2

Vincent van Gogh and Starry Skies Over France

Vincent van Gogh, in the last 2 years of his life, created some of the most spectacular and well-known paintings of twilights and night skies.

In Vincent's canvas entitled *White House at Night*, a brilliant "star" dominates the sky above a villa in the town of Auvers-sur-Oise, France. Does this painting portray morning twilight or evening twilight? How do astronomical calculations, Vincent's letters, and meteorological records allow us to determine the precise date in 1890 and the time when the artist observed the sky that inspired this work? Does the "white house" in Auvers-sur-Oise still exist? Do the maps and guidebooks available in the town direct visitors to the correct location? What is the identity of the bright object that Vincent van Gogh depicted in the twilight sky?

Vincent van Gogh painted his famous *Starry Night* in 1889 in the town of Saint-Rémy-de-Provence in southern France. In the same town and same year Vincent created another astronomical painting that shows wheat stacks in a field enclosed by a stone wall and, in the twilight sky, a prominent orange disk partly hidden behind a mountain range. This field is familiar from many other van Gogh paintings because it could be seen from his window in the Saint-Paul monastery. Can we use astronomical analysis to determine whether this canvas with the orange disk portrays a sunrise, sunset, moonrise, or moonset? How can we determine the date and the precise time, accurate to the minute, when the artist observed this scene?

Vincent van Gogh painted another dramatic sky in his *Road with Cypress and Star*, created in 1890 at Saint-Rémy-de-Provence. This canvas depicts a rural scene of two figures walking down a road, with a carriage in the middle distance. The sky above includes two bright objects, one especially brilliant,

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near a slender crescent Moon. Are these objects stars or planets? How do astronomical calculations, Vincent's letters, and meteorological records allow us to determine the date and time when the artist observed the sky that inspired this painting? What rare celestial grouping does this work commemorate?

The Story of the *White House at Night*

A brilliant "star" dominates the twilight sky above a villa in the town of Auvers-sur-Oise, as seen in Vincent van Gogh's spectacular painting entitled *White House at Night* (Fig. 2.1). This canvas mysteriously disappeared for 75 years, and catalog entries during that period included phrases like "present location unknown." Recently the *White House at Night* resurfaced at an exhibition in Russia, and our Texas State group made the first astronomical analysis of the sky in this work.

Fig. 2.1 *White House at Night, F766, Vincent van Gogh, Auvers-sur-Oise, 1890*

Art historians have debated several different locations in Auvers-sur-Oise for the "white house" seen in this canvas. We wondered whether we could use clues in the painting to resolve this controversy and to find the location of the house in the present-day town. If we could find the house, we could determine the direction of view in the painting. Knowing which part of the sky Vincent depicted might then allow us to identify the bright object in the twilight sky.

Four paintings by Vincent van Gogh have emerged as the most familiar and often-reproduced images of the night sky. *Cafe Terrace at Night* and *Starry Night Over the Rhône* feature the heavens above Arles, a town in southern France. In nearby St. Rémy he created his famous *Starry Night* as well as *Road with Cypress and Star*. In 1995 a fifth night-sky painting by van Gogh resurfaced as part of an exhibition at the State Hermitage Museum in St. Petersburg, Russia.

Our Texas State group was astonished to learn that this stunning work, *White House at Night*, still existed. In the text of the catalog for the Russian exhibition held on the 50th anniversary of the end of World War II, curator Albert Kostenevich explained the fascinating odyssey of this long-lost canvas:

> The paintings in this book were long thought to have been destroyed in the war. Only now has it been revealed that they spent the last half century hidden in the storerooms of the Hermitage, their existence a carefully guarded state secret… outstanding paintings include several by van Gogh, among them his remarkable White House at Night, painted six weeks before his death and depicting the kind of nocturnal sky seen in his well-known Starry Night. (Kostenevich 1995: notes on dust jacket)

The introduction to this catalog makes the observation: "The pictures in this book…have a most unusual history…they are virtually unknown, not only to the public but to the most conscientious scholars…" (Kostenevich 1995: 9).

During the 1920s Otto Krebs, a German industrialist in the village of Holzdorf, acquired *White House at Night* for his private collection. When the Nazis rose to power, the painting became even more inaccessible. Fearing political reprisals against collectors of what the Nazis considered "degenerate art," Krebs in the 1930s and 1940s had to avoid attracting attention to his holdings. Kostenevich described what happened during the Russian pursuit of the retreating German army in 1945: "Private collections and museum objects…found their way into specially prepared bunkers…Guns were still firing when Soviet troops began to discover these bunkers…Soviet representatives sent to the East everything they considered important…

Art objects were coming in from different places, in railroad cars…" (Kostenevich 1995: 9).

Although much of the history of the *White House at Night* is still cloaked in mystery, sufficient information establishes the work as an authentic van Gogh. An early black-and-white photograph of the canvas exists, taken by Eugène Druet prior to 1916, and the painting appeared in several exhibitions in Switzerland during the 1920s and in the first compilation of van Gogh's complete works (de la Faille 1928). Moreover, in one of his many letters, Vincent provided a detailed description of *White House at Night*.

Johanna van Gogh, the wife of Vincent's brother Theo, collected the letters, attempted to arrange them in chronological order, numbered them, and published the compilation in 1914. In the 1990s the Vincent van Gogh Museum in Amsterdam assembled a team in a venture called the Van Gogh Letters Project, which has created an authoritative website with facsimiles of each of the artist's letters in a revised numbering system. The website includes both transcriptions of each letter's original language, usually Dutch or French, and translations into English. For the passages quoted below in this chapter, the citations will reference each letter by two numbers, both in the original system used by the van Gogh literature prior to 2009 and also in the revised system now used by the Letters Project.

Vincent's letter of June 17, 1890, to his brother Theo in Paris includes a detailed description of how this painting portrayed: "…une maison blanche dans de la verdure avec une étoile dans le ciel de nuit et une lumière orangée à la fenêtre et de la verdure noire et une note rose sombre." ("a white house amid greenery with a star in the night sky and an orange light in the window and dark greenery and a note of somber rose"). (Letter 642, as numbered by Johanna van Gogh, Letter 889, as numbered by the Van Gogh Letters Project).

Van Gogh sent this letter from Auvers-sur-Oise, a town about 20 miles northwest of Paris. He spent the last 70 days of his life in Auvers and produced about 70 paintings there before his death on July 29, 1890. This remarkable pace suggests that he likely created the *White House at Night* only a short time before he wrote his letter on June 17th.

As part of a course in the Honors College at Texas State University, my students and I first studied the four well-known van Gogh night-sky paintings and then, after seeing the illustration in Kostenevich's book, we wondered – could we identify the brilliant celestial object in this rediscovered masterpiece?

Candidates for Vincent's "Star"

To see what might have caught van Gogh's eye, we set our planetarium computer programs for northern France in mid-June of 1890 and looked for bright stars and planets. The brightest stars visible at this time of year were Arcturus and Vega high overhead at evening twilight, and Capella low in the northeastern sky just before sunrise. There was a new Moon on June 17, 1890, which helps to explain the Moon's absence from the painting.

