

Watching solar eclipses 1945–2017

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On 2017 August 21, I saw a total solar eclipse in Glendo State Park, Wyoming. The sky was clear, the corona magnificent.

I could have stopped here. You can stop reading here, the main message being already delivered.

However, I will write a little more.

Eclipse of 2017 August 21

In the morning of August 17, at 05:07 local time (03:07 UT), while still in my home in Uppsala, I started the excursion by taking some photos of the moon, which was ostensibly and accurately aiming for the sun. I then travelled to Denver, CO. The plane landed at 15:38 local time (21:38 UT), only 3 minutes after schedule. I came out from the airport at 17:25, 1 hour and 47 minutes later.¹ I had rented a car: I chose a Chevrolet compact car, much resembling the Citroën C4 I drive in Europe, and equally comfortable and easy to drive.² I drove in the evening to Douglas, WY, (elevation 4,836 ft, 1,474 m), arriving around 23:00 (August 18, 05:00 UT). The distance from Denver to Douglas is about 217 mi.³

The next day I travelled to Casper, WY, (elevation 5,150 ft, 1,560 m), which was actually the first place I had planned to be at. (Also Madras, OR, was a location I thought of early.) On my way to Casper I stopped to see Ayres Natural Bridge south of Interstate Route 25.

Later the same day I drove to Orin (a place with a rest area; elevation 4,705 ft, 1,434 m), and Glendo (elevation 4,724 ft, 1,440 m). I looked for suitable parking spaces and rest areas along Interstate 25.

It seemed to me that Glendo State Park would be the best location of the places I had visited.

On August 19 I drove to Laramie, WY, now entering Glendo State Park on the way. Bennett Hill was a place recommended by two very helpful guides in the park. (Distance Douglas – Laramie 146 mi; time 2 hours and 13 minutes.)

I stayed three nights, August 19–22, in Laramie (elevation 7,165 ft, 2,184 m).

¹This is an all-time record, surpassing the time spent in all other countries I have entered, including several sub-Saharan countries in Africa.

²I drove a lot during my first visit to the US, from July 1965 through July 1966, in particular across the continent from Princeton, NJ, to La Jolla, CA, in June–July 1966, and the habit had not vanished.

³1 mi = 1 mile = 5,280 ft = 63,360 in = 1.609344 km = 1,609,344 mm exactly.

On the day of the eclipse I started at 02:04 local time (08:04 UT) from Laramie, driving along US Route 30 = US Route 287 and then along Wyoming State Route 34 and Interstate 25 without any problem. (On Wyoming 34 I saw two cars going in my direction and none in the opposite direction.) I stopped for a minute on Wyoming 34 and could see the Milky Way for the first time in several years. I arrived to the park at 04:31. Michael H. F. Wilkinson was also there, with two telescopes, and I stayed close to him. He took a tremendous amount of photos and could capture the Diamond Ring effect, also known as Baily's beads effect.⁴

From Xavier M. Jubier's interactive map I take the following data as input, trying to use the spot where we were, a few hundred meters to the southwest from Bennett Hill and about 2 mi (a little more than 3 km) from the central line: At latitude $42^{\circ} 30' 39.90''$, longitude $105^{\circ} 00' 00.41''$, the eclipse started at 10:24:03.2 local time (16:24:03.2 UT), the total phase at 11:45:07.2; the maximum was reached at 11:46:21.2, the end of the total phase occurred at 11:47:34.9, and the end of the partial phase at 12:12:14.8.⁵ The duration of the total phase was 2:27.7.

The corona was magnificent, and much larger than during the eclipse of 1999. Indeed a wonderful experience! I could see no prominences. Michael, however, could take a photo showing a few small prominences.

As I remember, it was considerably darker during totality in 1999 than in 2017. (However, what is a memory worth after 18 years?) Maybe this was due to slightly more haze in 2017. A smaller shadow could not be the explanation, since the maximal path width near Albena in 1999 was 113 km and Albena was a bit away from the central line (indicated by the fact that duration was 1:49 as opposed to the maximum of 2:23), while the path width at Glendo was 109 km with a duration of 2:27. The sun's altitude at the two locations was 59° in 1999 and 55° in 2017, thus not very different. We may conclude that the maximal distance in 2017 from the point of observation to the penumbra was quite similar to that in 1999.

