

Total Solar Eclipses as Example Illustrations on a Pan-Emotional Spectrum

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Abstract. The history of total solar eclipses usually is to be found within the history of science. However, a true social history of total eclipses must include the experience of the general population that witnessed it. I am interested in the emotions induced by a total eclipse of the Sun in the recent past. I surmise that solar eclipses engender all eight of the psycho-evolutionary classifications of emotion enunciated by Robert Plutchik. There are eight primary emotions in Plutchik's system. I suggest examples corresponding to each, relying on accounts of the total solar eclipse of 7 August 1869.

Introduction

The history of total solar eclipses is usually to be found within the history of science. Professional astronomers plan expeditions. Their travels and observations are detailed. The context of their discoveries is established. However, a true social history of total eclipses must include the experience of the general population that witnessed it.¹

I am interested in the emotions and behaviours induced by a total eclipse of the Sun in the recent past. Regarding emotions, I surmise that solar eclipses are psychologically interesting because they engender all eight of the psycho-evolutionary classifications of emotion enunciated by Professor Robert Plutchik (1927–2006) of the Albert Einstein College of Medicine in New York.² There are eight primary emotions in Plutchik's

¹ For example, Sean P. Goldy, Nickolas M. Jones, and Paul K. Piff, 'The Social Effects of an Awesome Solar Eclipse', *Psychological Science* 33, no. 9 (2022): p.1452.

² Robert Plutchik and Henry Kellerman, eds, *Theories of emotion*, 3 vols (Amsterdam: Academic Press, 2013).

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system, arranged in pairs of opposites: joy versus sadness; trust versus disgust; fear versus anger; and anticipation versus surprise.

I suggest examples corresponding to each, relying on accounts of the total solar eclipse of 7 August 1869. The eclipse path across the contiguous United States resulted in a probable record population available to see it. For example, in Wheeling, West Virginia, we read that ‘The entire population was in the streets...’, which perhaps is an exaggeration.

I estimate the census along the eclipse path to be 6,000,000 people. My source material for individual response to the eclipse is mostly small-circulation newspapers, thus skewing my examination toward urbanites. The fit between Plutchik’s categories and accounts of responses the eclipse are strong in some instances, less so in others.

In the nineteenth-century’s more rural, agrarian United States, through which most of the path of totality was located, life was hard, and routine. A total solar eclipse was an interruption in the familiar cycle of days and attracted great interest.

Surprise. Not everyone in that era was aware of up-coming celestial events.

We learn that on that day of the eclipse several families who don’t live far from this place [in Iowa], not having any previous knowledge of the affair, got badly frightened when the eclipse occurred, and in their terror yelled and screamed so as to be heard by those living over a mile distant.³

In the latter nineteenth century, there still were people who not only did not know the date of the total solar eclipse but were unaware that a solar eclipse was to take place. Even among the better informed there was a problem: generic notifications, frequently composed elsewhere and reprinted locally, did not always cover basic information such as (for a given locality) when totality would occur:

We have seen no general statement of the exact time at which the eclipse a week from Saturday will commence here... it is impossible to tell how long the eclipse will be total here...

³ ‘Total Solar Eclipse in August’, *Western Christian Advocate* 36, no. 31 (1869): p.242.

have your smoked glass ready... you will not have chance to see another during this century.⁴

Of course, now, the use of a smoked glass would be considered unsafe. Eclipse circumstances of sufficient exactitude, for use by those other than professional astronomers, were fully predictable and available well ahead of time beginning early in the century. The requisite information was to be found in an almanac by a person who knew how to read such a source. However, astronomical almanacs were scarce and considered the truck of sailors. In places where an almanac was available, it did not always solve the problem. At Nashville, Tennessee, use was made of the *Cumberland Almanac*, which certainly sounds like an appropriate reference. Lamentably, and unbeknownst to Nashville, all the times listed in it were for the capital city of Washington.⁵

It is conceivable that no inhabitant of a given, small midwestern municipality had access to a proper almanac or the expertise to make use of its tables and charts. The townspeople would have to rely on the authority of an astronomer. If no such individual passed by prior to the total eclipse of the Sun, this avenue for instruction was closed, too.

Professor Gustav Hinrich (1836–1923) of the University of Iowa, who was among the few denizens of his state who could be called an astronomer, lived on the eclipse path in Iowa City.⁶ Why did he not offer up the time to inform the public? It may have been that he did not feel that this was within his purview.