Three planets were especially prominent in mid-June. Venus shone as a brilliant "evening star," visible in the western sky for about 2 h after sunset. Mars stood low in the southeastern sky at sunset and far outshone its nearby rival, the red giant star Antares in the constellation of the Scorpion. Jupiter rose about an hour before midnight and dominated the southeastern and southern sky until sunrise.

To make a convincing identification of van Gogh's "star," we realized that we needed to answer several questions about the *White House at Night*. Does the painting show an actual house? Does this distinctive house still exist in the present-day town? Where would van Gogh have been standing to obtain this view of the house? Toward what direction was he facing? What part of the sky did van Gogh depict in the painting?

To answer these questions, during May 2000 our group traveled to France and spent 4 days in Auvers-sur-Oise (Olson et al. 2001). Because no battles during either World War I or II occurred in the town, we had reason to hope that houses from 1890 would still be standing. The townspeople warmly welcomed our group to Auvers, where municipal officials, the staff at the tourism office, and many other residents went out of their way to help us. After dividing into groups of two or three, we walked along every street and studied the windows, chimneys, walls, and gates of houses for miles in each direction from the center of town. In the course of our search we passed by dozens of van Gogh painting locations, including the Church at Auvers (Fig. 2.2), the town hall, cottages, gardens and wheat fields.

Eventually we all were certain that the *White House at Night* matched only one house, a villa (Fig. 2.3) on the south side of the main road. The house, with modern address 25/27 Rue du Général de Gaulle, stands only two blocks west of the Auberge Ravoux, the inn where Vincent resided in June 1890.

The owners made some modifications to the house between 1890 and the present day. For example, the family added dormers to the roof when converting the attic into bedrooms for their children. Van Gogh's painting shows

Fig. 2.2 *Church at Auvers, F789, Vincent van Gogh, Auvers-sur-Oise, 1890. The photograph dates from May 2000 (Photograph by the author)*

seven windows in the upper story, including six large windows with shutters and a narrow central window without shutters. The six large windows and their shutters remain today, along with a blank space above the center door. The family kindly invited us into the house, and we confirmed that the narrow central window was filled in during a construction project. The narrow central window originally provided light to a stairwell that was eliminated when the family added a spiral staircase in a modern tower attached to the rear of the house.

As we stood in front of the white house, the students noticed an especially distinctive architectural feature: the three windows on the left side of the upper story have noticeably uneven horizontal spacing and are not directly above the windows on the ground floor. These odd misalignments (Fig. 2.4) exactly match the windows in van Gogh's painting and confirmed that we were definitely at the correct location.

After visiting bookstores in Auvers, we were gratified to learn that a memoir by a contemporary of van Gogh's identified the *White House at Night* with exactly the same house that we found independently. Paul Gachet was 16 years old in 1890 when he met van Gogh through his father, Dr. Gachet,

Fig. 2.3 *In this photograph from May 2000, the setting Sun obliquely illuminates the north-facing front of the white house (25/27 Rue du Général de Gaulle), while leaving the left side of the house in shadow. Visitors to Auvers-sur-Oise can still recognize the White House at Night site here despite changes to the roof and the modern building at the far right (Photograph by Russell Doescher. Used with permission)*

who helped to care for Vincent during his stay in Auvers. According to Paul Gachet, the white house went by the name Villa Ponceaux and served as the Victorine residence, the home of a local merchant (Gachet 1994: 140). Users of Google Street View can see the Villa Ponceaux as house number 25/27 on the southwestern corner of the intersection where Rue des Ponceaux meets Rue du Général de Gaulle.

Venus as Evening Star in June 1890

The front of Villa Ponceaux faces generally to the north. During our visit to Auvers we stood in the exact spot where Vincent must have set up his easel. From van Gogh's point of view looking at the villa, the last rays of the Sun setting in the northwest angled across the facade from right to left, while the left end of the house remained in shadow. Our computer calculations for June 1890 place Venus in the western sky, above and to the right of the white house,

Fig. 2.4 *The windows in the upper story of the white house have uneven spacing and, more distinctively, do not align directly above the windows on the ground floor. These odd misalignments exactly match the windows in van Gogh's painting (Photograph by the author)*

exactly as seen in the canvas. The radiant "star" painted by van Gogh must actually be the "evening star" – the planet Venus in the evening twilight glow.

Vincent was not the only person in France to notice Venus then. A contemporary article in the leading French astronomy magazine, published by the science popularizer Camille Flammarion, encouraged observers to look for Venus after sunset in June 1890: "Vénus est facile à reconnaître, le soir, à l'Occident; elle brille d'un très vif éclat aussitôt après le coucher du Soleil" (Venus is easy to recognize, in the evening, in the West; it shines very brightly immediately after sunset.) (Vimont 1890: 238).

So, the *White House at Night* accurately depicts the north face of the Villa Ponceaux in Auvers-sur-Oise near sunset in June 1890, with brilliant Venus in the western sky.

Fig. 2.5 *Several guidebooks incorrectly direct visitors to this house at number 44 Rue du Général de Gaulle. The sunlight illuminates the south-facing facade in this midday photograph, but in spring and summer the Sun's rays do not illuminate the front of the house near sunrise or sunset (Photograph by the author)*

In addition to Paul Gachet's book, stores in Auvers sell half a dozen guidebooks and souvenir maps that direct visitors to the *White House at Night* location (for example, Mothe 1987: 83; Défossez 1993: 9; Auvers Tourist Office 2000: 1). But all of these other authorities incorrectly identify the white house as number 44 Rue du Général de Gaulle! The ground floor level at 44 Rue du Général de Gaulle (Fig. 2.5) now houses several businesses, including an art gallery that proudly claims the connection to Vincent van Gogh by using *White House at Night* as the illustration on its promotional material.

The house at number 44 has prominent dormers in the roof, but we used old photographs to verify that these dormers are modern additions, so their presence now does not immediately rule out this being the house. However, three pieces of evidence allow us convincingly to rule out number 44. The lighting cannot possibly match van Gogh's painting, because this house stands

on the north side of the main road. In the month of June, the Sun's rays do not illuminate the south-facing facade at either sunrise or sunset, when the light slants in from the northeast or northwest, respectively. The chimneys at number 44 also do not match those in the painting, and the upper story of this house has only five windows, instead of the correct number of seven.

The mayor's office kindly gave us access to a book with more than 300 vintage postcard photographs of Auvers as the town appeared near the time of van Gogh's stay (Club Philatélique d'Auvers sur Oise 1998). These vintage photographs showed the same wrongly-spaced chimneys and the same five windows in the upper story and allowed us to conclude that the house at number 44 was definitely not the house painted by van Gogh.

The correct identification of the white house with number 25/27 Rue du Général de Gaulle does appear now in an online guide at a website, www.museonature.com, with descriptions and a map showing more than two dozen Vincent van Gogh painting locations in Auvers-sur-Oise. The website credits our Texas State group for the identification of the celestial object: "L'étoile représentée est la planète Venus. La présence de la planète au moment de la réalisation a été confirmée en juin 2000 par un groupe d'astronomes de Texas State University à San Marcos (USA). (The star represents the planet Venus. The presence of this planet at the moment of creation [of the painting] was confirmed in June 2000 by a group of astronomers from Texas State University in San Marcos, USA.) (www.museonature.com/fr/fiches-fr/van-gogh-maison-blanche-la-nuit.pdf)

Dating the *White House at Night* by Meteorological Evidence

Before we left France, we hoped to determine a more precise date for *White House at Night* by consulting weather records for June 1890. In the Météo-France archives at the Montsouris Observatory in Paris, we examined a set of large handwritten ledgers with detailed weather observations and remarks, recorded at six times during each day.

