

ASTRONOMICAL DATING OF EDVARD MUNCH'S
SUMMER SKY PAINTINGS

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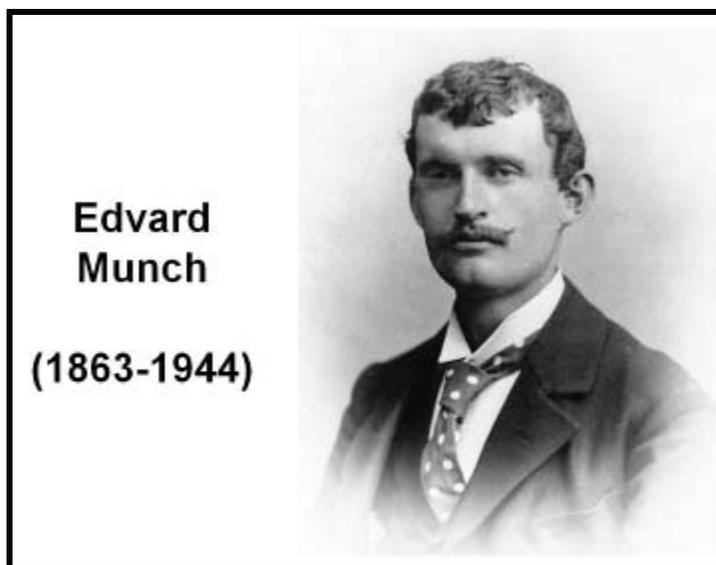
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ABSTRACT

Norwegian painter Edvard Munch, most famous for *The Scream*, created many spectacular works depicting the skies of Norway. Our Texas State group used astronomical methods to analyze three of these paintings: *Starry Night*, *The Storm*, and *Sunrise in Åsgårdstrand*. Astronomical dating of these paintings has some importance because the precise days when Munch visited Åsgårdstrand are unknown. Our research group traveled to Norway in August 2008 to find the locations from which Munch painted these three works. We then used astronomical calculations, topographical analyses, historical photographs, and weather records to determine the precise dates and times for the scenes depicted in these paintings.



THE SKIES OF EDVARD MUNCH

Professor Donald Olson's Texas State University group has long had an interest in the way Edvard Munch portrayed the sky. He linked the blood-red sky of *The Scream* to the cloud of volcanic aerosols and other debris that spread worldwide following the eruption of Krakatoa. As part of his research, the group traveled to Norway and found the exact location depicted in *The Scream*. They verified that the artist was facing to the southwest, exactly the direction where the Krakatoa twilights appeared when at their most spectacular during the winter following the eruption.¹

On that same trip Dr. Olson's group found the site of Munch's *Girls on the Pier* in Åsgårdstrand. They determined the artist's direction of view and showed that the yellow disk in the sky of this painting was setting in the southwest and therefore must be a summer full Moon – not the Sun, as some had claimed.²

As a starting point for a similar analysis of the Getty Center's *Starry Night* (Fig. 1), we consulted biographies of Munch, exhibition catalogues, and a detailed year-by-year Munch chronology, which date this painting to 1893.^{3,4} We were intrigued to see that the list of 1893 works includes two other Åsgårdstrand paintings with astronomical content. In *The Storm* (Fig. 2), a bright star shines in the stormy twilight sky above Åsgårdstrand's

Grand Hotel. *Sunrise in Åsgårdstrand* (Fig. 3) features the Sun just above the horizon, with a prominent glitter path stretching across the Oslo fjord.

Astronomical dating of these three paintings has some importance because the precise days when Munch visited Åsgårdstrand during 1893 are unknown. Some authors even question whether the artist traveled there at all during that year and imply that he must have created these works from memories of previous visits to the resort.



Figure 1: Edvard Munch, *Starry Night*, 1893

oil on canvas, 135.6 x 140 cm

The J. Paul Getty Museum, Los Angeles

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Figure 2: Edvard Munch, *The Storm*, 1893

oil on canvas, 92 x 131 cm

Museum of Modern Art, New York

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Society (ARS), New York



Figure 3: Edvard Munch, *Sunrise in Åsgårdstrand*, ca. 1893

oil on canvas, 65 x 89 cm

private collection

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Society (ARS), New York

MUNCH'S VISIT TO ÅSGÅRDSTRAND IN 1893

We checked two of the most detailed chronologies of Munch's life, and neither of these makes any mention of a visit to Åsgårdstrand in 1893.^{5,6}

Author Ketil Bjørnstad goes further and explicitly states for the year 1893 that Munch was not on the scene in Åsgårdstrand:

During the summer Munch does not go to Åsgårdstrand. Instead, he remains in Germany, paints landscapes with deeply atmospheric, smouldering colour, paints *Starry Night*, *Moonlight* and *The Storm*.⁷

A recent biography by Sue Prideaux discusses Munch's stay in Germany in 1893 and likewise concludes:

Summer came, and Munch had neither the money nor the inclination to go to Norway.⁸

But these biographies and chronologies are incomplete. Our research turned up a first-person account that was apparently overlooked by these authors. Jens Thiis, a long-time director of the National Gallery in Oslo, visited Åsgårdstrand in 1893 with several friends, including Edvard Munch and the poet Helge Rode. Thiis wrote:

I happened to meet Helge again in Åsgårdstrand. It was his friend Edvard Munch who had invited him there...One day in August, when we were sitting together on the hotel veranda, I had the desire to sketch Helge Rode....⁹

This drawing, seen in Fig. 4, bears the date of August 17, 1893, handwritten by Thiis in the corner.



Figure 4: Sketch of Helge Rode, by Jens Thiis, 17 August 1893

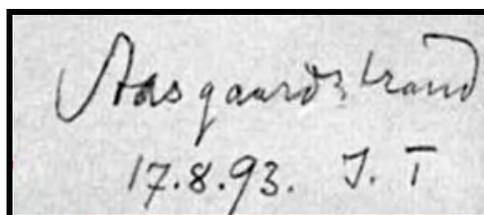


Figure 5: Detail of upper right corner of Thiis' Sketch, "Åsgårdstrand, 17.8.93. J.T."

Because this account definitely places Munch in Åsgårdstrand, where he could be inspired by the Norwegian skies, we realized that we could possibly identify the celestial objects in Munch's paintings and determine dates for these works.

VENUS IN *STARRY NIGHT* ?



Figure 6: *Starry Night*, 1893

In the articles and books that we consulted, the art historians who comment on the sky of *Starry Night* all agree that Munch included the planet Venus.

The Getty sponsored a book devoted entirely to an analysis of *Starry Night*. The author, art historian Louise Lippincott, asserts that:

The pink “star” on the horizon in *Starry Night* is actually the planet Venus....¹⁰

Lippincott also refers to the “appearance of Venus” in the painting as “the red star on its horizon.”¹⁰

Arne Eggum, former chief curator of the Munch Museum, was apparently the first to make this Venus identification. Lippincott acknowledged that she was “deeply indebted to A. Eggum for pointing out the star symbolism in *Starry Night* during his visit to Malibu...”¹⁰ Eggum explained his reasoning:

The first title Munch gave the painting *Starry Night* was *Evening Star*. As we know, the evening star is the planet Venus....¹¹

Later authors adopted the planetary identification made by Eggum and Lippincott. For example, Marit Lande asserts that the “light on the horizon is the reflection of the planet Venus....”¹²

Dieter Buchhart states that this painting includes “the bright evening star and its prominent swath of light ... the planet of Venus....”¹³

These descriptions are somewhat confusing – some seem to be referring to the red light on the horizon and others to the bright object up in the sky – but all of these art historians agree that Munch’s *Starry Night* includes Venus.

MOON IN STARRY NIGHT ?

Louise Lippincott provides an astronomical explanation for the vertical white column visible in the garden:

The view depicted in *Starry Night* looks down from the Grand Hotel window and across this enclosed private garden. The great linden trees form a mound silhouetted against the night sky, and their bulky shape is pierced by a dot and a streak of light from the moon hidden behind them.¹⁴

She argues that her lunar theory is reasonable:

...Munch already had developed the dot and streak as a way of representing a light source and its reflection; it seems plausible to identify the motif in the Getty Museum’s *Starry Night* as the moon and its reflection seen through the trees.¹⁵

RED SHED IN *STARRY NIGHT*?



Figure 7: Contrast-enhanced image of *Starry Night*; a small red roofed building may be seen through the linden trees.

Regarding the “small red house” seen inside the silhouette of the trees, Lippincott asserts that

Åsgårdstrand’s topography does not explain *Starry Night*’s most enigmatic element, however: the small red house standing near the great lindens, to the right of the streak of moonlight. No such building seems ever to have existed at the foot of the Kiosterudgarden or anywhere in its immediate vicinity. Nor is it clear in the painting exactly where the house is situated. Is it in front of the trees, or does one glimpse it through the foliage?¹⁴

To check these planetary, lunar, and topographical identifications, we wanted to carry out our own astronomical analysis.

TRIP TO NORWAY

Accordingly, our Texas State group traveled to Åsgårdstrand during August 2008. For *Starry Night* and also for *The Storm* and *Sunrise in Åsgårdstrand*, we hoped to answer several questions: Where was Munch standing? Which way was he was facing and therefore which part of the sky did he depict? Could we determine the dates and times? Could we identify the celestial objects in these works?

We began by making a topographic survey of the town, using surveyor's chains and transit to measure distances and angles.



Figure 8: Ava Pope, Joe Herbert, and Donald Olson surveying scenes of *Starry Night* and *The Storm*



Figure 9: Ava Pope and Joe Herbert determining exact position of tree in *The Storm*

Next, Åsgårdstrand resident Knut Christian Henriksen kindly shared his immense local history collection, including hundreds of photographs showing Åsgårdstrand as it appeared in Munch's time.

Figure 10: Don Olson, Knut Henriksen, and Ava Pope standing in front of Knut's shop, Fru Fadum



By studying the historical photographs, we could see that many of the town's buildings from 1893 are still standing, and we could see where changes had occurred.



Figure 11: Comparison of modern hotel to the Grand Hotel as it was in Munch's day. Yellow arrow denotes the approximate view of the *Starry Night* scene as seen from the Grand Hotel

The white fence visible in Munch's *Starry Night* is easy to find today, and the original group of linden trees is still standing in the garden of the Kiøsterud estate. To obtain the view for *Starry Night*, Munch must have been somewhere in the nearby Grand Hotel.

A complication is that the hotel burned down in 1930 and then was rebuilt. We used the historical photographs, along with our own topographic survey, to determine the precise location of the original hotel. The southeast corner of the modern hotel is now somewhat farther from the Kiøsterud estate (by about 10 feet) and much closer to the fjord (by about 30 feet).

We allowed for this in our calculations, using a 3-dimensional computer model to simulate placing Munch on the veranda, on the balcony, and in the windows of the original hotel. We found that we could reproduce the view of *Starry Night* only from near the center of the upper floor of the old hotel.

FLAGPOLE

Louise Lippincott argues that *Starry Night's* vertical white column with the round dot on the top is “the moon and its reflection seen through the trees.”¹⁵ With assistance from Knut Christian Henriksen’s resources, we can offer a different explanation.

It is true that Munch depicted summer full Moons and their glitter paths in the fjord in dozens of other works. But glitter paths are reflections in the water and cannot extend up higher than the horizon. In Munch’s other works showing glitter paths, the columns of light stop at the horizon. The vertical white column in *Starry Night* extends well above the horizon and cannot be a glitter path.

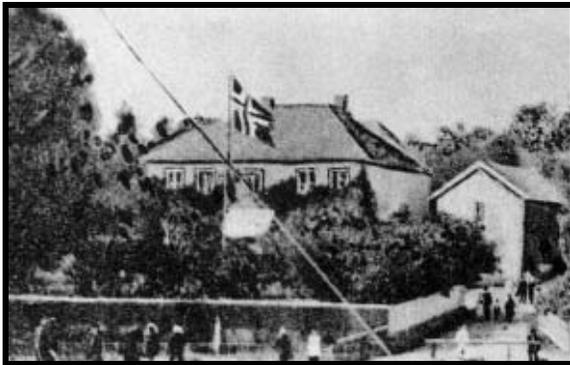


Figure 12: Example of Munch’s glitter paths (note that the light from the reflection of the moon clearly ends where the water meets the horizon)



Figure 13: Detail of “Moon” in *Starry Night*

More than twenty historical photographs, taken from almost all possible directions, show a flagpole with a round ball at the top standing in the Kiøsterud garden. The flagpole no longer exists, but our computer model shows that it stood exactly where Munch painted it and had the correct height (about 45 feet) relative to the group of linden trees.



Figures 14 & 15: Historical photographs from Munch's time. The flagpole stands in the yard of the Kiøsterud House just as it appears in *Starry Night*



Figure 16: Ava Pope, Bob Newton, and Joseph Herbert standing in the Kiøsterud yard at the location of the base of the flagpole

We discovered a depression in the grass where the flagpole's base had been. The depression can be found by starting at the corner of the white fence, walking uphill 20 feet along the fence that runs directly away from the water, and then walking 37 feet into the garden directly away from that fence.¹⁶

The hypothetical "Moon" and reflection in *Starry Night* turns out to be a flagpole.

The Red Shed

To resolve the dilemma posed by Lippincott regarding the existence of a red shed near the large group of linden trees in Munch's painting we looked at many vintage Åsgårdstrand photographs provided by Knut Henriksen. A small shed outside the garden fence, in exactly the position to be glimpsed through the trees from Munch's location in

the Grand Hotel, appears in ten of these pictures. The historic photographs are black-and-white, but we also recognized the same shed depicted with a red roof in two Munch paintings, one at the Wadsworth Athenaeum and another at the Musée d'Orsay.



Figure 17: Detail of *Åsgårdstrand*, c. 1904; showing the red roof of a shed in front of the Kiøsterud estate. (Wadsworth Athenaeum)



Figure 18: *Summer Night in Åsgårdstrand*. A red roofed shed may be seen just beyond the group of linden trees. (Musée d'Orsay)



Figure 19: Historical photograph showing a shed that Munch could have seen through the group of trees from the Grand Hotel

The “enigmatic” red shed did exist in the location in which it was portrayed by Munch.

What about Venus? Did Munch see Venus during the summer of 1893?

WAS VENUS VISIBLE IN 1893?

During our visit to Åsgårdstrand we took photographs from the hotel by day, during evening and morning twilight, and at night. We verified that Munch's direction of view for *Starry Night* was generally to the east. The stars on the left side of the painting would lie somewhat north of east, while the trees on the right side are south of east.

Our computer calculations show that Venus was never visible at or above the eastern horizon during morning twilight or at sunrise on any date in the spring or summer of 1893. At sunset and in evening twilight, Venus was to the west of the hotel (the side away from the fjord), and the planet was never higher than 5° above the geometric horizon at sunset. A steep hill behind the hotel rises with a slope that we measured to be 8° . This hill would have blocked the view of Venus at sunset.

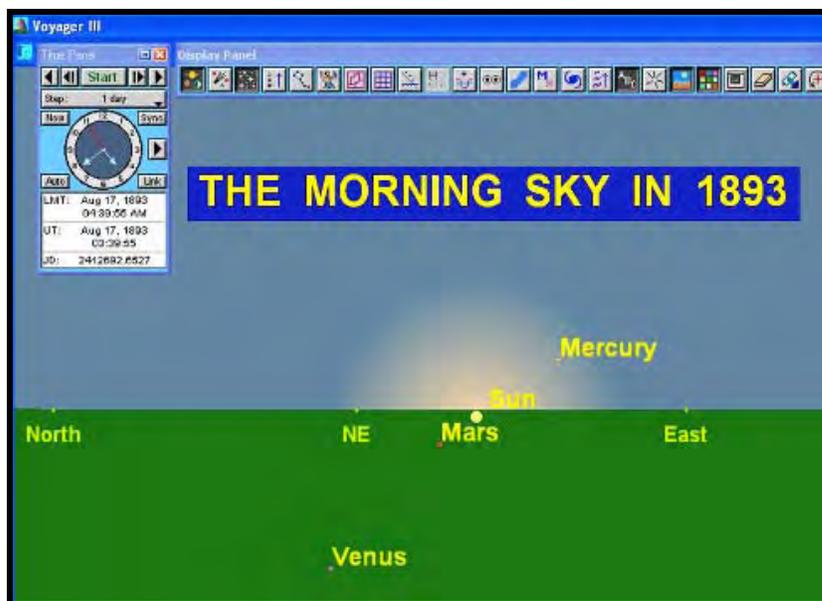


Figure 20: Computer simulation of the sky of Åsgårdstrand in the summer of 1893

Therefore Munch could not have seen Venus from the Åsgårdstrand Grand Hotel whether from the front or back of the hotel, whether looking east toward the fjord or west toward the hill behind the hotel, whether at morning or evening twilight, on any date in the spring or summer of 1893.¹⁷

But a very bright “star” is clearly visible in *Starry Night*. What did Munch see? The blue skyglow of *Starry Night* suggests a Norwegian twilight. Is this morning twilight or evening twilight?

