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Barthel, P.

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# Santa and the Moon

## Peter Barthel

Kapteyn Astronomical Institute,  
University of Groningen, The Netherlands  
E-mail: [pdb@astro.rug.nl](mailto:pdb@astro.rug.nl)

## Keywords

Books, Moon Phases, Christmas

## Summary

This article reflects on the use of illustrations of the Moon in images of Santa Claus, on Christmas gift-wrapping paper and in children's books, in two countries which have been important in shaping the image of Santa Claus and his predecessor *Sinterklaas*: the USA and the Netherlands. The appearance of the Moon in Halloween illustrations is also considered. The lack of either knowledge concerning the physical origin of the Moon's phases, or interest in understanding them, is found to be widespread in the Netherlands, but is also clearly present in the USA, and is quite possibly global. Certainly incomplete, but surely representative, lists that compile occurrences of both scientifically correct and scientifically incorrect gift-wrapping paper and children's books are also presented.

## Introduction

Images of the Moon are often used to indicate an evening or night scene, not only as illustrations in books (for adults and children), but also on product packaging, brochures, greetings cards, gift-wrapping paper, in advertising, commercials, as pictograms, etc. A full Moon is often used, partly hidden behind trees or clouds, but a partially lit Moon — half or crescent — also frequently appears. The latter case leaves no doubt as to an image's identification with the Moon; a full Moon could possibly be mistaken for the Sun. There are two ways of depicting a partially lit Moon: around its first and its last quarters. A crescent Moon, on its way towards first quarter is called a waxing Moon, and such a waxing Moon can be observed in the afternoon twilight and in the evening. Its right hand side is illuminated, for observers in the northern hemisphere (left for observers in the south). The first quarter Moon sets at midnight, a waxing Moon even earlier. A waning crescent Moon (from third quarter to new Moon: left hand side illuminated) rises around 3 am, hence can only be observed late at night and in the morning twilight. The full Moon is directly opposite the Sun in the sky, and hence rises at sunset.

Moon illustrations are occasionally incorrect. There are postcards showing artist's impressions of tropical evenings with both the Sun and the full Moon close to each other. Full Moons sometimes rise around

midnight in movie scenes. Illustrations which show Moon crescents are also occasionally wrong: third quarter Moons or waning crescents are depicted when the actual scene is in the evening. A 2010 UNICEF Christmas card as well as the opening scene in the 2010 Jacquie Lawson animated Advent e-Calendar — both widely sold items — provided the culmination of several years of frowning (and smiling) about this misconception or ignorance, and triggered the research presented below. The UNICEF card, of British design<sup>1</sup>, shows children decorating an outdoor Christmas tree. Judging from the Moon phase, the scene takes place at 4 am or 5 am in the morning, which is not impossible but unlikely. The village scene that opened the 2010 Jacquie Lawson<sup>2</sup> digital Advent Calendar depicts a Christmas carol concert, sung in the village square. Whereas the thin waning Moon indicates an early morning event, the artist undoubtedly wants to show us an early evening scene, judging from the people on the square and the lights in the houses, shops and the church. It is just about possible that both artists intended to create Australian scenes with reversed Moon phases, but the presence of snow in both scenes is strongly suggestive of the northern hemisphere in December.... The same misunderstanding is frequently seen on gift-wrapping paper in the Netherlands, displaying *Sinterklaas*, the predecessor of Santa Claus, distributing presents in the evening with a third quarter or waning Moon in the sky.

To quantify the level of ignorance concerning the phase of the evening Moon related to the *Sinterklaas*, Santa Claus and the Christmas season, a (jolly) research project was conducted, examining illustrations in children's books, on gift-wrapping paper, and on Christmas cards, both in the USA and in the Netherlands. These are the two countries that have shaped the image of Santa Claus and his name-giver *Sinterklaas* (Saint Nicholas, Sint Nicolaas), the benevolent figures who have been of key importance in commercialising the December holiday season. The goal of publishing this research is obviously to focus educators' attention on a great opportunity to explain the (origin of the) Moon's phases, as offered by these happy end-of-year events. The need for such education has been, for instance, well demonstrated by the video *A Private Universe*<sup>3</sup>.

## Theoretical background

The *Sinterklaas* and Santa Claus stories are well known and date back to the fourth century bishop Nicholas of Myra (now Demre, in southern Turkey). Legends of his generosity and kindness spread over Europe and he became the patron saint of many groups, cities, and even countries. The 5 December, the eve of his death, was commemorated with an annual feast in many European countries. Following the Protestant Reformation in the sixteenth century, some countries merged the

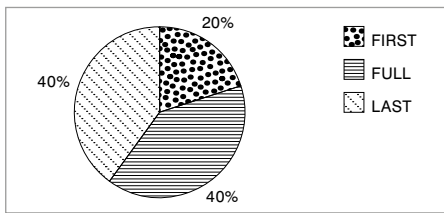


Figure 1. Book statistics from the Netherlands.