The records show a week-long period of overcast and inclement weather extending from June 7th to June 14th, with remarks mentioning cloud cover and either rain *(pluie)*, heavy showers *(forte ondée)*, or thunderstorms *(orage)* on each day. The skies began to clear on June 15th. Almost certainly van Gogh worked on the *White House at Night* on June 16th, when clear blue skies prevailed all day long, and the weather observer's remarks describe the afternoon as very beautiful *(tres beau)*. By June 17th, the day when van Gogh

Fig. 2.6 *Venus in White House at Night, F766, Vincent van Gogh, Auvers-sur-Oise, 1890, detail*

mentioned the painting in the letter to his brother, the weather had turned bad again, with the records showing 100 % cloud cover and the threat of thunderstorms *(menace d'orage)*.

Based on the accumulated evidence, we conclude that the *White House at Night* accurately depicts the north face of the Villa Ponceaux in Auvers-sur-Oise near sunset, about 8 p.m. local time on June 16, 1890, with Venus (Fig. 2.6) in the western sky.

Fig. 2.7 *Venus in Starry Night, F612, Vincent van Gogh, Saint-Rémy-de-Provence, 1889, detail*

Venus and Vincent van Gogh

But *White House at Night* was not the first van Gogh work depicting this planet. This was his third painting to include Venus.

The first such canvas with Venus is none other than the famous Saint-Rémy *Starry Night*, dated to mid-June of 1889. UCLA art historian Albert Boime and Harvard astronomer Charles Whitney have independently identified Venus as the very bright object just to the right of the cypress tree (Fig. 2.7),

near the eastern horizon in *Starry Night* (Boime 1984: 87; Whitney 1986: 356). Both of these scholars used one of Vincent's many letters to prove that the artist observed Venus in June 1889, the same month when he created *Starry Night*.

A letter from Vincent, written to his brother Theo and mailed near the beginning of June 1889, describes watching Venus as "morning star." Computer calculations show that this planet rose into the eastern sky before sunrise during June 1889. In fact, Venus during that month was near its maximum possible brilliancy and especially prominent, as Vincent noticed: "Ce matin j'ai vu la campagne de ma fenêtre longtemps avant le lever du soleil avec rien que l'etoile du matin laquelle paraissait tres grande." (This morning I looked at the countryside from my window for a long time before sunrise with nothing but the morning star, which appeared very large.) (Letter 593, as numbered by Johanna van Gogh, Letter 777, as numbered by the Van Gogh Letters Project.)

The second canvas with Venus is *Road with Cypress and Star*, painted in Saint-Rémy during late April or early May of 1890. Vincent could have witnessed a rare twilight grouping of the planets Venus and Mercury near a slender crescent Moon on April 20, 1890. As explained later in this chapter, the spectacular sight may have inspired the sky in *Road with Cypress and Star*. This canvas shows two objects, one especially bright (Fig. 2.8), close to a thin crescent Moon. Several weeks later, after van Gogh had relocated to Auvers-sur-Oise, he drafted a letter that included a sketch of *Road with Cypress and Star*, and Vincent described the especially luminous object (almost certainly Venus) as: "une étoile à éclat exagéré…" (a star with exaggerated brilliance). (Letter 643, as numbered by Johanna van Gogh, Letter RM23, as numbered by the Van Gogh Letters Project.)

We realized that art historians have dated this letter recalling the sky of *Road with Cypress and Star* to June 16 or 17, 1890, exactly the same period when he was creating *White House at Night*. Our discovery of this intriguing connection between the two paintings helps to support our conclusion that both feature similar astronomical subjects – evening twilight scenes with Venus in the western sky.

In summary, Vincent van Gogh included the brilliant planet Venus in three of the most memorable night-sky depictions ever created: *Starry Night* of mid-June 1889, *Road with Cypress and Star* on April 20, 1890, and *White House at Night* on June 16, 1890.

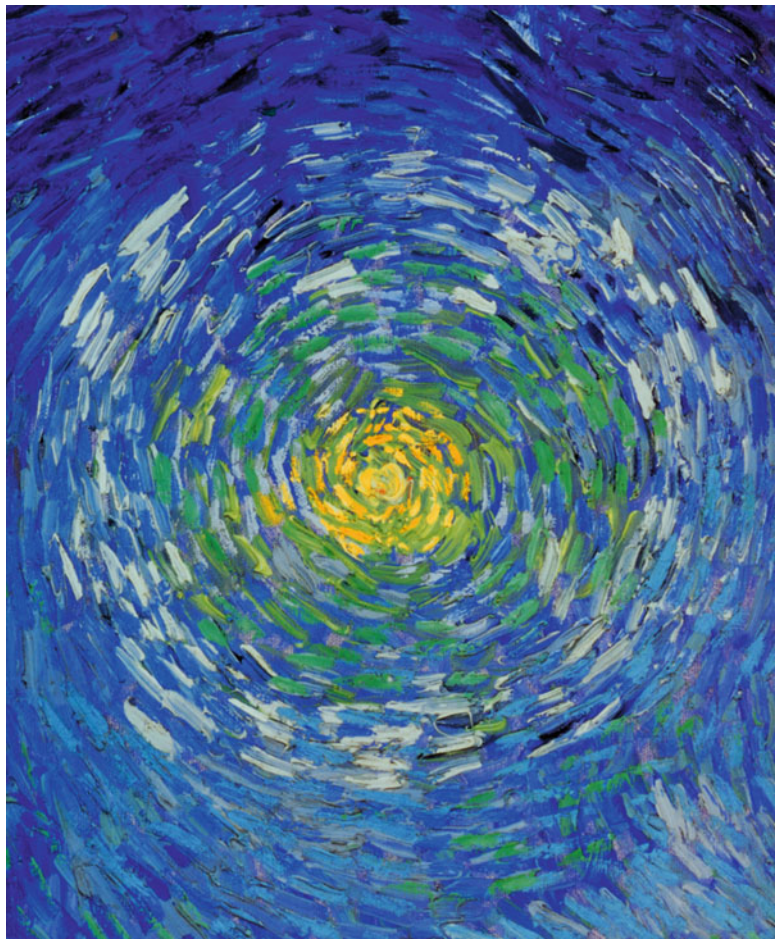

Fig. 2.8 *Venus in Road with Cypress and Star, F683, Vincent van Gogh, Saint-Rémy-de-Provence, 1890, detail*

Dating Vincent van Gogh's *Moonrise*

Vincent van Gogh painted his famous *Starry Night* at the town of Saint-Rémy-de-Provence in southern France. In a letter composed during mid-June of 1889, Vincent wrote to his brother Theo that he had just produced "a new study of a starry sky." Art historians therefore generally agree that van Gogh created *Starry Night* during that month.

No such consensus exists regarding the date of another van Gogh astronomical painting created in Saint-Rémy-de-Provence during 1889.