STARRY NIGHT = EVENING STAR

The composition now called *Starry Night* was exhibited by Edvard Munch in his lifetime with a variety of titles. According to Arne Eggum and other experts at the Munch Museum, the alternate titles used for this work include *The Stars*, *Evening Star*, *Night*, *Starry Heavens*, and finally *Starry Night*.¹⁸ We realized that the title *Evening Star* provides an important astronomical clue, telling us that the bright “star” was observed between sunset and midnight.

But like so much else about *Starry Night*, even this use of the title *Evening Star* is hotly disputed by some art historians. Several scholars identify the title *Evening Star* with a composition now known as *The Voice*, which shows a woman standing in a forest along the coastline near Åsgårdstrand, with a yellow glitter path of moonlight reflecting in the fjord.



Figure 21: *The Voice*, c. 1896, oil on canvas

This title dispute is considered especially significant because *Evening Star* (whatever painting it was) was shown at Berlin in 1902 in the important position as painting #1 in

the first complete exhibition of the *Frieze of Life*, a group of paintings considered the major work of Munch's artistic career. Likewise, the catalogue for an exhibition at Oslo's Diorama Hall in 1904 lists *Evening Star* as painting #1 in the group called *Frieze (Modern Life of the Soul)*.

Munch biographer Sue Prideaux discusses an early exhibition and makes the judgment:

The first big question of identity concerns whether...*Evening Star* in the catalogue, was *Starry Night* or *The Voice*. I have come down on the side of *The Voice* ...¹⁹

The catalogue for a recent major Munch exhibition at the Museum of Modern Art comes to the same conclusion.²⁰

With help from librarians at Texas State University, the National Library of Norway, and the Munch Museum Library, we located two primary sources that help to resolve this title controversy.

A newspaper critic from the Norwegian paper, *Morgenbladet*, gave the following eyewitness description of a Munch exhibition in Oslo:

And turning to his exhibition in the Diorama Hall, I want people to focus their attention on number 1 in the catalogue – “Evening Star.”

What in the world should prevent people from understanding that this is a beautiful picture? The poetry of the summer night, the great tree standing there slumbering in the garden, the fence shining white down towards the sea and the evening star shimmering up in a deep blue sky.²¹

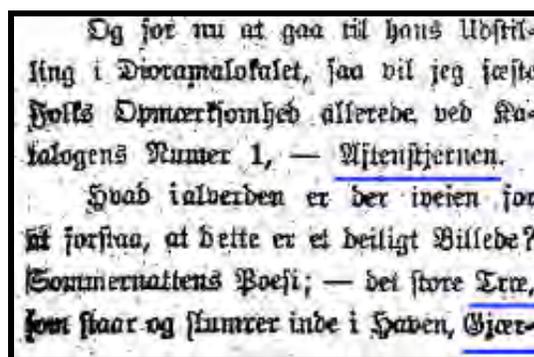


Figure 22: Excerpt from *Morgenbladet*, November 6, 1904. Underlined in blue are references to the title *Evening Star*, the great tree, and the white fence of the Kjøsterud estate.

These details leave no doubt that the writer was describing the painting now known as *Starry Night*.

As further confirmation, the Munch Museum has a series of photographs taken at the Commeter Gallery in Hamburg, Germany. Painting #62 in Figure 23 definitely shows *Starry Night*, and an accompanying list in Munch's handwriting includes the title "62 – Abendstern" (German for "Evening Star").



Figure 23: Number 62 is the Wuppertal Museum's *Starry Night* painted by Munch c. 1893.

Figure 24: Entry number 62 (in Munch's Handwriting) corresponds to the image in Fig. 23.

Therefore, despite the contrary claims by some authors, this evidence demonstrates that Munch did use *Evening Star* as an early title for *Starry Night*.

THE BRIGHT “STAR” IN *STARRY NIGHT*

During summer evenings in 1893 did any especially brilliant celestial body shine in the eastern sky over the Oslofjord?

Computer calculations provided the answer: the planet Jupiter, dazzling at apparent magnitude -2.4 and by far the brightest object visible to an observer looking out from Åsgårdstrand’s Grand Hotel.

Above the bright object in the painting is a distinctive asterism that we recognized as the Pleiades. Computer simulations show that the Pleiades star cluster was in fact located just above Jupiter as the planet rose into the evening sky in 1893.

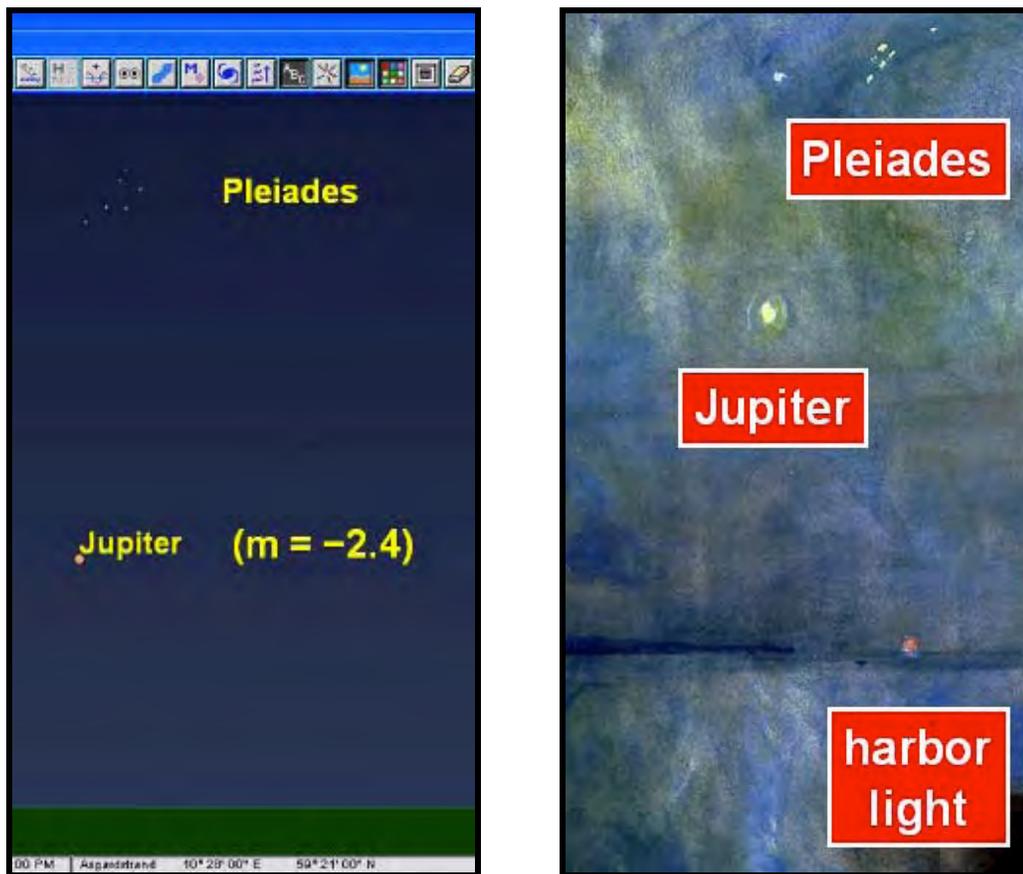


Figure 25: Comparison of computer model with painting. Similarities support the idea that Munch correctly represented the late summer sky of 1893.

Jupiter appears in the painting somewhat north of east, but the lack of topographic landmarks along the coastline makes it difficult to assign a precise azimuth. Because long glitter paths like those seen in the painting occur only for celestial objects near the horizon, Munch must have observed Jupiter at a low altitude, not long after the planet rose.

The scene cannot be from the early part of the summer because, before July 9, Jupiter rose after midnight and would not reasonably be called an “evening star” by Munch.²² A postcard in the Munch Museum archives proves that Munch had left Åsgårdstrand and was receiving mail at Nordstrand by September 24, 1893. The view in *Starry Night* must correspond to a date between July 9 and September 24.



Figure 26: Image of postcard to Munch indicating that he had left Åsgårdstrand by 24 September 1893.

Determining a more precise date astronomically is difficult, because Jupiter’s position among the background stars remains nearly the same for many consecutive nights. We therefore consulted weather records of the Norwegian Meteorological Institute. Rain and overcast skies were common, and most nights could be ruled out as a match for the painting. We found two especially clear nights.

Describing the night of August 16-17, 1893, the local Åsgårdstrand paper recorded that the clouds present near sunset quickly disappeared and:

Until late in the night the heavens were clear with twinkling stars.²³

The night of August 23-24, 1893, was likewise cloudless.

We conclude that *Starry Night* shows Jupiter and the Pleiades during evening twilight, most likely on August 16 or August 23, 1893.

THE STORM



Figure 27: *The Storm*, 1893

We realized that *The Storm* might provide an independent way to determine when Munch visited Åsgårdstrand.

A woman in white dominates the foreground of *The Storm*, while a cluster of women in the middle distance stands near the same fence depicted in *Starry Night*. A tree bends in the wind in front of lighted yellow windows of the Grand Hotel, the same building from which Munch observed the view for *Starry Night*. Beyond these connections to *Starry Night*, *The Storm* is also of special interest to astronomers because of the bright star visible in the sky just to the north (to the right) of the hotel.²⁴

An actual storm inspired the painting, according to the same eyewitness account that places Munch in Åsgårdstrand during August of 1893. The memoir by Jens Thiis mentions some “beautiful sun-filled late summer days” during this visit to the resort but goes on to describe a sudden change in the weather:

One sultry evening...there suddenly began a rustling in the air and a quaking in the tree in front of the hotel. ... a gale broke out. ... the fjord stood heavy as lead in a foaming uproar. ... fishermen’s wives huddled together in a group. All were looking out through the dusky twilight for the fishing boats that were out there – would they all manage to get home safely?

The next day, Munch painted the events in his famous picture *The Storm*...The house with the illuminated windows is the hotel where we stayed, and the woman in white in the foreground is my future wife.²⁵

The woman in white, previously unidentified in several publications is therefore Ragna Vilhelmine Dons, who married Jens Thiis in 1895.



Figure 28: Image of Ragna Vilhemine Dons by Jens Thiis, and painting of Jens Thiis by Edvard Munch. Both were on the scene during *The Storm*.

The weather records for July, August, and September list many days with rain but only one “strong thunderstorm” – a spectacular event on the evening of August 19, 1893.

The Oslo paper for the next day confirms that the storm hit during evening twilight:

A thunderstorm with magnificent lightning passed over the city around 9 o'clock yesterday evening.²⁶

Another newspaper writer was impressed by the almost unprecedented strength of this storm:

...there was a downpour so heavy and lightning so frequent and strong, in a manner that we can scarcely remember.²⁷

What bright star did Munch observe as the storm began to rage? To answer this question, we needed to know which direction the artist was facing.

The painting shows the corner of the white fence aligned with the house of the Kiøsterud estate, and a tree aligned with the center of the Grand Hotel. Several authors mistakenly identify the tree in *The Storm* as a poplar. Knut Christian Henriksen and several other Åsgårdstrand residents are certain that it was a birch, and the caption to an early photograph describes it as the birch tree (“bjørketreet”) painted by Munch.

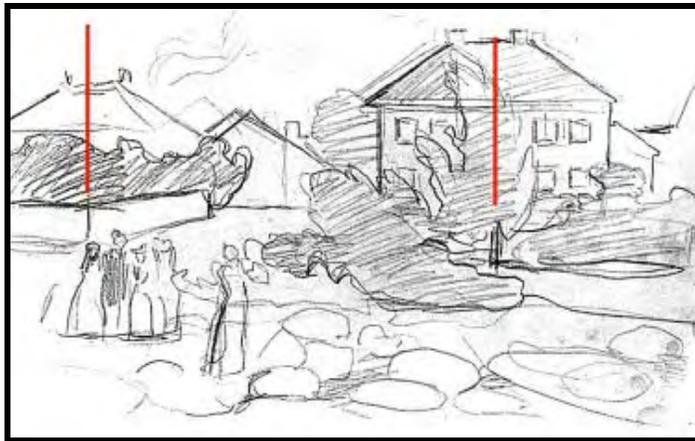


Figure 29: Munch's preliminary sketch for *The Storm*. Red lines indicate objects that we used to triangulate Munch's position.

Although the tree has recently been cut down, the stump is still locatable. Using the location of the stump and the corner of the white fence along with many historical photographs we were able to triangulate Munch's position to within a few feet.



Figure 30: Ava Pope's feet and legs standing on the remnants of the birch tree in Munch's *The Storm*.



Figure 31: Ava Pope standing on the tree stump so that its exact location could be used in topographical analysis.

We found that the bright star in *The Storm* had an azimuth near 267° (slightly south of west) and an altitude near 25° . For the latitude of Åsgårdstrand ($59^\circ 21'$ North) we calculated a stellar declination near $+20^\circ$.

The star must therefore be Arcturus, an especially plausible candidate because it has the distinction of being the 2nd-brightest star (after Sirius) in the sky of Norway.²⁸



Figure 32: Comparison of *The Storm* and photograph taken by Russell Doescher during our visit to Åsgårdstrand. Note Arcturus in the upper right corner of both images.

Sky simulations show that the time depicted in *The Storm* must be during evening twilight, within a few minutes of 9:15 p.m.²⁹ The time derived from the position of the bright star is in excellent agreement with the times mentioned by Thiis and the newspaper stories.

We conclude that *The Storm* shows Arcturus in the western sky as the tempest began on the evening of August 19, 1893.

SUNRISE IN ÅSGÅRDSTRAND



Figure 33: *Sunrise in Åsgårdstrand*. c. 1893

We also found a way to use the Sun to determine the time of year when Munch visited Åsgårdstrand. The point on the horizon where the Sun rises varies seasonally, with the Sun rising farthest to the northeast at the summer solstice, farthest to the southeast at the winter solstice, and directly east at the spring and fall equinoxes.

Sunrise in Åsgårdstrand looks across the water to a rising Sun with a long glitter path reflected in the fjord. We recognized, just to the left of the glitter path, the same group of trees seen in *Starry Night* and the roof of the Kiøsterud house. The small building below and to the right of the glitter path served as a boathouse.

The right side of the painting shows the house now known as Russellgården, with its roof almost exactly superposed on the distant horizon. We found that this view is possible only from the upper floor of the nearby Soelberggården house.



Figure 34: Donald Olson in front of the Soelberggården house. The circled window indicates the room from which Munch saw the scene of *Sunrise in Åsgårdstrand*.

The current owners of Soelberggården kindly allowed us into their home.



Figure 35: Ava Pope, Marilyn Olson, Donald Olson, and owners of the Soelberggården house

We could match Munch's view of the bend in the road only from a specific room in the upper story. In one of the most moving moments of our trip, we realized that we were standing on the same floorboards by the same window where the artist himself had looked out to watch the rising Sun, more than a century before.



Figure 36: Photograph from Munch's window in the Soelberggården house, taken by Russell Doescher in 2008.

Our modern photographs reveal several changes: the trees have grown taller, and Russelgården has undergone some structural modifications, most notably a dormer added to the roof. Knut Christian Henriksen showed us a historical photograph of Russelgården with no dormer, just as painted by Munch.