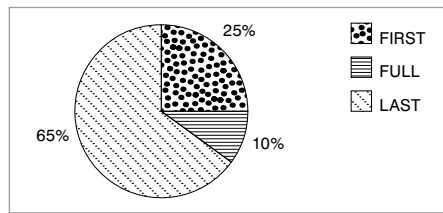


Figure 2. Wrapping paper statistics from the Netherlands.

St. Nicholas celebration with Christmas, but others stuck to 5 December. The characteristic features of benevolence and the exchange of gifts obviously hark back to legends around St. Nicholas. Local folklore was added, which resulted in different flavours for the celebrations in various countries. Dutch settlers in the New World celebrated St. Nicholas' Eve in the 17th century, and those celebrations evolved through contacts with immigrants of other nationalities. Concerning the transformation to Santa Claus, the importance of the author Washington Irving in 1809 and of the 1823 poem *A visit from Saint Nicholas*, commonly known as *The night before Christmas*<sup>4</sup>, is well documented, as are the drawings of Thomas Nast in the 1860s and the Coca Cola advertisements in the 1930s (e.g., Jones, 1978; Crichton, 1987; and www.stnicholascenter.org).

The Dutch *Sinterklaas* together, with his helpers, is believed to distribute his presents on the evening of 5 December. He may also pay visits during the evenings and nights before 5 December, leaving some candy in shoes set before the fireplace, but the main event is the evening of the 5th. Once delivered, the presents are unwrapped during that same evening. Scenes depicting the 5 December *Sinterklaas* events should depict waxing, first quarter or full Moon (or no Moon) to be scientifically correct.

On Christmas Eve Santa Claus works through the night of 24–25 December to get his job done: the gifts are unwrapped on Christmas morning. If a Moon is shown in a Santa scene that takes place at the beginning of the night, its phase should be waxing, quarter or full, otherwise it can have any phase. The poem, *A visit from Saint Nicholas*, has the father witnessing Santa's arrival before going to bed, and thus in the evening. The Moon "on the breast of the new fallen snow" must have been a waxing, first quarter, or full Moon to be scientifically correct.

In summary, illustrations should preferentially show first quarter or full Moons on *Sinterklaas* or Santa Claus scenes, unless it is clear from the text that Santa's job is nearly done (i.e. he has a nearly empty sleigh...) Any winter evening scene in general, and certainly those having children around, should have a first quarter or full Moon, if the artist wants to show one.

### Measurements and results

#### December events

All data were obtained in the months November 2010–January 2011, and can be found compiled in Tables I through IV, which are available online<sup>5</sup>. In the Netherlands, two dozen book stores and department stores were visited, during November–December 2010. Book illustrations depicting *Sinterklaas* and the Moon were examined, with regard to the Moon phase. Twenty-five images selected from 25 books (Table I) provide the pie chart statistic as shown in Figure 1. It is seen that 40% of the pictures display the last quarter Moon, which is incorrect.

The Netherlands wrapping paper analysis (20 different designs, from various firms, department stores and book stores) indicates an even higher level of misunderstanding. The chart in Figure 2 indicates a 65% occurrence of the incorrect last quarter or waning Moon. There is no reason to believe that this statistic is not representative, because examination of a collector's sample of older *Sinterklaas* gift wrap<sup>6</sup> yields the comparable figure of 67% (six out of nine Moon designs incorrect).

It must be concluded that the Dutch are often wrong, both on wrapping paper and in book illustrations; and more often so in the former case. Figure 3 nevertheless presents an example of nice wrapping paper with a correct waxing evening Moon.



Figure 3. Scientifically correct *Sinterklaas* gift-wrapping paper. Credit: Keyzer Co., Wormerveer, The Netherlands: type 090011 (reproduced with permission).

The US research was carried out during November 2010–January 2011, in New England and in Los Angeles: also here roughly two dozen book stores, stationery stores, pharmacies and department stores were visited. In addition, samples of commercially available wrapping paper and Christmas cards were inspected on the internet. Thirty-three Moon scene images selected from 30 different books (Table III) provide the pie chart statistic as shown in Figure 4. It is clear that most of the time (70%) a full Moon is drawn, but it should be noted that 17 of the 30 inspected books were renditions by various illustrators of the poem *A visit from Saint Nicholas*. Inspection of illustrated editions of this poem<sup>7</sup> from the 19th and early 20th century indicates that the full Moon is indeed shown very frequently, throughout the lifetime of this poem. Whereas the text does not explicitly mention the full Moon, that Moon phase may have become implicitly "attached" to its lines over the years: the full Moon moreover provides a nice background for sleigh and reindeer.... Nevertheless, in several American books an incorrect waning or third quarter Moon is seen accompanying stories involving children in evening scenes, or illustrating Santa with a full sleigh, i.e., at the beginning of a night's work. The booklet, *The Night before Christmas in California* (Smith & Egan, 1992) displays two different Moons (full and waning) during one and the same evening....

