

Astronomical Computing

Conducted by Roger W. Sinnott

LINCOLN AND THE ALMANAC TRIAL

ABRAHAM LINCOLN, prior to his 1860 election as the 16th president of the United States, was a member of the Illinois bar for more than two decades. Arguably his most famous legal case and the most interesting, especially to astronomers, was the 1858 Armstrong murder trial. It is sometimes also called the "almanac trial."

A prosecution witness claimed to have seen the fatal fight at 11 p.m. by the light from a nearly full Moon standing high in the sky. As defense attorney, Lincoln had the witness repeat his statements about the bright Moon several times. Then Lincoln surprised the entire court by suddenly bringing forth an almanac and using astronomical evidence regarding the lunar phase and the time of moonset to discredit the prosecution witness and obtain a dramatic acquittal for his client.

Director John Ford's classic 1939 film, *Young Mr. Lincoln*, includes a fictionalized (and inaccurate) version of the almanac trial, with Henry Fonda in the leading role. The dramatic climax is the introduction of the almanac and the resulting breakdown of the witness, almost as in the final scene of a Perry Mason episode on television:

Lincoln: How'd you see so well?

Cass: I told you it was Moon bright, Mr. Lincoln.

Lincoln: Moon bright.

Cass: Yes.

Lincoln: Look at this. Go on, look at it. It's the *Farmer's Almanack*. Go ahead, look at it, look at page 12. You see what it says about the Moon? That the Moon was only in its first quarter that night and set at 10:21, 40 minutes before the killing took place. So you see it couldn't have been Moon bright, could it? You lied, didn't you, Cass?

Every substantial biography of Lincoln discusses the almanac trial, but the astronomical details given are often vague and confusing — even incorrect and contradictory.

Our initial purpose was to establish the correct astronomy of the almanac trial using personal computer programs, which make it easy to reconstruct the skies over rural Illinois in the 1850's. In the process we made an unexpected discovery regarding the unusual behavior of the Moon on the very night of the murder. As detailed in this article, our discovery helps to explain a long-standing mystery about the almanac case.

Image
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Rockwell's *Lincoln for the Defense* shows the future president at the Armstrong trial, almanac in hand, citing the astronomical evidence. This painting, originally done for the *Saturday Evening Post* of February 10, 1962, is now on display at the Norman Rockwell Museum in Stockbridge, Massachusetts. Copyright 1962 The Curtis Publishing Co.

MEETING AT VIRGIN'S GROVE

In August of 1857 the famous Methodist circuit rider Peter Cartwright convened a religious camp meeting of three weeks' duration in Mason County, Illinois. The tents and platforms for preaching stood among the trees of Virgin's Grove, about five miles northeast of the junction of Salt Creek and the Sangamon River.

Around the fringes of the camp meeting, gambling and drinking flourished at temporary bars set up for the occasion. One such outdoor saloon, run by bartender Tom Steele, stood about a mile southwest of Virgin's Grove.

There, about 11 p.m. on Saturday, August 29, 1857, on the final weekend of the camp meeting, William "Duff" Armstrong and James H. Norris became involved in a fight with James Preston "Pres" Metzker. Afterwards, Metzker mounted his horse and rode to a friend's home nearby, where he died of head injuries three days later. Both Norris and Armstrong were arrested and indicted for murder. Norris was tried first, convicted, and began serving six years in the state penitentiary.

THE ALMANAC TRIAL

Hannah Armstrong, mother of the remaining defendant, then traveled to Springfield to ask for help from Abraham Lincoln. He was an old family friend whose gratitude to the Armstrongs dated back to his earliest days in New Salem, Illinois. Lincoln immediately agreed to defend her son but would accept no fee for his efforts.

On May 7, 1858, the murder trial of Duff Armstrong took place at the Cass County courthouse in Beardstown, Illinois, with Judge James Harriott presiding. State's attorney Hugh Fullerton conducted the prosecution with two assistants, while the defense team consisted of Lincoln and William Walker. As the trial proceeded, evidence began to accumulate as strongly against Armstrong as it had against Norris.

The main prosecution witness, Charles Allen of Petersburg, stated that he was about 150 feet away from the fight but saw everything clearly by the light from a bright, nearly full Moon, high in the sky near the meridian. Allen claimed he saw Armstrong strike the fatal blows with a slungshot, a kind of blackjack made of a lead weight sewn into a leather strap. As described above, Lincoln produced an almanac to prove that the Moon at 11 p.m. was going out of sight, within about an hour of setting, and not standing overhead as the witness had claimed.