Figure 37: Historical photograph shows that the Russelgården house (c. 1900) closely resembles the house in Munch's painting.

is September 2, 1895 at 5:31 a.m. Local historical records indicate that the doctor Wilhelm Grimsgaard, a friend of Munch, was living in Åsgårdstrand at the Soelberggården house by 1895. This raises the intriguing possibility that Munch was visiting his friend or possibly renting a room in the Soelberggården. Regardless of the year, the sunrise painting must be from the first five days of September, which confirms that Munch was in the habit of visiting Åsgårdstrand in late summer.

CONCLUSIONS

Starry Night shows an evening twilight scene, with Jupiter and the Pleiades rising into the eastern sky on a date in the second half of August 1893.

The Storm shows an evening twilight scene looking west, with Arcturus setting next to the Grand Hotel, near 9:15 p.m. on August 19, 1893.

Sunrise in Åsgårdstrand looks east to a rising Sun and a glitter path in the fjord at a time near 5:30 a.m. on a morning in the first five days of September.

The three paintings studied here have been dated independently – one using stars and a planet, another using a storm and meteorological records, and the last using the Sun – and all three dates fall within a three-week period between mid-August and early September.

Starting from observations of nature during his visit to Åsgårdstrand in 1893, Munch showed his artistic genius by expressing emotional content that goes beyond literalism. Knowing the details of the celestial scenes in these paintings only increases our admiration of the artist's skill at portraying the mystery of the Norwegian summer skies.

ACKNOWLEDGEMENTS

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NOTES

- 1 D. W. Olson, R. L. Doescher, and M. S. Olson, "When the Sky Ran Red: The Story Behind *The Scream*," *Sky & Telescope*, February 2004, pp. 28-35.
- 2 D. W. Olson, B. Robertson, and R. L. Doescher, "Reflections on Edvard Munch's *Girls on the Pier*," *Sky & Telescope*, May 2006, pp. 38-41.
- 3 Edvard Munch's Åsgårdstrand *Starry Night* exists in two versions, one at the Getty Center in Los Angeles and the other at the Von der Heydt-Museum in Wuppertal, Germany.
- 4 Johan Langaard and Reidar Revold, *A Year by Year Record of Edvard Munch's Life*, 1961. *Starry Night* was first exhibited in Berlin in December 1893.
- 5 Langaard and Revold (1961), pp. 22-23.
- 6 *Edvard Munch: The Modern Life of the Soul*, exhibition catalogue, Museum of Modern Art, 2006, pp. 221-238.
- 7 Ketil Bjørnstad, *The Story of Edvard Munch*, 1993 (Norwegian), 2001 (English translation), p. 124.
- 8 Sue Prideaux, *Edvard Munch: Behind the Scream*, 2005, p. 148.
- 9 Jens Thiis in *Festskrift Til Francis Bull*, 1937, p. 307.
- 10 Louise Lippincott, *Edvard Munch: Starry Night*, 1988, pp. 46-49, 69, 93.
- 11 Arne Eggum, *The Frieze of Life from Painting to Graphic Art*, 1990 (Norwegian), 2000 (English translation), pp. 79-80.
- 12 Marit Lande in *Edvard Munch: The Frieze of Life*, 1992, p. 55.
- 13 Dieter Buchhart in *Edvard Munch: Theme and Variation*, 2003, p. 157.
- 14 Lippincott (1988), p. 46.
- 15 Lippincott (1988), p. 93.
- 16 We agree with art historian Thomas Messer who saw the flagpole and wrote in 1973 that "the tree group with the white fence in front and even the white flagpole that stands out against the foliage like a mysterious light reflection may still be found in their places today." (*Edvard Munch*, 1985 reprint of 1973 edition, p. 76).
- 17 Louise Lippincott (1988, pp. 67-69) identifies Venus in *Starry Night* as "the red star on its horizon." Lippincott was influenced by a passage in the famous account *Farthest*

North by polar explorer Fridtjof Nansen, in part because Nansen was an early private owner of Munch's *Starry Night*.

Nansen describes the first appearance of Venus for the winter season in a journal entry written near latitude 78° North (far above the Arctic Circle) on January 8, 1894. Nansen recalls how he, "came on deck and saw a strong red light just above the edge of the ice in the south." Nansen quickly realized that the spectacular object was, "Venus, which we see to-day for the first time, as it has till now been beneath the horizon. It is beautiful with its red light." (*Farthest North*, 1898 edition, Volume I, pp. 368-369.) A Venus apparition like this, with the planet slowly rising nearly parallel to the horizon and remaining within one or two degrees of the horizon during the planet's entire travel from rising to setting, is possible above the Arctic Circle but cannot occur at the latitude of Åsgårdstrand (59° 21' North).

We suggest that the red light on the horizon in *Starry Night* may be a harbor light near the town of Larkollen on the east side of the Oslofjord.

18 In the exhibition catalogues, the titles in the original languages are *Die Sterne* (Berlin, 1893), *Stjernor* (Stockholm, 1894), *Stjerner* (Oslo, 1897), *Abendstern* (Berlin, 1902), *Aftenstjernen* (Oslo, 1904), *Nat* (Copenhagen, 1906), *Stjernehimmel* (Copenhagen, 1908), *Stjernenat* (Stockholm, 1917), and *Sternennacht* (Berlin, 1927).

19 Prideaux (2005), pp. 209, 353.

20 *Edvard Munch, The Modern Life of the Soul* (2006), p. 205.

21 *Morgenbladet*, November 6, 1904.

22 Norway in 1893 had not adopted modern time zones or daylight saving time. Åsgårdstrand (longitude 10° 28' East) used local mean time, 42 minutes ahead of Universal Time. For example, on July 9, 1893, Jupiter rose at 23:16 UT = 11:58 p.m. local mean time at Åsgårdstrand.

23 *Gjengangeren*, August 20, 1893.

24 The bright star in *The Storm* is missing from some book reproductions, for example, *Edvard Munch: The Modern Life of the Soul*, Museum of Modern Art, 2006, p. 113. The star may have been mistakenly identified as a defect and removed from the digital file using Photoshop or an equivalent program. The bright star, above and to the right of the hotel, is clearly visible in the unretouched digital photographs taken by visitors to the Museum of Modern Art in New York, as can be verified at www.flickr.com by using the search terms: moma munch storm.

25 Thiis (1937), p. 307.

26 *Dagbladet*, August 20, 1893.

27 *Aftenposten*, August 22, 1893.

- 28 Arcturus had declination $+19^{\circ} 44'$ in 1893.
- 29 20:33 UT = 9:15 p.m. local mean time; see note 22.
- 30 4:48 UT = 5:30 a.m. local mean time; see note 22.

Appendix

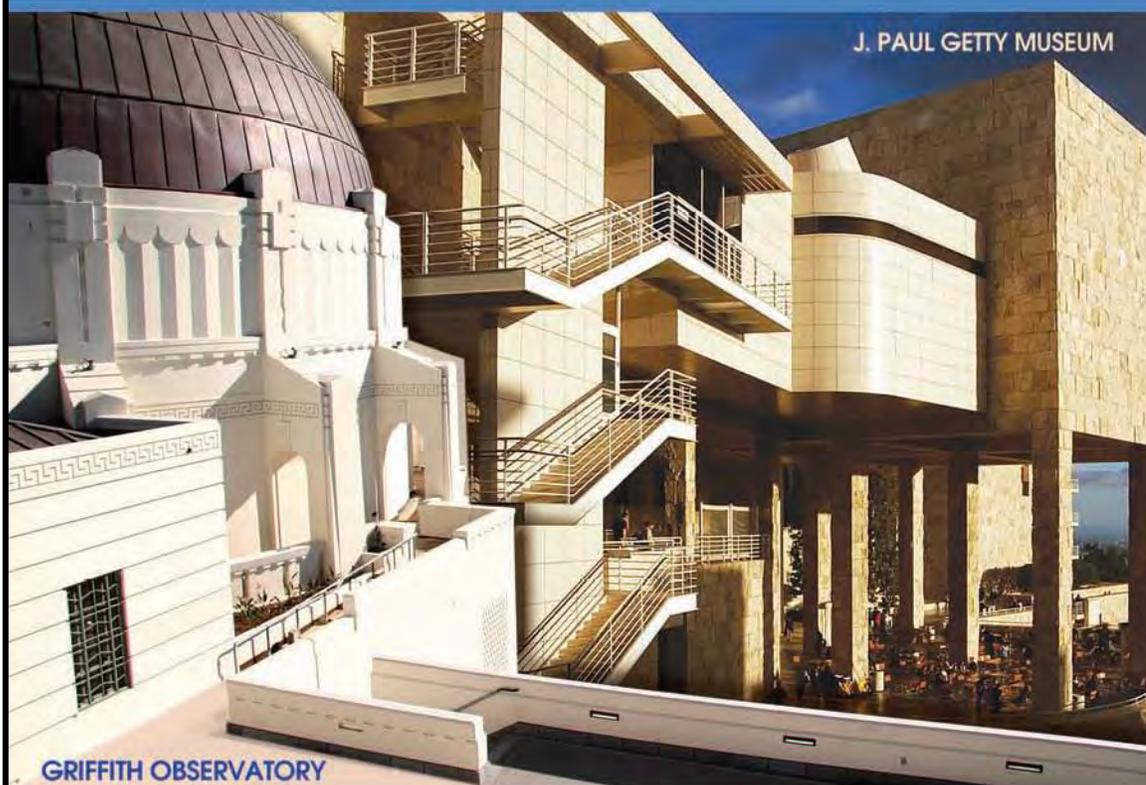
Our research was published in 2 magazine articles and several articles written about our work were published in a variety of newspapers and web pages. The following are a few publications of our work:

Griffith Observer, August 2009	Pages 38–56
Astronomi, August 2009	Pages 57–66
Science, 2009	Page 67
Smithsonian.com, July 2009	Page 68
Gjengangeren, July 24, 2009	Page 69
Dagens Naeringsliv, July 2009	Page 70



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J. PAUL GETTY MUSEUM

GRIFFITH OBSERVATORY

COSMIC CONJUNCTION ASTRONOMY & ART

Edvard Munch's Starry Nights, Stormy Skies, and Summer Sunrises

Donald W. Olson, Russell L. Doescher,
Joseph C. Herbert, Robert H. Newton, and Ava G. Pope

Texas State University
San Marcos, Texas 78666

With singular astronomical murals by Hugo Ballin, A.B. Heinsbergen, and Don Dixon and Robert Kline, Griffith Observatory has always been and continues to be affiliated with the intersection of astronomy and art. In 1983, renowned U.C.L.A. astronomer Dr. George O. Abell and I collaborated with U.C.L.A. art history professor Albert Boime in Griffith Observatory's previous planetarium to reconstruct the astronomical configurations depicted in three paintings by Vincent van Gogh: *Starry Night*, *Café Terrace at Night*, and *Starry Night over the Rhône*. When professor Boime subsequently published the results of the study in the December, 1984, issue of *Arts Magazine*, he emphasized van Gogh's deliberate observation and studied use of the real sky and discounted the prevailing view, which classified van Gogh's work as hallucinatory and visionary.

Dr. Donald Olson, astronomer at Texas State University, and his collaborators—particularly Russell Doescher—have been energetically examining the celestial circumstances embedded in celebrated paintings, photographs, history, and literature since 1987. The Olson team's bibliographic record now totals nine articles on astronomy in art, ten articles on astronomy in literature, and 22 articles on significant astronomical modulation of historical events.

Dr. Olson and his work were spotlighted nationally in the April, 2009, issue of *Smithsonian*. The article "Celestial Sleuth," details his forensic astronomy.

One article in the Olson, Doescher, *et al* catalog, "California Surprise: A California Observation of the 1833 Leonid Meteor Storm," appeared in the November, 1999, issue of the *Griffith Observer*, in time to salute the 1999 Leonid meteor squall.

Now, readers of the *Griffith Observer* are privileged to read a firsthand report of original research on Norwegian skies painted by the famous artist Edvard Munch. It is a tale of mystery, astronomical interpretation so wrong it makes you want to scream, and detective work at the scene of the time. Dr. Olson and the rest of the team show what really caught Munch's eye and demonstrate his capacity for accurate observation.

—E.C.K.

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VISITORS COME TO the hills overlooking Hollywood to observe the stars and planets through the telescopes at Griffith Observatory and to enjoy the night sky simulations in the Samuel Oschin Planetarium. Ten miles west of Griffith Park, on another hill with a spectacular view of the Los Angeles basin, they can be awed by a different kind of starry night—a painting at the Getty Center titled *Starry Night*.

Edvard Munch (1863-1944), the Norwegian artist best known for *The Scream*, created the Getty Center's *Starry Night*. A white fence and a group of linden trees dominate the foreground. A curving shoreline borders the waters of the Oslofjord, which reflects the blue sky-glow of a night in the summer resort town of Åsgårdstrand. One especially bright celestial object stands out among the stars that fill the heavens.¹

The Skies of Edvard Munch

Our Texas State University group has long had an interest in the way Edvard Munch portrayed the sky. We linked the blood-red sky of *The Scream* to the cloud of volcanic aerosols and other debris that spread worldwide following the eruption of Krakatoa, in Indonesia. As part of our research, we traveled to Norway and found the exact location depicted in *The Scream*. We verified that the artist was facing to the southwest, the direction where the Krakatoa twilights appeared when at their most spectacular during the winter following the eruption.²

On that same trip we visited the site of Munch's *Girls on the Pier* in Åsgårdstrand. We determined the artist's direction of view and showed that the yellow disk in the sky of this painting was setting in the southwest and therefore must be a summer full moon—not the sun, as some had claimed.³

FRONT COVER

Cosmic Conjunction: Astronomy and Art

Almost two years ago, after some of the dust from reopening Griffith Observatory had settled, the Observatory management team developed an agenda of priorities and development for the next several years. Griffith Observatory Director Dr. E.C. Krupp included in the programming initiatives an effort to link the arts and astronomy in a series of specially conceived performances and events. The plan was presented to the Board of Friends Of The Observatory (FOTO) on 27 March 2008, and subsequently the FOTO Board selected some of the objectives for primary FOTO support. The Board was especially interested in the notion of linking the arts and astronomy through independent Griffith Observatory activities and through cooperative ventures with other institutions. An effort to stage a live performance of *Observations*, music composed by Symphony in the Glen conductor Arthur Rubinstein for the International Year of Astronomy, as part of an astronomical concert program on Observatory grounds, is now underway. Observatory staff are now also developing *Light of the Valkyries*, a new planetarium show designed to complement the staging of Richard Wagner's entire Ring Cycle by the Los Angeles Opera in 2010. In the meantime, however, this issue of the *Griffith Observer* brings astronomy and art together in an article by Dr. Donald Olson and the Texas State University forensic astronomy team on three paintings by the famous Norwegian artist Edvard Munch. One of these paintings, *Starry Night*, belongs to the collection of the J. Paul Getty Museum, Los Angeles. Our front cover this month pairs the Getty Museum with Griffith Observatory, the other hilltop fortress of civilization in southern California, to acknowledge an unexpected alliance of astronomy and art in your August *Griffith Observer*. (photograph of Getty Center by Atwater Village Newbie, photograph Griffith Observatory by Anthony Cook, cover design by Grace Ramos)



Edvard Munch captured the sky for *Starry Night* in Åsgårdstrand, a coastal town in southern Norway, south of Oslo, on the west side of Oslofjord. Details of interpretive interest include the bright "star" on the left and its glitter path on the water, the red light on the horizon, and the white dot and vertical line in front of the silhouetted linden tree. (Edvard Munch, *Starry Night*, 1893 oil on canvas, 135.6 x 140 cm The J. Paul Getty Museum, Los Angeles © 2009 The Munch Museum/The Munch-Ellingsen Group/Artists Rights Society (ARS), New York)

As a starting point for a similar analysis of the Getty Center's *Starry Night*, we consulted biographies of Munch, exhibition catalogues, and a detailed year-by-year Munch chronology, which date this painting to 1893. We were intrigued to see that the list of 1893 works included two other Åsgårdstrand paintings with astronomical

content. In *The Storm*, a bright star shines in the twilight sky above Åsgårdstrand's Grand Hotel. *Sunrise in Åsgårdstrand* features the sun just above the horizon, with a glitter path stretching across the fjord.⁴

Astronomical dating of these three paintings has some importance because the precise



Edvard Munch's *Starry Night* is in the collection of the Getty Center in Los Angeles. The three-day-old waxing crescent moon hangs over the Pacific, beyond the Getty Center, just after sunset on 12 December 2007. It's the kind of scene that might inspire Munch. (photograph Nathan Copeland)

days when Munch visited Åsgårdstrand during 1893 are unknown. Some authors even question whether the artist traveled there at all during that year and imply that he must have created these works from memories of previous visits to the resort.

