

PHASES OF THE MOON: A STUDY OF 19TH CENTURY SCIENTIFIC BOOK  
ILLUSTRATIONS

PROVIDING A COMPREHENSIVE CATALOGUE  
FOR THE FIRST THREE EDITIONS OF  
JAMES NASMYTH & JAMES CARPENTER'S  
*THE MOON: CONSIDERED AS A PLANET, A WORLD, AND A SATELLITE*

by

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## ABSTRACT

Phases of The Moon: A Study of Nineteenth Century Scientific Book Illustrations,  
Providing a Comprehensive Catalogue for The First Three Editions of James Nasmyth  
and James Carpenter's *The Moon: Considered as a Planet, a World, and a Satellite*

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James Hall Nasmyth (1808–1890) was an accomplished engineer and amateur astronomer. The culmination of Nasmyth's drawings from telescopic observation, the advent of photomechanical print processes, and his interest in the causative features of the lunar surface, led to the 1874 publication of *The Moon: Considered as a Planet, a World, and a Satellite*. This thesis provides a comprehensive catalogue of the lunar illustrations in the first three editions, revealing the aesthetic variations in the illustrative plates due to reproduction and print processes used. These processes include: engraving, photogravure, heliotype, lithograph, chromolithograph, and four different variations of the Woodburytype. The editions are contextualized using scientific photographs as illustrations, through a discussion of astronomy, book production, and Nasmyth's biography. Through an examination of Nasmyth's use of photography and permanent print processes, this thesis argues that his lunar illustrations remain an important scientific contribution.

## ACKNOWLEDGEMENTS

This thesis is dedicated to my father, Dr. Robert Douglas Ramsey, who shared his passion in the arts and sciences with such enthusiasm that I could not possibly escape it. To my mother, Deborah Lyn Hunter Ramsey, who was careful to educate both my eye and my heart. It is from them that I have acquired the beautiful technique of reasoning, and also the obsession with requiring constant instructive activity. I am a better scholar, and woman, for having them in my life.

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Kelley Wilder (programme leader of the MA in Photographic History and a member of the Photographic History Research Centre at De Montfort University), Sophie Hackett (associate curator, photography at Art Gallery of Ontario), and of course Lori Pauli.

I would like to express my sincere gratitude to all of those who have assisted me during my visits to the various institutions: New York Public Library, Toronto Public Library, Visual Studies Workshop, Thomas Fisher Rare Book Library, Buffalo and Erie Public Library and the Art Gallery of Ontario. To my colleagues at the Edward Bortynsky Studio, who were always open to discuss ideas, and whose support and encouragement have truly enlightened me.

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This is also dedicated to the Secret Scholar Society, you know who you are.

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It is very strange, that amidst all our vaunted improvements in education, the faculty of comparison by sight, or what may be commonly called *the correctness of eye*, has been so little attended to. Drawing is, the Education of the Eye. It is more interesting than words.  
It is graphic language." - James Hall Nasmyth

## INTRODUCTION

The focus of this thesis is a scientific publication titled *The Moon: Considered as a Planet, a World, and a Satellite*, first published in London in 1874, and co-authored by James Nasmyth (1808–1890) and James Carpenter (1840–1899). At the time of publication, much had been written on the topography and the intricate movements of the moon, but with very little written to help illustrate the physiography and causative phenomena of its features. Nasmyth's and Carpenter's observations led them to the conclusion that the moon's topography was the result of volcanic energy that was manifested in its characteristic craters.

Nasmyth spent thirty years making sketches of his telescopic observations with chalk, drawing the lunar features at different phases of the moon in order to capture the changes in shadow, thereby determining the elevations of the moon's surface. He later translated these sketches into plaster models, which he then photographed. Photographic technology, due to the long exposure times and the relatively insensitive materials available; did not allow photographers to record minute details of the lunar surface. Furthermore, even if it were possible, any one photograph of the moon taken normally in its full phase, would reveal a very flat surface given the incident light. While many later scholars have criticized Nasmyth's photographic illustrations as false or science fiction based largely on their construction, these plaster models made from various observations over a long period of time, were a standard method of visual communication during his lifetime.

The first edition (published in 1874) includes illustrations produced through a

variety of permanent print processes: engraving, photogravure, heliotype, Woodburytype and lithographic prints.<sup>1</sup> In the subsequent editions of 1874 and 1885, there is an evident shift towards the sole use of the Woodburytype process for the illustrations.

The main purpose of this project is to identify the changes in each edition resulting from the shifts in the photomechanical processes used. This thesis also acts as an authentication of print processes and a comprehensive catalogue of the first three editions, including digitized reproductions, which, for the first time, brings the plates from all three editions together for comparison. Because many of the changes in the illustrations are due to the shift in the photomechanical processes used, I provide microscopic reproductions of each process to aid in their identification. The plates from these books, like many others, are currently being removed from their original contexts, as scientific illustrations in the case of Nasmyth's publication, and placed into a space, such as the museum or art gallery, which regards them as art objects or artefacts of an historical process. This thesis helps to preserve the information about the illustrations as they were originally published, and this is contextualized with a literature survey on relevant texts, Nasmyth's biography, scientific illustration in the nineteenth century, and an extensive chapter on print processes.

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<sup>1</sup> Capitalization in photographic nomenclature is generally used for processes derived from inventors' names. In this thesis I will be following the standards set by the Getty Art & Architecture Thesaurus: engraving, photogravure, heliotype, Woodburytype, lithograph, chromolithograph, and Autotype. "Art and Architecture Thesaurus Online," The Getty Research Institute, accessed August 29, 2014, <http://www.getty.edu/research/tools/vocabularies/aat/>.



## 1. LITERATURE SURVEY

This survey was conducted to provide insight into the ways in which James Nasmyth's publication, *The Moon: Considered as a Planet, a World, and a Satellite* has been discussed in contemporary literature. The essays and reviews written during Nasmyth's lifetime are considered primary sources in this thesis, and will be discussed throughout the subsequent chapters. It begins with a review of history of photography books (with a focus on scientific imagery), books on the history of photomechanical reproduction, followed by a review of academic texts, which specifically discuss Nasmyth's publications. The survey concludes with a brief overview of photomechanical manuals.

### **a. History of Scientific Photography and Photomechanical Reproduction**

In the foreword in his publication *The History of Photography from 1839 to the Present* (5th edition, 1982), Beaumont Newhall outlines the idea that photography is both science and art.<sup>2</sup> His approach to discussing photography is to emphasize its contribution to the visual arts as a form of communication and expression. Newhall announces that he will not be discussing the scientific theory of the photographic processes, which makes his publication the first to treat photography with a view other than a technical development perspective.<sup>3</sup> In the chapter "For the Printed Page," Newhall acknowledges the immediate link of photography to the printing press and praises the now obsolete

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<sup>2</sup> Beaumont Newhall, *The History of Photography from 1839 to the Present*. 5th ed. (New York: Museum of Modern Art, 1982): 7-12.

<sup>3</sup> Newhall's first iteration of this text was published in 1937, preceeding Helmut Gernsheim's *A Concise History of Photography* (1955) or Raymond Lecuyer's *Histoire de la photographie* (1945), that treated photography in the same way.

process of the Woodburytype as the finest ever process for reproducing photographic facsimiles using ink.

In contrast, editors Elizabeth Edwards and Janice Hart in their book *Photographs Objects Histories: On the Materiality of Images* (2004), present photographs as not only images but as objects. Thinking about photographs as material objects has an impact on the way in which they are understood, collected, and presented. The information compiled from each of these representative publications, when applied to Nasmyth's photomechanical plates, will help to further the discussion of scientific, photographic objects within institutions in which such items are collected.

The most comprehensive history of photography in the field of science is Ann Thomas' publication *Beauty of Another Order: Photography in Science* (1997). It is comprised of a collection of essays from several authors situating scientific images within the context of art and science.<sup>4</sup> It begins with an analysis of scientific drawings preceding photography, introduces the history of photography and its many developments, then discusses the many images Thomas describes in her foreword as: "...'faithful and unerring' but which were not, as well as those subjects thought to be too fast, too small, too vast or too distant to be captured on film."<sup>5</sup> In the chapter "Capturing Light: Photographing the Universe," Thomas considers Nasmyth's images as primarily scientific illustrations stating: "These models and the attempted simulations, simplistic as they may

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<sup>4</sup> These authors are as follows: Ann Thomas, Marta Braun, Mimi Cazort, Martin Kemp, John P. McElhone, and Larry J. Schaaf.

<sup>5</sup> Ann Thomas, *Beauty of Another Order: Photography in Science* (New Haven: Yale University Press, 1997): 9.

appear to us now, followed sound scientific principles of producing laboratory models which could be observed under controlled conditions."<sup>6</sup>

Kelley Wilder's book, *Photography and Science* (2009), also discusses the relationship between photography and science from a teleological perspective. This book is divided into four chapters: "Photography and Observation"; "Photography and Experiment"; "Photography and the Archive"; and "Art and the Scientific Photograph." As Wilder states in her introduction, these chapters are linked by three themes: the representation of scientific objects or phenomena in pictures; the use of photography to measure phenomena; and the development of photography as a science. Throughout the book, Wilder identifies two important matters of discussion that she characterizes as being inherent to photography: that of 'trust' and of 'illustrating science'. The matter of trust questions the reliability of evidence, or specifically the reliability of photography. The matter of illustrating science discusses how photography is used as an illustrative tool for scientific endeavours. In the section on academic texts that follows, the issue of 'trust' is discussed by contemporary scholars with regard to Nasmyth's plates. In Wilder's chapter entitled "Photography and Experiment," one learns of the possibility for scientific photographs to transcend their original intentions and to be discussed under the aesthetic criteria normally reserved for art objects.<sup>7</sup> It is now through these criteria that Nasmyth's work is collected, exhibited, and discussed.<sup>8</sup>

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<sup>6</sup> Ibid., 205.

<sup>7</sup> Kelley Wilder, *Photography and Science*. (London: Reaktion Books, 2009): 53.

<sup>8</sup> For example, the prints and drawings collection at the Art Gallery of Ontario currently holds four Brooks Day & Son Woodburytypes that, at some point, were removed from either the first or second edition and sold as art objects to the institution. These are plate X - Aristotle & Exodus, plate VIII - Copernicus, plate XV - Mercator & Campanus, plate XVIII - Aristarchus and Herodotus).

## **b. Academic Texts**

In Stella Halkyard's 2013 essay in *PN Review* 209<sup>9</sup>, she discusses the use of photography as a tool for authentication. The structure of the essay includes a brief biography of Nasmyth and his accomplishments, describes the lunar prints in his book (as images), then reveals at the end of the essay that these images are not in fact photographs of the surface of the moon, but rather photographs of plaster models created by Nasmyth. This suspension of disbelief or issue of trust provided by the medium of photography is a common theme when discussing Nasmyth's lunar images.

Out of all the very brief contemporary articles on Nasmyth's work, the most insightful example that actually looks at the prints as objects is the 2006 essay by Frances Robertson, "Science and Fiction: James Nasmyth's Photographic Images of the Moon".<sup>10</sup> Published in the periodical *Victorian Studies*, Robertson focuses on the histories of literature, arts, philosophy, and science during the Victorian period in England. While Robertson's main objective is to provide a full account of the steps taken to develop this publication, she also focuses on the suspension of disbelief when using photography to compile and depict objective evidence. Apart from Thomas, I did not find any contemporary scholars whom support Nasmyth's illustrations as valid scientific artefacts, avoid the 'issue of trust' in photography, and the use of buzz words such as: 'science-fiction,' 'false,' 'fantasy,' 'deceit' and 'disbelief.'

Furthermore, modern scholars seem fixated on the idea that since these photographically based illustrations were not from a negative exposed to the light of the

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<sup>9</sup> Stella Halkyard, "James Nasmyth The Poetics of Space: James Nasmyth and The Moon Considered....," *PN Review* 209 39, no. 3 (2013): inside cover.

<sup>10</sup> Frances Robertson, "Science and Fiction: James Nasmyth's Photographic Images of the Moon," *Victorian Studies* 48, no. 4, (Indiana: Indiana University Press, 2006): 595-623.

moon, but rather from plaster models, this therefore makes the depictions unreliable. It is important to understand, and this is the basis of the thesis's argument, that Nasmyth created these illustrations to depict observational reality, and that they were based on the lengthy processes of direct observation and triangulation, the most accurate methods before the advent of photography; to collect information.<sup>11</sup> Furthermore, new scientific data shows that Nasmyth's illustrations are, in fact, incredibly accurate (Fig. 1).

### **c. Photomechanical Manuals**

The exactness of the photograph, through focus, speed, and use of colour has gradually evolved with the help of technological advancements. This evolution has helped to solidify the issue of trust, and to reinforce the idea that the photograph acts as a conveyor of objective truth. When looking back at historical scientific imaging processes, such as observational drawing, engraving, photogravure or the Woodburytype, it is common to assume that the images are less capable of depicting objective truth when compared to the images we have successfully produced today. To fully understand these historical images, and their importance within the history of visual communication, we must follow the methods of Edwards and Hart and examine them first as objects and in the context in which they were created.

Since the Woodburytype eventually became the primary process for translating Nasmyth's photographs into print, I have focused my attention on the literature of this

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<sup>11</sup> Triangulation is a technique used to further validate the information collected through the cross verification of two or more sources. As stated in the introduction, Nasmyth recorded each lunar feature during different phases of the moon, capturing the changes in shadow. He then compiled this information to create the plaster models.

process. As the manuals will be used as primary sources in chapter 5, I will only list them and describe their methodology in brief.

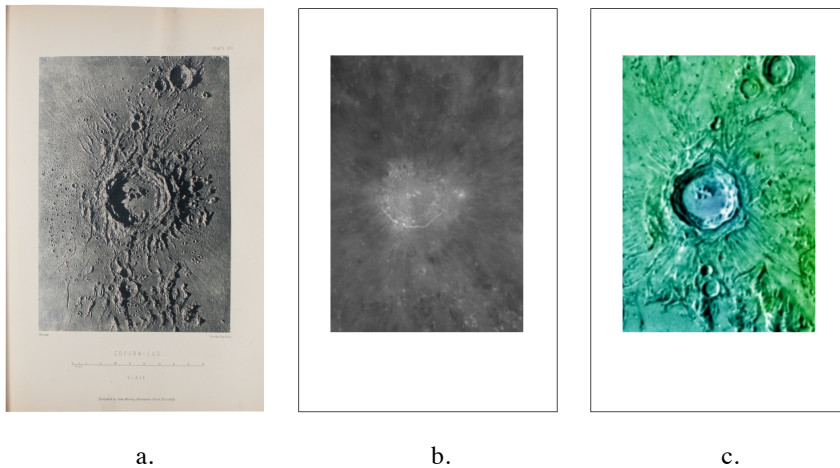
In the chapter "Non-silver processes: Carbon, blueprint, platinum, and a couple of others" in Richard Benson's *The Printed Picture* (2008), we are introduced to the Woodburytype process. Benson highlights the technically difficult, and expensive process in brief detail, identifies the subject matter as mainly portraiture, and emphasizes the permanent qualities of the medium.