With only a few exceptions, wrapping paper and Christmas cards sold in the USA (book

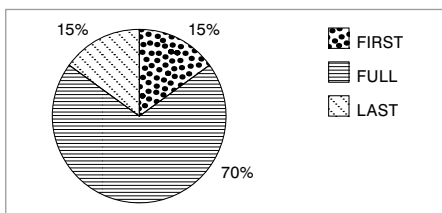


Figure 4. USA book statistics.

stores, general and department stores, stationery stores and pharmacies: single cards and boxed sets) were found to display full Moons, with or without Santa. The UNICEF card referred to in the Introduction represents one of the incorrect cases. Also a 2010 Holiday Delices set (cookies), sold by a famous (Fifth Avenue) department store, was found displaying a last quarter Moon at the beginning of a night of hard work by Santa and his crew. It must be concluded that the Americans are occasionally wrong, but not as frequently as the Dutch.

#### Other events

Other relevant happy outdoor evening events include Trick-or-treat (Halloween, the eve of Old Hallows) and Sint Maarten (Saint Martin), widely celebrated each year respectively in the USA, the UK, and Canada (31 October) and the Netherlands, Belgium, France, and Germany (11 November). Often carrying lanterns and costumed, children go from home to home, begging for candy or money. Short songs about Sint Maarten are performed, whereas trick-or-treat is obviously accompanied by an innocent threat to the home owner's property. Given that these are early evening activities, then any Moon depicted should be waxing, first quarter, or full. With reference to Table IV, inspection of eleven American trick-or-treat books indicated five cases (45%) of an incorrect last quarter Moon, one first quarter, and five full Moons. Three Dutch books dealing with Sint Maarten all showed the incorrect last quarter Moon. Two of these, however, were translations from German and Swiss editions: it is conceivable that the misunderstanding or lack of knowledge is global.

Finally, the well known classic children's book *Goodnight Moon* (Brown & Hurd, 1947) displays a correct full (evening) Moon, while the various Moon phases are also correctly dealt with in the classic *Moon Man* (Ungerer, 1967). On a last note, however, several titles in the Good Night Our World boardbook series ([www.goodnightourworld.com](http://www.goodnightourworld.com)), where children say good-

night to their city or region, display incorrect waning moons.

#### Discussion

We have established that illustrators and designers draw Moons *ad libitum*, according to their taste, but that these illustrations are often astronomically incorrect. The most common mistake is to show the early morning waning Moon in an evening scene. Our research focussed on *Sinterklaas*, Santa Claus, and Christmas scenes, with a short side trip to Sint Maarten and Halloween. The apparent lack of knowledge concerning the physics of the Moon phases is most likely widespread and not just limited to the countries examined here. Further investigations are however outside the scope of the present research. We note in passing that also the psyche could play a role: people may for instance be more inclined to draw Moon crescents which are open to the right, i.e. northern hemisphere waning Moons.

Naturally, the question arises: so what, who cares? The errors are innocent, somewhat comparable to incorrectly drawn rainbows, with the red colour at the inside of the arc. Now, watching beautiful natural phenomena like rainbows and Moon crescents is one thing, but understanding them makes them a whole lot more interesting. Moreover, understanding leads to knowledge which lasts. A tiny bit of insight, leading to the conclusion that the full Moon, being opposite the Sun, rises when the Sun sets and sets when the Sun rises, so that first quarter Moon, being at  $\sim 90$  degrees, sets around midnight, and that last quarter Moon, at  $\sim 270$  degrees, rises around that time, is required to avoid making the reported mistakes. The Halloween, Sint Maarten, *Sinterklaas*, and Santa Claus settings provide wonderful opportunities for Moon phase education<sup>8</sup>, through simple naked eye observations. If this paper stimulates that education and leads to improved understanding, we would all be pleased. "You better watch out" is often heard in the December month: it should also be taken literally....

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#### Notes

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- [www.jacquelawson.com](http://www.jacquelawson.com)
- <http://www.learner.org/resources/series28.html>
- The widely known poem, with credit to Clement Clarke Moore, can be found for instance on <http://poets.org/viewmedia.php/prmMID/19286> (retrieved 7 January 2012). The site <http://rpo.library.utoronto.ca/poem/1312.html> (retrieved 7 January 2012) attributes it to Henry Livingston, Jr., following research published in 2000 by Donald Foster. A critical assessment of the authorship case can be read on <http://www.common-place.org/vol-01/no-02/moore/> (retrieved 7 January 2012)
- <http://www.astro.rug.nl/~pdb/santa.html> (retrieved 7 January 2012)
- <http://www.Sinterklaaspapier.nl>
- <http://www.iment.com/maida/familytree/henry/illos/editions/index.htm>
- Useful Moon phase education webpages are maintained by NASA and by NOAO: <http://www.jpl.nasa.gov/education/index.cfm?page=123> (retrieved 7 January 2012) and <http://www.noao.edu/education/phases/> (retrieved 7 January 2012). Excellent moon phase activities can be found on <http://www.dennisschatz.org/activities.html>

#### Biography

**Peter Barthel** is astronomy professor at the Kapteyn Institute, University of Groningen in the Netherlands. In 2008, together with his team, he won the national Dutch science communication contest. Since the International Year of Astronomy 2009 he has been collaborating with the professional pianists Elies van der Heiden and Siebert Nix in the project *Keys to the Stars*, merging astronomy and music.