Munch's Visit to Åsgårdstrand in 1893

We checked two of the most detailed chronologies of Munch's life, and neither of these makes any mention of a visit to Åsgårdstrand in 1893.^{5,6}

Author Ketil Bjørnstad goes further and explicitly states for the year 1893 that Munch was not on the scene in Åsgårdstrand,

During the summer Munch does not go to Åsgårdstrand. Instead, he remains in Germany, paints landscapes with deeply atmospheric, smouldering colour, paints *Starry Night*, *Moonlight* and *The Storm*.⁷

A recent biography by Sue Prideaux discusses Munch's stay in Germany in 1893 and likewise concludes,



At least two experts on Munch claimed he did not visit Åsgårdstrand in 1893, the year to which *Starry Night* is assigned. The Grand Hotel is the shoreline building on the right. The small building on the far left, with a red roof, also appears in the Munch painting through the foliage of the linden trees. (historical postcard, collection of Knut Christian Henriksen, Åsgårdstrand)

Summer came, and Munch had neither the money nor the inclination to go to Norway.⁸

But these biographies and chronologies are incomplete. Our research turned up a first-person account that was apparently overlooked by these authors. Jens Thiis, a long-time director of the National Gallery in Oslo, visited Åsgårdstrand in 1893 with several friends, including Edvard Munch and the poet Helge Rode. Thiis wrote,

I happened to meet Helge again in Åsgårdstrand. It was his friend Edvard Munch who had invited him there...One day in August, when we were sitting together on the hotel veranda, I had the desire to sketch Helge Rode...⁹

This drawing bears the date of August 17, 1893, handwritten by Thiis in the corner. Because this account definitely places Munch in Åsgårdstrand, where he could be inspired by the Norwegian skies, we realized that we could possibly identify the celestial objects in Munch's paintings and determine dates for these works.



The Texas State University Munch expedition to Åsgårdstrand is on the scene in front of the Kiøsterud estate (enclosed by the white fence), on the left, and the rebuilt Grand Hotel, on the right. The team occupies nearly the same position as the figures in Munch's *The Storm*. From left to right, they are Roger Sinnott, Joseph Herbert, Russell Doescher, Donald Olson, Robert Newton, Ava Pope, and Marilyn Olson. (photograph Russell Doescher, through the magic of a self-timer)

Venus in *Starry Night*?

In the articles and books that we consulted, the art historians who comment on the sky of *Starry Night* all agree that Munch included the planet Venus.

The Getty sponsored a book devoted entirely to an analysis of *Starry Night*. The author, art historian Louise Lippincott, asserts that

The pink “star” on the horizon in *Starry Night* is actually the planet Venus...¹⁰

Lippincott also refers to the “appearance of Venus” in the painting as “the red star on its horizon.”¹⁰

Arne Eggum, former chief curator of the Munch Museum, was apparently the first to make this Venus identification. Lippincott acknowledged that she was “deeply indebted to A. Eggum for pointing out the star symbolism in *Starry Night* during his visit to Malibu...”¹⁰ Eggum explained his reasoning,

The first title Munch gave the painting *Starry Night* was *Evening Star*. As we know, the evening star is the planet Venus...¹¹

Later authors adopted the planetary identification made by Eggum and Lippincott. For example, Marit Lande asserts that the “light on the horizon is the reflection of the planet Venus...”¹² Dieter Buchhart states that this painting includes “the bright evening star and its prominent swath of light...the planet of Venus...”¹³

These descriptions are somewhat confusing—some seem to be referring to the red light on the horizon and others to the bright object up in the sky—but all of these art historians agree that Munch's *Starry Night* includes Venus.

Moon in *Starry Night*?

Louise Lippincott provides an astronomical explanation for the vertical white column visible in the garden:

The view depicted in *Starry Night* looks down from the Grand Hotel window and across this enclosed private garden. The great linden trees form a mound silhouetted against the night sky, and their bulky shape is pierced by a dot and a streak of light from the moon hidden behind them.¹⁴



What had been identified as the moon shining through the linden trees in Munch's *Starry Night* is easily identified in this historical postcard. It is actually the round ball that topped a flagpole in the garden of the Kiøsterud estate. The flagpole shows up in dozens of vintage photographs. This view south was taken from a spot in front of the original Grand Hotel. The building on the right is evident in Munch's *The Storm* and is also easy to spot in the historical photographs of the Åsgårdstrand shore. (collection of Knut Christian Henriksen, Åsgårdstrand)

She argues that her lunar theory is reasonable.

...Munch already had developed the dot and streak as a way of representing a light source and its reflection; it seems plausible to identify the motif in the Getty Museum's *Starry Night* as the moon and its reflection seen through the trees.¹⁵

To check these planetary and lunar identifications, we wanted to carry out our own astronomical analysis.

Trip to Norway

Accordingly, our Texas State group, accompanied by *Sky & Telescope* editor Roger Sinnott, traveled to Åsgårdstrand during August, 2008. For *Starry Night* and also for *The Storm* and *Sunrise in Åsgårdstrand*, we hoped to answer several questions: Where was Munch standing? Which way was he facing and therefore which part of the sky did he depict? Could we determine the dates and times? Could we identify the celestial objects in these works?

We began by making a topographic survey of the town, using a surveyor's chains and transit to measure distances and angles. Next,

Åsgårdstrand resident Knut Christian Henriksen kindly shared his immense local history collection, which includes hundreds of photographs showing Åsgårdstrand as it appeared in Munch's time. By studying the historical photographs, we could see that many of the town's buildings from 1893 are still standing, and we could see where changes had occurred.

The white fence visible in Munch's *Starry Night* is easy to find today, and the original group of linden trees is still standing in the garden of the Kiøsterud estate. To obtain the view for *Starry Night*, Munch must have been somewhere in the nearby Grand Hotel.

The analysis is complicated, however, because the hotel burned down in 1930 and was rebuilt. We used the historical photographs, along with our own topographic survey, to determine the precise location of the original hotel. The southeast corner of the modern hotel is now farther from the Kiøsterud estate (by about 10 feet) and closer to the fjord (by about 30 feet). We used a 3-dimensional computer model to simulate Munch's view from the veranda, the balcony, and the windows of the original hotel. We found that we could reproduce the view of *Starry Night* only from near the center of the upper floor of the old hotel.



The settings of both *Starry Night* and *The Storm* are preserved in this postcard view of Åsgårdstrand from about 1910. The white fence on the left encloses the linden trees and a pole flying the Norwegian flag. The fence, the trees, and the pole are all seen in *Starry Night*. The Grand Hotel, near the center, is partially obscured by the birch tree, as it is in *The Storm*. (collection of Knut Christian Henriksen, Åsgårdstrand)



Knut Christian Henriksen, in the center between Dr. Donald Olson and Ava Pope, provided almost all of the information on local history in Åsgårdstrand and supplied many historical images. (photograph Marilyn Olson)

Flagpole

Louise Lippincott argues that *Starry Night's* vertical white column with the round dot on the top is "the moon and its reflection seen through the trees."¹⁵ With assistance from Knut Christian Henriksen's resources, we can offer a different explanation.

It is true that Munch depicted summer full moons and their glitter paths in the fjord in dozens of other works, but glitter paths are reflections in the water and cannot extend up higher than the horizon. In Munch's other works showing glitter paths, the columns of light stop at the horizon. The vertical white column in *Starry Night* extends well above the horizon and cannot be a glitter path.

More than 20 historical photographs, taken from almost all possible directions, show a flagpole with a round ball at the top standing in the Kiøsterud garden. The flagpole no longer exists, but our computer model shows that it stood exactly where Munch painted it and had the correct height (about 45 feet) relative to the group of linden trees. We discovered a depression in the grass where the flagpole's base had been.¹⁶



Edvard Munch's viewpoint for the scene in *Starry Night* must have been near the center of the upper floor of the Grand Hotel, photographed here in about 1910. (collection of Knut Christian Henriksen, Åsgårdstrand)



Joseph Herbert, Robert Newton, Ava Pope, Donald Olson, and Marilyn Olson search through primary sources at the Munch Museum Research Library in Oslo, Norway. (photograph Russell Doescher)

The hypothetical "moon" and reflection in *Starry Night* turns out to be a flagpole. What about Venus? Did Munch see Venus during the summer of 1893?

Was Venus Visible in 1893?

During our visit to Åsgårdstrand we took photographs from the hotel by day, during evening and morning twilight, and at night. We verified that Munch's direction of view for *Starry Night* was generally to the east. The stars on the left side of the painting would lie somewhat north of east, while the trees on the right side are south of east.

Our computer calculations show that Venus was never visible at or above the eastern horizon during morning twilight or at sunrise on any date in the spring or summer of 1893. At sunset and in evening twilight, Venus was to the west of the hotel (the side away from the fjord), and the planet was never higher than 5° above the geometric horizon at sunset. A steep hill behind the hotel rises with a slope that we measured to be 8° . This hill would have blocked the view of Venus at sunset.

Therefore Munch could not have seen Venus from the Åsgårdstrand Grand Hotel whether from the front or back of the hotel, whether looking east toward the fjord or west toward

the hill behind the hotel, whether at morning or evening twilight, on any date in the spring or summer of 1893.¹⁷

But a very bright "star" is clearly visible in *Starry Night*. What did Munch see? The blue skyglow of *Starry Night* suggests a Norwegian twilight. Is this morning twilight or evening twilight?

Starry Night = Evening Star

The composition now called *Starry Night* was exhibited by Edvard Munch in his lifetime with a variety of titles. According to Arne Eggum and other experts at the Munch Museum, the alternate titles used for this work include *The Stars*, *Evening Star*, *Night*, *Starry Heavens*, and finally *Starry Night*.¹⁸ We realized that the title *Evening Star* provides an important astronomical clue, telling us that the bright "star" was observed between sunset and midnight.

But like so much else about *Starry Night*, even this use of the title *Evening Star* is hotly disputed by some art historians. Several scholars identify the title *Evening Star* with a composition now known as *The Voice*, which shows a woman standing in a forest along the coastline near Åsgårdstrand, with a yellow glitter path of moonlight reflecting in the fjord.



Roger Sinnott uses shadows cast by the sun to measure the slope of Havnegata, the road between the Grand Hotel and the Kiøsterud estate in Åsgårdstrand as part of a topographic survey of the town. (photograph Ava Pope)

For example, Munch biographer Sue Prideaux discusses an early exhibition and makes the judgment:

The first big question of identity concerns whether...*Evening Star* in the catalogue, was *Starry Night* or *The Voice*. I have come down on the side of *The Voice*...¹⁹

The catalogue for a recent major Munch exhibition at the Museum of Modern Art comes to the same conclusion.²⁰

With help from librarians at Texas State University, the National Library of Norway, and the Munch Museum Library, we located two primary sources that help to resolve this title controversy.

A newspaper critic gave the following eyewitness description of a Munch exhibition in Oslo.

And turning to his exhibition in the Diorama Hall, I want people to focus their attention on number 1 in the catalogue—“*Evening Star*.”

What in the world should prevent people from understanding that this is a beautiful picture? The poetry of the summer night, the great tree standing there slumbering in the garden, the fence shin-



Ava Pope, Joseph Herbert, and Donald Olson established accurate directions in Åsgårdstrand through transit measurements. (photograph Marilyn Olson)

ing white down towards the sea and the evening star shimmering up in a deep blue sky.²¹

These details leave no doubt that the writer was describing the painting now known as *Starry Night*.

As further confirmation, the Munch Museum has a series of photographs taken at the Commeter Gallery in Hamburg, Germany. Photograph #62 definitely shows *Starry Night*, and an accompanying list in Munch's handwriting includes the title “62—Abendstern” (German for “Evening Star”).

Therefore, despite the contrary claims by some authors, this evidence demonstrates that Munch did use *Evening Star* as an early title for *Starry Night*.

The Bright “Star” in *Starry Night*

During summer evenings in 1893 did any especially brilliant celestial body shine in the eastern sky over the Oslofjord?

Computer calculations provided the answer. The planet Jupiter, dazzling at apparent magnitude -2.4, was by far the brightest object visible to an observer looking out from Åsgårdstrand’s Grand Hotel.

Above the bright object in the painting is a distinctive asterism that we recognized as the Pleiades. Computer simulations show that the Pleiades star cluster was in fact located just above Jupiter as the planet rose into the evening sky in 1893.

Jupiter appears in the painting somewhat north of east, but the lack of topographic landmarks along the coastline makes it difficult to assign a precise azimuth. Because long and narrow glitter paths like those seen in the painting occur only for objects near the horizon, Munch must have observed Jupiter at a low altitude, not long after the planet rose.

The scene cannot be from the early part of the summer because, before July 9, Jupiter rose after midnight and would not reasonably have been called an “evening star” by Munch.²² A postcard in the Munch Museum archives proves that Munch had left Åsgårdstrand and was receiving mail at Nordstrand by September 24,

1893. The view in *Starry Night* must correspond to a date between July 9 and September 24.

Determining a more precise date astronomically is difficult, because Jupiter’s position among the background stars remains nearly the same for many consecutive nights. We therefore consulted weather records of the Norwegian Meteorological Institute. Rain and overcast skies were common, and most nights could be ruled out as a match for the painting. We found two especially clear nights.

Describing the night of August 16-17, 1893, the local Åsgårdstrand paper recorded that the clouds present near sunset quickly disappeared and,

Until late in the night the heavens were clear with twinkling stars.²³

The night of August 23-24, 1893, was likewise clear.

We conclude that *Starry Night* shows Jupiter and the Pleiades during evening twilight, most likely on August 16 or August 23, 1893.

The Storm

We realized that *The Storm* might provide an independent way to determine when Munch visited Åsgårdstrand.

CENTER

Moonlight in the *Starry Night*

Despite earlier claims to the contrary, the moon does not appear in Edvard Munch’s 1893 painting *Starry Night*. The actual astronomical circumstances of the art have now been established by Dr. Donald W. Olson, Russell L. Doescher, Joseph C. Herbert, Robert H. Newton, and Ava G. Pope. Their original research, incorporating on-site examination of Åsgårdstrand, Norway, the town where Munch designed his painting, appears this month in their article “Edvard Munch’s *Starry Nights*, *Stormy Skies*, and *Summer Sunrises*.” Their approach includes photographic documentation of the point of view of the painting, and that perspective is illustrated in this picture, shot to the east, over a recognizable white fence and past the same linden trees shown in *Starry Night*. This fieldwork was undertaken just a year ago this month, and the photograph captures the moon climbing out of Oslofjord on 18 August 2008 and laying a glitter path on its waters. The light reflected on the fjord in Munch’s painting belongs to an entirely different celestial object. (photograph Russell Doescher)





The Storm, by Edvard Munch, illustrates the view up Havnegata road as intense weather approaches, but a star still glows above the buildings and to the right. The view is west. (Edvard Munch, *The Storm*, 1893 oil on canvas, 92 x 131 cm Gift of Mr. and Mrs. H. Irgens Larsen and acquired through the Lillie P. Bliss and Abby Aldrich Rockefeller Funds. The Museum of Modern Art, New York © 2009 The Munch Museum/ The Munch-Ellingsen Group/Artists Rights Society (ARS), New York)

A woman in white dominates the foreground of *The Storm*, while a cluster of women in the middle distance stands near the same fence depicted in *Starry Night*. A tree bends in the wind in front of lighted yellow windows of the Grand Hotel, the same building from which Munch observed the view for *Starry Night*. Beyond these connections to *Starry Night*, *The Storm* is also of special interest to astronomers because it includes a bright star visible in the sky just to the north (to the right) of the hotel.²⁴

An actual storm inspired the painting, according to the same eyewitness account that places Munch in Åsgårdstrand during August of 1893. The memoir by Jens Thiis mentions some “beautiful sun-filled late summer days” during

this visit to the resort but goes on to describe a sudden change in the weather.