In *Practical Photography* (1879) by Owen Edlestone Wheeler, the process of creating a Woodburytype is described practically alongside other photomechanical processes. Wheeler contributes a lengthy résumé of the process, acknowledging the lack of directions given to the public by Walter Woodbury. His text focuses on the visual characteristics of the Woodburytype, rather than the steps taken to create it. The publications *How to Identify Prints: A Complete Guide to Manual and Mechanical Processes from Woodcut to Inkjet* (2004) by Bamber Gascoigne, and *Care and Identification of 19th Century Photographic Prints* (1986) by James M. Reilly, also discuss the Woodburytype with regard to its visual characteristics. The only complete manual for the Woodburytype process is a text written by Barret Oliver in 2006, *A History of the Woodburytype*. This text covers the full history of the Woodburytype, as well as discusses the reason for its short-lived use. None of the sources dealing with the photographic processes venture to introduce the idea of fidelity to the seen object or truthfulness in photography.

I would propose that once Nasmyth's plates have been fully understood as objects, and examined in the context of their original historical intention and publication, the

schema of discussion should be shifted from that of issues of trust or truthfulness, to the more applicable issue of illustrating science.

FIGURE 1



a.) Nasmyth - A Woodburytype, c. 1874, from a photograph of a plaster model of the crater Copernicus, created after many hand drawings of the varying phases of the moon observed over time through Nasmyth's telescope. Plate VIII from the 1st edition of *The Moon*<sup>12</sup>.

b.) Visible Light Photograph - A mosaic of images taken by the Clementine spacecraft, which was launched in 1994, of the crater Copernicus. This is a black-and-white digital photograph that documents what you would see if you were in orbit around the moon. You will notice a 'flatness' due to the incident light. This composite imagery was prepared by the U.S. Geological Survey (USGS) in 2009.<sup>13</sup>

c.) Elevation - A lunar terrain map of the crater Copernicus, generated by the USGS in conjunction with the Unified Lunar Control Network, using stereoscopic pairs calibrated with LIDAR<sup>14</sup> to generate a digital elevation model, and to render this information into a shaded relief map using a digital airbrush technique, also known as photogrammetry. This map is color-coded by altitude (2009).<sup>15</sup>

Notes: As you can see, Nasmyth's illustration from plaster model is very similar to what we have been able to illustrate using the digital elevation model derived from stereo pairs provided by orbital platforms around the moon, which are accepted as visual evidence today.

<sup>12</sup> Currently in the Visual Studies Workshop Collection, Rochester, New York.

<sup>13</sup> "About Google Moon," Google, accessed July 19, 2014, <http://www.google.ca/moon/about.html>.

<sup>14</sup> LIDAR measures elevation data with a laser

<sup>15</sup> "The Unified Lunar Control Network 2005," USGS, accessed July 19, 2014, <http://pubs.usgs.gov/of/2006/1367/>.



## 1. NASMYTH

The importance of observation as an aid to either scientific or artistic endeavours is a theme that is referred to in almost every chapter of James Nasmyth's autobiography,<sup>16</sup> and also one that is of primary importance throughout this thesis.

Nasmyth was born on August 8, 1808 in Edinburgh, Scotland. His father Alexander Nasmyth (1758–1840), was an accomplished landscape painter who first introduced James to the importance of the arts. Nasmyth was an ambidextrous child, exhibiting mechanical prowess at a young age. He remembered first looking at the moon with his father's Ramsden "spy-glass" in 1820,<sup>17</sup> which surely planted the seed for his astronomical ventures when he was only twelve years of age.

Photography was introduced to the public commercially in 1839 when Nasmyth was thirty-one years old. Like a few others, this was not his first introduction to the process. In his essay "The First Photograph James Nasmyth Ever Saw," Larry J. Schaaf discusses a positive photographic print (the process unknown), in one of Nasmyth's personal albums.<sup>18</sup> Taken by Paul-Gustave Froment (1815–1865), it is printed on a scrap piece of yellowed paper, measures approximately 12 x 12 cm and depicts Parisian rooftops.<sup>19</sup> The date inscribed on the photograph (1835), predates the accepted "birth of photography" and is the main discussion of his essay.<sup>20</sup> This photograph is considered to

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<sup>16</sup> James Nasmyth, *James Nasmyth Engineer, An Autobiography* (London: John Murray, 1883): vii, 51, 58, 131, 147, 235, 316, 330, 353.

<sup>17</sup> Ibid., 103.

<sup>18</sup> Larry J. Schaaf, "The First Photograph James Nasmyth Ever Saw," *Scottish Photography Bulletin* 2 (1990): 15–22. The album is held at the National Library of Scotland.

<sup>19</sup> There is a wonderful reproduction of this photograph in Schaaf's essay, Ibid., 16.

<sup>20</sup> Schaaf discusses the validity of the 1835 date and explores the provenance.

be one of the earliest examples of photography in existence, and possibly inspired Nasmyth's interest in photography.

In 1842, at the age of thirty-four, Nasmyth patented his invention for a steam hammer, perhaps the most famous of his many mechanical innovations. Immediately following his successful patent, Nasmyth constructed a telescope with a twenty-inch speculum in order to pursue his interest in astronomy. Nasmyth was able to retire from working as an engineer in 1856 to a home in Penshurst, Kent, which he and his wife affectionately named 'Hammersfield' and where Nasmyth continued to work on his celestial observations. Apart from his studies on the moon, Nasmyth observed and recorded varying patterns on the surface of the sun, which allowed him to hypothesize that the heat produced was distributed unevenly through space, therefore creating fluctuations depending on the earth's spatial position, and thereby explaining the glacial period of our earth.<sup>21</sup>

Nasmyth's first drawings of the moon were made as early as 1842, and were first exhibited in Edinburgh at a meeting of the British Association for the Advancement of Science in 1850.<sup>22</sup> The first public presentation of photographs of Nasmyth's models took place in 1856 at the Manchester Photographic Society Exhibition.<sup>23</sup> Entitled "Portions of the Moon's Surface, from Models by James Nasmyth, Esq."<sup>24</sup> the photographs are attributed to Joseph Sidebotham (1824–1885).<sup>25</sup> Sidebotham was known for his mastery

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<sup>21</sup> This theory was further developed from 1914–1918 by Serbian geophysicist and astronomer Milutin Milanković, and is now known as the Milankovic cycles.

<sup>22</sup> William Jay Youmans (ed.), "Sketch of James Nasmyth," *Popular Science Monthly* 51, (1897): 117–123.

<sup>23</sup> In Frances Robertson's "Photography and the SFX of the Moon Landscape", she mentions Sidebotham's photographs and that they were published in 1852 in the *Strines Journal* with the title "The Moon and it's Surfaces".

<sup>24</sup> This photograph may be from the same model as shown in Fig. 2 a, b, and d. on page 24.

<sup>25</sup> Sidebotham's youngest son was named James Nasmyth Sidebotham.

of the waxed paper negative process and many of his photographic contributions to the Society are identified as such. Like many others, he later converted to the wet-plate collodion process.<sup>26</sup> The photograph of Nasmyth's model exhibited in 1856 is an example of his earliest contribution of this wet-plate process. Two years later, in 1858, Nasmyth learnt the wet-plate collodion process and began making his own salted paper prints from glass plate negatives<sup>27</sup>.

Although Nasmyth carved out a place in the history of photography within the realm of scientific illustration, rather than of artistic production, his contribution to the field of visual culture is an important one. As Wilder observes in *Photography and Science*, "...pre-photographic scientific observation required not only years of painstaking acquisition of skill, but an innate genius for concentration and attention to detail. Photography promised these skills to those who lacked such training."<sup>28</sup> Nasmyth's work lies on the perfect cusp of trained observation, photography, and permanent print processes.

In 1864, Sir John Herschel (1792–1871)<sup>29</sup> and his daughter Isabella (1831–1893), visited Nasmyth at Hammersfield, where Nasmyth entertained them with his many demonstrations that aimed to explain the formation of the lunar surface. One experiment was the cracking of a glass globe, which was first filled with water, then hermetically sealed. The water inside was then heated and upon expansion the glass globe would crack

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<sup>26</sup> Roger Taylor and Larry J. Schaaf, *Impressed By Light: British Photographs From Paper Negatives, 1840-1860*. (New York City: Metropolitan Museum of Art, 2007): 371.

<sup>27</sup> All of the extant photographic prints of Nasmyth's models are salted paper prints from a collodion negative. There are a few existing examples labelled as 'Calotypes' which is the term used for paper negatives, and this designation would indicate that the salted paper prints are from the waxed calotype negative process. From my research, however, I would argue that the salted paper prints are from the wet-plate collodion process. (Fig. 2)

<sup>28</sup> Wilder, *Photography and Science*, 18

<sup>29</sup> Astronomer and experimental photographer who invented the Cyanotype and coined the term 'photography' in 1839. A Brazilian named Hércules Florence used the term 'photographie' in 1834.

producing radiating lines from one point of tension, very similar to those observed on the surface of the moon.<sup>30</sup>

Nasmyth's many experiments and acute observations resulted in the most exact representations of the lunar surface to be published in his lifetime. James Hall Nasmyth passed away on May 7, 1890 at the age of eighty-two, only five years after the 3rd edition was published.

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<sup>30</sup> This experiment was photographed, and appears as a heliotype in plate XIX in the first edition, see p. 76.

### 3. THE BOOK

COLLINGWOOD, *March* 10, 1871.

MY DEAR SIR - A great many thanks for the opportunity of securing your most exquisite photographs from the models of lunar mountains. I hope you will publish them. They will create quite an electric sensation. Would not one or two specimens of the apparently non-volcanic mountain ranges, bordering on the great plains, add to the interest? Excuse my writing more, as I pen this lying on my back in bed, to which a fierce attack of bronchitis condemns me. With best regards to Mrs. Nasmyth, believe me yours very truly,

J.F.W. HERSCHEL.<sup>31</sup>

Nasmyth began work on the publication of *The Moon* following the receipt of this letter from Sir John Herschel in 1871.<sup>32</sup> The tedious tasks of photographing the models and sending the glass plate negatives to the various printmakers were all done by Nasmyth.<sup>33</sup> The writing for the book was completed with the help of James Carpenter, a British astronomer at the Royal Observatory in Greenwich. While the original drawings that Nasmyth had created as references for the plaster models were objective observations of the lunar surface as seen through a telescope, that will be explained further in the included preface; the resulting plates were used as reference material in this publication

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<sup>31</sup> Nasmyth, *Autobiography*, 393.

<sup>32</sup> Herschel died only two months after sending this letter on May 11, 1871. Ibid., 393.

<sup>33</sup> 1st edition printmakers: Theodore Oldham Barlow for the engraving and mezzotint; J.H. & F.C. McQueen for the photogravure and aquatint; Heliotype Co. for the heliotype; Unknown printer for two of the Woodburytypes; Vincent Brooks Day & Son for the lithographs, chromolithograph and eleven Woodburytypes.

to help support and illustrate the volcanic theory in regards to the origin of the crater-riddled surface of the moon.

At the time of their publication, Nasmyth's illustrations were held in the highest regard by both the public and the scientific community. In the 1874 review published in *Nature*, J. Norman Lockyer states: "No more truthful or striking representations of natural objects than those here presented have ever been laid before his readers by any student of Science; and I may add that, rarely if ever, have equal pains been taken to insure such truthfulness."<sup>34</sup> In Nasmyth's autobiography, he mentions a letter he received from Isabella Herschel, the daughter of the late eminent astronomer Sir John Herschel, that describes the illustrations as: "perfectly enchanting photographs, which, I think, one could never be tired of looking at." The creation of the illustrations used in *The Moon* were described in detail by Nasmyth in the preface to the book:

During upwards of thirty years of assiduous observation, every favourable opportunity has been seized to educate the eye not only in respect to comprehending the general character of the moon's surface, but also to examining minutely its marvellous details under every variety of phase, in the hope of rightly understanding their true nature as well as the causes which had produced them. This object was aided by making careful drawings of each portion or object when it was most favourably presented in the telescope. These drawings were again and again repeated, revised, and compared with the actual objects, the eye thus advancing in correctness and power of appreciating minute details, while the hand was acquiring, by assiduous practice, the art of rendering correct representations

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<sup>34</sup> Norman J. Lockyer, "The Moon," *Nature* 9 (12 Mar. 1874): 358-61.

of the objects in view. In order to present these Illustrations with as near an approach as possible to the absolute integrity of the original objects, the idea occurred to us that by translating the drawings into models which, when placed in the sun's rays, would faithfully reproduce the lunar effects of light and shadow, and then photographing the models so treated, we should produce most faithful representations of the original. The result was in every way highly satisfactory, and has yielded pictures of the details of the lunar surface such as we feel every confidence in submitting to those of our readers who have made a special study of the subject. It is hoped that those also who have not had opportunity to become intimately acquainted with the details of the lunar surface, will be enabled to become so by aid of these illustrations. In conclusion, we think it desirable to add that the photographic illustrations above referred to are printed by well-established pigment processes which ensure their entire permanency.<sup>35</sup>

It was due to Nasmyth's superior talent in observation and visual communication, that this book was exceptionally persuasive in terms of its theories and unfortunately perpetuated a misconception for almost 100 years. The discourse surrounding the origin of lunar craters began in 1609 when Galileo first discovered them. Since that time, the widely accepted volcanic theory advanced by the work of both Sir William Herschel (1738–1822) and his son Sir John Herschel, was that these lunar craters were volcanic in origin. The volcanic theory was supported through the comparison of lunar craters to

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<sup>35</sup> James Nasmyth and James Carpenter, *The Moon: Considered as a Planet, a World, and a Satellite*. 1st ed. (London: J. Murray, 1874): vii - ix.

similar geological features on the surface of earth. Large impact craters found on earth are rare, and until the twentieth century were poorly understood and usually misidentified. Most impact craters have been obscured due to erosion, burial or plate tectonics. Robert Hooke (1635–1703), Curator of Experiments at the Royal Society, was the first to suggest that the lunar craters might have been created through some kind of impact rather than through volcanic activity.<sup>36</sup>

In 1873 (a year before Nasmyth's publication), Richard A. Proctor (1837–1888) further advanced this impact theory in his book entitled *The Moon: Her Motions, Aspect, Scenery, and Physical Condition*.<sup>37</sup> The illustrations in Proctor's book included photographs of the moon by Lewis M. Rutherfurd (1816–1892), as well as many diagrams, one early drawing by Nasmyth, and two drawings of a lunar landscape. Proctor was aware of the poor reception of his publication (which was soon to be eclipsed by Nasmyth's), so he published a revised edition in 1878, that simplified many of his ideas and excluded the impact theory altogether.<sup>38</sup> It was not until 1969, when the Apollo 11 space mission brought back geologic samples from the moon, that the impact theory gained credibility,<sup>39</sup> and the volcanic hypothesis was finally abandoned.<sup>40</sup>

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<sup>36</sup> Robert Hooke, *Micrographia or Some Physiological Descriptions of Minute Bodies* (London: Cosimo Inc., 2007): 243. Originally published in 1665.