This work shows wheat stacks in a field enclosed by a stone wall and, in the twilight sky, a prominent orange disk partly hidden behind a mountain range. Is this orange disk a setting Sun or a rising Sun? Because the full Moon can take on a orange color when observed close to the horizon, might this canvas instead depict a rising or setting full Moon? Can we use astronomical analysis to determine whether this canvas portrays a sunrise, sunset, moonrise, or moonset? Toward which direction was the artist facing? How can we determine the date and the precise time, accurate to the minute, when the artist observed this scene?

Van Gogh and the Wheat Field in Saint-Rémy

On May 8, 1889, Vincent van Gogh moved from the town of Arles to the hospital housed in the Saint-Paul monastery at Saint-Rémy-de-Provence. By the time of his discharge on May 16, 1890, Vincent had produced there the staggering total of nearly 150 paintings and 140 drawings, works that reflected his interest in the natural light of southern France. More than a dozen of these show similar views of a wheat field enclosed by a stone wall, with houses visible among rounded hills beyond the wall and the Alpilles mountains rising on the right. Within the garden, an internal dividing stone wall makes a distinctive T-shaped intersection with the outside stone wall, with a shed visible on the right edge of the canvas.

Art historians refer to van Gogh's works by the catalog numbers assigned by Jacob-Baart de la Faille in his pioneering and monumental 1928 compilation. The painting known as F735 (Fig. 2.9) shows wheat stacks in this Saint-Rémy wheat field and, in the twilight sky, a prominent orange disk partly hidden behind the mountains. Is this orange disk the Sun or the Moon?

De la Faille's 1928 catalog listed F735 with the title *Sunset* ("Coucher du soleil") and included the descriptive text that "the yellow-orange solar globe sinks behind the dark blue mountains that limit the horizon" (de la Faille 1928: 208). A 1937 catalog by W. Scherjon and W. J. de Gruyter changed the title of the work to identify the scene as *Rising Moon (Haycocks)* and placed this canvas with the works from August or September 1889 (Scherjon and de Gruyter 1937: 219). De la Faille adopted the title *Moonrise* and the month of September 1889 for F735 in a revised 1938 edition of his catalog (de la Faille 1938: 436). But a completely different month appeared in the 1970 edition of the de la Faille catalog, completed by a committee of experts after the original author's death. This posthumous edition lists F735 with the title *Rising Moon: Haycocks* and gives the very specific date as "6 July" (de la Faille 1970: 281).

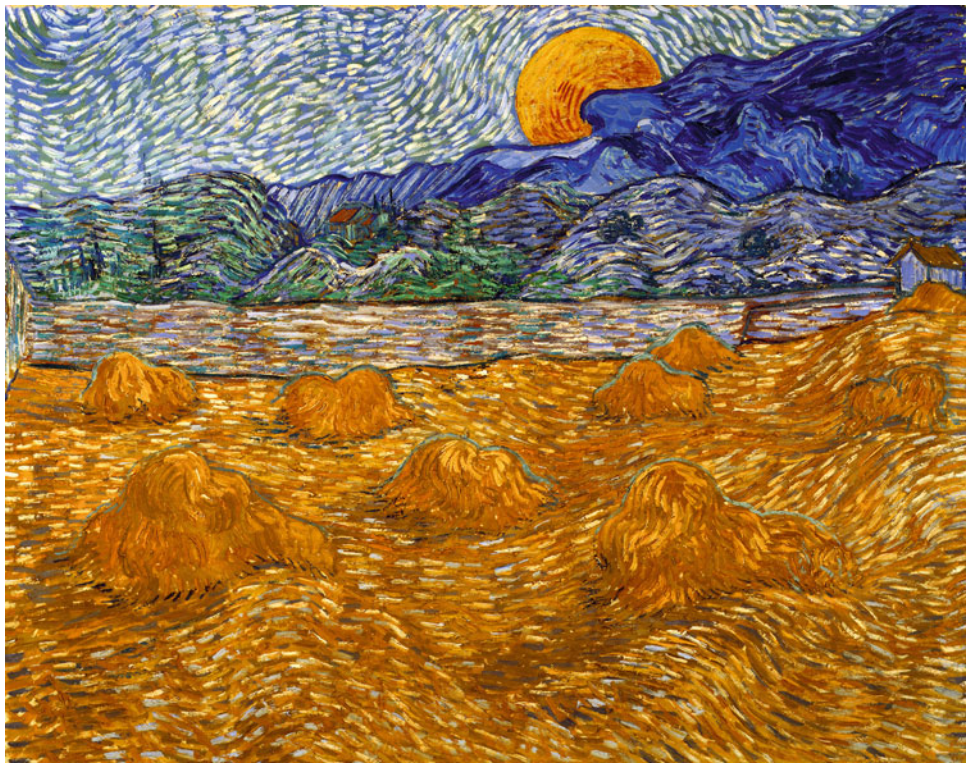

Fig. 2.9 *Moonrise (Wheat Stacks), F735, Vincent van Gogh, Saint-Rémy-de-Provence, 1889. Once thought to show a setting Sun, this Vincent van Gogh painting actually depicts a rising Moon at Saint-Rémy-de-Provence (Collection Kröller-Müller Museum, Otterlo, the Netherlands)*

Jan Hulsker was a member of the committee that completed the publication of the 1970 de la Faille catalog. Hulsker later published, on his own, two editions of van Gogh's complete works. In both of these catalogs, he gives F735 the title *Enclosed Field with Sheaves and Rising Moon* and dates this painting to "6 July 1889" (Hulsker 1977: 400, 1996: 406).

Modern experts have come to a consensus that this canvas depicts a moonrise, some even mentioning a specific date. Is this consensus correct? Does the painting show a rising Moon? Is July, August, or September the correct month for this canvas? Does the appearance of the Moon on July 6, 1889, match the painting?

All these scholars used Vincent's many letters to help determine the content and sequence of his paintings. In the case of the painting F735, the

correspondence makes it certain that the canvas depicts a view to the east and southeast with a rising Moon.

Vincent often looked at the sky from his room on the upper floor of the east side of the monastery, as he mentioned in a letter of late May 1889 to his brother Theo in Paris: "A travers la fenêtre barrée de fer j'apercois un carré de blé dans un enclos…au-dessus de laquelle le matin je vois le soleil se lever dans sa gloire." (Through the window with iron bars I can see a square enclosed wheat field…above which I see the Sun rise in all its glory in the morning.) (Letter 592, as numbered by Johanna van Gogh, Letter 776 as numbered by the Van Gogh Letters Project)

As cited earlier in this chapter, a letter mailed near the beginning of June 1889 described an observation of brilliant Venus as "morning star," rising into the eastern sky before sunrise. That Vincent was able to watch sunrises and the morning star from his window proves that the view across the enclosed field looks generally towards the east. The painting F735 therefore must depict either a sunrise or a moonrise, not a sunset or a moonset, which would necessarily occur toward the west.