Residents of another Iowa town knew when to observe; it was not clear from where.

The scientific inclined of Keokuk of course took much interest in preparing for elaborate observations. Taking our instruments, we started out to the bluff southwest of the city. On reaching this, refreshed by the fresh clover fragrances, we saw a higher one, beyond, which we determined to reach. And still meaning ‘excelsior,’ we went on from hill to hill till the ‘totality’ was preparing to occur...⁷

⁴ *Republican* (Tipton, IN), 12 August 1869, p.1.

⁵ *The Tennessean*, 18 August 2017, p.1.

⁶ C. E. Irish, *Observations of the Total Eclipse of the Sun of August 7, 1869, at Iowa City, Iowa* (Iowa City, IA: Iowa Academy of Science, 1869).

⁷ *Daily Gate City* (Keokuk, IA), 8 August 1869, p.1.

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Ordinary Americans had to, or tried to, become eclipse ‘experts’:

So it happened that a general enthusiasm on the subject was produced which manifested itself in much street conversation, interspersed with rather obscure jargon about the Penumbra, the Umbra, Mean Time, Local Time, Total Obscuration, &c., &c., which had it fallen on the ears of a casual visitor would have created the impression that this quiet country town was the seat of some great University and that all its doctors, lawyers, preachers, merchants, tradesmen and mechanics were learned professors or ambitious undergraduates.⁸

Disgust. There were those who were well-informed about the total eclipse of the Sun yet were sceptics.

One old gentleman, over 70 years of age, and one of the earliest pioneers of Illinois, insisted that there would be no eclipse, because he said it was impossible for any person to foretell such things.⁹

A peer, after the eclipse was well progressed, insisted that it would not be total because ‘there was not stuff enough to cover the sun.’¹⁰

A newspaper shares with us the information that, ‘We know of persons who had loaned small sums to friends, without thinking of the eclipse [at the time], who called on Saturday [, 7 August,] to secure notes for the loans...’¹¹

Trust. Tourists from elsewhere bent on viewing the total eclipse of the Sun added a sense of importance to the occasion:

... at exactly the time calculated a party of gentlemen, including many of our [Rayleigh, North Carolina] citizens and several members of the press, and gentlemen from other cities, together with a party of observers from New York, who came prepared to make accurate observations, through the

⁸ *Eagle* (Fayetteville, NC), 8 August 1869, p.1.

⁹ *Evening Bulletin* (Cairo, IL), 9 August 1869, p.1.

¹⁰ *Evening Bulletin*, p. 1.

¹¹ *Daily Express* (Louisville, KY), 8 August 1869, p.1.

courtesy of Dr. Grissom of the Lunatic Asylum, were stationed upon the roof of that noble institution near our city, provided with smoked and painted glass, and other necessary instruments.¹²

These ‘other necessary instruments’ were not specified.

While they comprised a small number compared to those who lived on the eclipse path, there were those willing to travel to see the total eclipse of the Sun, and who could afford to do so:

A party of Cincinnati [, Ohio,] gentlemen have engaged the sidewheeler General Lytle, to leave that city on Saturday morning, at 7 o’clock, so as to reach a point near Louisville in time to see the total eclipse on that day.¹³

They were undeterred by the fact that the boiler of the steamboat *General Lytle* had exploded several years earlier at the cost of several dozen lives.¹⁴

Anticipation. On Total-eclipse Day,

... In every parlor, at every dinner table, on every street corner, beside every counter, within every counting room, between drayman and steamboat-Captain, merchant and customer, lawyer and client, physician and patient, master and servant, mistress and cook, hostler and chamber maid the staple of conversation was the eclipse...¹⁵

By the afternoon on Eclipse Saturday,

The Sun looked cheerfully down without a single thought of the humiliation he was about to suffer.¹⁶ ‘... the whole population [of Brighton, Iowa,] became astronomers for an hour or so.’¹⁷

¹² *Weekly Standard* (Raleigh, NC), 11 August 1869, p.1.

¹³ Helen Bartter Crocker, ‘Green River Steamboating a Cultural History, 1828-1923’ (MA Thesis, Western Kentucky University, 1970), p.105.

¹⁴ USDeadlyEvents, <https://www.usdeadlyevents.com/> [accessed 4 August 2022].

¹⁵ *Eagle* (Vinton, IA), 18 August 1869, p.1.

¹⁶ *Union* (Nashville, TN), 7 August 1869, p.1.