Several of the jury members later stated that "the almanac floored the witness." Lincoln also introduced medical testimony and concluded with an emotional speech



Henry Fonda starred in the title role of *Young Mr. Lincoln* in 1939.

recalling the days he had spent in the Armstrong home. After a short deliberation, the jury acquitted Armstrong.

THE ALMANAC

No one knows for certain which almanac or almanacs Lincoln consulted. Different authorities have suggested *Jayne's Almanac*, *Goudy's Almanac*, and *Ayer's American Almanac*, as well as the *Old Farmer's Almanack*, the *Illustrated Family Christian Almanac*, and several others. The first two in this list are mentioned most often.

Almost immediately after the trial, serious allegations circulated that a fake almanac had been used, with the lunar phases and times of moonset altered in a printshop to fit Lincoln's purpose. The charges of dishonesty were repeated in 1860 during the presidential campaign and in 1866 when J. Henry Shaw, assisting prosecution counsel at the trial, suggested in a written statement that an almanac of a "year previous to the murder" may have been "prepared for the occasion." In 1872 an early biography, Ward Hill Lamon's *Life of Lincoln*, discussed the almanac and suggested that there was "question concerning its genuineness."

Many later historians, with Lincoln's reputation for honesty in mind, have made statements like the following from Albert Beveridge's *Abraham Lincoln 1809-1858* (1928, Vol. I, page 571):

It is hard to account for the origin of the gossip of the false almanac; hard to explain the vitality and persistence of the story.

Nevertheless, many townspeople at the



This page from the 1857 *Old Farmer's Almanack* shows the "Moon runs low" notation near the end of August. The actual almanac used by Lincoln at the trial is not known. Reproduction courtesy Houghton Library, Harvard University.



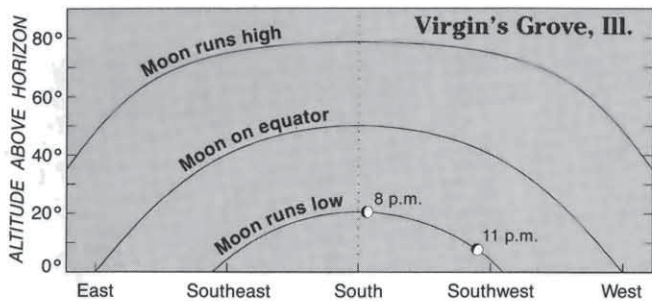
The waxing gibbous Moon shown here is 74-percent sunlit, exactly the same phase as on the night of August 29, 1857. The authors took this photograph near 0^h Universal time on February 5, 1990.

time believed that Lincoln had prepared a fake almanac. There is a clear implication of dishonesty in the following newspaper account, quoted in William Barton's *Life of Abraham Lincoln* (1925, Vol. I, pages 509-510):

[The] Petersburg people, who remember the trial . . . talked the matter over. Some of them remembered as positively as the witnesses had done that there was nearly a full moon on the night Pres Metzker was beaten at the camp-meeting. They insisted on their recollections in spite of Mr. Lincoln's documentary evidence. There was an overhauling of old almanacs in various households. Sure enough, they showed a moon nearly in mid-heavens at the hour of the affray. Then there was inquiry for the almanac which had been presented by Mr. Lincoln in court. The little pamphlet could not be found.

The Moon's position "nearly in mid-heavens" is a reference to the Moon's crossing of the meridian, an event also known then as the "southing of the Moon" and called upper transit or upper culmination by astronomers. Farmers in the 1850's were more familiar with the use of almanacs than are most people now. Almanacs often contained information on the times of the southings of the Moon and bright stars.

Even a writer sympathetic to Lincoln, Edgar Lee Masters, said, "Many people of Lincoln's time thought that there was



Plotted here are the different tracks the Moon followed in 1857, a year when its north and south declinations reached unusual extremes. Unless otherwise credited, illustrations for this article were supplied by the authors.

Just before 8:00 p.m., the Moon crossed the meridian in the cloudless sky over Virgin's Grove. As the camp meeting ended only a few hours later, the Moon was dropping quickly from view. The motion of the Moon on August 29, 1857, was very unusual because of its southern declination, near the extreme value possible in an 18.6-year lunar cycle.

This new astronomical evidence provides a strong clue as to how the stories of the spurious almanac began. It gives added reason for believing that Lincoln was honest in his quotations from the almanac.

something wrong about the use of the almanac" (*Lincoln: The Man*, 1931, page 135). How could Lincoln prove that the Moon was near the horizon and setting, since the people at the camp meeting had seen it with their own eyes, shining brightly and standing near the meridian?