<sup>37</sup> Richard Anthony Proctor, *The Moon: Her Motions, Aspect, Scenery, and Physical Condition* (London: Longmans, Green, and Company, 1873).

<sup>38</sup> In the preface to the second edition Proctor states: "Although I have had no occasion to be dissatisfied with the reception given to the first edition of this work, yet I have found reason to believe that portions of the original work were too difficult for the general reader. I have therefore removed from the present edition the matter relating to details of the lunar theory..."

<sup>39</sup> The impact theory was gaining ground prior to Apollo 11; For example the work of Gene Shoemaker on the Ries Impact crater in Germany & the Barringer a.k.a. Meteor Crater in Arizona, and William K. Hartmann's work on the impact theory. See the essays in W.K. Hartmann, R.J. Phillips and G.J. Taylor, eds. *Origin of the Moon*, (Houston: Lunar and Planetary Institute, 1986).



In 1858 only two plaster models were documented (Fig. 2) with the aid of photography. While photographic studies of these early models exist in collections today, they were not prepared for illustrative use in the publication. A minimum of eighteen additional plaster models (corresponding to the eighteen different views shown in book) were created between 1858 (when he learnt the wet-plate collodion process) and 1871, when Nasmyth began the systematic process of photographing them and sending the glass negatives for printing. Only two of the eighteen later plaster models are known to have survived, and are currently on display at the Science Museum in London. I have been able to connect one of the surviving models with plate IX in the first edition (Fig. 3).

The first edition of Nasmyth's *The Moon* was published by John Murray<sup>41</sup> in November of 1874.<sup>42</sup> This edition includes seven different printmaking processes from six print companies,<sup>43</sup> including two different variants of the Woodburytype, one of which is unidentified, and the other printed by Brooks Day & Son.<sup>44</sup>

The first edition sold out quickly, resulting in a second edition published within a month (1874).<sup>45</sup> The second edition reduced the number of processes used to five,<sup>46</sup>

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<sup>40</sup> It is interesting to note that once astronomers started to accept the impact theory in regards to the moon, there was a paradigm shift in explaining the earth's history. Take for example the Alvarez hypothesis that was published only ten years later in 1980 that states the extinction of the dinosaurs was caused by a large impact of an asteroid or meteor.

<sup>41</sup> John Murray III (1808–1892) of Albemarle Street, London. This firm also published Charles Darwin's *On the Origin of Species by Means Selection* (1859).

<sup>42</sup> The print run of the first and second editions in 1874 were 1500 copies, both in quarto (4to) and were sold at 30/-; the third edition in 1885 printed 1000 copies in 8vo (octavo) and were sold at 21/-. This information is derived from the John Murray Archive: Ledger G Folio 376.

<sup>43</sup> These comprised of one line engraving, five aquatinted photogravures, four heliotypes, one lithograph, one chromolithograph, two unidentified Woodburytypes and eleven Brooks Day & Son Woodburytypes.

<sup>44</sup> Brooks Day & Son held the British Woodburytype patent from 1870 to 1872.

<sup>45</sup> The first and second editions sold for £1.10s in 1874, which equates to approximately £774.31s or \$1285.32 USD today. In 2013 the first edition sold at auction by Christies for \$1625.00. The original price of the books was found in this publication: Henry Sotheran, *Sotheran's Price Current of Literature* (London: Henry Sotheran & Co., 1816): 104.

removing the heliotype and the photogravure (perhaps due to the poor image quality produced by these processes). During the initial production of the first edition, a number of Brooks Day & Son Woodburytypes were left over and that were then re-used and tipped in to the second edition.<sup>47</sup> Woodburytypes prepared by The Photo Relief Company replaced the plates that had previously been printed using the heliotype and aquatinted photogravure process.<sup>48</sup> The third edition, published in 1885,<sup>49</sup> a reproduction of the first two editions, is comprised solely of second generation Woodburytypes printed by the Woodbury Permanent Photographic Printing Company,<sup>50</sup> and is almost half the size of the first two editions.<sup>51</sup> A fourth edition was published in 1903, illustrated completely using the halftone process.<sup>52</sup> The fourth edition and all other subsequent editions, including all digitized versions and reprints, will not be discussed, as they are out of bounds of my focus.

We can speculate that Nasmyth or his publishers may have wanted the third edition to be smaller, therefore less expensive than the previous editions, in order for the

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<sup>46</sup> The second edition is comprised of one line engraving, one lithograph, one chromolithograph, eight Brooks Day & Son Woodburytypes and twelve Woodburytypes printed by the Photo Relief Company.

<sup>47</sup> Plates VI, VIII, IX, X, XI, XV, XVII, XVIII. Eight of the eleven Brooks Day & Son Woodburytypes from the first edition were used in the second edition. The two plates not carried over (III and IV) are the photograph of the moon by Warren de La Rue and the accompanying Picture Map, which was reprinted by The Photo Relief Company.

<sup>48</sup> The Photo Relief Company took over the British Woodburytype patent from 1872 through 1878.

<sup>49</sup> In 1885 Walter Woodbury became very ill and was quite destitute. This is when the Woodbury Fund was created and many colleagues and previous customers were urged to publish works to provide an income for Woodbury. There is no evidence that Nasmyth published his third edition for this purpose, however, the timing seems suggestive. A large sum of money was successfully raised as were the hopes of his friends, unfortunately Woodbury passed away later that year.

<sup>50</sup> The Woodbury Permanent Photographic Printing Company held the Woodburytype patent from 1878 to 1885.

<sup>51</sup> The closed dimensions of the 1st edition are 22.5 x 29.3 x 3.8 cm; those of the 2nd edition, 22.5 x 29.3 x 3.8 cm; and those of the 3rd edition, 16.5 x 22.8 x 3.8 cm. The 1st and 2nd editions are Quarto, and the 3rd edition is Octavo.

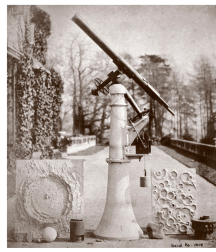
<sup>52</sup> A fourth edition was published in 1903 by John Murray and was illustrated exclusively by means of the halftone process. It is Octavo sized and has a blue wrapped hardcover with a gold leaf moon.

book to be available to a wider audience. Given the photographic technology of the time, the production of smaller photographic prints made from the plaster models of the moon would have meant that Nasmyth would need to produce a new set of smaller glass plate negatives. However, a close inspection of the Woodburytypes in the third edition reveals that Nasmyth's signature is visible as a part of the image, meaning that the plates were made from an earlier signed Woodburytype or other process from either the first or second edition, by photographing the original plates and creating reproductions or second generation Woodburytypes. Furthermore, the image-loss evident in the images of the third edition is typical of the effect produced as a result of reproduction (Fig. 4).

This suggests that the Woodburytypes in the third edition are in fact produced from photographic copies taken of Woodburytypes, or, depending on the plate copied, from the other various processes used in the first or second editions of the book, and were not derived from a second set of photographs made from the plaster models. The reasons for Nasmyth's use of copy photographs in the third edition could have been more practical in nature than a desire to produce a smaller book for a larger audience. While it is not known why the copy photographs were made, it is likely that the plates used for the printing of the first and second editions of the book were either lost or destroyed. In addition it may have been that most the plaster models had already been destroyed by the time of publication in 1885 and were thus unavailable to be photographed for the third edition. It also may have been simply more efficient for the printer to make photographic copies from the previously published editions rather than having to make new photographs from the plaster models.

Throughout the three editions there are obvious layout differences. Many of the plates have been rotated, reversed, or are a different tone or colour. These changes can all be explained by the shift in processes used, rather than due to an aesthetic choice made by the authors. These changes will be more fully explored in chapter five that examines photomechanical processes, and are documented in the catalogue.

FIGURE 2



a.



b.



c.



d.

a. Science Museum Group, photographic print; Calotype  
 Maker: Nasmyth, James; Place made: Penshurst, Kent, England, United Kingdom  
 Date Made: "March 24, 1858" Materials: paper; card; image: 21.4 cm x 19 cm

b. Science Museum Group, photographic print;  
 Maker: Nasmyth, James Date Made: June 10, 1858 Materials: paper; card; glass;  
 "A Bit of the Moon! By James Nasmyth June 10, 1858" image: 23.6 cm x 16.6 cm

c. J. Paul Getty Museum Record:  
 Unknown English, late 1850s Salt from a collodion negative, 13 cm x 16.5 cm.  
 "Photograph of the moon, Calotype made by Sir John Herschel 1842, one of the earliest photographs on"  
 Once owned by J. Herschel

d. J. Paul Getty Museum Record:  
 Unknown English, late 1850s Salt from a collodion negative  
 "Moon landscape, Calotype by Sir John Herschel 1842" 6.98 cm x 10 cm  
 Once owned by J. Herschel

Notes: The information provided above is taken from the original catalogue records found in online archives<sup>53</sup>. Nasmyth learned the collodion process, making these salted paper prints (not calotypes). The two prints that were in Herschel's collection, c. and d. (both rotated 90° counter clockwise), are from the same models pictured above with the telescope. These models / prints are early studies, and do not appear in the 1874 publication. The captions for the two images, which have been rotated incorrectly, leads me to assume that someone who was unaware of the correct orientation wrote them on at a later date. This accounts for the wrong date and attribution.

<sup>53</sup> Interesting to note that the two Getty records (c and d above) originally stated that these were calotypes, created by Herschel. Since my inquiry they have changed the record to the above.

FIGURE 3



a. and b. (detail) Collection: Science Museum: London  
 Object Name: model - representation; Maker: Nasmyth, James  
 Place Made: Penshurst, Kent, England, United Kingdom  
 Date Made: 1850-1871  
 Materials: complete; plaster; pine (wood); Measurements: overall 58 X 47.5 cm.

c. Collection: Science Museum: London  
 Object Name: black-and-white prints (photographs)  
 models (representations); lunar crater models; Maker: Nasmyth, James, 1808-1890  
 Place Made: England, United Kingdom  
 Date Made: 1850-1871  
 Materials: paper; card; complete; Measurements: overall mount: 27.5 x 22.5 cm

d. Collection: SCM - Astronomy  
 Object Name: black-and-white prints (photographs)  
 models (representations); lunar crater models; Maker: Nasmyth, James, 1808-1890  
 Place Made: Manchester, England, United Kingdom  
 Date Made: 1850-1871  
 Materials: paper; card; complete; Measurements: overall (mount): 21 x 17.5 cm

e. 1st Edition - Visual Studies Workshop Collection  
 Title: Plate IX, THE LUNAR APENNINES, ARCHEMEDIES &c. &c.  
 Dimensions: 19.9 x 16.2 cm.  
 Date: [1871 - 1872]  
 Process: Woodburytype; Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: These are the catalogue records from the institutions, apart from (e) which I have compiled (the cataloguing information is explained in chapter 7.1 of the thesis). Note the variant lighting on (c), (d) and (e), which indicates that Nasmyth made several photographic studies of each plaster model, before deciding on a standard of lighting direction (see Figure 5).

FIGURE 4



2nd Edition

Plate: XXI  
Title: NORMAL LUNAR CRATER  
Dimensions: 14.2 x 20.2 cm  
Date: [1872–1874]  
Process: Woodburytype  
Maker: J. Nasmyth; Photo Relief Company



3rd Edition

Plate: XXIII  
Title: NORMAL LUNAR CRATER  
Dimensions: 10.2 x 13.2 cm  
Date: [1878–1885]  
Process: Woodburytype, 2nd generation  
Woodburytype from Photo Relief Company  
Maker: J. Nasmyth; Woodbury Permanent  
Photographic Printing Company

Notes: This is an example of generation loss through the act of reproduction. This is also known as the 'photocopy effect', where generational copies of the original object begin to accumulate the inherent idiosyncrasies of the medium doing the copying. In this case, the pigmented gelatin of the Woodburytype is starting to break apart, and lose detail.

#### 4. SCIENTIFIC ILLUSTRATION

The illustrations in Nasmyth's book can be divided into two separate categories, diagrams (or figures) and plates. Diagrams are printed alongside the text by the process of relief, which gives them the printing surface of type; they are typically simplified line drawings that provide further explanation to the accompanying text. Plates are full or half page illustrations that are printed separately from the text, because of the more complex printing processes needed to express the full range of detail. The term 'plate' comes from the practice of engraving by hand on a woodblock or metal plate, then printing on a sheet of paper, which is later pasted or tipped in to the publication. For the purpose of identification between the two categories, diagrams are typically labeled with Arabic numerals (1, 5, 10) and plates are labeled with Roman numerals (I, V, X).

Because this thesis focuses on the more complex processes of photomechanical printing, I will be discussing only the plates used in the book, with a direct focus on the photogelatin processes of the heliotype, photogravure, and the Woodburytype.

While many varying studies (drawings and photographs) were created for the illustrations in Nasmyth's book, the light source for almost all the final aerial views in the book is from the left (Fig. 5). Of all the considerations made for this publication, the visual consistency seems to have been a primary concern. From a brief survey of scientific illustrations, the use of lighting from the left seems to be the standard,



especially in shaded relief mapping, and has prevailed throughout the years.<sup>54</sup> The one exception which uses right-hand lighting in an aerial view, is plate XII.<sup>55</sup>

In the case of Nasmyth's book, the illustrations formed the primary thrust of his argument, with the text acting as a secondary support compiled at a later date with the help of James Carpenter. The decision to wait for a photomechanical process to be invented that would provide the detail and permanency that Nasmyth desired, was expressed in a letter to Herschel in 1871:

"I am so glad that by the aid of those improved processes in respect to printing Photographs in permanent ink and china ink the Prejudice [sic] on the part of publishers to the use of such a mode of illustration is now removed and that the wonderfully truthful and delicate minutiae which photography yealds [sic] will henceforth play its well-merited part."<sup>56</sup>

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<sup>54</sup> John L. Ridgeway, *Scientific Illustration* (Stanford: Stanford University, 1960): 14.

<sup>55</sup> Plate XII, "Theophilus Cyrillus & Catharina." See page 69 in the catalogue.

<sup>56</sup> Royal Society: Nasmyth to Herschel 14 March 1871 HS. 13.88.

