

Introduction to sky maps for observing planets and bright stars at evening and morning mid-twilight

[August 2021, lat. 40° N]

By Robert C. Victor and Robert D. Miller

When organizing a first sky watching session for students, we suggest that you begin your outdoor session during evening twilight, so students can experience the joy of discovering and identifying the brighter stars as they first appear. Begin your session no later than one-half hour after sunset, or even earlier if the Moon or a bright planet is visible. You may wish to continue until the sky is dark enough for naked-eye observation of constellations of interest. Binoculars and telescopes can provide inspiring views of Moon, planets, double stars, star clusters such as the Hyades and the Pleiades, the Great Nebula in Orion's sword, the Lagoon Nebula above the spout of the Teapot of Sagittarius, Andromeda Galaxy, and more.

If you also schedule a predawn session, you can start as early as 1¼ to 2 hours before sunrise, before morning twilight begins, to allow enough dark-sky time to observe a selection of constellations and deep sky objects. Continue long enough into twilight to watch some of the brighter stars disappear.

My friend and former colleague at Michigan State University, Mr. Robert D. Miller, has kindly created computer programs and provided us with monthly sky charts tracking daily locations of the five naked-eye

planets and the 15 stars of first magnitude or brighter visible from latitude 40° north. Positions of the stars and planets are plotted each day at the moment the Sun is 9° below the horizon, which we have called "mid-twilight". Locations of the planets are plotted as a separate dot for each day, with larger dots plotted weekly on the 1st, 8th, 15th, 22nd, and 29th day of the month. Star positions during the course of the month are plotted as continuous tracks, with all stars drifting westward (left to right on the charts) in the course of the month, owing to the Earth's revolution around the Sun.

For latitude 40° N, the moment of evening mid-twilight during the course of the year occurs 43 to 53 minutes after sunset, and morning mid-twilight occurs a similar interval ahead of sunrise. For locations south of lat. 40° N, the same stage of twilight occurs closer to sunset and sunrise, and for locations farther north, twilights are longer.

[Evening twilight star map for August 2021](#)

In August 2021, at evening mid-twilight, Venus shows little change in its altitude above western horizon, but shifts southward, from W toward WSW as month progresses. **Jupiter first** appears on ESE horizon in evening mid-twilight in first week, and climbs higher as month progresses. (Jupiter is at *opposition* to the Sun on August 19 and visible all night, from dusk until dawn. Note **Saturn** to Jupiter's upper right at dusk. Saturn reached opposition on night of August 1.)

Bright stars of August evenings include the *Summer Triangle* of **Vega, Altair, and Deneb** climbing high in east. In mid-August 2021, a line from Vega to Altair, 34° long, extended 31° locates Saturn. **Antares**, heart of Scorpius, crosses from S to SSW. Bright **Arcturus** is in W, with **Spica** 33° to its lower left, sink lower in the course of the month. **Note Venus closing in on Spica late in August.** They will appear only 1.6° apart on Sept. 5.

[Morning twilight star map for August 2021](#)

In the morning sky in August 2021, Saturn exits in the SW, with **Jupiter following**. The *Summer Triangle* is sinking in W to WNW, while the eastern sky is filling up with same bright stars we will see on winter evenings. On August mornings, the last of these to rise are the “Dog Stars”, **Procyon** in east and **Sirius** in ESE, in the second week. The two Dog Stars, plus **Betelgeuse**, Orion's shoulder, comprises the *Winter Triangle*. Members of the *Winter Hexagon*, in clockwise order beginning with its

brightest star, are Sirius; Procyon; the “Twin” stars **Pollux and Castor** just 4.5° apart; **Capella; Aldebaran; Rigel**; and back to Sirius, completing the polygon, with Betelgeuse inside.

Robert C. Victor was Staff Astronomer at Abrams Planetarium, Michigan State University. He is now retired and enjoys providing sky watching sessions for groups in and around Palm Springs.

Robert D. Miller, who provided the twilight charts, did graduate work in Planetarium Science and later astronomy and computer science at Michigan State University and remains active in research and public outreach in astronomy.