There were four planets that could theoretically be seen. Listed from the left they were: Jupiter (about 47° to the east of the sun), Mercury (about 8° to the east of the sun), Mars (about 8° to the west of the sun), and Venus (about 34° to the west of the sun). Of these I saw only Venus, the most brilliant. Maybe I did not look carefully enough; maybe the slight haze made the other three more difficult to see. Michael has a photo showing Mercury.

I did not see any shadow bands:⁶ the ground consisted of sand and grass, and so was too irregular to allow for this kind of observation.

Not only the moon was between us and the sun: all of a sudden, seven pelicans flew in front of the sun. I saw them on Michael's computer screen, he filmed them and put

⁴Named for Francis Baily (1774–1844). The phenomenon is caused by rays passing through valleys in the moon's mountains.

⁵The precision is exaggerated. One hundredth of an arc second in latitude is about 1 ft or 30 cm. Of course I cannot indicate our location so exactly. One hundred meters east or west would give a difference in time of about 0.13 seconds, since the speed was 751 m/s.

⁶Shadow bands are thin wavy lines of alternating light and dark that can be seen moving and undulating in parallel on plain-coloured surfaces immediately before and after a total solar eclipse.

the result on Youtube:⁷

https://www.youtube.com/watch?v=2E_6_E-8fE0

Due to all the cars, I could not leave the park any time soon after the eclipse had ended; only at 18:05, almost four hours after the end, did I leave the park. By then there were no longer cars queueing in the park—but outside. In order to avoid Interstate 25, I first planned to drive along smaller roads to the east of that highway, but somebody told me that traffic there was proceeding at 20 miles per hour, which seemed good enough, so I entered it. However, traffic was extremely slow, not anywhere near 20 mph, so I left Interstate 25 at Exit 100 and drove Wyoming 117 and Wyoming 320 to Wheatland, and from there Wyoming 34 and US Route 30 = US Route 287 again. I arrived at my apartment in Laramie at 22:01, after a drive of 112 miles. At 02:36, August 22, Michael sent me a message that he had arrived at Estes Park, CO.

I wrote several sms to Sweden; the first one at 08:12. Some of them just failed; the others were put on hold and sent away at 16:04, i.e., after a delay of almost 8 hours for the first one. (It seems the system was overloaded because of all the people using telephones in the park.)

On August 22 I visited the Art Museum of the University of Wyoming in Laramie before going south to Thornton, CO, close to Denver, where I stayed in a motel during the last night, 22–23. On August 23, I visited Denver Art Museum, returned the car some miles from the airport,⁸ and flew from Denver to Frankfurt; the following day to Arlanda.

I arrived safely to my home in Uppsala on August 24, at 16:01 local time (14:01 UT), after almost 23 hours of travel from the motel in Thornton.

Both before and after the eclipse I corresponded with two friends in addition to Michael: one of them saw the eclipse successfully in Tetonia, ID, (elevation 6,047 ft, 1,843 m), close to Grand Teton National Park in Wyoming; the other, equally successfully, in Mitchell, OR, (elevation 2,777 ft, 846 m).

Eclipse of 1945 July 09

This eclipse, the first I had seen, was total in the north of Sweden, e.g., in Bjuröklubb, but I saw it as partial at Boardinghouse Kairo in Upplands Väsby, a little north of Stockholm. My father had rented a cabin there for the whole summer vacation—for 250 SEK. He provided us children with pieces of window glass, one side of which he had (carefully) covered with soot from a candle. He advised us to hold the glass so that the side with the soot faced the sun, not so that it touched our noses.

Lyell McConnell saw this eclipse in Wyoming, also there as a partial eclipse, two hours before me. This I was to learn 72 years later when I happened to meet her in Laramie in August 2017. She is Michael Ward's aunt—Michael was my host in Laramie.

⁷If you look at the pdf file, it is probably safer to write the address by hand rather than clicking on the address.

⁸I drove more than one thousand miles during the week.

Eclipse of 1954 June 30

I travelled to Persnäs in the island of Öland, on the central line, with my Newtonian reflector, the 6" mirror of which I had made myself, while my father had made almost all the rest—a heavy load on the train, on the ferry boat⁹ to the island, and on the railbus¹⁰ towards the northern part of the island.

The day of June 30 was cloudy, but at one moment the clouds were somewhat thinner, so I could see the brightest (innermost) part of the corona and a small prominence, and took a picture of them.

Many astronomers from Stockholm Observatory were there, including Bertil Lindblad (1895–1965) and Yngve Öhman (1903–1988), as were astronomers from many other countries. The concrete foundations used for the instruments remained in the field of the observations even after several decades.

