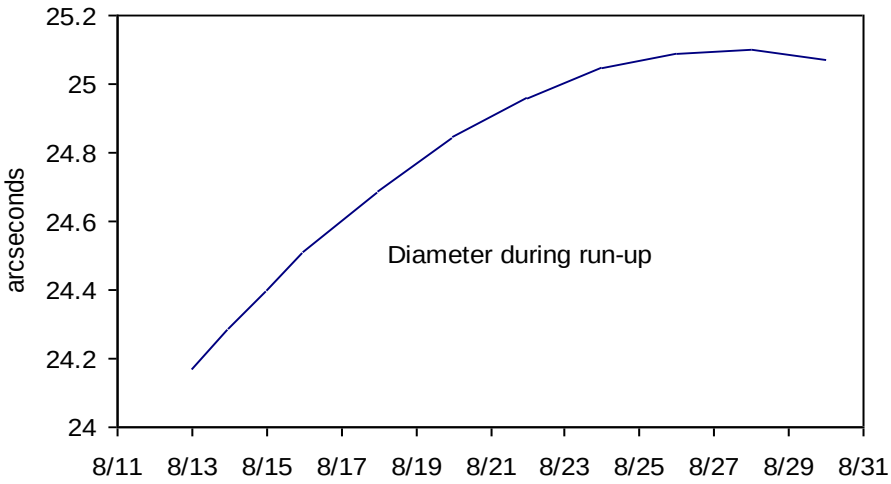

Figure 2. Diameter during late August 2003

As we can see, the diameter is relatively large for the month before and the month after (the shape is basically the same on the other side of opposition on the 28th), so we can observe Mars when it is more conveniently placed in the early evening and still have a fine view.

[This year is one of the lesser “spikes.” Mars reaches 24.3 arcsec on July 30, 2018]