FIGURE 5

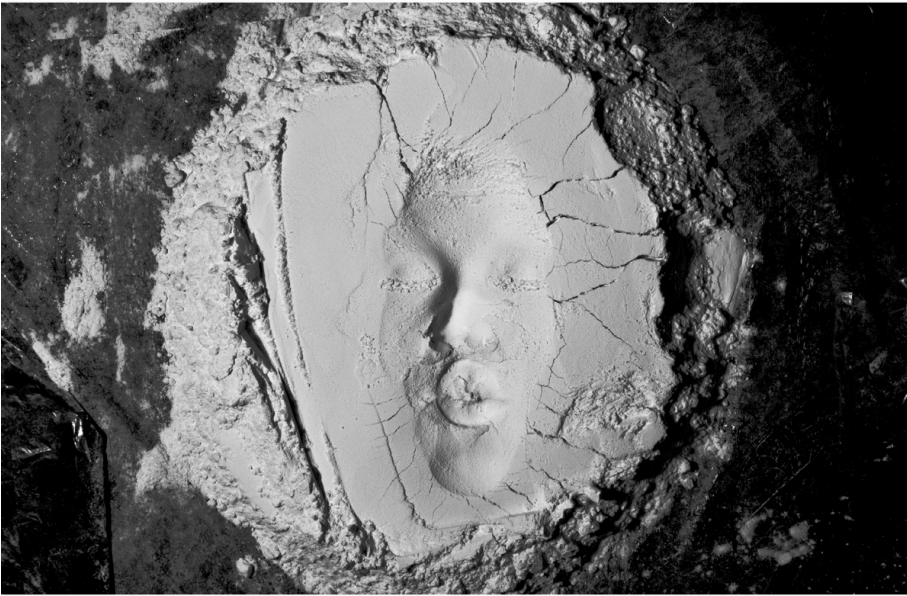


Notes: When creating a shaded relief map it is the standard to use top, left hand lighting. In cartography this standard was established in the 1500s to reduce the concave/convex illusion.<sup>57</sup> This illusion is further explained in Fig. 6. These images are all the plates from the 3rd edition of *The Moon* (1885).<sup>58</sup>

<sup>57</sup> Eduard Imhof, *Cartographic Relief Presentation*, 1982, (online reissue by ESRI Press, 2007): 2-3.

<sup>58</sup> currently held at: Visual Studies Workshop, Rochester, New York.

FIGURE 6



Notes: This is a digital photograph that I took of my face pressed into a pile of flour, to help illustrate the concave/convex illusion.<sup>59</sup> While my face has been depressed into the flour to create a concave relief, the bottom right hand or south-east lighting confuses the brain into thinking the mountains are valleys, or in this case, that the face is protruding, resulting in a convex image. Plate XII (see Fig. 5) is the only (aerial) shaded relief model with right hand light. The reason for this is unknown and the effects are less severe as the point of reference has already been established.

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<sup>59</sup> Robert Douglas Ramsey (the current Director of the Remote Sensing and GIS Laboratory at Utah State University, College of Natural Resources) was consulted for his expertise in explaining why the consistent use of NW lighting. While I had initially assumed that in the northern hemisphere, the lighting on the moon is consistently from left to right, he explained that this observation was irrelevant, and pointed out that our brains naturally process concave and convex images depending on the illumination direction. Most observers process shaded relief maps of topographic features correctly if the illumination source comes from the NW direction. If the illumination is from the SE, the terrain will typically appear in reverse (valleys to mountains and mountains to valleys as shown in Figure 6 above). While most observers can mentally reconcile topography regardless of lighting direction when given a point of reference, this ability has to be taught and practiced. For the casual observer, this becomes impractical and cartographers therefore consider the illumination of shaded relief maps from the NW as a standard. Robert Douglas Ramsey, telephone conversation with author, July 24, 2014.

## 5. PHOTOMECHANICAL PROCESSES

*The Moon: Considered as a Planet, a World, and a Satellite* is a visual representation of the application of the quickly evolving photomechanical processes to the recording and dissemination of visual information in the second half of the nineteenth century. In *Photography in the Printing Press: The Photomechanical Revolution*, Helena E. Wright states: "Photography has been credited with 'redefining the nature of artistic expression and information transfer,' yet this iconographic revolution actually was accomplished largely by means of the medium's widespread reproduction."<sup>60</sup> Before photomechanical processes were developed, the only options for the dissemination of images were engraving, etching, lithography, and photography. Engraving and lithography are used in Nasmyth's book, however they provided minimal detail, and were not up to the standards that Nasmyth desired. While books in the nineteenth century were published with actual photographs tipped into the pages,<sup>61</sup> the problem of fading was soon realized. In response, many pigment processes were developed, the most outstanding was Alphonse-Louis Poitevin's (1819–1882) carbon process, invented in 1855, and further developed by Joseph Wilson Swan (1828–1914) in 1864.<sup>62</sup> Once this was introduced to practitioners, there were so many variations and developments in such a short amount of time that it is almost impossible to differentiate between all of them. Moreover, the use of

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<sup>60</sup> Helena E. Wright, *Photography in the Printing Press: The Photomechanical Revolution* (London: Bernard Finn, 2004): 21.

<sup>61</sup> The first known book ever commercially published, illustrated with photographs was *The Pencil of Nature* by William Henry Fox Talbot during the years 1844-1846. This publication included twenty-four salted paper prints.

<sup>62</sup> John Werge, *The Evolution of Photography: With a Chronological Record of Discoveries, Inventions, Etc., Contributions to Photographic Literature, and Personal Reminiscences Extending Over Forty Years* (Madison: Piper & Carter and J. Werge, 1890): 113.

photography in printmaking further complicated the processes and altered the steps taken to develop them. The following sub-chapters act as a guide to identify and reveal the subtle differences in the processes used in Nasmyth's books.

Ernest Edwards explained in his 1876 book *The Heliotype Process*,<sup>63</sup> that photo-gelatin processes, also known as photomechanical processes; can be organized into three main classes:

Class A: Those in which each print is itself a sheet of gelatine acted on by light, such as Carbons or Autotypes.<sup>64</sup>

Class B: Those in which *one* gelatine print is obtained by means of light, and is used as a means of supplying a metal or stone printing matrix, such as Photo-Lithography, or the Woodbury process.

Class C: Those in which one gelatine print is obtained by means of light and itself, that is, the actual sheet of gelatine itself, is used as a printing matrix, such as in the Heliotype process.

It is important to note here that both class 'A' and class 'C' are image reversal processes. That is to say, the resulting print is horizontally flipped. Following this introduction is a description of each process used in *The Moon*, in chronological order, providing a brief history, a micro-photographic study, as well as important, inherent visual characteristics that will help aid in the identification process.

To help illustrate the basic steps in each process, a black and white diagram with a crescent moon is used. A black moon on a white background represents a negative image,

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<sup>63</sup> Ernest Edwards, *The Heliotype Process* (Boston: James R. Osgood and Company, 1876): 1.

<sup>64</sup> There are no examples of Class A in Nasmyth's book.

whereas a white moon on a black background signifies a positive. For example: in 5.1, first a negative engraving is made, a positive print is then created from the engraving revealing the two-step process. Also included is a microscopic study of each process taken by the author, of the plates in either the first, second, or third edition to reveal the image pattern inherent to the process. Microscopic studies were taken of the shadow, mid-tone, and highlight areas of each process. One microscopic detail was chosen from this collection of data to represent the process. When the process does not appear in the edition, the term 'n/a' is used, meaning not applicable.

## 5.1 ENGRAVING AND MEZZOTINT



NEGATIVE POSITIVE

### (non-photographic process)

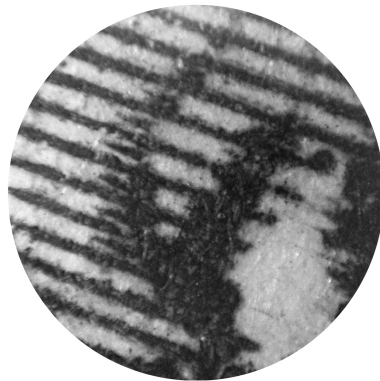
1st edition: frontispiece

2nd edition: frontispiece

3rd edition: n/a

Maker: Thomas Oldham Barlow - English mezzotint / line engraver

Date: 1873 (Approx. date of the plates used in the books)



50 x Magnification

The frontispiece in both the first and second editions is an engraving created and printed by Thomas Oldham Barlow (1824–1899). These plates are unusual in that they are a combination of two processes: mezzotint and line engraving, and are the only examples completed purely by hand. Line engraving is completed with the use of a sharp burin or chisel, while a mezzotint is created using a steel rocker with many sharp points that slowly builds up the dark image areas. The metal plate (either copper or zinc) is then

rubbed with a stiff ink until all the grooves have been filled. The plate is then wiped clean and passed through a rolling press and the image transferred to a clean, dampened sheet of paper.

A main identifier of this process is the appearance of a plate mark that, in this case, does not appear. This is common for the majority of engravings made after 1850, since the plates used were, at that point, larger than the paper.



## 5.2 PHOTOGRAVURE AND AQUATINT



NEGATIVE   GELATIN   COPPER   PHOTO - AQUATINT

### (Class B)

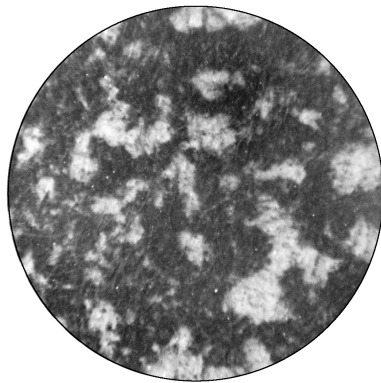
1st edition: plates I, XII, XIII, XVI, XX

2nd edition: n/a

3rd edition: n/a

Maker: J.H. & F.C. McQueen - Fine Art Copperplate Printers

Date: 1873–1874 (Approx. date of the plates used in the books)



50 x Magnification

Unlike engraving and mezzotint (see chapter 5.1), the aquatint is an etching process that requires acid. The first step is to prepare the copper plate by polishing it, then covering it completely with a layer of shellac in alcohol. When this solution dries, it cracks, and leaves a design of unprotected copper that you can see in the detail above. The next step is to prepare the image. In this case, a glass plate or paper negative is contact printed with a gelatin coated tissue paper, proportionally hardening the gelatin in

the light image areas. The exposed gelatin tissue paper and copper plate are placed together in a cold bath of water, the tissue paper base separates from the gelatin and the hardened gelatin adheres to the plate that is now called a 'resist.' The resist then goes through a succession of acid baths (ferric chloride) that etches the image into the plate. The last step is similar to engraving, where a stiff ink is spread across the entire plate and the plate wiped clean, leaving ink only in the recessed areas. The plate is passed through a press with a damp piece of paper, transferring and creating the printed image.

### 5.3 HELIOTYPE



NEGATIVE   GELATIN   HELIOTYPE

#### (Class C)

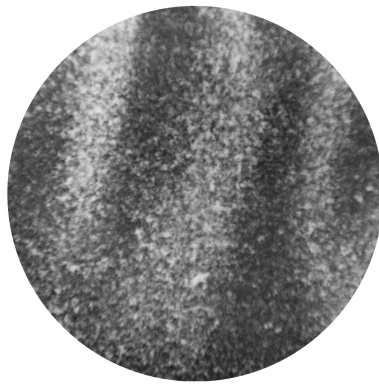
1st edition: plates II, XIX, XXI, XXIII

2nd edition: n/a

3rd edition: n/a

Maker: Heliotype Co. Ltd., London

Date: 1869–1872 (Approx. date of the plates used in the books)



50 x Magnification

In 1869, the photographer Ernest Edwards (1837–1903) patented the 'heliotype'. This process is sometimes identified as a collotype, since many later examples of the two processes were used together.<sup>65</sup> During the late nineteenth century, printmakers were developing their own variations of each process, so it can be confusing to group the many processes developed under one definitive name (see chapter 5.6-5.9). The heliotype was

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<sup>65</sup> Bertrand Lavédrine states, "The collotype process was also known by a variety of other names in different periods and locales. These include 'collograph,' 'heliotype,'...To avoid confusion it is best to use the term "collotype" for all variations." Bertrand Lavédrine, *Photographs of the Past: Process and Preservation* (Los Angeles: Getty Publications, 2007) 182.

indeed a variation of the collotype, however, under magnification, it does not exhibit the reticulated pattern inherent to the collotype. This reticulated pattern was the result of heating the gelatin to accelerate the drying time.<sup>66</sup> Another defining feature of this process that sets it apart from the original collotype patent is the use of two different inks to produce an image with a wider variation of tone. Edwards solved many variables when dealing with the unreliable nature of gelatin.

In this process, a layer of gelatin is spread on a glass plate, and dried. The glass plate is first waxed so the gelatin sheet could be removed easily. Once removed from the glass plate, the gelatin sheet is placed in direct contact with a paper or glass-plate negative and exposed. This hardens the gelatin in the lighter image areas creating a positive matrix. This gelatin matrix is attached to a metal support by a method of suction using a 'squeegee.' It is inked in two different stages to create a wider variety of tone: first, with a stiff ink for the shadows, and second, with a watered down pigment to fill in the midtones.

The resulting print has a beautiful range of tones, however, due to the heliotype process, the image is flipped, thereby appearing reversed, a characteristic inherent to class 'C' of the photo-gelatin processes. This can be seen by comparing plates II, XIX, XXI, XXIII in the first edition with the plates in the second and third editions.

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<sup>66</sup> Accelerated drying was not introduced until after c. 1880, therefore, earlier collotypes will not exhibit the reticulated pattern. Making this process even more difficult to distinguish from the photogravure or the heliotype if not labelled by the maker.

## 5.4 LITHOGRAPH



NEGATIVE LITHOGRAPH

**(non-photographic process)**

1st edition: plates V, VII

2nd edition: plate VII

3rd edition: n/a

Maker: Vincent Brooks Day & Son

Date: 1873–1874 (Approx. date of the plates used in the books) 1885 - 3rd Edition



50 x Magnification

Lithography is the only process that uses stone as the base for the creation of the image. The 'lithographic stone,' usually limestone, is a hard yet fine grained stone that is first cleaned and levelled for use. In this process, the design is copied onto the stone with black grease, in this case by the method of pen, brush, and spatter. Printing the image first onto a transparency was a common way to ensure very detailed illustrations could be easily transferred to the stone. Once the inked grease dries, the stone is gummed with a gum arabic to protect the background of the image, and again left to dry. A solution of

asphaltum is next applied, and the surface is washed off with water, removing the gum and leaving those areas damp. The stone is then inked — the damp areas reject the ink — and this forms the acid resist. The resist is etched with a nitric acid solution and is ready for printing. This process does not produce any mid-tone qualities; the image looks similar to a line drawing

## 5.5 CHROMOLITHOGRAPH



NEGATIVE CHROMOLITHOGRAPH

**(non-photographic process)**

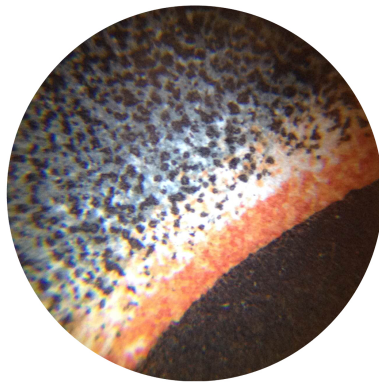
1st edition: plate XXII

2nd edition: plate XXII

3rd edition: plate XXIV

Maker: Vincent Brooks Day & Son

Date: 1873–1874 (Approx. date of the plates used in the books) 1885 - 3rd Edition



50 x Magnification

In the case of chromolithography, several stones are prepared, with the various colour channels of the image divided (a different stone is used for each colour). It is very important to use register marks to ensure that the various layers match up accordingly on the sheet of paper. Typically the print is trimmed to hide these register marks, which appears to be the case with the chromolithographs used in Nasmyth's book.