¹⁷ *Pioneer and Home Visitor* (Brighton, IA), 20 August 1869, p.1.

Men walked more softly and spoke in lower tones of voice. And for some minutes before the appearance of the Moon, the hum of conversation had died away, the members of the party were all at their respective spots, and expectation was on tiptoe...¹⁸

Joy. Did the eclipse itself inspire joy? *The Ladies' Repository* reported that,

At that moment flashed a light of inexpressible richness--pure, brilliant, glittering--seemingly a star of tenfold magnitude--a great diamond; or, it seemed, a lamp of purest fire, swung by an unseen Hand, in the depths of eternal space. Every beam it shot forth was full of joy and lighted up the soul with the brightest happiness. It seemed like Goodness, and Truth, and Bliss laughing, and dancing, and leaping forth out of the infinite heavens. It twinkled suddenly into extinction, the landscape fell into darkness, the whole sun was obscured, and there, in the violet sky, was the round, dark Moon encircled by the corona, which looked more like a wreath than like a halo.¹⁹

How long had totality lasted? '... a minute passed as if an hour'.²⁰ In reality, the time was less than three minutes.

Sadness. Some reports indicate that during totality, some fell to their knees in prayer. In one account a 'very pious... lady... (said), I would just like to know why the "good man" sends these things; it must be because the people have done so many wicked things. I do wish they would behave themselves'.²¹ 'Weird' was a commonplace adjective used to describe the total eclipse of the Sun, as in, 'A dark shadow hid the Sun, darkness like night, and yet unlike it, fell upon the Earth and pervaded the heavens, and

¹⁸ *Hawk Eye* (Burlington, IA), 11 August 1869, p.1.

¹⁹ 'The Great Solar Eclipse', *The Ladies' Repository* (1869): p.285.

²⁰ Ora Williams, 'On the Trail of the Corona', *Annals of Iowa* 29, no. 2 (1947): p.81.

²¹ *State Democratic Press* (Iowa City, IA), 4 August 1869, p.1.

the strange, weird appearance was greatly intensified'.²² Further, 'This great occurrence on Saturday last, was shrowded [*sic*] with gloom and a desolate foreboding...'²³ The total eclipse, it was said, '... portended evil...'²⁴

Meanwhile, the rituals of life did not cease entirely during the solar eclipse. In Quincy, Illinois, a

... funeral procession found itself on Main Street, nearing Sixth, at the moment of totality... As the light faded, the solemn procession halted in the street, and while yet the city was enveloped in partial darkness, a prayer was offered up... As the light burst upon us from the sun the procession moved slowly on, while those composing it began singing a funeral chant. The scene will not soon be forgotten.²⁵

Anger. The aphorism *post hoc, ergo propter hoc* was applied liberally:

We have been enjoying splendid October weather during the past week. The general belief is that the approach of the total eclipse of the sun is the cause of all this unusual frigidity. If so, we have no desire that this kind of an eclipse comes oftener than once in a century at most; and less frequently if it can be got along with.²⁶

A farmer reported that '... his wheat was all "spiled" by the rains, caused by the eclipse'.²⁷ An individual, curiously described as a 'sleepist' [insomniac], predicted 'that the Sun would never shine clearly after the eclipse...'²⁸ The Vinton, Iowa, paper in which his forecast appeared admitted that it had been hazy or cloudy for ten days since, though this kind of sky during a prairie August is hardly an outlier condition.²⁹ Elizabethtown, Kentucky, which was on the total-eclipse path, actually caught fire and burned!

²² *Tama County Republican* (Toledo, IA), 12 August 1869, p.1.

²³ *Boone County Democrat* (Boone, IA), 12 August 1869), p.1.

²⁴ *Boone County Democrat*, p.1.

²⁵ *Pentagraph* (Bloomington, IL), 11 August 1869, p.1.

²⁶ *Cedar Rapids Times* (Iowa), 17 June 1869, p.1.

²⁷ *State Democratic Press*, p.1.

²⁸ *Eagle*, 18 August 1869. p.1.

²⁹ *Eagle*, 18 August 1869. p.1.