During the summer of 1889, Vincent mailed an envelope containing two letters, one to Theo and another (now lost) written to the artist Paul Gauguin with a sketch of a reaper cutting the wheat in the enclosed field. The letter to Theo, numbered as 603 by Johanna van Gogh, is important for astronomical analysis because it explicitly describes a moonrise painting. In this letter, Vincent described to Theo several completed paintings and then went on to add that: "J'en ai un en train d'un lever de lune sur le même champ du croquis dans la lettre de Gauguin mais où des meules remplacent le blé. C'est jaune d'ocre sourd et violet. Enfin tu verras dans quelque temps d'ici." (I have one in progress of a moonrise over the same field as the sketch in the letter to Gauguin, but with wheat stacks replacing the wheat. It is dull yellow ochre and violet. Anyway, you will see it sometime soon.) (Letter 603, as numbered by Johanna van Gogh, Letter 790, numbered by the Van Gogh Letters Project)

Scholars consider this letter, which describes the moonrise painting as being "in progress," especially troublesome to date. Unfortunately, the letter itself does not bear either a handwritten date or postmark. Johanna van Gogh placed Letter 603 in the chronological sequence just before other letters more securely dated to September. This probably explains why the early authors Scherjon, de Gruyter and de la Faille dated the moonrise painting to August or September.

Several recent scholars argue instead that Letter 603 does not fall between Letter 602 of late August and Letter 604 of early September. But the experts differ on exactly what date to give to Letter 603 and thereby to the moonrise painting.

Jan Hulsker, an authority on van Gogh's correspondence, moved Letter 603 to "July 6" and observed that "the change in the sequence of these letters is not only important from the biographical angle but also for the chronology of Vincent's art, for it means that the canvases referred to in 603 should be dated 2 months earlier," including "the moonlit landscape with stacks of wheat" (Hulsker 1972: 26). Hulsker's assumption for the timing of Letter 603 explains why both of his catalogs dated the moonrise painting to July 6, 1889.

At some point during the summer of 1889, van Gogh's medical condition worsened, and the artist produced almost no works at all for a period of about 6 weeks. Hulsker dated Vincent's medical crisis to the days immediately after the moonrise painting, that is, Hulsker argued that the work stoppage ran from "about July 8 till about the middle of August" (Hulsker 1972: 30).

Art historian Ronald Pickvance, curator of the Metropolitan Museum of Art's 1986 exhibition "Van Gogh in Saint-Rémy and Auvers," offered a different chronology. Pickvance placed the moonrise painting in the range of July 8th to 13th and favored a date of about July 14th for Letter 603 that describes the moonrise canvas and July 16th for the onset of the medical crisis (Pickvance 1986: 37).

Our Texas State group wondered whether we could use astronomical methods to date the moonrise painting directly and thereby also resolve the controversy about the disputed date of letter 603.

Possible Dates for van Gogh's Moonrise

We can be certain that Vincent created F735 between May 8th, when he first arrived at Saint-Rémy, and late September, when he mailed the canvas to Theo in a batch of ten paintings that also included the famous *Starry Night*.

Letter 603 tells us that the bright orange body in F735 must be either a full or nearly full Moon. A full Moon appears in the region of the sky that is nearly opposite to the location of the Sun. The behavior of the rising and setting of the full Moon is also opposite to that of the Sun. That is, the full Moon rises just as the Sun sets. In fact, for these reasons early astronomers used the word "opposition" to refer to the time of the full Moon.

Computer calculations of the dates near the full Moons in 1889 quickly showed the only possible periods for van Gogh's painting were May

15th–17th, June 13th–15th, July 12th–14th, August 11th–13th, and September 9th–11th. On each of those days a full or nearly full Moon would have risen into the sky near the time of sunset.

A Cliff and a House

We noticed in van Gogh's *Moonrise* a striking topographic feature: the distinctive overhanging cliff that partially blocks the disk of the rising Moon. Vincent also included, in the foothills below the cliff, an unusual building that we called the "double house" because it had the appearance of a smaller structure attached to a larger dwelling. We were encouraged that these might be real features of the landscape because the overhanging cliff and the "double house" appear above the wheat field in fifteen of van Gogh's paintings and drawings from Saint-Rémy.

We knew that the Saint-Paul monastery still existed. If we made a research trip to Saint-Rémy, could we find the nearby "double house" and overhanging cliff? Could we determine the precise direction of the overhanging cliff, as seen from the wheat field near the monastery? Did a nearly full Moon rise in that direction on a date during 1889?

Fact-Finding Trip to Provence

To answer these questions, our Texas State group (Olson et al. 2003) traveled to Saint-Rémy in June 2002. Before leaving Texas, we contacted Les Astronomes Amateurs Du Delta, an astronomy club based in nearby Arles. Three of the group's members, Claude Suc, Vincent Suc, and Bruno Massal, helped us by scouting possible observing locations and then accompanying us during our visit.

Within minutes of our arrival in Saint-Rémy, we were gratified to see that the overhanging cliff actually does exist to the southeast of the monastery (Fig. 2.10). Measuring its precise coordinates as seen from the wheat field proved complicated, in part because Saint-Paul is still a working hospital, with both van Gogh's former room and the enclosed field, now a garden, strictly off-limits. The facility allows tourists to visit a different room called "Reconstitution Chambre Van Gogh," but this was not the actual room occupied by van Gogh in 1889.

More importantly, a forest of tall pine trees has grown up during the last century and obscures the landscape. For example, by exploring dirt roads

Fig. 2.10 *The overhanging cliff painted by van Gogh actually exists to the southeast of the Saint-Paul monastery. Our Texas State group determined the precise direction and altitude of the overhanging cliff by observing the Sun, Moon, and stars during a visit to Saint-Rémy. In this photograph the Moon passing behind the cliff is only faintly visible because the Sun was still above the horizon (Photograph by Russell Doescher. Used with permission)*

into the forest, we found that the "double house" (Fig. 2.11) still stands 2,100 ft southeast of the monastery, but this distinctive building can no longer be seen from locations near Saint-Paul.

The Arles group had forewarned us of these problems and helped us to find a large open field immediately northwest of Saint-Paul. From here we had a clear view directly over the monastery to the Alpilles beyond (Fig. 2.12). For 6 days and nights, we observed the Sun, Moon, and stars as they rose and thereby were able to measure the precise altitudes and directions of the peaks and cliffs of the mountain range.

Narrowing the Choices

Van Gogh's vantage point in the enclosed wheat field was near the north wall, which is barely visible at the extreme left edge of the painting. According to our topographic measurements, from van Gogh's position the artist would have seen the overhanging cliff 8,800 ft away in a direction to the southeast. More precisely, van Gogh would have seen the overhanging cliff at a