## 5.6 WOODBURYTYPE: UNKNOWN MAKER



NEGATIVE GELATIN LEAD WOODBURYTYPE

### (Class B)

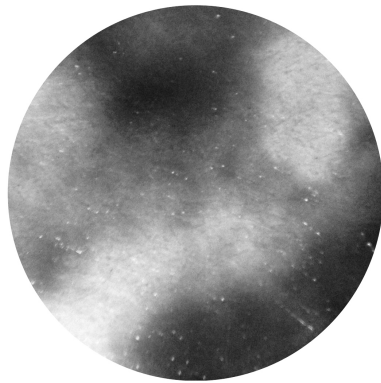
1st edition: plates III, IV

2nd edition: n/a

3rd edition: n/a

Maker: Unknown; these two prints closely resemble the Woodburytypes in the second edition printed by the Photo Relief Company.

Date: 1869–1874 (Approx. date of the plates used in the books)



50 x Magnification

The Woodburytype was patented in 1864 by Walter Woodbury. The patent rights changed hands many times in England, and were first purchased by Disderi & Co in 1868. A year later, in 1869, the Photo Relief Company acquired Disderi & Co, and all of its patent ownership rights. In 1870, Vincent Brooks Day & Son purchased the patent rights and labelled their prints with their name (see chapter 5.7). Due to an oversight, the patent dropped into public domain in 1872, and was quickly acquired again by the Photo



Relief Company, who labelled their prints '(Woodbury)' but without the name of the company. This company held the patent until 1878, when the Woodbury Permanent Photographic Printing Company acquired it. Since Brooks Day & Son were careful to label all of their work with its name, and since these two plates so closely resemble the plates in the second edition labelled '(Woodbury)' it is likely that these too were printed by the Photo Relief Company (see chapter 5.8)

The Woodburytype is similar to the heliotype, in that it is a copper or lead mould obtained by exposing a sheet of gelatin in contact with a photographic glass plate or paper negative. Instead of using the hardened gelatin as the matrix, the Woodburytype process required that the hardened gelatin be pressed into a copper or lead plate by means of a large hydraulic press, creating a negative lead matrix. A mixture of gelatin and pigment is then warmed and poured onto the centre of the copper mould. A sheet of paper is placed on top and this is run through the press. Once the print has dried, the edges are trimmed to remove the overflow of excess, pigmented gelatin. This process left the image with almost no visible image grain, and was often considered the most successful photo-gelatin process.

## 5.7 WOODBURYTYPE: VINCENT BROOKS DAY & SON



NEGATIVE   GELATIN   LEAD   WOODBURYTYPE

### (Class B)

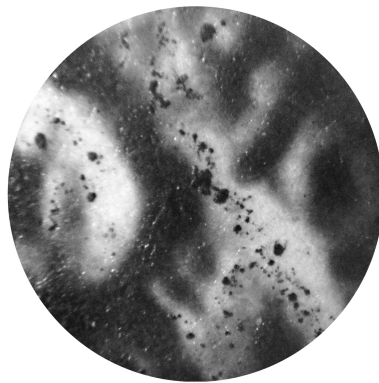
1st edition: plates III, IV, VI, VIII, IX, X, XI, XIV, XV, XVII, XVIII

2nd edition: plates VI, VIII, IX, X, XI, XV, XVII, XVIII

3rd edition: n/a

Maker: Vincent Brooks Day & Son

Date: 1870–1872 (Approx. date of the plates used in the books)



50 x Magnification

The Woodburytype process is described in 5.6 above. These plates are not identified as Woodburytypes on the actual plates in the publication, and have often been

misidentified in catalogues.<sup>67</sup> The most common misidentification is that they are 'Autotypes.' The Autotype is a similar carbon process, however it is a Class 'A' photo-gelatin process, which makes it inherently an image reversal process. Since none of these plates exhibit that quality, and since only the Autotype Company could produce autotypes (these were printed by Brooks Day & Son), I disagree with the identification of these reproductions as Autotypes. These plates do differ significantly from the other Woodburytypes in the books. They are bluish-black in tone and have significant cracking and striations in the gelatin. The cracking and striations are not a result of too little pressure, as can be the case with hand-pressed processes such as carbon printing. Instead, the cracking and striations relate to the amount of gelatin used in the mix (perhaps too much). Another identifying feature that can only be seen under magnification (see above) is the amount of rogue pigment particles found loose in the highlight areas of the print. This may simply be inherent to the Woodburytypes printed by Vincent Brooks Day & Son.

---

<sup>67</sup> E-mail correspondence (December 16, 1998) from John McElhone (Photographs Conservator, National Gallery of Canada), to Julie Melby (Graphic Arts Librarian, Department of Rare Books and Special Collections, Princeton University [at the time of the e-mail, Melby was at the Houghton Library, Harvard]). Curatorial files, National Gallery of Canada. McElhone: "The 20 photographic image plates fall into two categories of appearance, corresponding to the printed designation appearing on the page of either "(Woodbury)" or "Brooks Day & Son". The former (Plates 1, 2, 3, 4, 12, 13, 14, 16, 19, 20, 21, 23) are warm in tone and the prints are relatively free of pigment debris in the image-carrying layer. The latter (Plates 6, 8, 9, 10, 11, 15, 17, 18) are cooler in tone and have a higher occurrence of pigment debris in the image-carrying layer. We have identified all 20 prints as Woodburytypes in our database. Your (Julie) enquiry addresses the identification of the second group as "autotypes", as was done in the publication, *The Truthful Lens*. In my opinion, this is inaccurate since the Autotype process, a commercial variant of the carbon transfer process, would be identified as such and would be credited to the Autotype Company (London). However, the two categories of prints are clearly distinct and probably come from different printing establishments using different printing technologies. Distinguishing Woodburytypes from carbon transfer prints is famously difficult; the few reliable distinguishing features that I know of are not helpful in this case. So while the second group of prints may well be carbon transfer prints (or "carbon prints", as we call them in our database), I cannot come up with a solid reason to change the medium description we already have." Despite this correspondence, the catalogue at Harvard still refers to these plates as 'Autotypes' as do many other institutions.

Furthermore, the 1874 publication: *The Boydell Gallery: A Collection of Engravings Illustrating the Dramatic Works of Shakespeare, by the Artists of Great Britain...*<sup>68</sup> by John Boydell, has 97 Woodburytypes attributed to Vincent Brooks, Day & Son. The Woodburytypes in this publication are reproductions of the original engravings first published in 1803, and they do in fact exhibit the rogue pigment particles (Fig. 7).

---

<sup>68</sup> John Boydell, *The Boydell Gallery: A Collection of Engravings Illustrating the Dramatic Works of Shakespeare, by the Artists of Great Britain, Reproduced from the Originals in Permanent Woodburytype by Vincent Brooks, Day, and Son* (London: Bickers and Son, 1874).

## 5.8 WOODBURYTYPE: PHOTO RELIEF COMPANY



NEGATIVE GELATIN LEAD WOODBURYTYPE

### (Class B)

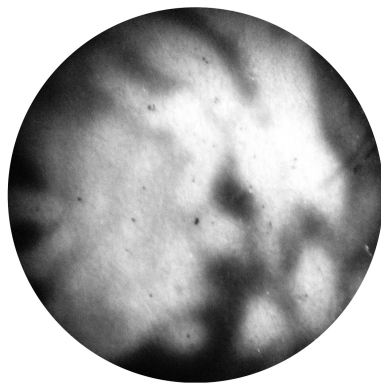
1st edition: n/a

2nd edition: plates I, II, III, IV, XII, XIII, XIV, XVI, XIX, XX, XXI, XXIII

3rd edition: n/a

Maker: [Photo Relief Company]

Date: 1872–1874 (Approx. date of the plates used in the books)

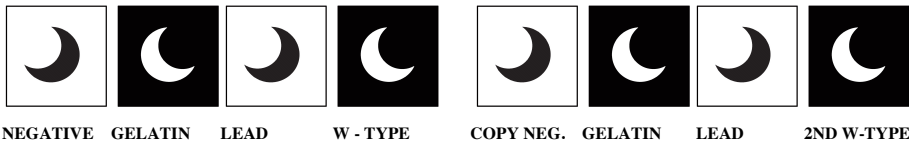


50 x Magnification

The Woodburytype process is described in 5.6 above. These twelve plates are all labelled as '(Woodbury)' but are not identified on the actual plates as having been printed by the Photo Relief Company. These plates were printed as replacements for those formerly printed by the heliotype and photogravure processes in the first edition, which would seem to support the hypothesis that it was Nasmyth's intention to move toward working solely with the Woodburytype process.

These plates only appear in the second edition, which was published very shortly after the first, in December 1874. The Photo Relief Company held the Woodburytype patent from 1872 until 1878 when the Woodburytype Permanent Photographic Printing Company took it over.

## 5.9 WOODBURYTYPE: WOODBURY PERMANENT PHOTOGRAPHIC PRINTING COMPANY



### (Class B)

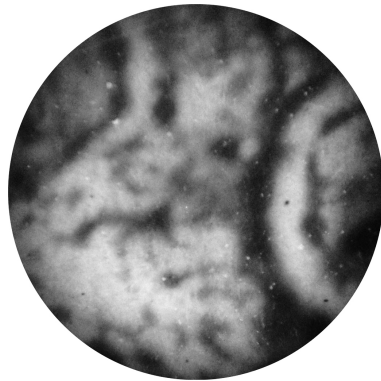
1st edition: n/a

2nd edition: n/a

3rd edition: All plates except XXIV (chromolithograph)

Maker: Woodbury Permanent Photographic Printing Company

Date: 1878–1885 (Approx. date of the plates used in the books)



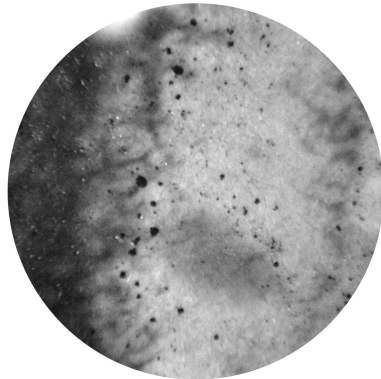
50 x Magnification

The Woodburytype process is described in 5.6 above. By 1885, Walter Woodbury was failing in health and struggling financially. The Walter Woodbury Fund was created to raise money and urged publishers to use the Woodburytype in their publications to help support the inventor at his time of need. It is not confirmed that this was the reason for the publication of a third edition, however the timing seems to fit. The third edition

was printed octavo and used '2nd generation' Woodburytypes printed by the Woodbury Permanent Photographic Printing Company and are labelled as "Woodburytype". These second generation Woodburytypes (see Fig. 4) are reproductions of the Woodburytypes and other print processes in either the first or second edition, making these objects at least seven steps removed from the original negatives of the plaster models (original negative, gelatin relief, metal plate, Woodburytype, copy negative, gelatin relief, metal plate, second generation Woodburytype).



FIGURE 7



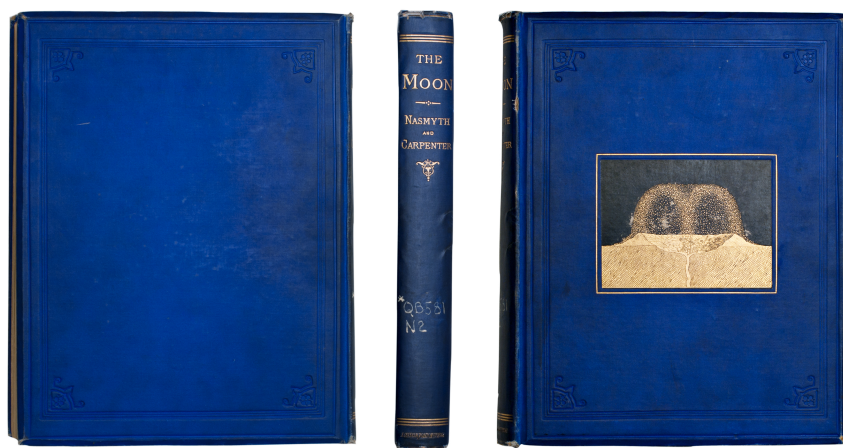
50 x Magnification

Notes: This is a microscopic view of a Brooks Day & Son Woodburytype found in the 1874 John Boydell publication *The Boydell Gallery: A Collection of Engravings Illustrating the Dramatic Works of Shakespeare, by the Artists of Great Britain, Reproduced from the Originals in Permanent Woodburytype by Vincent Brooks, Day, and Son*. The view exhibits similar rogue pigment particles to those found in the plates in the Nasmyth publication (see chapter 5.7). As such, it provides further evidence supporting the identification of the Nasmyth plates as Woodburytypes printed by Brooks Day & Son, and not Autotypes as they have heretofore been identified.

|

7. CATALOGUE OF THE FIRST THREE EDITIONS OF JAMES NASMYTH'S *THE MOON: CONSIDERED AS A PLANET, A WORLD, AND A SATELLITE*.

FIGURE 8



2nd edition, original cover with blue leather and gold / ink stamped illustration from a lithographic printing stone. Buffalo & Erie County Public Library.

## 7.1 CATALOGUE GUIDE

In preparing this catalogue, the author examined three copies of the first edition of Nasmyth's book, (two copies in The New York Public Library, New York City and one in the Visual Studies Workshop, Rochester); three copies of the second edition (The New York Public Library, New York City, National Gallery of Canada, Ottawa, and Buffalo & Erie Public Library, Buffalo); and three copies of the third edition (Toronto Public Library, Toronto, Visual Studies Workshop, Rochester and one in a private collection, Ottawa). Each of the nine copies was complete. However, the only copy which retained its original cover, and had not been rebound, was the second edition at the Buffalo and Erie Public Library; it was in the best condition (see Fig. 8).

The author digitized the page spreads, with the plates from all three editions, and white balanced consistently using a colour checker. The first and third editions are reproduced, with permission, from copies held at the Visual Studies Workshop, Rochester, New York. The second edition is reproduced, with permission, from the copy held in the Buffalo & Erie County Public Library, Buffalo, New York. The copies are reproduced in relative scale.

This thesis focuses on the aesthetic and observed differences due to the various print processes used in Nasmyth's book. Therefore, the catalogue is organized by image, not by plate number. To retain some order, the succession of plates in the first edition will be followed. While this causes strange anomalies, such as plates three and four in the third edition, and other various misalignments; this sequencing provides the reader with the ability to compare the illustrations as though side by side. In addition, the catalogue

provides notes directing the reader to the appropriate concordant position of the plates in each edition.