One sultry evening...there suddenly began a rustling in the air and a quaking in the tree in front of the hotel... a gale broke out...the fjord stood heavy as lead in a foaming uproar...fishermen’s wives huddled together in a group. All were looking out through the dusky twilight for the fishing boats that were out there—would they all manage to get home safely?

The next day, Munch painted the events in his famous picture *The Storm*... The house with the illuminated windows



Photographer Russell Doescher helped establish the exact perspectives of the Munch paintings and documented their current conditions on the scene. (photograph Marilyn Olsson)

is the hotel where we stayed, and the woman in white in the foreground is my future wife.²⁵

The weather records for July, August, and September list many days with rain but only one “strong thunderstorm”—a spectacular event on the evening of August 19, 1893.

The Oslo paper for the next day confirms that the storm hit during evening twilight.

A thunderstorm with magnificent lightning passed over the city around 9 o’clock yesterday evening.²⁶

Another newspaper writer was impressed by the almost unprecedented strength of this storm.

...there was a downpour so heavy and lightning so frequent and strong, in a manner that we can scarcely remember.²⁷

What bright star did Munch observe as the storm began to rage? To answer this question, we needed to know which direction the artist was facing.

The painting shows the corner of the white fence aligned with the house of the Kiøsterud

estate and a birch tree aligned with the center of the Grand Hotel. (Although the tree has recently been cut down, the stump is still easy to find.)²⁸ Munch’s view is possible from only one location, which our survey determined within a few feet.

We found that the bright star in *The Storm* had an azimuth near 267° (slightly south of west) and an altitude near 25°. For the latitude of Åsgårdstrand (59° 21’ north) we calculated a stellar declination near +20°. The star must therefore be Arcturus, an especially plausible candidate because it has the distinction of being the second brightest star (after Sirius) in the night sky of Norway.²⁹

Sky simulations show that the time depicted in *The Storm* must be during evening twilight, within a few minutes of 9:15 p.m.³⁰ The time derived from the position of the bright star is in excellent agreement with the times mentioned by Thiis and the newspaper stories.

We conclude that *The Storm* shows Arcturus in the western sky as the tempest began on the evening of August 19, 1893.

Arcturus is well-known to astronomers worldwide as a prominent star during August evenings. Readers of this issue of the *Griffith Observer* can confirm this by consulting the sky chart showing the Evening Sky in August, on page 22, or, better yet, by observing this brilliant star in the western sky during evening twilight this month.

Sunrise in Åsgårdstrand

We also found a way to use the sun to determine the time of year when Munch visited Åsgårdstrand. The point on the horizon where the sun rises varies seasonally, with the sun rising farthest to the northeast at the summer solstice, farthest to the southeast at the winter solstice, and directly east at the spring and fall equinoxes.

Sunrise in Åsgårdstrand looks across the water to a rising sun with a long glitter path reflected in the fjord. We recognized, just to the left of



Edvard Munch looked a little north of due east to catch the sun over Oslofjord. Astronomical analysis, on-site survey, and review of historical records confirm this to be an early September sunrise. (Edvard Munch, *Sunrise in Åsgårdstrand*, ca. 1893 oil on canvas, 65 x 89 cm private collection © 2009 The Munch Museum/ The Munch-Ellingsen Group/ Artists Rights Society (ARS), New York)

the glitter path, the same group of trees seen in *Starry Night* and the roof of the Kiøsterud house. The small building below and to the right of the glitter path served as a boathouse.

The right side of the painting shows the house now known as Russellgården, with its roof almost exactly superposed on the distant horizon. We found that this view is possible only from the upper floor of the nearby Soelberggården house.

The current owners of Soelberggården kindly allowed us into their home. We could match Munch's view of the bend in the road only from a specific room in the upper story. In one of the most moving moments of our trip, we realized

that we were standing on the same floorboards by the same window where the artist himself had looked out to watch the rising sun, more than a century before.

Our modern photographs reveal several changes: The trees have grown taller, and Russellgården has undergone some structural modifications, most notably a dormer added to the roof. Knut Christian Henriksen showed us a historical photograph of Russellgården with no dormer, just as painted by Munch.

Based on our survey we determined that the rising sun in the painting was near azimuth 80° (that is, 10° north of east). Using the angular width of the boathouse to set the



The building on the right side of Munch's *Sunrise in Åsgårdstrand* is Russellgården. In this historical photograph, it looks just as it did painted by Munch. (collection of Knut Christian Henriksen)



A 2008 photograph of the scene in *Sunrise in Åsgårdstrand*, obtained from the upper story of Soelberggården house, records taller trees. Also, more recent structural modifications to Russellgården house add a dormer to the roof. This feature is absent in the Munch painting and in the historical photograph. (photograph Russell Doescher)

scale, we estimated the sun to be about 2° to 4° above the horizon, an altitude consistent with the long and narrow glitter path in the fjord. Munch could have observed the rising sun near this position only during the second week of April (ruled out because Munch was then in Germany) or during the first five days of September.

Weather records show many mornings in Norway plagued by overcast skies and rain. In 1893 the only date and time consistent with the sun and the sky in the painting is September 3 at 5:30 a.m.³¹

The early history of the sunrise painting is somewhat uncertain, and scholars at the Munch Museum tell us that this work may date from a year or even a few years after 1893. A later date consistent with the position of the rising sun and the weather records is September 2, 1895, at 5:31 a.m. Local historical records indicate that the doctor Wilhelm Grimsgaard, a friend of Munch, was living in Åsgårdstrand at the Soelberggården house by 1895. This raises the intriguing possibility that Munch was visiting his friend or possibly renting a room in the Soelberggården. Regardless of the year, the sunrise painting must be from the first five days of September, which confirms that Munch was in the habit of visiting Åsgårdstrand in late summer.



Reconstruction of the view for *Sunrise in Åsgårdstrand* places Munch in a window in the upper floor of Soelberggården house. (photograph Donald Olson)

Conclusions

Starry Night shows an evening twilight scene, with Jupiter and the Pleiades rising into the eastern sky on a date in the second half of August, 1893.

The Storm shows an evening twilight scene looking west, with Arcturus setting next to the Grand Hotel, near 9:15 p.m. on August 19, 1893.

Sunrise in Åsgårdstrand looks east to a rising sun and a glitter path in the fjord at a time near 5:30 a.m. on a morning in the first five days of September.

The three paintings studied here have been dated independently—one using stars and a planet, another using a storm and meteorological records, and the last using the sun—and all three dates fall within a three-week period between mid-August and early September.

Starting from observations of nature during this visit to Åsgårdstrand, Munch showed his artistic genius by expressing emotional content that goes beyond literalism. Knowing the details of the celestial scenes in these paintings only increases our admiration of the artist's skill at portraying the mystery of the Norwegian summer skies.

Acknowledgments

The authors are grateful for research assistance from Lasse Jacobsen of the Munch Museum Research Library, Tove Dahl Johansen of the National Library in Oslo, Knut Christian Henriksen, Vidar Lund Iversen, Randi Bretting, and Sven Arne Trolsrud in Åsgårdstrand, Roger Sinnott of *Sky & Telescope*, and Margaret Vaverek of the Alkek Library at Texas State.

Notes

1 Edvard Munch's Åsgårdstrand *Starry Night* exists in two versions, one at the Getty Center in Los Angeles and the other at the Von der Heydt-Museum in Wuppertal, Germany.

2 D. W. Olson, R. L. Doescher, and M. S. Olson, "When the Sky Ran Red: The Story Behind *The Scream*," *Sky & Telescope*, February 2004, pp. 28-35.

3 D. W. Olson, B. Robertson, and R. L. Doescher, "Reflections on Edvard Munch's *Girls on the Pier*," *Sky & Telescope*, May 2006, pp. 38-41.

4 Johan Langaard and Reidar Revold, *A Year by Year Record of Edvard Munch's Life*, 1961.

Starry Night and *The Storm* were first exhibited in Berlin in December, 1893.

5 Langaard and Revold (1961), pp. 22-23.

6 *Edvard Munch: The Modern Life of the Soul*, exhibition catalogue, Museum of Modern Art, 2006, pp. 221-238.

7 Ketil Bjørnstad, *The Story of Edvard Munch*, 1993 (Norwegian), 2001 (English translation), p. 124.

8 Sue Prideaux, *Edvard Munch: Behind the Scream*, 2005, p. 148.

9 Jens Thiis in *Festskrift Til Francis Bull*, 1937, p. 307.

10 Louise Lippincott, *Edvard Munch: Starry Night*, 1988, pp. 46-49, 69, 93.

11 Arne Eggum, *The Frieze of Life from Painting to Graphic Art*, 1990 (Norwegian), 2000 (English translation), pp. 79-80.

12 Marit Lande in *Edvard Munch: The Frieze of Life*, 1992, p. 55.

13 Dieter Buchhart in *Edvard Munch: Theme and Variation*, 2003, p. 157.

14 Lippincott (1988), p. 46.

15 Lippincott (1988), p. 93.

16 We agree with art historian Thomas Messer who saw the flagpole and wrote in 1973 that "the tree group with the white fence in front and even the white flagpole that stands out against the foliage like a mysterious light reflection may still be found in their places today." (*Edvard Munch*, 1985 reprint of 1973 edition, p. 76).

17 Louise Lippincott (1988, pp. 67-69) identifies Venus in *Starry Night* as "the red star on its horizon." Lippincott was influenced by a passage in the famous account *Farthest North* by polar explorer Fridtjof Nansen, in part because Nansen was an early private owner of Munch's *Starry Night*.

Nansen describes the first appearance of Venus for the winter season in a journal entry written near latitude 78° north (far above the arctic circle) on January 8, 1894. Nansen recalls how he "came on deck and saw a strong red light just above the edge of the ice in the

south.” Nansen quickly realized that the spectacular object was “Venus, which we see to-day for the first time, as it has till now been beneath the horizon. It is beautiful with its red light.” (*Farthest North*, 1898 edition, Volume I, pp. 368-369.)

We suggest that the red light on the horizon in *Starry Night* may be a harbor light near the town of Larkollen on the east side of the Oslofjord.

18 In the exhibition catalogues, the titles in the original languages are *Die Sterne* (Berlin, 1893), *Stjornor* (Stockholm, 1894), *Stjerner* (Oslo, 1897), *Abendstern* (Berlin, 1902), *Aftenstjernen* (Oslo, 1904), *Nat* (Copenhagen, 1906), *Stjernehimmel* (Copenhagen, 1908), *Stjernenat* (Stockholm, 1917), and *Sternennacht* (Berlin, 1927).

19 Prideaux (2005), pp. 209, 353.

20 *Edvard Munch, The Modern Life of the Soul* (2006), p. 205.

21 *Morgenbladet*, November 6, 1904.

22 Norway in 1893 had not adopted modern time zones or daylight saving time. Local mean time at Åsgårdstrand (longitude 10° 28' east) was 42 minutes ahead of Universal Time. For example, on July 9, 1893, Jupiter rose at 23:16 UT = 11:58 p.m., local mean time.

23 *Gjengangeren*, August 20, 1893.

24 The bright star in *The Storm* is missing from some book reproductions, for example, *Edvard Munch: The Modern Life of the Soul*, Museum of Modern Art, 2006, p. 113. The star may have been mistakenly identified as a defect and removed from the digital file using Photoshop or an equivalent program. The bright star, above and to the right of the hotel, is clearly visible in the unretouched digital photographs taken by visitors to the Museum of Modern Art in New York, as can be verified at www.flickr.com by using the search terms: *moma munch storm*.

25 Thiis (1937), p. 307. The woman in white is therefore Ragna Vilhelmine Dons, who married Jens Thiis in 1895.

26 *Dagbladet*, August 20, 1893.

27 *Aftenposten*, August 22, 1893.

28 Several authors mistakenly identify the tree in *The Storm* as a poplar. Knut Christian Henriksen and several other Åsgårdstrand residents are certain that it was a birch, and the caption to an early photograph describes it as the birch tree (“bjørketreet”) painted by Munch.

29 Arcturus had declination +19° 44' in 1893.

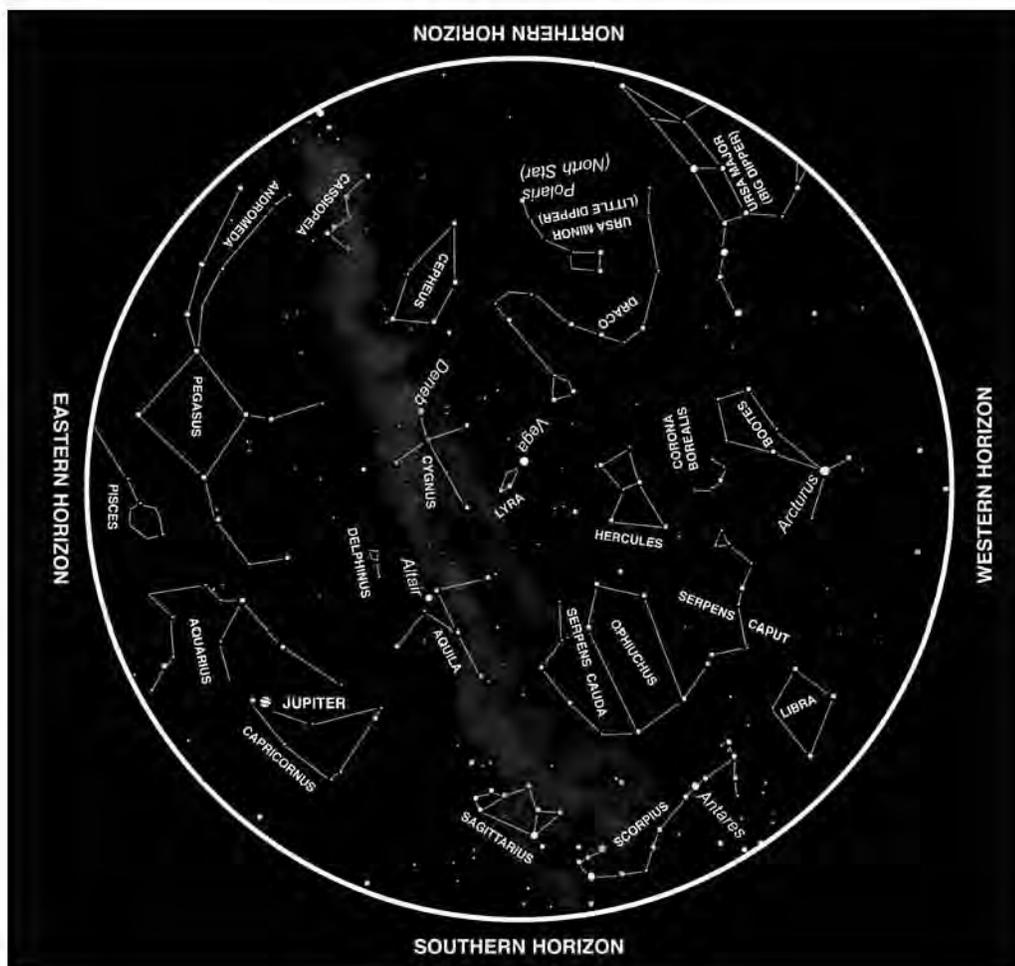
30 20:33 UT = 9:15 p.m., local mean time; see note 22.

31 4:48 UT = 5:30 a.m., local mean time; see note 22.