Åke Wallenquist (1904–1994), from Uppsala University and Kvistaberg Observatory, chose Gotland instead, where totality was somewhat shorter—but saw the eclipse without clouds.

Eclipse of 1990 July 22

I travelled by car with Marianne Ståhlberg to a place close to Joensuu on July 21. We spent part of the night in a tent. The sky was covered by heavy clouds, and we could experience nothing but darkness.

Eclipse of 1999 August 11

Marianne and I travelled to Varna; we stayed in a hotel in Св. Константин, Albena, just north of Varna. My oldest son Dan Kiselman, his wife Ingela Kiselman and their daughter Klara (two and a half), and Ingela's parents Gunnel Ericsson and Sven Georg Ericsson were there too, as was Sabira Ståhlberg, Marianne's daughter, and Sabira's friend Sašo (Александър Шиваров, Aleksandăr Šivarov). We were standing on the roof of Hotel Tervel, 60 meters from the Black Sea. The totality lasted 1 minute and 49 seconds there, as opposed to the maximal duration of 2 minutes and 23 seconds. The sky was perfectly clear but perhaps there was a very slight haze. An absolutely marvelous experience, really unforgettable, especially in view of the less successful excursions in 1954 and 1990. I got an impression of the planetary system as a three-dimensional structure. That the sun dominates this system was evident: I saw Venus and Mercury and other planets in obedience. See my two publications (1999a; 1999b), which are available at my web site.

I could also see shadow bands during a few seconds just at the end of totality. They vibrated on the bright floor and on the walls of the terrace. The wavelength was about 15 cm, 6 in. The contrast between the dark and bright parts was very weak.

⁹A bridge from mainland Sweden to Öland was opened in 1972.

¹⁰Rail traffic on the island ceased in 1965.

A three-generation project

My father Sam Svensson (1896–1966) was very knowledgeable in astronomy. He started his professional life as a sailor already as a young boy, then educated himself to become a First Mate, Master Mariner, and Navigation Teacher (diplomas obtain in 1922, 1923, and 1924, respectively). He studied astronomy at Stockholm University College. On 1930 December 02 he was examined by Bertil Lindblad and obtained what corresponds to today's 30 ECTS Credits. He taught me a lot, to the effect that I can say that I learnt spherical trigonometry (the geometry of rays) before I learnt plane trigonometry.

Already as a child, I knew that there would be transits of Venus in 2004 and 2012. I thought of this as something in a very distant future. Now both years are behind us—and I have seen two transits of Venus.

On 1958 June 23 I was examined by the very same Bertil Lindblad, whom I had known since 1954, and obtained what corresponds to 60 ECTS Credits.

Then, on 1993 June 01, my oldest son Dan Kiselman got a PhD with Bengt Gustafsson as advisor, and is now a docent and lecturer at Stockholm University. He is a member of the Swedish National Committee for Astronomy (former President) and Secretary of the Swedish Astronomical Society. There is a planet Kiselman, number 12673, discovered by Clas-Ingvar Lagerkvist on 1980 Mars 16 at La Silla and named for Dan . . . well, actually it is an asteroid, only 7.837 kilometers in diameter . . .

It took three generations to reach this far.

References

- Kiselman, Christer. 1999a. Eklipso de la suno. *Kontakto*, No. 172 (1999:4), p. 9. (Item 99-i in my web site).
- Kiselman, Christer. 1999b. Suna eklipso 1999 08 11. *Fonto* **19**, No. 227, November 1999, pp. 30–31. (Item 99-iv in my web site).

Appendix: Some solar eclipses 1945–2024

<i>Date</i>	<i>Maximal length of totality</i>	<i>Where</i>
1945-07-09	1:15	Total in the north of Sweden. I saw it as partial in Upplands Väsby.
1954-06-30	2:35	Persnäs, Öland. Cloudy; however, I could take a photo of the corona and a small prominence.
1990-07-22	2:33	Near Joensuu. Completely cloudy.
1999-08-11	2:23	Св. Константин, Albena, just north of Varna. Clear sky, maybe a very weak haze.
2008-08-01		Total in Russia and China. Saw it as partial in Uppsala.
2015-03-20		Total at Tórshavn. Saw it as partial in Uppsala.
2017-08-21	2:40	Glendo State Park, Wyoming. Clear sky, but a slight haze.
2019-07-02	4:33	Chile and Argentina (near Buenos Aires).
2020-12-14	2:10	Chile and southern Argentina.
2024-04-08	4:28	Mexico and USA.