At the request of various Lincoln historians over the years, the lunar phase and time of moonset on the night of August 29-30, 1857, have been calculated by many prominent astronomers — in 1871 by Elias J. Loomis, in 1909 and again in 1925 by Joel Stebbins, in 1925 by the staff of Yerkes Observatory, in 1928 by Harvard College Observatory, and in 1905, 1925, and 1976 by the U. S. Naval Observatory. All found moonset times near 12:04 a.m. on August 30, 1857, supporting Lincoln's claim that the Moon at 11 p.m. on the 29th was low and near to setting.

Repeating this calculation ourselves, we discovered a remarkable coincidence. It involves a well-known 18.6-year lunar cycle and its effect on the lunar declination of August 29, 1857. This new finding helps explain the mystery of why so many people thought Lincoln had faked the almanac. We believe that it resolves the apparent conflict between Lincoln's astronomical evidence and the recollections of the townspeople.

THE MOON "RUNS LOW" ON AUGUST 29, 1857

For an observer at a given latitude in the northern U. S., the length of time the Moon spends above the horizon depends primarily on the lunar declination. The Moon "runs high" when it has an extreme northern declination, passing near the zenith and staying in the sky a long time before finally setting in the northwest. The Moon "runs low" at the other extreme in declination, skimming low above the southern horizon, then quickly setting in the southwest.

As the table and graph above show, 1857 was a special year with respect to lunar declination. Every 18.6 years the most extreme lunar declinations are possible, when the tilt of the Earth's axis (23°.5) and the tilt of the lunar orbit (5°) combine to produce lunar declinations exceeding 28° north and 28° south. George Lovi discusses the geometry of this

YEARS OF HIGH AND LOW MOONS

(Extreme north-south declination)

...	1876	1932	1987
1838	1894	1950	2006
1857	1913	1969	...

18.6-year cycle, the period of regression of the lunar nodes, in "The High-Low Moon of 1987" (*S&T*: January, 1987, page 57).

Indeed, we have found that the final Saturday of the Virgin's Grove camp meeting was one of the dates in 1857 when the Moon ran exceptionally low. As the Moon crossed the meridian on the evening of August 29th, its geocentric declination was -28°.6. Including parallax corrections for an observer in central Illinois gives an apparent lunar declination of -29°.5, nearly the extreme value which the Moon can possibly attain.

The Moon traveled from "mid-heavens" (the meridian) to the horizon in only a little more than four hours, as shown in the table below. Readers can verify the times given for moonrise and moonset from the program in this department for July, 1989, pages 78-80.

WAS LINCOLN HONEST?

Did the townspeople really see a bright Moon "nearly in mid-heavens" during the camp meeting? Or did Lincoln accurately state that the Moon at the time of the murder was very low and near to setting? Given the Moon's declination that night, we see that there is no conflict — both were correct!

RELATION TO AUGUST 29, 1990

The extreme lunar declinations seen in 1857 will not occur again until the year 2006. However, we note that the calendar dates of lunar phases in August, 1990, approximately repeat those of August, 1857. This occurs because 1990 = 1857 + (7 × 19), so that 1990 follows 1857 by an even multiple of 19 years (the Metonic cycle).

On the evening of August 29, 1990, the waxing gibbous Moon will "run low" over the southern horizon and travel from meridian crossing to setting in less than 4½ hours — roughly recreating the even more remarkable lunar behavior observed from Virgin's Grove, Illinois, on the evening of August 29, 1857.

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THE MOON "RUNS LOW" ON AUGUST 29-30, 1857

	Local mean time	Altitude	Azimuth	Event
Aug. 29	3:26 p.m.	...	129°	Moonrise at Virgin's Grove, Illinois
	6:36 p.m.	19°	165°	Sunset
	7:04 p.m.	20°	171°	End of civil twilight
	7:44 p.m.	20°	180°	Moon crosses the local meridian
	8:00 p.m.	20°	184°	
	9:00 p.m.	18°	197°	
	10:00 p.m.	14°	209°	
	11:00 p.m.	8°	221°	Time of fatal fight
Aug. 30	12:04 a.m.	...	231°	Moonset

The authors made these calculations for Virgin's Grove, Illinois, located at west longitude 89° 46', north latitude 40° 10'. At the time of the fight the Moon was 74-percent sunlit and waxing gibbous, 2.6 days past first quarter. According to weather records recently located by meteorologist Walter Zeltmann, a cold front had passed through central Illinois on August 28th, bringing cool and dry air to the region. At 9 p.m. on the 29th, the Smithsonian meteorological observer at Athens, Illinois, only 14 miles south of Virgin's Grove, reported a temperature of 56° Fahrenheit, a light breeze from the northwest, and completely clear skies.