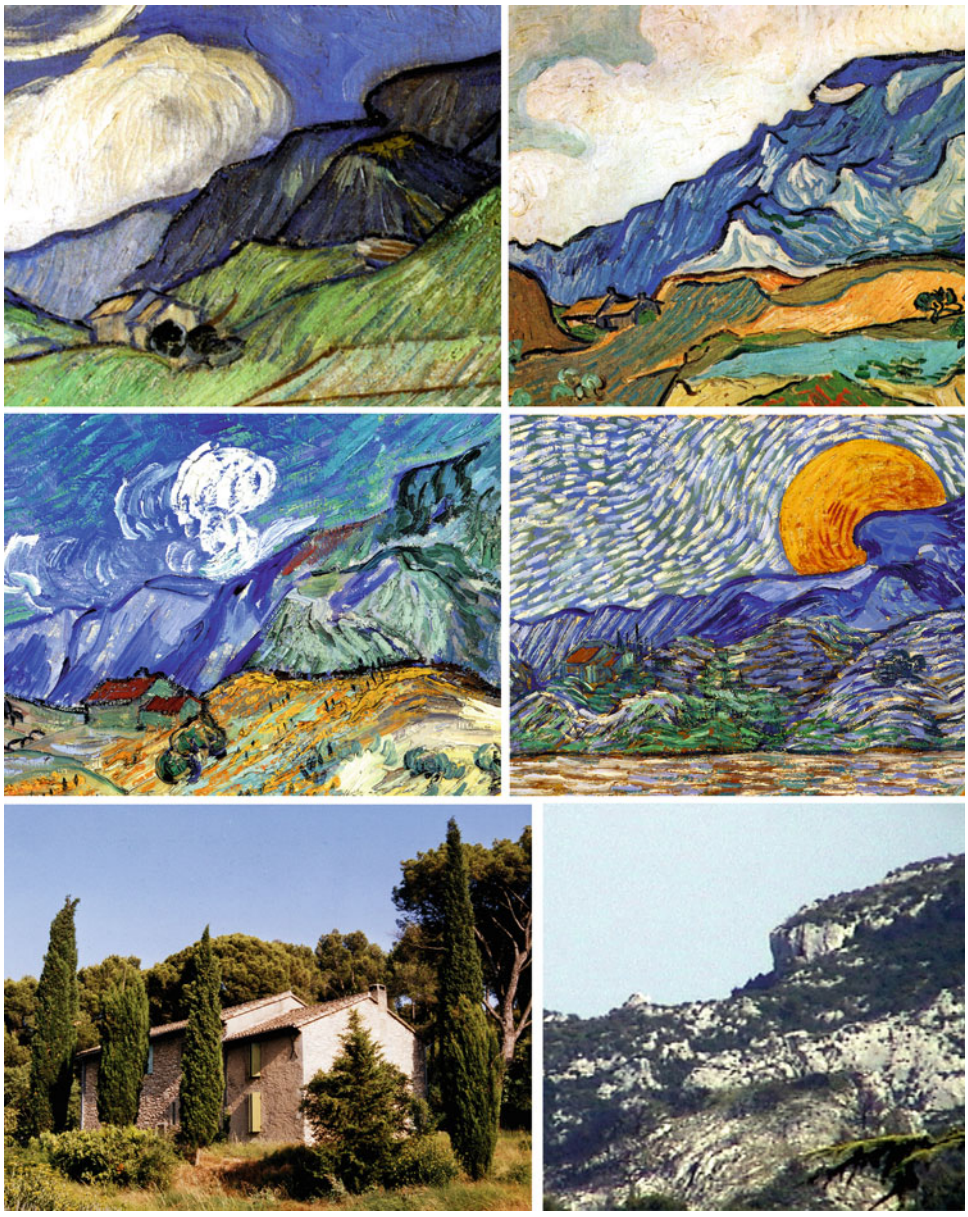

Fig. 2.11 *Vincent van Gogh, in the Moonrise painting and in more than a dozen other works, included an unusual building that we called the "double house" because it had a split-level roof, or the appearance of a smaller structure attached to a larger dwelling. The artist varied the roof colors, sometimes using tan and sometimes red. The actual "double house" – with a tan roof – still stands in the hills below the overhanging cliff, to the southeast of the Saint-Paul monastery. Upper left: "double house" and overhanging cliff, detail, F611, Wheat Field After a Storm. Upper right: "double house" and overhanging cliff, detail, F724, The Alpilles. Center left: "double house" and overhanging cliff, detail, F641, Enclosed Wheat Field. Center right: "double house" and overhanging cliff, detail, F735, Moonrise (Wheat Stacks). Lower left: "double house," photograph taken in 2002 (Photograph by the author.). Lower right: overhanging cliff, photograph taken in 2002 (Photograph by Russell Doescher. Used with permission)*

Fig. 2.12 *This postcard aerial view shows the scene for more than a dozen of Vincent van Gogh's paintings, including Moonrise (Wheat Stacks), F735. The Saint-Paul monastery fills the foreground, with the Alpilles mountains to the southeast. The red arrow points to van Gogh's location in the enclosed wheat field, now a garden. The white arrow points to the "double house," and the yellow arrow shows the location of the overhanging cliff. Since this postcard view was taken, the hillsides above the monastery have become covered with a dense forest of tall pine trees, obscuring the landscape*

compass direction of 126° (that is, 36° south of due east) and extending between altitude 4½° and 4¾° above the horizon. Computer calculations then showed that from the wheat field, van Gogh could have seen a nearly full Moon rising behind the overhanging cliff on only two dates in 1889 – May 16th and July 13th.

Weather

Meteorological observations from 1889, preserved at the Météo-France archives, show that favorable conditions prevailed on both of these evenings. Very heavy rain fell on May 14th and 15th, but skies cleared on May 16th. No rainfall at all occurred during the entire first 2 weeks of July, and the

fraction of the sky covered by clouds decreased on July 13th from 50 % to 30 %. The weather records provided a good consistency check but did not help us to establish a unique date.

Ripening Wheat

The colors in the foreground of *Moonrise* allow us to eliminate one of these dates. Shortly after arriving in Saint-Rémy in May, Vincent noted in a letter that green wheat fields surrounded the monastery. In another letter from the middle of June, he described a canvas of a field turning yellow and ears of wheat "whose tones are as warm as the crust of a loaf of bread." In late June, the artist painted reapers cutting wheat that was all yellow. The *Moonrise* painting, with reaped wheat in golden stacks, therefore, cannot correspond to a date in mid-May but fits perfectly with our astronomically derived date of July 13th.

Results for van Gogh's *Moonrise*

The Moon's disk spent less than 2 min passing behind the overhanging cliff. This allowed us to determine a precise time for van Gogh's moonrise – exactly 9:08 p. m. local mean time on July 13, 1889.

Because van Gogh produced approximately one painting or drawing per day at Saint-Rémy, our calculations therefore suggest the artist worked on the canvas perhaps later that evening or on the next day. Vincent probably wrote the letter describing the *Moonrise* as in progress on about July 14, 1889, a date that conflicts with the conclusions of many authors but agrees exactly with the chronology given by Ronald Pickvance. Based in part on our astronomical analysis, the Van Gogh Letters Project now dates this letter to July 14, 1889.

Van Gogh and the Natural World

Our topographic observations, combined with computer calculations, provide strong evidence that van Gogh was working from nature when he created *Moonrise*, a canvas with an accurate depiction of both the overhanging cliff in the Alpilles and the position of the rising Moon. The shadows of the wheat stacks do not align with the Moon, suggesting to us that van Gogh remained in the field as the evening twilight faded and the rising Moon began to swing toward the southern sky, causing the shadows to rotate.

