

DARK SKIES for July 2017:

S/S	July	1/2	1:36 a.m.	-	3:09 a.m.
S/M	July	2/3	2:05 a.m.	-	3:10 a.m.
M/T	July	3/4	2:35 a.m.	-	3:11 a.m.
T/W	July	4/5	3:08 a.m.	-	3:12 a.m.
W/T	July	5/6	none		
T/F	July	6/7	none		
F/S	July	7/8	none		
S/S	July	8/9	none		
S/M	July	9/10	none		
M/T	July	10/11	none		
T/W	July	11/12	none		
W/T	July	12/13	none		
T/F	July	13/14	10:49 p.m.	-	11:20 p.m.
F/S	July	14/15	10:48 p.m.	-	11:50 p.m.
S/S	July	15/16	10:46 p.m.	-	12:21 a.m.
S/M	July	16/17	10:45 p.m.	-	12:53 a.m.
M/T	July	17/18	10:44 p.m.	-	1:29 a.m.
T/W	July	18/19	10:42 p.m.	-	2:09 a.m.
W/T	July	19/20	10:41 p.m.	-	2:56 a.m.
T/F	July	20/21	10:39 p.m.	-	3:34 a.m.
F/S	July	21/22	10:38 p.m.	-	3:36 a.m.
S/S	July	22/23	10:36 p.m.	-	3:38 a.m.
S/M	July	23/24	10:35 p.m.	-	3:39 a.m.
M/T	July	24/25	10:33 p.m.	-	3:41 a.m.
T/W	July	25/26	10:31 p.m.	-	3:43 a.m.
W/T	July	26/27	10:38 p.m.	-	3:44 a.m.
T/F	July	27/28	11:08 p.m.	-	3:46 a.m.
F/S	July	28/29	11:38 p.m.	-	3:48 a.m.
S/S	July	29/30	12:07 a.m.	-	3:50 a.m.
S/M	July	30/31	12:37 a.m.	-	3:51 a.m.
M/T	July	31/1	1:09 a.m.	-	3:53 a.m.

Times listed are for Dodgeville, Wisconsin when

(1) Moon is below the horizon

(2) Sun is > 18° below the horizon
(astronomical twilight)

Time Travel

conducted by David Oesper

THE BEGINNINGS OF AMERICAN ASTRONOMY (continued)

American navigators had no superiors in the first half of this century. Nantucket whalers covered the Pacific, Salem ships swarmed in the Indies, and the clipper ships made passages round the Horn to San Francisco, which are a wonder to-day. Part of their success is due to the bold enterprise of their captains (who were said to carry deck-loads of studding-sail booms to replace those carried away), but an important part depended on their skill as observers with the sextant. One of the sister ships to the one of which Bowditch was supercargo was visited at Genoa by a European astronomer of note (Baron de Zach), who found that the latest methods of working lunar distances to determine the longitude were known to all on board, sailors as well as officers. His bewilderment reached its climax

when the navigator called the negro cook from the galley and bade him expound the methods of determining longitude to the distinguished visitor.

On Bowditch's own ship there was "a crew of twelve men, every one of whom could take and work a lunar observation as well, for all practical purposes, as Sir Isaac Newton himself." Such crews were only to be found on American ships in the palmy days of democracy. All were cousins or neighbours, and each had a "venture" in the voyage. But these anecdotes may serve as illustrations of the intellectual awakening which came about as soon as our young country was relieved from the pressure of the two wars of 1776 and 1812. An early visitor, Baron Hyde de Neuville (1805), felt "an unknown something in the air," "a new wind blowing." This new spirit, born of freedom, entered first into practical life, as was but natural; science next felt its impulse, and, last of all, literature was born. Emerson hailed it (in 1837) "as the sign of an indestructible instinct." "Perhaps the time is already come," he says, "when the sluggish intellect of this country will look from under its iron lids and fill the postponed expectation of the world with something better than the exertions of mechanical skill. Our day of dependence, our long apprenticeship to the learning of other lands, draws to a close. The millions that around us are rushing into life can not always be fed with the sere remains of foreign harvests."

Benjamin Peirce, a graduate of Harvard in the class of 1829, had been concerned with the translation of the "Mécanique Céleste," and was early familiar with the best mathematical thought of Europe. He became professor in Harvard College in 1833, and, after the death of Bowditch, in 1838, he was easily the first mathematical astronomer in the country. His instruction was precisely fitted to develop superior intelligences, and this was his prime usefulness. Just such a man was needed at that time. Besides his theoretical researches on the orbits of the planets (especially Uranus and Neptune) and of the moon, his study of the theory of perturbations, and his works on pure mathematics and mechanics, he concerned himself with questions of practical astronomy, although the observations upon which he depended were the work of others. He was the consulting astronomer of the "American Ephemeris and Nautical Almanac" from its foundation in 1849, and its plans were shaped by him to an important degree. His relative, Lieutenant Davis, United States Navy (the translator of Gauss's "Theoria Motus Corporum Cœlestium") (1857), was placed in charge of the "Ephemeris," and the members of its staff—Runkle, Ferrel, Wright, Newcomb, Winlock, and others—most effectively spread its exact methods by example and precept. Professor Peirce undertook the calculations relating to the sun, Mars, and Uranus in the early volumes of the "Ephemeris." As a compliment to her sex, Miss Maria Mitchell was charged with those of Venus, Mercury was computed by Winlock, Jupiter by Kendall, Saturn by Downes, Neptune by Sears Walker.

[Edward S. Holden](#), *Science*, June 18, 1897