**EDITIONS:** The first three editions are presented in this catalogue.

**FIRST EDITION:** Published in 1874 by John Murray, London. This edition has twenty-four illustrative plates and is printed quarto sized.

**SECOND EDITION:** Published in 1874 by John Murray, London (shortly after the first). This edition has twenty-four illustrative plates and is printed quarto sized.

**THIRD EDITION:** Published in 1885 by Scribner & Welford, New York. This edition has twenty-six illustrative plates. While there are not additional illustrations, two diptych style plates in the first and second edition were printed as separate plates. It is printed octavo sized.

**PLATE:** The number listed is the plate number printed on the plate accompanying the illustration.

**PAGE:** This is the page number of the plate as listed in the 'List of Plates' section in the appropriate editions.

**TITLE:** The title listed is the title printed on the frontispiece or the plate accompanying the illustration.

**DIMENSIONS:** These are provided with height x width in centimetres, and are the dimensions of the illustration (not the entire page) based on orientation of the illustration, not orientation of the page as bound in the book.

**DATE:** The dates listed are based on when production dates of the book, patent ownership of the process, and working dates of the printmaker or company. These are discussed in chapter five.

**PROCESS:** The process listed refers to the printmaking process and is based on my research and identification methods. These are discussed in chapter five.

**MAKER:** refers to the names printed on the plate; information in square brackets have been added by the author.

**PHOTOGRAPHERS:** James Nasmyth or Warren de La Rue

**PRINTMAKERS:** Theodore Oldham Barlow, J.H. & F.C. McQueen, Photo Relief Company, Heliotype Company Ltd, Vincent Brooks Day & Son, Woodbury Permanent Photographic Printing Company.

INSCRIPTIONS: Any additional inscription printed on the plate other than the title or maker.

NOTES: Additional observations or notes made by the author.

#### ABBREVIATIONS:

DELT: Delineavit (Latin for 'drew') used to credit the original artist of the work, when engraver was working from a drawing or photograph, which in this case was prepared by Nasmyth.

SCULT: Sculpsit (Latin for 'engraved') used to credit the engraver

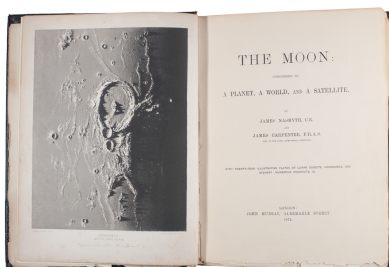
Tipped: illustrations that have been glued in, and not printed directly on the page.

CW: Clockwise

CCW: Counter-clockwise

N/A: Not applicable, or not available

Note: Information in square brackets has been added by the author.



### 1st Edition

Plate: frontispiece [not printed on page]

Page: [at beginning]

Title: GASSENDI NOV 7 1867/ 10 P.M.

Dimensions: 22.5 x 17.5 cm

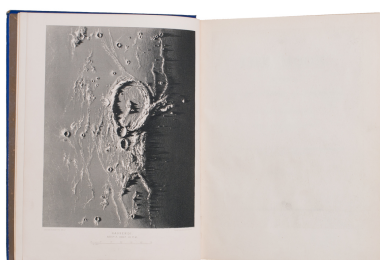
Date: [1873–1874]

Process: [engraving and mezzotint]

Maker: JAMES NASMYTH DEL<sup>T</sup>; THO<sup>S</sup> O BARLOW SCUL<sup>T</sup>

Inscription: LONDON JOHN MURRAY ALBEMARLE STREET 1873

Notes: not tipped



### 2nd Edition

Plate: frontispiece [not printed on page]

Page: [at beginning]

Title: GASSENDI NOV 7 1867 10 P.M.

Dimensions: 22.5 x 17.5 cm

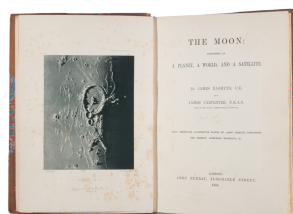
Date: [1873–1874]

Process: [engraving and mezzotint]

Maker: JAMES NASMYTH DEL<sup>T</sup>; THO<sup>S</sup> O BARLOW SCUL<sup>T</sup>

Inscription: LONDON JOHN MURRAY ALBEMARLE STREET 1873

Notes: not tipped



### 3rd Edition

Plate: FRONTISPICE

Page: [at beginning]

Title: GASSENDI

Dimensions: 12.5 x 9.8 cm

Date: [1878–1885]

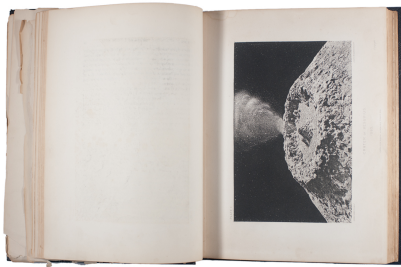
Process: “Woodburytype” [2nd generation Woodburytype from a photograph of an engraving]

Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]

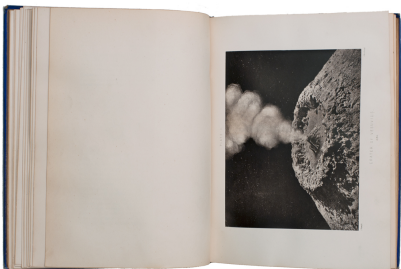
Inscription: [n/a]

Notes: tipped

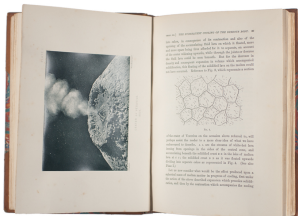
NOTES: At this date (November 7, 1867), the moon would have been a waxing gibbous when Nasmyth created the original drawing. Photography was not used for this illustration; the engraving was instead prepared from a chalk drawing.



**1st Edition**  
 Plate: I  
 Page: [26]  
 Title: CRATER OF VESUVIUS 1865  
 Dimensions: 13 x 20 cm  
 Date: [1873–1874]  
 Process: [photogravure and aquatint]  
 Maker: JAMES NASMYTH DEL<sup>y</sup>; J.H. & F.C. McQUEEN SCULP<sup>r</sup>  
 Inscription: LONDON JOHN MURRAY ALBEMARLE STREET 1873  
 Notes: not tipped, page rotated 90° CCW in book

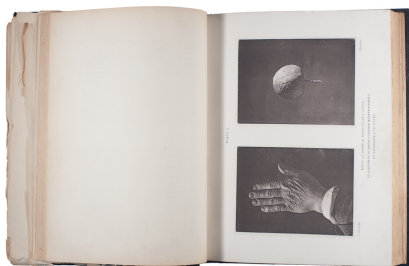


**2nd Edition**  
 Plate: I  
 Page: [26]  
 Title: CRATER OF VESUVIUS 1864  
 Dimensions: 15.3 x 19.6 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped, page rotated 90° CCW in book, smoke is smudged with Nasmyth's(?) fingerprints, lava flow added, the date has changed here from 1865 to 1864.



**3rd Edition**  
 Plate: I  
 Page: [To face page 29]  
 Title: CRATER OF VESUVIUS/ 1864  
 Dimensions: 9.6 x 12.5 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped, page rotated 90° CCW in book

Notes: In the first edition, the smoke has been added to the image by way of either pencil or chalk. In the second edition, Nasmyth used his finger to smudge the smoke, and has added a lava flow from the volcano. I believe this was done to the photographic negative before handing off to the printmaker, an early example of photo manipulation.



#### 1st Edition

Plate: II

Page: [30]

Title: BACK OF HAND & SHRIVELLED APPLE  
TO ILLUSTRATE THE ORIGIN OF CERTAIN MOUNTAIN RANGES BY SHRINKAGE OF THE GLOBE

Dimensions: 12.9 x 9.5 / 12.9 x 9.5 cm

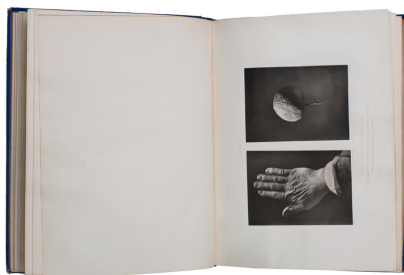
Date: [1871–1874]

Process: heliotype

Maker: J. Nasmyth; [Heliotype Co. Ltd, London]

Inscription: [n/a]

Notes: not tipped, page rotated 90° CCW in book.



#### 2nd Edition

Plate: II

Page: [30]

Title: BACK OF HAND & WRINKLED APPLE/ TO ILLUSTRATE THE ORIGIN OF CERTAIN MOUNTAIN RANGES RESULTING FROM SHRINKAGE OF THE INTERIOR

Dimensions: 11.5 x 8.2 / 11.5 x 8 cm

Date: [1872–1874]

Process: (Woodbury) [Woodburytype]

Maker: J. Nasmyth; [Photo Relief Company]

Inscription: [n/a]

Notes: tipped, page rotated 90° CW in book.



#### 3rd Edition

Plate: II, III

Page: [To face each other, 33]

Title: [II] BACK OF HAND TO ILLUSTRATE THE ORIGIN OF CERTAIN MOUNTAIN RANGES RESULTING FROM SHRINKAGE OF THE INTERIOR

[III] SHRIVELLED APPLE TO ILLUSTRATE THE ORIGIN OF CERTAIN MOUNTAIN RANGES RESULTING FROM SHRINKAGE OF THE INTERIOR OF THE GLOBE

Dimensions: [II] 11.7 x 8.7 cm; [III] 11.4 x 8.1 cm

Date: [1878–1885]

Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]

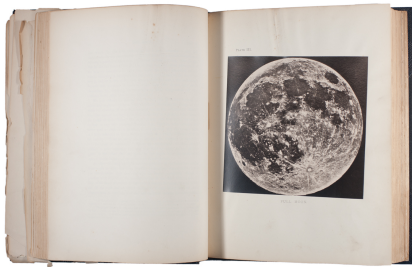
Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]

Inscription: [n/a]

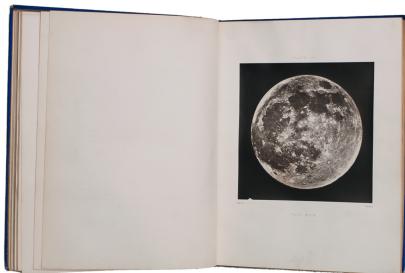
Notes: tipped

Notes: In the first edition the hand and apple are horizontally flipped, this is due to the heliotype process of image reversal (making this Nasmyth's right hand). In the third edition, in order to preserve the size of the illustrations, the hand and apple diptych were split up into two separate plates.

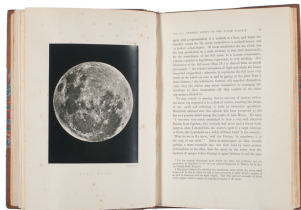




**1st Edition**  
 Plate: III  
 Page: [52]  
 Title: FULL MOON  
 Dimensions: 15.2 x 15.5 cm  
 Date: 1871–1874  
 Process: [Woodburytype]  
 Maker: [Unknown, Photo Relief Company or Vincent Brooks Day & Son]  
 Inscription: [n/a]  
 Notes: tipped, photograph by Warren de la Rue



**2nd Edition**  
 Plate: III  
 Page: [52]  
 Title: FULL MOON  
 Dimensions: 15.3 x 15.4 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: De La Rue; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped, photograph by Warren de la Rue

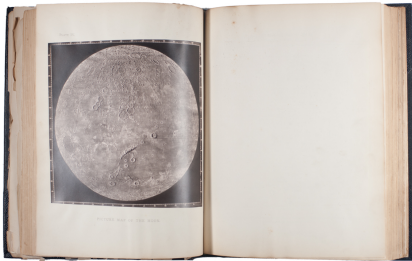


**3rd Edition**  
 Plate: IV  
 Page: [To face page 59]  
 Title: FULL MOON  
 Dimensions: 12.9 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped, photograph by Warren De la Rue, black ink on plate: N? S?, image rotated 90° CCW

Notes: In the third edition, the image of the moon has been rotated 90 degrees counter clock-wise. This is not the correct orientation of the moon as seen from the northern hemisphere of the earth.

David Harris 14-8-26 8:22 AM

**Comment [1]:** Perhaps you should add something about Warren de la Rue? I don't think that he was mentioned earlier?



#### 1st Edition

Plate: IV

Page: [To face skeleton map (plate V), 68]

Title: PICTURE MAP OF THE MOON

Dimensions: 18.1 x 18.2 cm

Date: 1871–1874

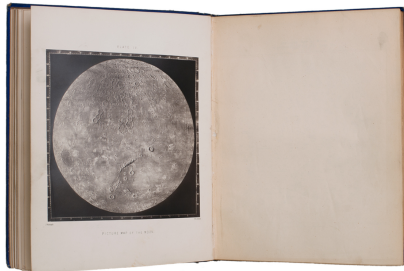
Process: [Woodburytype]

Maker: [Unknown, Photo Relief Company or Vincent

Brooks Day & Son]

Inscription: [n/a]

Notes: tipped



#### 2nd Edition

Plate: IV

Page: [To face skeleton map (plate V), 68]

Title: PICTURE MAP OF THE MOON

Dimensions: 17.9 X 18 cm

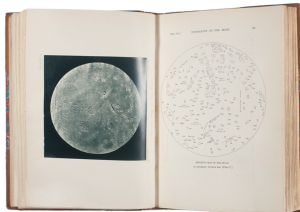
Date: [1872–1874]

Process: (Woodbury) [Woodburytype]

Maker: J. Nasmyth; [Photo Relief Company]

Inscription: [n/a]

Notes: tipped



#### 3rd Edition

Plate: V

Page: [79]

Title: PICTURE MAP OF THE MOON

Dimensions: 11.3 x 11.4

Date: [1878–1885]

Process: “Woodburytype” [2nd generation Woodburytype

from Vincent Brooks Day & Son Lithograph]

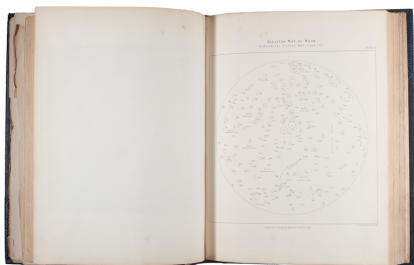
Maker: J. Nasmyth; [Woodbury Permanent Photographic

Printing Co]

Inscription: [n/a]

Notes: tipped, page rotated 90° CCW in book

Notes: The plate in the third edition has been rotated 90 degrees counter clockwise. This leads to some confusion as it no longer matches up visually with the skeleton map on the next page. The skeleton map has been treated as a diagram in the third edition, whereas in the first and second it has been treated as a plate; this is illustrated and discussed on the next page.



#### 1st Edition

Plate: V

Page: [To face picture map (plate IV), 68]

Title: SKELETON MAP OF THE MOON TO ACCOMPANY PICTURE MAP. CHAP VII

Dimensions: 19 x 19 cm

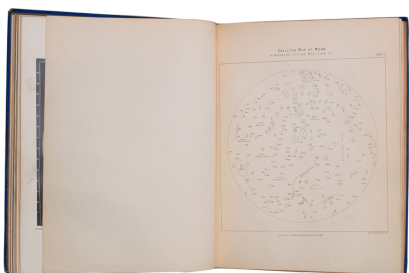
Date: [1867–1874]

Process: [lithograph]

Maker: Vincent Brooks Day & Son Lith.