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The great eclipse of the Sun occurred just about the time the fire was subdued. The eclipse gave a somber hue to all nature, well *befitting* the calamity which had destroyed one-half of the business houses of our town.³⁰

Fear. People died during the total eclipse. Of course, people expire during any three-minute span, but only in regard to the total eclipse did theologians, and those who considered themselves to be, wonder whether, if you die in such a darkness, are you doomed to Hell? The *Voter*, of Knoxville, Iowa, reported that

A Mrs. Gifford of Marion County [Iowa] died Saturday from effects of fright at the Eclipse. She had no knowledge of its approach, and being alone at the time, as the eclipse commenced she fled to her nearest neighbors. When she arrived there, her reason was gone, and she fell down in a fit. A doctor was called, but pronounced the case hopeless.³¹

The story of sixteen-year-old Thomas Bowman is more mysterious:

When trying to make his way to his brother's homestead in 1869, and upon the day of the great total eclipse over the Sun, in August, he was lost. At about 4 P. M., when the Sun was fully overcast he became bewildered and lost his bearings. It seemed like night and the prairie wolves howled savagely over the trackless waste.³²

My attempt at analysis of the populace's reaction to the eclipse assumes that everyone actually paid attention to it. Of course, the claim that it was viewed by the 'gaze of all humanity' is an exaggeration.³³ Professional astronomer Maria Mitchell (1818–1889) of Vassar College was on hand for the eclipse and recalled that, during totality, a woman in a veil

³⁰ Samuel Haycraft, *History of Elizabethtown Kentucky and its Surroundings* (Elizabethtown, KY: Women's Club of Elizabethtown, 1921), p.87.

³¹ *Voter* (Knoxville, IA), 19 August 1869, p.1.

³² Thomas McCulla, *History of Cherokee County* (Chicago, IL: S. J. Clark Publishing Company, 1914), p.507.

³³ *Post* (Wilmington, NC), 8 August 1869, p.1.

wandered ghost-like through Mitchell's observing site, seemingly, inferring from Mitchell's words, oblivious to what was going on above.³⁴

And what are we to make of this gentleman? A Prof. Collins left Iowa in the first part of August 1869 in order to tour Nebraska, and returned only after the eclipse. Was he traveling despite the total eclipse of the Sun, or to actively avoid it? Did this total solar eclipse result in a greater public appreciation of future celestial events or astronomy in general? There is no straightforward means with which to test such a hypothesis. We only have glimpses that favour the proposal, such as this tongue-in-cheek anecdote:

The journal says that the eclipse has developed such an enthusiastic love for astronomy among the young folk of Muscatine [Iowa] that a great many have taken to sitting up nearly all night, watching the movements of the heavenly bodies. The young ladies very generally become so much exhausted in their scientific pursuits as to fall over in the arms of their companions.³⁵

After the fact, 'Children resumed their play—men and women returned to their accustomed pursuits—but the grand eclipse is still, and long will be, the theme of thought and conversation.'³⁶ But it was not. Memory of the 1869 total solar eclipse became blurred:

Ever heard about the big eclipse us old timers had back in the early seventies? [*sic*] Well, that was a whale of a big show, and they ain't been nothin like it pulled around here since. It came along about three o' clock in the afternoon, and everything went *dark as pitch for half an hour*. Schools closed so the kids could run home before dark, and folks had ta light the gas... [*my italics*]³⁷

Actually, the darkness of the 1869 total solar eclipse was not so great as to make this last recollection credible.

³⁴ Maria Mitchell, *Maria Mitchell: Life, Letters, and Journals* (Boston, MA: Lee and Shepard, 1896), p.228.

³⁵ *Daily Express* (Louisville, KY), 6 August 1869, p.1.

³⁶ *Cedar Rapids Times* (Iowa), 12 August 1869, p.1.

³⁷ W.L. Purcell, *Davenport, Scott County Iowa* (Davenport, IA: Purcell Printing Company, 1922), p.67.

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The solar eclipse of 7 August 1869 is a vivid example of the manner in which events, at the time evoking great emotion, fade in memory with the decades. They meld into a faint and obscure background, replaced by reaction to more recent affairs. The fanfare and excitement about the 1869 total eclipse were enormous at the time. (Someone even wrote a song about it!) Yet ask *Americans* today what they know about *anything* that took place in the 1860s.

There was the Civil War, the 13th Amendment to the Constitution, and Reconstruction, of course. Known of, but less often spoken about, is the murderous rampage of the Ku Klux Klan. The Presidencies of Abraham Lincoln and Ulysses Grant. Perhaps the impeachment of Andrew Johnson? The pony express? Stanley and Livingston? A 'dark horse' candidate: the first rodeo (literally)? But the percentage who can give any other answer must fall into the single-digit category. All of these were at the time emotion-laden events. Once that first-person response was lost, communal recollection soon followed.

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