In a letter written in 1888 to his artist friend Émile Bernard, Vincent described his reliance on the natural world: "Je ne travaille jamais de tête… Et je ne peux pas travailler sans modèle…j'ai tant peur de m'écarter du possible et du juste en tant que quant à la forme…j'ai tant de curiosité du possible et du réellement existant…J'exagère, je change parfois au motif mais enfin je n'invente pas le tout du tableau, je le trouve au contraire tout fait… dans la nature." (I never work from memory…and I cannot work without a model…I am too afraid of departing from the possible and the true in the matter of form…I have so much curiosity about what is possible and what really exists…I exaggerate, sometimes I make changes in a motif, but still I do not invent the whole picture, on the contrary, I find it all ready…in nature.) (Letter B19, as numbered by Johanna van Gogh, Letter 698, as numbered by the Van Gogh Letters Project)

When modern observers witness a summer full Moon rising in the southeast, they can think back to July 13, 1889, when van Gogh stood among the wheat stacks in the monastery field and captured a similar scene in his remarkable *Moonrise*.

Dramatic Twilight: Van Gogh's *Road with Cypress and Star*

Vincent van Gogh painted a dramatic twilight sky in his *Road with Cypress and Star,* created in 1890 at the town of Saint-Rémy-de-Provence in the south of France. This painting shows two bright objects, one especially brilliant, near a slender crescent Moon. Does this work depict morning twilight or evening twilight? In what direction did the artist face? How do astronomical calculations, Vincent's letters, and meteorological records allow us to determine the date and time when the artist observed the sky that inspired this canvas? What are the two bright objects near the crescent Moon – are they stars or planets?

Waxing Crescent Moon in *Road with Cypress and Star*

Vincent van Gogh lived at the hospital housed in the Saint-Paul monastery at Saint-Rémy-de-Provence for slightly more than a year, from May 8, 1889, to May 16, 1890. Art historians have concluded that he created *Road with Cypress and Star* (Fig. 2.13) very near the end of his year-long stay, shortly before he left Saint-Rémy by train on May 16th and returned to Paris.

Fig. 2.13 *Road with Cypress and Star, F683, Vincent van Gogh, Saint-Rémy-de-Provence, 1890 (Collection Kröller-Müller Museum, Otterlo, the Netherlands)*

The sharp horns of the lunar crescent point to the left in *Road with Cypress and Star*. This orientation indicates that Vincent portrayed the lunar phase known as a *waxing crescent*, when the Moon is increasing in light during the period of about a week between new Moon (Moon not visible) and first quarter (Moon 50 % lit). Waxing crescents are visible in the western sky during evening twilight, and the extremely thin crescent in the painting suggests a date just a day or two after new Moon.

Working backwards from May 16, 1890, Vincent's last day in Saint-Rémy, our Texas State group began our astronomical analysis (Olson and Doescher 1988)

by asking three questions. What was the date of the previous new Moon? On what day did the waxing crescent Moon reappear in the evening sky? Were there any especially bright stars or planets in the sky near the crescent Moon on that date?

Moon and Planets

Our computer calculations determined that the relevant new Moon occurred on April 19, 1890. (By the time of the next new Moon, which fell on May 18, 1890, van Gogh was back in Paris with his brother Theo.) For an observer at Saint-Rémy, the first visibility of the waxing Moon occurred in the evening twilight near 7 p. m. local time on April 20, 1890. At that moment the Moon appeared as a very thin crescent, only 35 h after the new Moon. Our calculations showed that no bright stars shone very near the Moon on the evening of April 20th. The nearest prominent star, Aldebaran in the constellation Taurus, was more than 20° away.

But when we calculated planetary positions for April 20th, we were amazed to see that Venus was within 4° of the Moon! Radiant Venus, was much brighter than any of the nearby stars and would have dominated the western sky. Also, the planet Mercury stood only 3° from Venus. Mercury's appearance can be quite variable, but on this date the planet's light rivaled that of the "Dog Star" Sirius, the brightest star in the night sky. Mercury was below Venus in the sky, with their relative brightness similar to that shown in the painting. So, three brilliant objects – Venus, Mercury and the Moon – gathered in a tight grouping that became visible shortly after sunset on April 20, 1890.

On that night the illuminated fraction of the Moon was only 2 %. Such a lunar crescent is very thin, but spectacular and memorable when noticed, and even more remarkable here because of the close proximity of Venus and Mercury.

Because of the rapid motion of the Moon in its orbit, the three bodies grouped close together only on April 20th and became dispersed by April 21st and succeeding days.

We emphasize that we did not search through numerous dates throughout van Gogh's entire life, and we did not look randomly for celestial configurations that resembled the sky of *Road with Cypress and Star*. Our Texas State team found this extraordinary grouping on the first logical date we examined – the day of the last waxing crescent Moon that van Gogh could have seen just before he left Saint-Rémy.

Mirror Image in *Road with Cypress and Star*

A difference between the computed sky and the painted sky requires comment. The grouping Moon-Venus-Mercury formed a broken line, with spacing and angle nearly identical to that in the painting, but van Gogh would have seen the planets on April 20th below and to the right of the Moon, while the painting shows them below and to the left. This mirror-image reversal may have occurred for compositional reasons. We also noticed that there may be a similar left-to-right mirror reversal in van Gogh's famous *Starry Night*.

Mirror Image in the Swirling Sky of *Starry Night*

UCLA art historian Albert Boime and Harvard astronomer Charles Whitney have suggested that a famous nineteenth-century drawing of a spiral nebula may have inspired the spiral pattern in van Gogh's *Starry Night* (Boime 1984: 94; Whitney 1986: 358). This nebula, commonly known as the Whirlpool Galaxy, bears the scientific name M51. The Anglo-Irish astronomer Lord Rosse used his great telescope, then the largest in the world, to discover the spiral nature of this cloud of stars in the constellation of Canes Venatici, the Hunting Dogs. Lord Rosse's often-reproduced drawing (Fig. 2.14) of the swirling nebula possibly became known to van Gogh through the writings of Camille Flammarion, a French astronomer, prolific author, and a popularizer of astronomy at that time.

If van Gogh read any astronomy book, the most likely candidate is Flammarion's popular work, appropriately called *Astronomie Populaire*. This volume included a reproduction of Lord Rosse's drawing with an explanatory text: "More extraordinary, still more wonderful are the star clusters that appear organized in spirals, and among them, splendid and fantastic is the amazing nebula located in the constellation of the Hunting Dogs…the great telescope of Lord Rosse has revealed the singular structure" (Flammarion 1884: 814).

In another book, *Les Étoiles et les Curiosités du Ciel*, Flammarion reproduced the drawing with an even more florid description of the spiral nebula:

> One evening in the spring of the year 1845, just as he was putting the finishing touches on the mirror of his huge telescope and was trying it out on the most beautiful nebulae in the heavens, Lord Rosse suddenly stopped short, stunned by the picture that had appeared!…This strange nebula appeared in the field of the telescope in the form of a series of constellated spirals, wrapping around each other…A tremendous whirlpool of suns was revealed in this splendor. The spirit flying up until these starry depths crossed a new universe, forgot ours, and walked out on the dust of the stars…All of that moves, all vibrates, and it all revolves…. (Flammarion 1882: 123)