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: not tipped



#### 2nd Edition

Plate: V

Page: [To face picture map (plate IV), 68]

Title: SKELETON MAP OF THE MOON/ TO ACCOMPANY PICTURE MAP. CHAP VII

Dimensions: 19 x 19 cm

Date: [1867–1874]

Process: [lithograph]

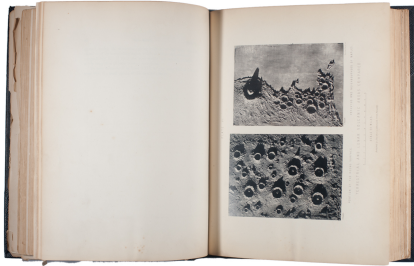
Maker: Vincent Brooks Day & Son Lith.

Inscription: Published by John Murray Albemarle Street Piccadilly

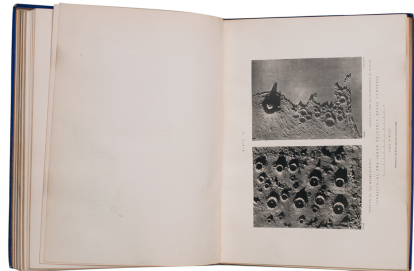
Notes: not tipped

3rd Edition - N/A

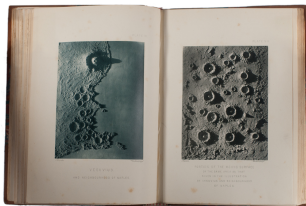
Notes: While a skeleton map does appear in the third edition, it has been treated as a diagram and not a plate. Therefore, I have not included it in my catalogue of plates (see p. 55). You can, however, see it on p. 61.



**1st Edition**  
 Plate: VI  
 Page: [88]  
 Title: PORTION OF THE MOONS SURFACE  
 VESUVIUS AND NEIGHBOURHOOD OF NAPLES  
 TERRESTRIAL AND LUNAR VOLCANIC AREAS  
 COMPARED  
 Dimensions: 12.7 x 9.2 / 12.5 x 9 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Pic-  
 cadilly  
 Notes: tipped, page rotated 90° CCW in book

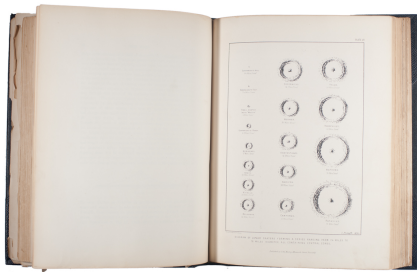


**2nd Edition**  
 Plate: VI  
 Page: [88]  
 Title: PORTION OF THE MOONS SURFACE  
 VESUVIUS AND NEIGHBOURHOOD OF NAPLES  
 TERRESTRIAL AND LUNAR VOLCANIC AREAS  
 COMPARED  
 Dimensions: 12.5 x 9.2 / 12.3 x 8.8 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Pic-  
 cadilly  
 Notes: tipped, page rotated 90° CCW in book



**3rd Edition**  
 Plate: VI; VII  
 Page: [To face each other 101]  
 Title: [VI] VESUVIUS AND NEIGHBOURHOOD OF  
 NAPLES; [VII] PORTION OF THE MOONS SURFACE  
 OF THE SAME AREA THAT GIVEN IN THE ILLUS-  
 TRATION OF VESUVIUS AND NEIGHBOURHOOD OF  
 NAPLES  
 Dimensions: [VI] 12.8 x 9.5; [VII] 12.6 X 9.4 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype  
 from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic  
 Printing Co]  
 Inscription: [n/a]  
 Notes: tipped

Notes: In the third edition, in order to preserve the size of the illustrations, the diptych was split up into two separate plates (see p. 53). The sequence of the two plates has also been switched from left to right.



#### 1st Edition

Plate: VII

Page: [92]

Title: DIAGRAM OF LUNAR CRATERS FORMING A SERIES RANGING FROM 1 3/4 MILES TO 78 MILES DIAMETER. ALL CONTAINING CENTRAL CONES

Dimensions: 21.2 x 15.2 cm

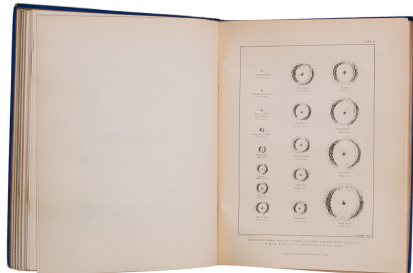
Date: [1873–1874]

Process: [lithograph]

Maker: J. Nasmyth 1873; Vincent Brooks Day & Son Imp.

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: not tipped



#### 2nd Edition

Plate: VII

Page: [92]

Title: DIAGRAM OF LUNAR CRATERS FORMING A SERIES RANGING FROM 1 3/4 MILES TO 78 MILES DIAMETER. ALL CONTAINING CENTRAL CONES

Dimensions: 21.1 x 15.2 cm

Date: [1873–1874]

Process: [lithograph]

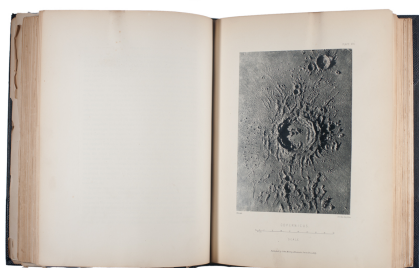
Maker: J. Nasmyth 1873; Vincent Brooks Day & Son Imp.

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: not tipped

3rd Edition - N/A

Notes: While a diagram of lunar craters does appear in the third edition, it has been treated as a diagram and not a plate. Therefore, I do not acknowledge it in my catalogue of plates (see p. 53).



### 1st Edition

Plate: VIII

Page: [96]

Title: COPERNICUS

Dimensions: 17.7 x 12.7 cm

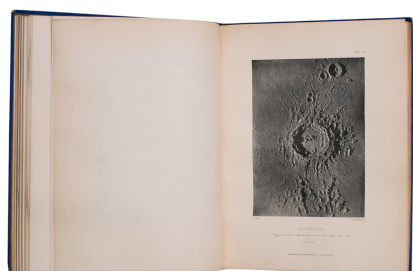
Date: [1870–1872]

Process: [Woodburytype]

Maker: J. Nasmyth; Brooks Day & Son

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: tipped



### 2nd Edition

Plate: VIII

Page: [96]

Title: COPERNICUS

Dimensions: 17.2 x 12.8 cm

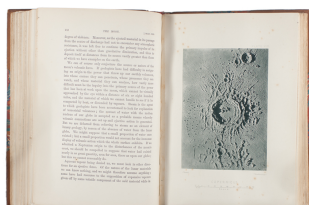
Date: [1870–1872]

Process: [Woodburytype]

Maker: J. Nasmyth; Brooks Day & Son

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: tipped



### 3rd Edition

Plate: VIII

Page: [To face page 110]

Title: COPERNICUS

Dimensions: 13.4 x 9.4 cm

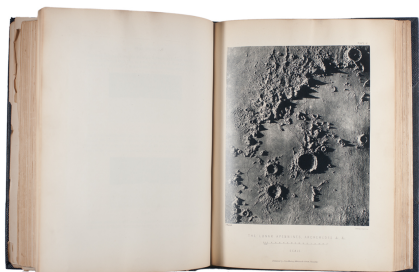
Date: [1878–1885]

Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]

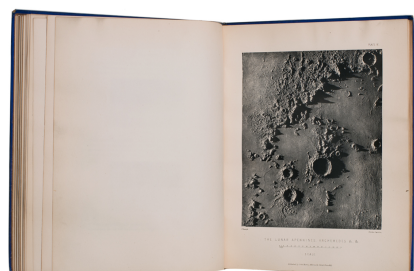
Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]

Inscription: [n/a]

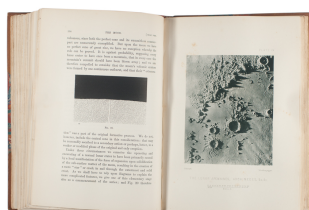
Notes: tipped



**1st Edition**  
 Plate: IX  
 Page: [100]  
 Title: THE LUNAR APENNINES, ARCHEMEDES &c.  
 &c.  
 Dimensions: 19.9 x 16.2 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped

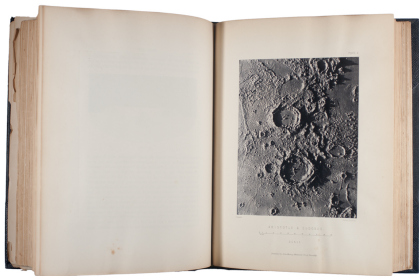


**2nd Edition**  
 Plate: IX  
 Page: [100]  
 Title: THE LUNAR APENNINES, ARCHEMEDES &c.  
 &c.  
 Dimensions: 19.8 x 16 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped

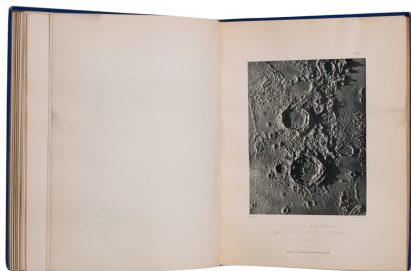


**3rd Edition**  
 Plate: IX  
 Page: [114]  
 Title: THE LUNAR APENNINES, ARCHEMEDES &c. &c.  
 Dimensions: 12.1 x 9.7 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped, spelling change in ‘Archimedes’

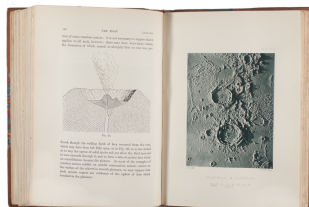




**1st Edition**  
 Plate: X  
 Page: [104]  
 Title: ARISTOTLE & EUDOXES  
 Dimensions: 17.4 x 13.4 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped

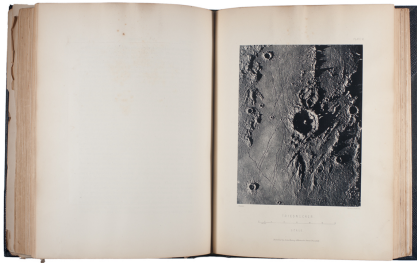


**2nd Edition**  
 Plate: X  
 Page: [104]  
 Title: ARISTOTLE & EUDOXES  
 Dimensions: 17.2 x 13.5 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped

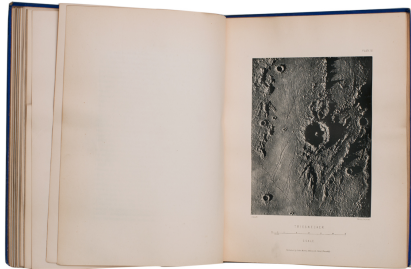


**3rd Edition**  
 Plate: X  
 Page: [To face page 120]  
 Title: ARISTOTLE & EUDOXES  
 Dimensions: 12.6 x 9.6 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped

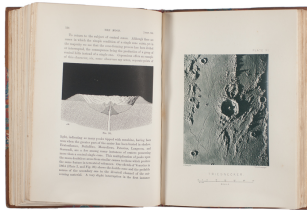




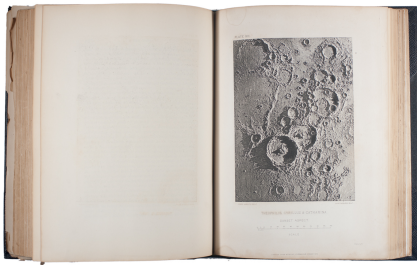
**1st Edition**  
 Plate: XI  
 Page: [108]  
 Title: TRIESNECKER  
 Dimensions: 17.8 x 13.2 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



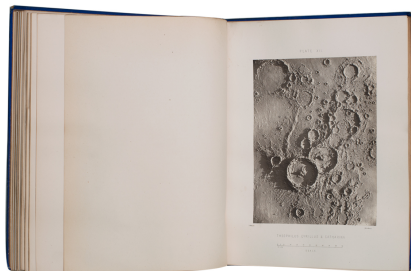
**2nd Edition**  
 Plate: XI  
 Page: [108]  
 Title: TRIESNECKER  
 Dimensions: 17.6 x 13.5 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



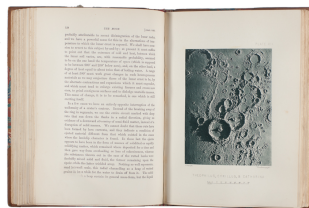
**3rd Edition**  
 Plate: XI  
 Page: [124]  
 Title: TRIESNECKER  
 Dimensions: 12.2 x 9.5 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped



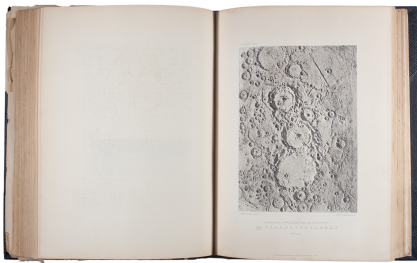
**1st Edition**  
 Plate: XII  
 Page: [112]  
 Title: THEOPHILUS CYRILLUS & CATHARINA  
 SUNSET ASPECT  
 Dimensions: 18.1 x 13.4 cm  
 Date: [1873–1874]  
 Process: [photogravure and aquatint]  
 Maker: JAMES NASMYTH DEL<sup>r</sup>; J.H. & F. C.  
 MCQUEEN SCUL<sup>r</sup>  
 Inscription: LONDON JOHN MURRAY ALBEMARLE  
 STREET 1873  
 Notes: not tipped



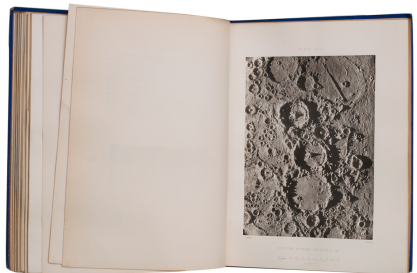
**2nd Edition**  
 Plate: XII  
 Page: [112]  
 Title: THEOPHILUS CYRILLUS & CATHARINA  
 Dimensions: 18.5 x 14.1 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped



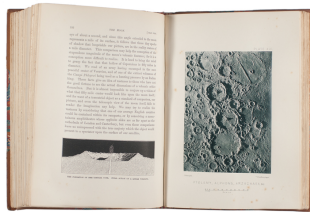
**3rd Edition**  
 Plate: XII  
 Page: [128]  
 Title: THEOPHILUS, CYRILLUS, & CATHARINA  
 Dimensions: 12.9 x 9.6 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype  
 from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic  
 Printing Co]  
 Inscription: [n/a]  
 Notes: tipped