BACK COVER

The Space Shuttle Endeavors to Leave

Disruptive weather at Cape Canaveral, Florida, on Sunday, 30 November 2008, diverted the Space Shuttle *Endeavour* to a California touchdown. The Space Shuttle can land at NASA's Dryden Space Flight Research Center at Edwards Air Force Base, near Palmdale, 65 miles northeast of Los Angeles, but it can't return to space from there. The Space Shuttle must be carried piggyback on a Boeing 747 across the country for its next liftoff, and it left California on 10 December 2008. Griffith Observatory Astronomical Observer Anthony Cook was credentialed for press access and on hand to document the endeavor. Three weeks later, Anthony Cook reported the *Endeavour's* departure for Florida to the audience assembled in the Leonard Nimoy Event Horizon for Griffith Observatory's monthly astronomical accounting, “All Space Considered,” hosted by Griffith Observatory Curator Dr. Laura Danly. (photograph John Woodbury, Griffith Observatory)



EVENING SKY IN AUGUST

To use: Hold the chart over your head and orient it so that the directions on the outside of the chart match the directions on the ground. The chart shows the entire sky from horizon to horizon at the time indicated.

This chart is set for the latitude of Los Angeles (34° north), but it is useful through out the continental United States and around the world at a similar latitude.

Planet positions are plotted for the 15th of the month. Sidereal times are: Evening chart, 18^h 45^m; Morning chart, 0^h 45^m.

Chart Times

Evening Sky

11:00 p.m.	P.D.T.	August	1
10:00 p.m.	P.D.T.	August	15
9:00 p.m.	P.D.T.	August	31

Morning Sky

5:00 a.m.	P.D.T.	August	1
4:00 a.m.	P.D.T.	August	15
3:00 a.m.	P.D.T.	August	31

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ikke uegnet for liv

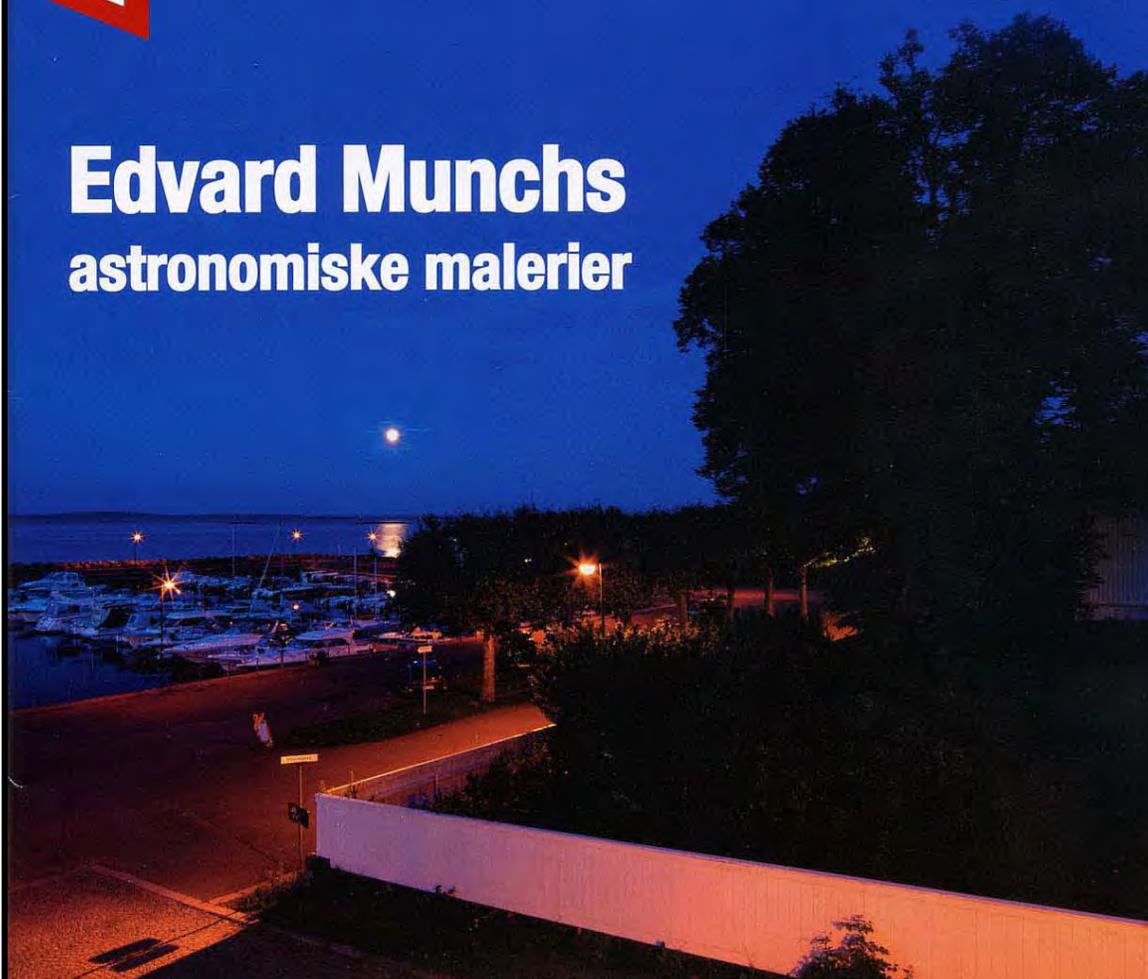
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nøyaktige mester

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skal jakte på ormehull

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**Edvard Munchs
astronomiske malerier**



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Stjernenetter, stormer og sommerlige soloppganger

Den geniale kunstneren Edvard Munch (1863-1944)
hentet mye inspirasjon i lyse, norske sommeretter.
Det finnes tallrike koplinger til astronomiske objekter
i hans malerier. Et av de vakreste er *Stjernenatt*.

**Bildet: Ava Pope, Joseph Herbert og Donald Olson
(med flere) har fulgt Edvard Munchs fotspor
i Åsgårdstrand. Og de har gått grundig til verks
for å finne ut mer om våre kunstskatter.**

Foto: Marilyn Olson



16

En reise i tid

Greenwich-observatoriet
i London ble i sin tid opp-
rettet for å trygge engelsk
sjøfart. I dag er det et flott
besøksenter og en stor
turistattraksjon.

Foto: David A. Wright



28

Universet er blitt yngre

Universet utvider seg raskere enn vi så langt har
trodd, viser ny forskning. Det innebærer at
Universets beregnede alder er blitt lavere. **24**

Nytt om Merkur

Romsonden Messenger har gitt oss uventet
kunnskap om Solsystemets innerste planet.
Den viser seg å være mer aktiv enn
forskerne har vært klar over. **26**

Skal jakte på ormehull

Russland vil bygge et 12 meter stort romteleskop
som skal samvirke med andre teleskoper.
Hvis de lykkes, vil det gi uhornt detaljert bilder av
astronomiske objekter. Teleskopet tenkes også
brukt til særdeles eksotiske oppgaver:
Leting etter ormehull og utomjordisk liv. **48**

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Kommende utgivelser:

6-09: 18. sep.
1-10: 27. nov.
2-10: 5. feb.

Bidrag:

Artikler bør leveres tre måneder
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Edvard Munch, Stjernenatt, 1893. Olje på lerret, 135,6 x 140 cm.

© The J. Paul Getty Museum, Los Angeles / Munch-Ellingsen-gruppen / BONO 2009



Utsynet i Edvard Munchs Stjernenatt kan ses den dag i dag, med det hvite gjerdet som omslutter lindetrærne ved Kiøsterud-villaen. Bildet ble tatt en sensommeraften 18. august 2008. Vi ser Månen stige opp og speile seg i Oslofjorden.

Foto: Russell Doescher

Edvard Munch:

Stjernenetter, stormer og sommerlige soloppganger

Selv om Edvard Munch (1863-1944) er best kjent for *Skrik*, laget han også tallrike malerier av himmelen og astronomiske objekter. Et av de vakreste er *Stjernenatt*.

AV DONALD W. OLSON, RUSSELL L. DOESCHER,
JOSEPH C. HERBERT, ROBERT H. NEWTON
OG AVA G. POPE*

Et hvitt plankegjerde og en gruppe lindetrær dominerer forgrunnen. En kystlinje bukker seg langs Oslofjorden, som reflekterer den blå nathimmelen over hans feriested Åsgårdstrand. Ett av himmelobjektene påkaller vår oppmerksomhet blant alle stjernene som fyller himmelen. Men hvilket?

Vår undersøkelse av *Stjernenatt* begynte med en detaljert gjennomgang av Munchs verker, som daterer maleriet til 1893. Til vår fascinasjon oppdaget vi at Munch hadde laget ytterligere to malerier med astronomisk innhold fra Åsgårdstrand dette året. I *Stormen* skinner en klar stjerne over Grand Hotell i skumringen. *Soloppgang i Åsgårdstrand* viser Solen

like over horisonten, der et glitrende vannspeilet strekker seg over fjorden.

En astronomisk datering av disse tre maleriene vil ha en viss verdi, siden det ikke er kjent eksakt når Munch besøkte Åsgårdstrand i 1893. Enkelte stiller faktisk spørsmål ved om han overhodet var der dette året, og antyder at Munch må ha laget bildene i Tyskland etter tidligere minner.

Munchs besøk til Åsgårdstrand i 1893

I undersøkelsen vår fant vi et førstehånds øyevitne i Jens Thiis, som lenge var direktør ved Nasjonalgal-

* Artikkelen er basert på en bacheloroppgave og er tilrettelagt for *Astronomi* av artikkelforfatterne, som du kan lese mer om til slutt i artikkelen. Teksten er oversatt til norsk av Trond Erik Hillestad.

**Edvard Munch,
Stormen, 1893.
Olje på lerret,
92 x 131 cm.**

© Museum of Modern Art, New York / Munch-Ellingsen-gruppen / BONO 2009



Lokasjonen for både Stjernenatt og Stormen kan ses på dette postkortet fra omtrent 1910. Til venstre ser vi det hvite gjerdet som omslutter lindetrærne ved Kiøsterud-villaen. Det norske flagget vaier fra flaggstangen som Munch malte i Stjernenatt. Nær sentrum i bildet er Grand Hotell, delvis dekket av bjørketreet som er avbildet i Stormen. Munch utsiktspunkt i Stjernenatt må ha vært nær midten av øverste etasje på hotellet.

Fra samlingen til Knut Christian Henriksen

leriet i Oslo. Thiis besøkte Åsgårdstrand i 1893 sammen med flere venner, inkludert Edvard Munch og poeten Helge Rode. Thiis skrev:

...traff jeg Helge igjen i Åsgårdstrand. Det var vennen Edvard Munch som hadde lokket ham dit. En dag i august, da vi satt på hotellverandaen sammen, fikk jeg lyst til å tegne Helge Rode...

I et av hjørnene på tegningen finner vi datoen 17. august 1893, skrevet med Thiis' håndskrift. Dette viser at Munch definitivt besøkte Åsgårdstrand dette året, der han kunne la seg inspirere av den norske himmelen. Vi så at det kunne være gode muligheter for å identifisere himmelobjektene i Munchs malerier og ut fra dette bestemme datoene for når de ble malt.

Venus i Stjernenatt?

Getty-stiftelsen sponset i sin tid en bok av kunsthistorikeren Louise Lippincott (*Edvard Munch: Starry Night*, 1988), som skriver at:

Den rosa «stjernen» på horisonten i *Stjernenatt* er i virkeligheten planeten Venus...

Lippincott henviser også til "tilsynekomsten til Venus" i maleriet som "den røde stjernen på horisonten."

Arne Eggum, tidligere førstekonservator ved Munch-museet, var trolig den første som identifiserte objektet som Venus. Lippincott skriver at hun var "dypt takknemlig overfor A. Eggum som pekte på stjernesymbolikken i *Stjernenatt*..." Eggum forklarer seg slik:

Den første tittelen Munch ga maleriet *Stjernenatt* var *Aftenstjernen*. Aftenstjernen er som kjent den samme som planeten Venus... (*Livsfrisen fra Maleri til Grafikk*, 1990)

Senere forfattere har adoptert denne identifiseringsringen. I en utstillingskatalog fra 2003 sier for eksempel Dieter Buchhard at *Stjernenatt* innehol-

der "den klare aftenstjernen og den tydelige lysba-
nen... planeten Venus..."

Disse beskrivelsene er litt forvirrende. Det virker som enkelte henviser til det røde lyset på horisonten, mens andre mener det lyssterke objektet oppe på himmelen. Alle historikerne er imidlertid enige om at *Stjernenatt* viser Venus.

Månen i Stjernenatt?

Louise Lippincott gir en astronomisk forklaring også for den lyse, vertikale streken som er synlig i hagen:

Utsikten i Stjernenatt ser nedover fra et vindu i Grand Hotell og bortover denne private, lukkede hagen. De store lindetrærne danner en opphøyning som ses i silhuet mot nattehimmelen. Gjennom trærne kan vi se et lyspunkt og en lysende strek fra Månen som skjuler seg bak dem.

Hun argumenterer for at måneteorien er fornuftig:

... Munch hadde allerede utviklet lyspunktet og stripen som en måte å representere en lyskilde og refleksen fra den; det virker plausibelt å identifisere motivet i Getty-museets *Stjernenatt* som Månen og en refleksjon sett gjennom trærne.

Vi satte i gang vår egen astronomiske undersøkelse for å sjekke denne identifiseringen av planeter og Månen.

Reisen til Norge

Gruppen vår fra Texas State University reiste til Åsgårdstrand i august 2008 sammen med Roger Sinnott, mangeårig redaktør i bladet *Sky & Telescope*. Vi hadde flere spørsmål til både *Stjernenatt*, *Stormen* og *Soloppgang i Åsgårdstrand*: Hvor sto Munch da han malte? I hvilken retning så han, og

Skrik og Pikene på broen

Forskergruppen vår ved Texas State University har lenge interessert seg for hvordan Edvard Munch avbildet himmelen. I en artikkel som vi publiserte i tidskriftet *Sky & Telescope* satte vi den blodrøde himmelen i *Skrik* i sammenheng med aerosoler og andre partikler som ble kastet ut da den indonesiske vulkanen Krakatau eksploderte i august 1883. Som en del av undersøkelsen reiste vi til Norge og lyktes å finne eksakt hvor Munch sto da han malte bildet. Vi kunne også verifisere at utsiktsretningen hans var mot sørvest. Dette var den retningen vi forventet at vulkanen ville gi røde aftenhimler, tatt i betraktning av at støvet fra Krakatau først kom til Norge vinteren samme år.

Vi besøkte også Åsgårdstrand under den samme turen, der Munch malte *Pikene på broen*. Vi klarte å bestemme hans synsretning og kunne dermed vise at den gule skiven han hadde malt på himmelen, befant seg i sørvest. Derfor måtte det være snakk om en sommerfullmåne og ikke Solen – som enkelte hadde hevdet.



Dette bildet er tatt fra øverste etasje i Solberggården og vi gjenkjenner utsynet i Soloppgang i Åsgårdstrand. Siden Munchs tid er trærne blitt større og Russellgården (til høyre) utvidet med et påbygg.

Russell Doescher

*Edvard Munch,
Soloppgang i
Åsgårdstrand, ca.
1893. Olje på lerret,
65 x 89 cm.*

Privat samling.

© Munch-Ellingsen-gruppen /
BONO 2009



Dette historiske fotografiet viser at Russellgården (før bygningsendringene) så akkurat ut slik Munch malte det.

Fra samlingen til Knut Christian Henriksen



Edvard Munch malte antakelig Soloppgang i Åsgårdstrand fra dette vinduet i 2. etasje på Soelberggården.

Foto: Donald Olson



En lys, vertikal strek med en rund ball på toppen kan ses mot de mørke lindetrærne i Stjernenatt. Enkelte har tolket dette som Månen og dens refleksjon sett gjennom trærne. Vår forklaring er enklere: En flaggstang med kule på toppen. Flaggstangen opptrer på flere dusin historiske fotografier.

Fra samlingen til Knut Christian Henriksen

hvilken del av himmelen malte han? Klarer vi å identifisere himmelobjektene i bildene?

Vi startet med en topografisk undersøkelse av stedet. Ved hjelp av målebånd og vinkelmåler fant vi avstander og vinkler. Den lokale innbyggeren Knut Christian Henriksen delte velvillig av sin kunnskap om lokalhistorien, inkludert hundrevis av fotografier som viste Åsgårdstrand på Munchs tid. Vidar Lund Iversen, som er aktiv i astronomiforeningen Deep Sky Exploration og som også bor i nærheten, hjalp oss med historisk litteratur og tjente som guide i nærområdet. De historiske fotografiene viste at mange av bygningene fra 1893 fortsatt finnes, mens vi andre steder kunne se hvilke endringer som var gjort.