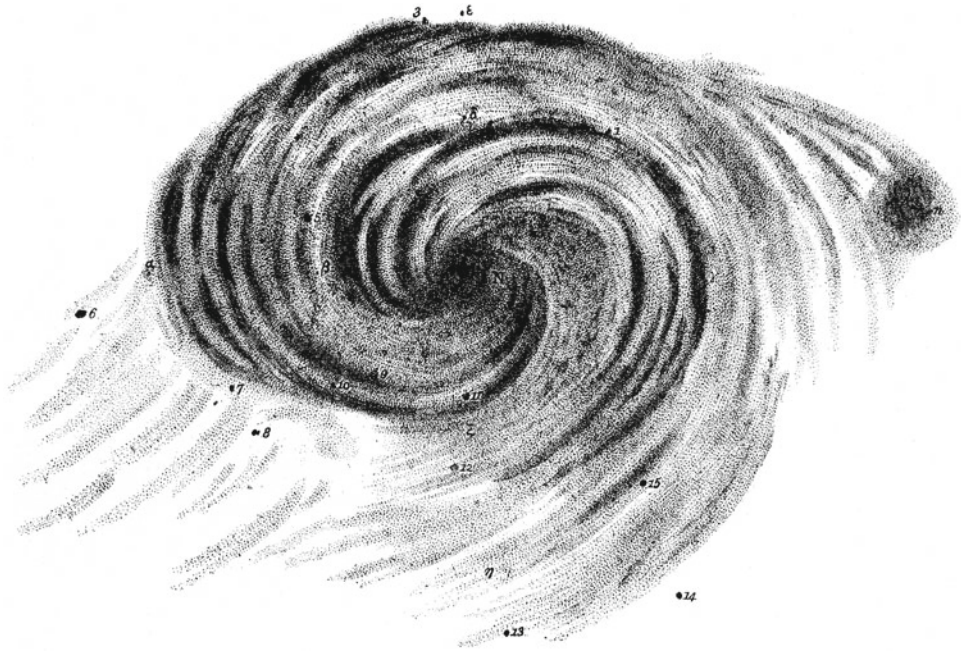

Fig. 2.14 *The spiral galaxy M51, commonly known as the Whirlpool Galaxy. The astronomer Lord Rosse used his great telescope to discover the spiral nature of this nebula in 1845. Lord Rosse's drawing, popularized in France in books by Camille Flammarion, may have influenced the swirling skies of Vincent van Gogh*

These vivid descriptions by Flammarion, along with the reproductions of Lord Rosse's drawing of the Whirlpool Galaxy, may have helped to inspire the swirling sky of van Gogh's *Starry Night*.

Our Texas State group noticed that several specific features of M51 resemble the central part of *Starry Night* much better when reversed left-to-right. In particular, the spiral motion in M51 is counter-clockwise, while van Gogh's central image appears to be rotating clockwise. This possible mirror reversal in *Starry Night* helps to make more plausible the mirror reversal of the position of the planets in *Road with Cypress and Star*.

A Rare Conjunction in April 1890

Vincent may have spotted the planetary grouping on April 20, 1890, just by chance while walking outside near sunset. But popular journals forewarned many French citizens, possibly including van Gogh, about the celestial display.

The periodical *L'Astronomie*, published in Paris by Camille Flammarion, included in the first issue for 1890 an "Agenda Astronomique" calendar that mentioned that on April 20th both Mercury and Venus would be in conjunction with the Moon. The issue for April 1890 gave more details and strongly encouraged readers to view the rare sight:

> Venus – This heavenly body is so brilliant that it remains easy to distinguish, in the west, immediately after the setting of the Sun…Conjunction with the Moon is on April 20th.
>
> On the 20th of April, starting at 7 p.m. and until 8:20 p.m., study the thin lunar crescent, on the next day after the new Moon.
>
> Mercury – This planet finds itself in conditions exceptionally favorable for observation…These events present themselves only very rarely. Moreover, there will be very interesting conjunctions which deserve full attention from the numerous friends of the noble Science of the Heavens…on April 20th…. (Flammarion 1890: 157)

The journal *Scientific American* for 1890, though not readily available to van Gogh in France, did contain an interesting article entitled "Position of the Planets for April." The writer located Mercury near the brighter Venus as evening stars in the second half of April and advised that: "…sharp-sighted observers may find them soon after sunset, Venus serving as guide to her smaller neighbor." (Munn and Beach 1890: 194)

These words could serve as a description of the sky in *Road with Cypress and Star*, which features a dazzling object and a "smaller neighbor" nearby.

Both from our own computer simulations and from contemporary accounts, we know that in the evening twilight of April 20, 1890, the bright planets Venus and Mercury stood very near a thin crescent Moon – the last waxing crescent Moon that van Gogh could have observed at Saint-Rémy.

Confirmation from Meteorological Evidence

Charles Whitney collected weather records for Provence in April 1890. After learning about our theory regarding the planetary grouping on April 20th, Whitney pointed out how the meteorological observations supported this date: "In St.-Rémy where van Gogh was living, these data show 4 days of moderately heavy rain prior to the 18th of April, 1890…The sky in nearby Arles the morning of the 19th was six-tenths overcast, while on the next 4 days the cloud cover ranged from two-tenths to three-tenths. Thus the 20th was the first fine day in a week, and van Gogh would probably have gone out to paint" (Whitney 1989: 237).

The meteorological evidence helps to explain why van Gogh, after several days of being forced to work indoors, might have been walking outside and looking for landscape subjects on April 20th.

Confirmation in a van Gogh Letter from 1890

Two months later, in mid-June of 1890 when van Gogh had relocated to Auvers-sur-Oise in the north of France, he drafted a letter that included a sketch of *Road with Cypress and Star*. Vincent remembered his time spent down in Provence and described how the sky in that canvas included an especially brilliant object:

> J'ai encore de là-bas un cyprès avec une étoile. un dernier essai – un ciel de nuit avec une lune sans éclat, à peine le croissant mince émergeant de l'ombre projetée opaque de la terre – une étoile à éclat exageré, si vous voulez, éclat doux de rose & vert dans le ciel outremer où courent des nuages. En bas une route bordée de hautes cannes jaunes derrière lesquelles les basses Alpines bleues, une vieille auberge à fenêtres illuminées orangées et un très-haut cyprès tout droit, tout sombre. Sur la route une voiture jaune attelée d'un cheval blanc et deux promeneurs attardés. Tres romantique si vous voulez mais aussi je crois "de la Provence."
>
> (I also have from down there a cypress with a star. A last attempt – a night sky with a moon without brightness, the slender crescent barely emerging from the opaque projected shadow of the Earth – a star with exaggerated brilliance, if you like, a soft brightness of rose and green in the ultramarine sky where clouds run. Below, a road bordered by tall yellow canes behind which are the blue foothills of the Alpilles, an old inn with orange illuminated windows and a very tall cypress, very straight, very dark. On the road a yellow carriage harnessed to a white horse, and two late wayfarers. Very romantic if you like, but also I think "Provençal.")
>
> (Letter 643, as numbered by Johanna van Gogh, Letter RM23, as numbered by the Van Gogh Letters Project)

The mention of "late wayfarers" is consistent with our result that this painting shows an evening twilight, not a morning scene. Vincent's explicit statement, that *Road with Cypress and Star* is a "last attempt" from "down there" in Provence, likewise is consistent with our analysis that dates the painting to the last lunar month before the artist's departure from Saint-Rémy.

As the daylight faded and the dramatic twilight deepened on April 20, 1890, Vincent van Gogh could have witnessed a rare grouping of dazzling Venus and bright Mercury near a slender crescent Moon – an extraordinary sight that may have inspired the painted sky in his *Road with Cypress and Star*.

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