Det hvite gjerdet som er synlig i Stjernenatt er lett å finne også i dag, mens den originale gruppen av lindetrær fortsatt står i hagen til Kiøsterud-villaen. Synsfeltet i maleriet tyder på at Munch må ha befundet seg i det nærliggende Grand Hotell.

Hotellet brant imidlertid til grunnen i 1930 og ble senere bygget opp igjen. Vi brukte historiske fotografier, sammen med vår topografiske undersøkelse, til å fastslå nøyaktig hvor det opprinnelige hotellet sto. Det viste seg at det sørvestlige hjørnet på det nåværende hotellet er lenger unna Kiøsterud-villaen (omtrent tre meter) og nærmere Oslofjorden (omtrent ni meter). Ved å bruke en tredimensjonal datamodell kunne vi simulere Munchs utsikt fra verandaen, balkongen og vinduene i det opprinnelige hotellet. Det viste seg at synsretningen fra *Stjernenatt* bare kunne gjenskapes fra nær midten av øverste etasje i det gamle hotellet.

Flaggstang

Louise Lippincott argumenterer for at den hvite stripen med en rund sak på toppen er "Månen og en refleksjon sett gjennom trærne." Vi har en annen forklaring.

Retten nok var Munch svært fascinert av sommerfullmånen og glitringen de ga i fjorden. Vi finner dette motivet i flere dusin malerier. Glitteret skyldes refleksjoner i vann og kan derfor ikke strekke seg høyere enn horisonten. I andre malerier som viser vannglitter stanser glitteret i horisonten. Den hvite streken i *Stjernenatt* strekker seg høyt over horisonten og kan derfor ikke være vannglitter.

Over tyve historiske fotografier, som er tatt fra omtrent alle mulige retninger, viser en flaggstang med kule på toppen i Kiøsteruds hage. Flaggstangen eksisterer ikke lenger, men datamodellering vi gjorde ut fra fotografiene viser at den sto eksakt der Munch malte den, og at den hadde riktig høyde (omtrent 14 meter) i forhold til lindetrærne. Vi oppdaget dessuten en fordypning i gresset der flaggstangen hadde stått.

Den hypotetiske "månen" og refleksjonen i *Stjernenatt* viser seg altså å være en flaggstang. Men hva med Venus? Ble Venus sett av Munch sommeren 1893?

Var Venus synlig i 1893?

Under vårt besøk i Åsgårdstrand fotograferte vi fra hotellet på dagtid, i skumring og demring, og om natten. Vi fant at Munchs synsretning generelt var mot øst da han malte *Stjernenatt*. Stjernene på venstre side i bildet skulle derfor ligge litt nord for øst, mens trærne på høyre side er sør for øst.



Glade Munch-forskere: Roger Sinnott, Joseph Herbert, Russell Doescher, Donald Olson, Robert Newton, Ava Pope og Marilyn Olson. Bildet er tatt i samme retning som maleriet Stormen.

Foto: Russell Doescher

Våre databeregninger viser at Venus *aldri* var synlig eller over østhorisonten, verken i morgengryningen eller ved soloppgang, i løpet av våren og sommeren 1893. Ved solnedgang og i skumringen sto Venus derimot *vest* for hotellet (på den siden som vender vekk fra Oslofjorden). Planeten var aldri mer enn 5° over den geometriske horisonten ved solnedgang. Bak hotellet finnes det imidlertid en skråning som vi målte til å ha en vinkel på 8° . Åsen bak hotellet sperret derfor utsikten mot Venus ved solnedgang.

Munch kan altså ikke ha sett Venus fra Åsgårdstrand Grand Hotell på noen dato i løpet av våren og sommeren 1893, verken fra forsiden eller baksiden av hotellet, uansett om han tittet over fjorden mot øst eller mot åsen bak hotellet i vest, eller om han lette i morgengryet eller aftenslumringen.

Det røde lyset som er helt nede ved horisonten i *Stjernenatt* er antakelig et havnefyr nær Larkollen på østsiden av Oslofjorden.

Likevel: En lyssterk "stjerne" er tydelig synlig oppe på himmelen. Hva var det Munch så? Den blå himmelgløden gir en antydning om norsk skumringslys. Men er det på morgenen eller kvelden?

Stjernenatt = aftenstjerne

Maleriet som nå kalles *Stjernenatt* ble utstilt flere ganger mens Edvard Munch levde, men under forskjellige titler. Ifølge Arne Eggum og andre eksperter ved Munch-museet er noen av titlene *Die Sterne* (Berlin, 1893), *Stjärnor* (Stockholm, 1894), *Stjerner* (Oslo, 1897), *Abendstern* (Berlin, 1902), *Aftenstjer-*



Lokalkjente Knut Christian Henriksen (i midten) delte velvillig av sin rikholdige historiske samling. Her flankert av Donald Olson og Ava Pope.

Foto: Marilyn Olson

nen (Oslo, 1904), *Nat* (Copenhagen, 1906), *Stjernehimme*l (Copenhagen, 1908), *Stjernenat* (Stockholm, 1917) og *Sternennacht* (Berlin, 1927). Vi innser jo at en tittel som *Aftenstjernen* gir oss en

Lokal midlere tid

I 1893 hadde Norge ennå ikke adoptert moderne tidssoner eller sommertid. Lokal midlere tid i Åsgårdstrand (lengdegrad $10^\circ 28'$ Øst) var 42 minutter foran Universaltid. Den 9. juli 1893, for eksempel, sto Jupiter opp kl. 23.16 UT = 23.58 lokal midlere tid.



Russell Doescher tar et bilde fra Solberggården for å sammenlikne med utsikten i Soloppgang i Åsgårdstrand.

Foto: Joseph Herbert

astronomisk ledetråd, et hint om at "stjernen" ble observert mellom solnedgang og midnatt.

Den klare "stjernen" i Stjernenatt

Fantes det, i løpet av sommerkveldene i 1893, et særlig lyssterkt himmelobjekt på østhimmelen over Oslofjorden?

Databeregninger ga oss svaret: planeten Jupiter, skinnende klar med en lysstyrke på -2,4 mag., og overlegent det klareste objektet som var synlig når man så ut fra Åsgårdstrands Grand Hotell.

Litt over det lyssterke objektet i maleriet finner vi en særpreget asterisme som vi tolker som Pleiadene. Datamaskinen viser oss at stjernehopene Pleiadene faktisk befant seg like over Jupiter idet planeten steg over horisonten på kveldene i 1893. Fordi lange og tynne glittermønstre i vannet, slik vi ser på maleriet, bare inntreffer når et himmelobjekt står lavt over horisonten, må Munch ha avbildet Jupiter ikke lenge etter oppgang.

Scenen kan imidlertid ikke være fra forsommeren. Før 9. juli sto Jupiter opp etter midnatt og det virker ikke fornuftig at Munch har kalt den en "aftenstjerne". Et postkort i Munch-museet viser at Munch hadde forlatt Åsgårdstrand og mottok posten sin på Nordstrand (sørøst i Oslo) innen 24. september 1893. *Stjernenatt* må derfor vise en scene som fant sted mellom 9. juli og 24. september.

Å bestemme en mer presis dato er i dette tilfellet vanskelig, fordi Jupiter hadde omtrent samme posisjon i forhold til bakgrunnsstjernene over mange netter. Vi oppsøkte derfor værreporter fra Meteorologisk institutt. Regn og overskyet viste seg å være vanlig, og de fleste netter kunne derfor utelukkes. Vi fant to spesielt klare netter:

Om natten 16.-17. august 1893 sier lokalavisen *Gjengangeren* at skyene raskt forsvant da Solen gikk ned og at:

Ud paa Natten var Himlen klar med blinkende Stjerner.

Også natten 23.-24. august 1893 var tilsvarende klar. Vi konkluderer derfor med at *Stjernenatt* viser

Jupiter og Pleiadene i skumringen på kvelden, mest sannsynlig den 16. eller 23. august 1893.

Stormen

Vi innså dessuten at maleriet *Stormen* kanskje kunne gi oss en uavhengig metode for å fastslå når Munch besøkte Åsgårdstrand.

En kvinne i hvitt dominerer forgrunnen i dette maleriet, mens en gruppe kvinner står litt lenger unna, nær det samme hvite gjerdet som ble avbildet i *Stjernenatt*. Et tre bøyer seg i vinden foran de gule lysene i vinduene i Grand Hotell, altså i samme hotell som Munch malte *Stjernenatt*. Foruten disse kopplingene mellom de to maleriene er *Stormen* av interesse for astronomer fordi det viser lyssterk stjerne like nord for (til høyre for) hotellet.

Maleriet er inspirert av en faktisk storm, ifølge det samme øyenvitnet som plasserte Munch i Åsgårdstrand i august 1893. Memoarene fra Jens Thiis nevner noen "skjønne solfylte sensommerdager" under besøket på feriestedet, men forsetter med å beskrive en brå forandring i været:

En lummer aften... begynte det plutselig å suse i luften og ruske i poplene foran hotellet... var orkanen brun løs... stod den blytunge fjord i frådende oprør... fiskernes koner samlet i klynge. Alle speidet gjennom tismærket etter fiskerbåtene som lå utpå - vilde de alle klare sig hjem?

Dagen efter malte Munch tildragelsen i sitt berømte bilde «Stormen»... Huset med de oplyste vinduer er hotellet, hvor vi bodde, og den lyse kvinneskikkelse i forgrunnen er min tilkommende hustru.

Kvinnen i hvitt er altså Ragna Vilhelmine Dons, som giftet seg med Jens Thiis i 1895.

Værdata for juli, august og september opplyser om mange dager med regn, men bare ett "sterkt tordenvær" – en spektakulær hendelse som inntraff på kvelden 19. august 1893. Oslo-avisen *Dagbladet* kunne neste dag bekrefte at stormen inntraff i skumringen:

Et Tordenvær med pragtfulde Lyn gik igaar aftes ved 9-Tiden over Byen.

En skribent i *Aftenposten* var imponert over den nærmest uovertrufne styrken i stormen:

... der var ogsaa et Regnskyl saa heftigt som ikke ofte og Lyn saa hyppige og sterke, som vi neppe kan erindre at have set dem.

Hvilken klar stjerne så Munch da stormen begynte å rase? For å besvare dette må vi vite hvilken retning han kikket i.

Maleriet viser hjørnet på det hvite plankegjerdet, Kiøsterud-villaen i samme retning som hjørnet, og et bjørketre som står rett foran midten av Grand Hotell. Treet har nylig blitt hugget ned, men vi fant med letthet stubben. Thiis omtaler treet foran hotellet som en poppel, men Knut Christian Henriksen og andre fastboende i Åsgårdstrand er sikre på at det var ei bjørk. Bildeteksten på et gammelt fotografi beskriver det som "bjørketreet" som Munch malte. Munchs synsretning er bare mulig fra én posisjon, som vi med landmålerutstyr bestemte innenfor én meter.

Forfatterne

Donald W. Olson og Russell L. Doescher underviser i fysikk og astronomi ved Texas State University. Joseph C. Herbert, Robert H. Newton og Ava G. Pope er spesielt dyktige bachelorstudenter ved Fysikkavdelingen som er blitt beåret med stipend fra det som kalles Honors Program ved universitetet.

Texas State University, San Marcos, TX 78666, <http://www.txstate.edu/>

Vi fant at den klare stjernen i Stormen hadde en asimut nær 267° (litt sør for vest) og en alititude på nær 25° . Ut fra Åsgårdstrands breddegrad ($59^\circ 21'$ Nord) beregnet vi en deklinasjon på $+20^\circ$. Stjernen må derfor ha vært Arcturus, en meget plausibel kandidat siden dette er den mest lyssterke stjernen (etter Sirius) på nattehimmelen sett fra Norge.

Planetarieprogrammer viste oss at tidspunktet for Stormen må ha vært i kveldsskumringen, innenfor noen få minutter fra 21.15 lokal tid. Dette beregnede tidspunktet stemmer utmerket med tidene som angis av Thiis og avisartiklene.

Vi konkluderer derfor at Stormen viser Arcturus på vesthimmelen idet stormen braket løs på kvelden den 19. august 1893.

Soloppgang i Åsgårdstrand

Vi klarte også å bruke Solen for å bestemme når på året Munch var i Åsgårdstrand.

I Soloppgang i Åsgårdstrand ser vi utover vannet mot en oppstigende sol og et langt solglitter vannet. Like til venstre for glitteret dro vi kjensel på den samme gruppen av trær som vises i Stjernenatt, samt taket på Kjøsterud-villaen. Den lille bygningen under og til høyre for glitteret tjente som båthus.

På høyre side i maleriet ser vi et hus som nå er kjent som Russellgården, der taket flukter nesten perfekt med den fjerne horisonten. Vi fant at denne utsikten kun er mulig fra øverste etasje i den nærliggende Soelberggården.

De nåværende eierne av Soelberggården slapp oss vennlig inn i sitt hus. Fra ett spesielt rom i øverste etasje fikk vi utsikten til å stemme perfekt med Munchs maleri. Dette var faktisk et av de mest rørende øyeblikk under hele vårt besøk, idet vi erkjente at vi sto på de samme gulvplankene og så ut gjennom det samme vinduet som den store kunstneren hadde gjort det, mer enn hundre år tidligere.

Våre moderne fotografier avslørte flere endringer: Trærne har vokst seg større, og Russellgården er delvis ombygget – særlig med utvidelsen av et soverom på taket. Knut Christian Henriksen viste oss et historisk fotografi av Russellgården uten soverommet, akkurat slik det ble malt av Munch.

Med landmålerutstyret fant vi at Solens himmelretning på maleriet var ca. 80° (dvs. 10° nord for øst). Ved å gå ut fra vinkelutstrekningen på båthuset fant vi at Solen måtte være 2° til 4° over horisonten. Denne solhøyden stemmer godt overens med det lange og smale solglitteret i fjorden. Munch kan ha observert Solen nær denne posisjonen enten i løpet av annen uke av april (hvilket er utelukket fordi Munch da var i Tyskland) eller en av de fem første dagene i september.

Nedtegnelser av været viser at mange morgener hadde overskyet himmel med regn. Det eneste tidspunktet Munch kan ha malt et slikt bilde i 1893, var den 3. september kl. 05.30 lokal tid.

Den tidlige historien til maleriet er imidlertid litt usikker. Lærde ved Munch-museet kunne fortelle oss at maleriet kan datere seg fra året etter, eller til og med flere år etter 1893. En senere dato som både oppfyller våre krav til Solens posisjon og væropplysninger, er 2. september 1895 kl. 05.31. Lokalhistoriske nedtegnelser viser at doktor Wilhelm Grimsgaard, en venn av Munch, bodde i Soelberggården i 1895. Det er godt mulig at Munch besøkte sin venn eller kanskje leide rom i Soelberggården.

Uansett årstall må maleriet ha blitt laget en av de fem første dagene i september måned, noe som bekrefter at Munch hadde for vane å besøke Åsgårdstrand på sensommeren.

Oppsummering

Stjernenatt viser en scene fra kveldsskumringen med Jupiter og Pleiadene som stiger opp på østhimmelen, en dato i andre halvdel av august 1893.

Stormen viser en scene fra kveldshimmelen i retning vest, med Arcturus i nedgang like ved Grand Hotell, rundt kl. 21.15 den 19. august 1893.

Soloppgang i Åsgårdstrand viser utsikten mot øst, en oppstigende sol og glitter i vannet. Tidspunktet er nær 05.30 og datoen en av de første fem dagene i september.

De tre maleriene vi har studert denne gang, er blitt datert uavhengig av hverandre – det ene ved å bruke stjerner og en planet, det andre ved å bruke en storm og meteorologiske nedtegnelser, og det tredje ved å bruke Solen. Alle tre datoer faller innenfor en treukersperiode fra midten av august til tidlig i september.

Ved først å observere naturen under sitt besøk til Åsgårdstrand, viste Munch sitt kunstneriske geni og har fått fram et følelsesmessig innhold i maleriene som strekker seg langt utover det ord kan beskrive. Å kjenne detaljene i disse himmelseenene bare øker vår beundring for denne kunstnerens dyktighet når det gjelder å avbilde den norske sommerhimmelen.

Takk til

Artikkelforfatterne vil gjerne takke Lasse Jacobsen ved Munch-museets bibliotek for assistansen med å gjennomgå litteratur, Tove Dahl Johansen ved Nasjonalbiblioteket i Oslo, Knut Christian Henriksen, Vidar Lund Iversen, Randi Bretting og Sven Arne Trolsrud i Åsgårdstrand, samt Margaret Vave-rek ved Alkek-biblioteket ved Texas State University.



Topografiske undersøkelser under vårt besøk i Åsgårdstrand. Ava Pope, Joseph Herbert, Donald Olson.

Foto: Marilyn Olson

Manglende stjerne i Stormen

Våre undersøkelser avslørte at den lyssterke stjernen i Stormen mangler i enkelte bokreproduksjoner, som i Edvard Munch: The Modern Life of the Soul, Museum of Modern Art, 2006, side 113.

Kanskje er stjernen blitt tolket som en defekt og fjernet fra den digitale bildefilen ved hjelp av et bildebehandlingsprogram. Stjernen mangler faktisk i flere digitale filer av dette maleriet. Selv i det nyeste firebindsverket Edvard Munch Complete Paintings mangler stjernen.

Den klare stjernen, over og til høyre for hotellet, er tydelig synlig på uretsjerte digitale fotografier som er tatt av besøkende ved Museum of Modern Art in New York, noe du selv kan se på <http://www.flickr.com>. Søk ved hjelp av søkeordene: moma munch storm.

Norway's Summer Skies

Astrophysicist Donald Olson and colleagues at Texas State University, San Marcos, have been finding lots to study in the paintings of Norwegian artist Edvard Munch. Their latest accomplishment: identifying the celestial objects in three canvases Munch painted in Åsgårdstrand, Norway. After locating a memoir that placed Munch in Åsgårdstrand in August 1893, the researchers traveled to Norway to find the exact sites of the paintings.

In *Starry Night* (right), scholars in the past have identified the bright star as Venus. But Venus was out of sight then, the Texans say.

A photo (left) they took from the same perspective shows it had to be Jupiter. They also figured out, with the help of 19th century photos of the town, that the vertical white line in the trees, which some have identified as a hidden moon and its reflection, was in fact a flag pole with a ball on top.



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Forensic Astronomer Tackles Three More Munch Paintings

July 22, 2009

Edvard Munch's
Starry Night, 1893



Forensic astronomer Don Olson solves puzzles. He looks at pieces of art, passages of literature and stories from history and uses science to answer questions like: Why is the sky red in Edvard Munch's painting *The Scream*? (Gas and ash from the 1883 eruption of Mount Krakatoa produced colored skies worldwide.)

Olson consulted personal accounts of Munch acquaintances, contemporary newspaper articles and historical photographs. He and his colleagues visited Åsgårdstrand to make a topographical survey of the town and to check out the views from various buildings. And they created computer simulations of the sky and parts of the town during Munch's supposed time there.

14 TORSDAG 10.9.2009

kultur

Gjengangeren

Hobby-astronom dekket saken



ARTIKK: Trond Erik Hillestad er redaktør av bladet «Astronomi». At han kunne hjelpe sin forskingsstift i sitt eget hjemlige gym kan nok være et spennende.

BARBÅKER: – Astronomer flest forsker på fysiske, men færre ting. Da er det kjempespennende når noen går andre veier, sier hobby-astronom Trond Erik Hillestad.

AV EILEN JOHANSSON

Han er redaktør for magasinet «Astronomi», som kommer ut med et angreiv i året. I august nummeret var Munch forskning en hovedopplag.

Jeg er bare en amatør-astronom som har drevet med dette lenge. Det var før alle noen finner et nytt område som det li-

ke har vært forsket så mye på tidligere. Donald Olson har kommet seg en liten stige. Tidligere har han tilstret til den første ma-rubin-danseren ble lagt for nyssag 2000 år siden. Høsten er det at en mann lagte ned for å vaske et fiskestykke som var på vei for å sugne fersk. Det skal ha skjedd i august, men han be-stitte at det ikke var mulig i den varmen som var den dagen. For-skjerne ved Texas universitetet har imponert meg med sin gran-dighet. De er så lille. Noen har så og med litt seg norsk for de kan bli. Det er i tillegg malerier har de gjort som et bekk i under-veitsingen, sier Trond Erik Hille-stad, bosatt på Barbåker.



MUNCHFORSKERE: Roger Sinnott, Joseph Herbert, Russell Donscher, Donald Olson, Robert Newton, Ava Pope og Marilyn Olson. Fotografen har latt kameraet opp i den samme rektangen som maleriet «Stjerne», se maleri til høyre.

FORSKET PÅ EDVARD MUNCHS ASTRONOMISKE MALERIER



UTSYNET I Edvard Munchs «Stjerneratt» kan sees den dag i dag, med det hvide gjerdet og lodstørnen. Bildet er tatt sent på kvelden 28. august 2008. Vi ser månen stige opp og spille seg i Osløfjorden.

EDVARD MUNCH: «STJERNENATT», 1893. Copyright: The J. Paul Getty Museum, Los Angeles/Munch-Ellingsen-gruppen/BONO 2008.

Prikket inn hvor Munch malte

ÅSGÅRDSTRAND/TEXAS: Kunstforskere har stilt seg tvilende til at flere av Edvard Munchs bilder virkelig ble malt i Åsgårdstrand, ja, han gjorde det, sier amerikanske astronomer nå fast.

AV EILEN JOHANSSON

Det er mange som kan lese av stjernerne posisjon på himmelen. I august i fjor var en delegasjon amerikanske astronomer på jobb i Åsgårdstrand, med utgangspunkt i tre malerier Edvard Munch malte sommeren 1893. Enkelte har antydning at kunstneren malte bildene i Tyskland et par tidligere måneder, men det kan

hvertvis avvikles som grunnløse spekulasjoner. Forfatter Donald Olson, Russell L. Donscher, Joseph Herbert og Ava Pope fra Texas State Un-versity reiste til Åsgårdstrand med flere spørsmål de ville ha svar på. Hvor sto Munch da han malte «Stjerneratt», «Stjernerinn» og «Soloppgang i Åsgårdstrand»? I hvilken retning så han, og hvilken del av himmelen malte han? Forfatterne ville klassifisere him-melobjektene på bildene.

DE STARTET MED Å foreta en topografisk undersøkelse av stedet, ved hjelp av målebånd og vinkelmåler, som hindrer å gamle fotografier av stedet på Munchs tid.

At mange av hypotesene og andre kjennetegn fra 1893

fortsett står der, forenklet under søkelyset. Det gjelder det hvide gjerdet rundt Kløstergården og de store lodstørnene i hagen, som er motret i «Stjernerinn». Det gamle Grand hotell er borte nå, men ved å bruke en tredimensjonal datamodell kunne forskerne simulere Munchs ut-sikt fra det gamle hovedet. Det viste seg at synsretningen fra «Stjernerinn»-bilde kunne gjenspe-ges fra nær midten av øverste etasje i det gamle hovedet.

Den hvide seteppen med en rund sokk på toppen har tidligere vært antatt å være midten og en referansepunkt mellom trærne, men den viste seg å være en fugging som sto i kløsteret på den høye.

PÅ MALERIT «STJERNENATT» er

den røde stjernen på himmelen tidligere identifisert som Venus. Forfatterne slår bevis på at det er Venus altså var vanlig eller mer astronomisk, verken i stjernegruppen eller ved solopp-gang i løpet av våren eller sommeren 1893. Det røde lyset som er helt røde ved himmelen i «Stjernerinn» er antagelig et hamnefyrtårn i nærheten av Osløfjorden.

Likvel er det en lysarett, signa-l og stjerne, som er databeregning viste var planeten Jupiter, som var skinnende klar. Etter at alle stjernerposisjonene posisjon ble plottet mot konstellasjon-forskere med at «Stjernerinn»-bilde, Jupiter og Pleiaden i stjernegruppen på kvelden, mest sannsynlig den 10. eller 23. au-gust 1893.

DA BE SKULLE TILFELT vite om ble ordet tatt i bruk. Verdt å for på, august og september opplyser om mange da jeg med meg, men har et slett minne, en spekkulær form-dette som uttrykk kvelden 18. august. Stjerne Munch så over lukkningen til høyre i bildet må være Åsgårdstrand, siden det er den mest historiske stjernen i et-tet stjerne på stjerneposisjon fra Norge.

SOLEN BLE BRUKT FOR å tildele nye «Soloppgang over Åsgårdstrand»-bilde. Soloppgang viser at været mange morgener var overskyet. Ved hjelp av land-målerne kunne de amerikanske forskere så fast at Edvard Munch 2. september 1893 klakk 05.31 180 i andre etasje i Sof-

berggården og malte et motiv som har endret seg for siden den gang.

EN OPPSUMMERING VISER at de tre malerier er dateret i henheng-ge av Åsgårdstrand, det ene sett å bruke stjerner og planeter, det andre ved å bruke meteorologi-ke indikationer, og det tredje ved å bruke solen. Alle daterer-tiltaket viser en trend i per-tide, fra midten av august til tidlig i september.

Å kjente detaljene i himmel-scenerne bare står vår beundring for skone kunstnerens dyktighet når det gjelder å løb-de den norske sommerhimmelen, avslører Donald Olson og Russell Donscher i sin oppsum-merte rapport som er gjengitt i augustnummeret i «Astronomi».



EDVARD MUNCH: «STJERNENATT», 1893. Gje på 100 cm, 52 x 113 cm. Copyright: Museum of Modern Art, New York/Munch-Ellingsen-gruppen/BONO 2008.



EDVARD MUNCH: «SOLOPPANG I ÅSGÅRDSTRAND», ca. 1893. Gje på 100 cm, 65 x 89 cm. Privat samling. Copyright: MUNCH-ELLINGSEN-GRUPPEN/TROND 2008.



EDVARD MUNCH: «SOLOPPANG I ÅSGÅRDSTRAND», ca. 1893. Gje på 100 cm, 65 x 89 cm. Privat samling. Copyright: MUNCH-ELLINGSEN-GRUPPEN/TROND 2008.

[Kunst]

Munchs stjernebilder

Et amerikansk astronom-team har studert stjerner og planeter for å finne historien bak Edvard Munch-maleriet «Stjernenatt». Det har ført Venus ut av kunsten, mens Jupiter seiler opp på nattehimmelen.

Maren Næss Olsen

STJERNER LYSER OPP nattehimmelen over Åsgårdstrand på Edvard Munchs maleri «Stjernenatt». Og aller klarest lyser planeten Venus. Eller? Etter feltarbeid i Norge har et team fra USA, ledet av astronomen Don Olson, kommet frem til at kunsthistorikere tidligere har tatt feil. For himmellegemet som lyser opp bildet er planeten Jupiter.

Og ikke nok med det: Lysstripen som strekker seg opp mot trærne til høyre i bildet, er slett ikke månelysset, som tidligere antatt, men en flaggstang i nabohagen.

- Hvorfor Munch er en stor kunstner? Ikke spør meg. Jeg har ikke svarene på de store spørsmålene. Jeg kan svare på fire ting: Hvor bildet ble malt, når det ble malt, hvilken vei Munch ser, og hva som er synlig på himmelen, sier Olson.

Astronomen fra Texas State University tilhører en svært liten gruppe forskere som kombinerer læren om stjerner og planeter med detektivarbeid for å tid- og stedfeste verdens kunstskatter - og himmelen over dem.

Olson har blandet fagfeltene astronomi, litteratur og kunsthistorie de siste 22 årene, og vært interessert i Munch like lenge.

Han understreker at slett ikke alle kunstneres verker er egnet for stjernetyding. - Mange malerier ser ut som om kunstnerne bare har klasket tilfeldige flekker på himmelen. Men vår konklusjon er at enkelte av Munchs bilder viser virkelige himler. Han maler fra naturen, ikke fra fantasien i et atelier, sier Olson.

Denne gangen har han og kollegene brukt solen, stjerner, en planet og en storm for å datere tre Munch-bilder. Resultatet av forskningen, som er gjennomført sammen med en gruppe studenter, er publisert i siste utgave av astronomitidsskriftet Griffith Observer magazine, samt i augustutgaven av bladet Astronomi, som utgis av Norsk Astronomisk Selskap.

Detektiver i felten. I august ifjor kom gruppen til Norge, på jakt etter historien bak «Stjernenatt». Forskerne satte i gang feltarbeid på tomten til Grand Hotell i Åsgårdstrand, som brant til grunnen i 1930. Ved hjelp av historiske fotografier, topografiske undersøkelser og en tredimensjonal data-



STJERNEKLART. Ved hjelp av datamodeller og et omfattende feltarbeid har astronomen Don Olson og hans team slått fast at himmellegemet som lyser sterkest i Munch-bildet «Stjernenatt» er planeten Jupiter.

GRUNDIG JOBB.

Ava Pope, Joseph Herbert (i midten) og Don Olson brukte topografiske undersøkelser for å finne ut nøyaktig hvor Edvard Munch befant seg da han malte. FOTO: MARILYN OLSON



modell, lyktes de med å rekonstruere utsikten fra de ulike rommene i det gamle hotellet. De fant ut at Munch må ha stått i øverste etasje da han malte, og sett mot øst.

Så begynte den astronomiske delen av oppgaven. For hvilket himmellegeme var det egentlig som lyste opp Munchs stjernehimmel? Ved hjelp av databeregninger kom gruppen til en klar konklusjon:

- Venus var ikke synlig fra noen kant av Grand Hotell. Derimot kunne Munch se Jupiter fra balkongen, sier Olson.

Neste spørsmål fra forskerne: Når ble bildet malt? Astronomen hjalp dem et stykke på vei. For frem til 9. juli 1883 var ikke Jupiter synlig før etter midnatt, noe som stemmer dårlig med at Munch selv kalte maleriet «Aftenstjernen». Gamle værreporter fra

Meteorologisk institutt bidro til å snevre inn søket ytterligere. For sensommeren 1893 var regntung, bare to netter var stjerneklare. Det betyr at «Stjernenatt» sannsynligvis ble malt den 16. eller 23. august 1893.

Men Don Olson og hans forskere stoppet ikke der. De fant ut at Munchs bilde «Stormen» viser en virkelig storm fra samme år, malt ganske nøyaktig klokken 21.15 den 19. august 1893. Samt at bildet «Soloppgang i Åsgårdstrand» ble malt rundt klokken 5.30 en dag i begynnelsen av september.

Turens høydepunkt kom da forskerne fant huset der Munch malte «Soloppgang i Åsgårdstrand».

- Familien som bor der i dag lot oss slippe inn på sovrommet der han må ha stått. Å stå der og se hva Munch så var den største opplevelsen på turen, sier Olson.

Munchs vulkan. Det er ikke første gang Don Olson og hans faste forskerkollega Russel Doescher forandrer kunsthistorien ved hjelp av astronomisk observasjon. I 2004 kom de to frem til at partikler fra den indonesiske vulkanen Krakatau, som hadde utbrudd i august 1893, forårsaket den blodrøde himmelen i Edvard Munchs «Skrik». Vulkanstøvet kom drivende over Europa samme år som Munch malte sitt mest kjente bilde, og gjorde skumringstimenen rødglødende og spektakulære.

- Det er det mest kreative arbeidet vi har gjort, sier Olson om vulkanoppdagelsen.

Men astronomen fra Texas nøyser seg ikke med å studere Munch. Han har også sted- og tidfestet flere Van Gogh-malerier ved hjelp av stjernene.

Ikke alle kunsthistorikere er like begeistret for forskningen.

- En tredjedel setter stor pris på arbeidet vi gjør, en tredjedel er ikke opptatt av det, og en tredjedel er fiendtlig innstilt. De vil gjerne konsentrere seg om følelsene i bildet, de bryr seg ikke om det viser Jupiter eller Venus.

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