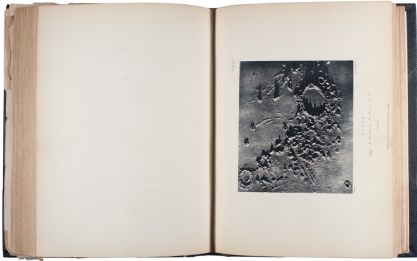
**1st Edition**  
 Plate: XIII  
 Page: [116]  
 Title: ARZACHAEL, PTOLEMY, AND THE RAILWAY  
 Dimensions: 18.2 x 13.1 cm  
 Date: [1873–1874]  
 Process: [photogravure and aquatint]  
 Maker: JAMES NASMYTH DEL<sup>y</sup>; J.H. & F. C. MCQUEEN SCULP<sup>t</sup>  
 Inscription: [n/a]  
 Notes: not tipped



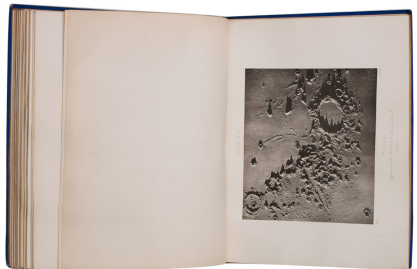
**2nd Edition**  
 Plate: XIII  
 Page: [116]  
 Title: PTOLEMY ALPHONS ARZACHAEL &c  
 Dimensions: 20.3 x 14.8 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped



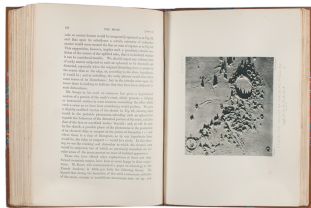
**3rd Edition**  
 Plate: XIII  
 Page: [132]  
 Title: PTOLEMY, ALPHONS, ARZACHAEL &c  
 Dimensions: 13.4 x 9.7 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped



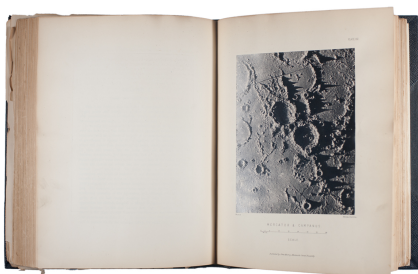
**1st Edition**  
 Plate: XIV  
 Page: [120]  
 Title: PLATO  
 Dimensions: 12.2 x 14.5 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped, page rotated 90° CCW in book



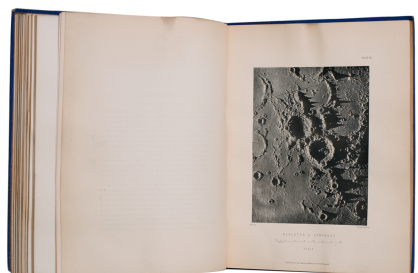
**2nd Edition**  
 Plate: XIV  
 Page: [120]  
 Title: PLATO  
 Dimensions: 15.6 x 17.3 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped, page rotated 90° CCW in book



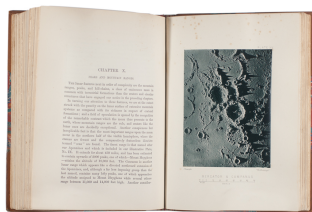
**3rd Edition**  
 Plate: XIV  
 Page: [136]  
 Title: PLATO, THE VALLEY OF THE ALPS, PICO, &c  
 Dimensions: 9.7 x 11 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped, page rotated 90° CCW in book



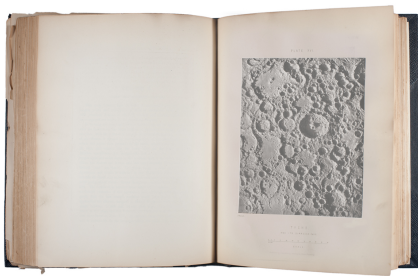
1  
**1st Edition**  
 Plate: XV  
 Page: [124]  
 Title: MERCATOR & CAMPANUS  
 Dimensions: 17.7 x 13.5 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



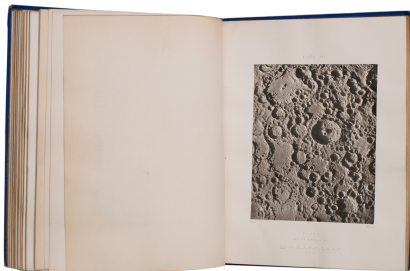
**2nd Edition**  
 Plate: XV  
 Page: [124]  
 Title: MERCATOR & CAMPANUS  
 Dimensions: 17.8 x 13.4 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



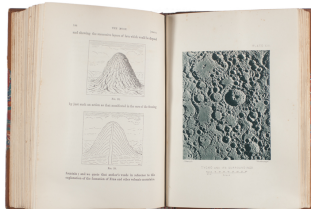
**3rd Edition**  
 Plate: XV  
 Page: [140]  
 Title: MERCATOR & CAMPANUS  
 Dimensions: 13.1 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped



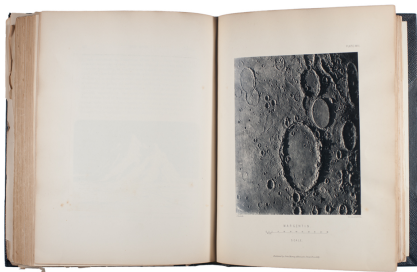
**1st Edition**  
 Plate: XVI  
 Page: [128]  
 Title: TYCHO AND ITS SURROUNDINGS  
 Dimensions: 18 x 14.3 cm  
 Date: [1873–1874]  
 Process: [photogravure and aquatint]  
 Maker: JAMES NASMYTH DEL<sup>r</sup>; J.H. & F. C. MCQUEEN SCULP<sup>r</sup>  
 Inscription: [n/a]  
 Notes: not tipped



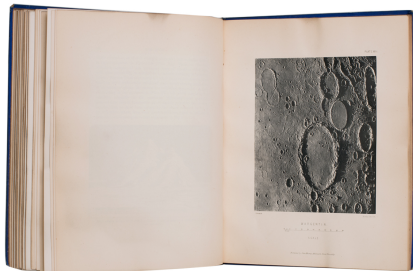
**2nd Edition**  
 Plate: XVI  
 Page: [128]  
 Title: TYCHO AND ITS SURROUNDINGS  
 Dimensions: 17.8 x 14.2 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped



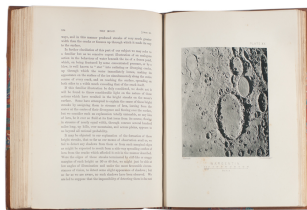
**3rd Edition**  
 Plate: XVI  
 Page: [144]  
 Title: TYCHO AND ITS SURROUNDINGS  
 Dimensions: 12.1 x 9.7 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped



**1st Edition**  
 Plate: XVII  
 Page: [132]  
 Title: WARGENTIN  
 Dimensions: 17.5 x 13.2 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



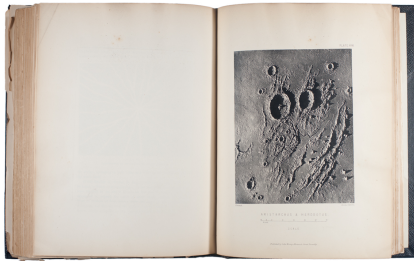
**2nd Edition**  
 Plate: XVII  
 Page: [132]  
 Title: WARGENTIN  
 Dimensions: 17.3 x 13.7 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



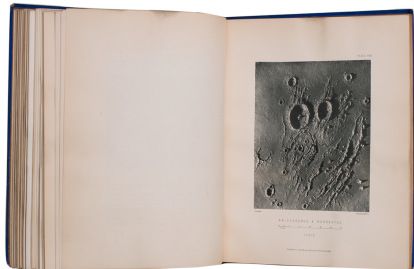
**3rd Edition**  
 Plate: XX  
 Page: [To face page 154]  
 Title: WARGENTIN  
 Dimensions: 12.4 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped

Notes: At this point, the sequence of plates in the third edition begins to deviate from that of the first and second editions; the image for plate XVII in the first and second editions appears as plate XX in the third edition.

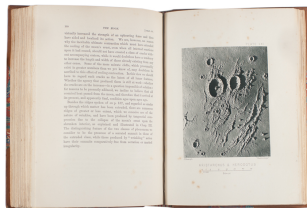




**1st Edition**  
 Plate: XVIII  
 Page: [136]  
 Title: ARISTARCHUS & HERODUTUS  
 Dimensions: 16.8 x 13.1 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



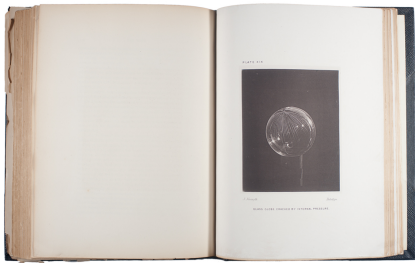
**2nd Edition**  
 Plate: XVIII  
 Page: [136]  
 Title: ARISTARCHUS & HERODUTUS  
 Dimensions: 16.6 x 13 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped



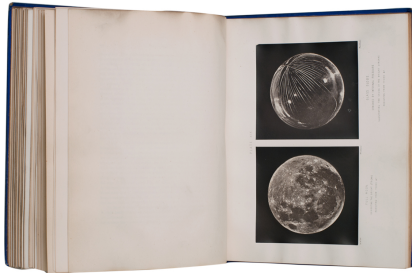
**3rd Edition**  
 Plate: XXI  
 Page: [160]  
 Title: ARISTARCHUS & HERODUTUS  
 Dimensions: 12.3 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Brooks Day & Son Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped

Notes: Note the different plate number in the third edition.

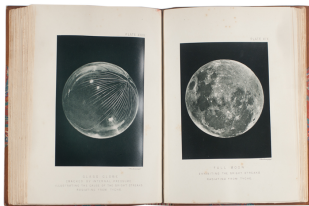




**1st Edition**  
 Plate: XIX  
 Page: [140]  
 Title: GLASS GLOBE CRACKED BY INTERNAL PRESSURE  
 Dimensions: 13.4 x 11 cm  
 Date: [1871–1874]  
 Process: heliotype  
 Maker: J. Nasmyth; [Heliotype Co. Ltd, London]  
 Inscription: [n/a]  
 Notes: not tipped, The heliotype is an image reversal process, this image is flipped horizontally.

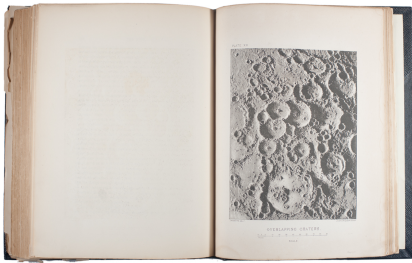


**2nd Edition**  
 Plate: XIX  
 Page: [140]  
 Title: FULL MOON EXHIBITING THE BRIGHT STREAKS RADIATING FROM TYCHO &c / GLASS GLOBE CRACKED BY INTERNAL PRESSURE ILLUSTRATING THE CAUSE OF THE BRIGHT STREAKS RADIATING FROM TYCHO &c  
 Dimensions: 11.7 x 10.9 / 11.7 x 10.9 cm  
 Date: [1870–1872]  
 Process: [Woodburytype]  
 Maker: J. Nasmyth; Brooks Day & Son; [Warren De la Rue]  
 Inscription: Published by John Murray Albemarle Street Piccadilly  
 Notes: tipped, lunar photograph by Warren De la Rue, page rotated 90° CCW

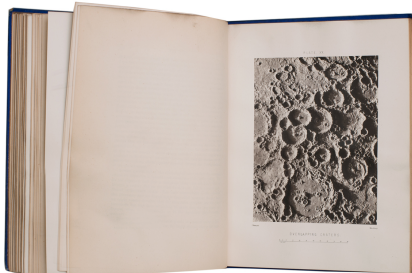


**3rd Edition**  
 Plate: XVIII; XIX  
 Page: [To face each other 151]  
 Title: [XVIII] GLASS GLOBE CRACKED BY INTERNAL PRESSURE ILLUSTRATING THE CAUSE OF THE BRIGHT STREAKS RADIATING FROM TYCHO [XIX] FULL MOON EXHIBITING THE BRIGHT STREAKS RADIATING FROM TYCHO  
 Dimensions: 14.4 x 9.7 cm / 12.9 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Warren De la Rue]; [Woodbury Permanent Photographic Printing Co];  
 Inscription: [n/a]  
 Notes: tipped, lunar photograph by Warren De la Rue, image rotated 90° CCW

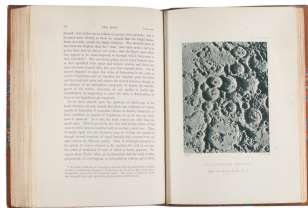
Notes: The first edition provides the reader with the glass globe plate only. In the second edition, it seems to make sense to visually compare the cracked globe with the striations in the moon. However, the moon has been flipped vertically to match the globe, which is not how the moon would appear from the northern hemisphere. The orientation of the plates is switched in the third edition, and treated as two individual plates. See p. 15.



**1st Edition**  
 Plate: XX  
 Page: [148]  
 Title: OVERLAPPING CRATERS  
 Dimensions: 18.8 x 14.5 cm  
 Date: [1873–1874]  
 Process: [photogravure and aquatint]  
 Maker: JAMES NASMYTH DEL<sup>r</sup>; J.H. & F. C. MCQUEEN SCULP<sup>t</sup>  
 Inscription: [n/a]  
 Notes: not tipped

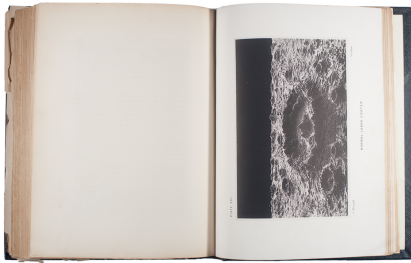


**2nd Edition**  
 Plate: XX  
 Page: [148]  
 Title: OVERLAPPING CRATERS  
 Dimensions: 18.5 x 14.1 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [n/a]  
 Notes: tipped

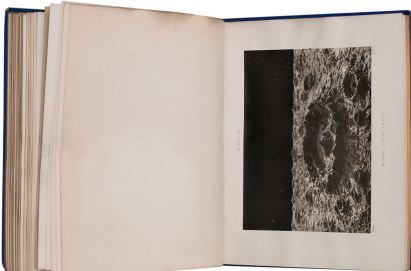


**3rd Edition**  
 Plate: XXII  
 Page: [166]  
 Title: OVERLAPPING CRATERS  
 Dimensions: 12.3 x 9.6 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [n/a]  
 Notes: tipped

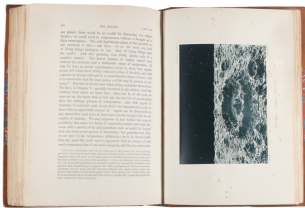
Notes: A different plate number in the third edition.



**1st Edition**  
 Plate: XXI  
 Page: [156]  
 Title: NORMAL LUNAR CRATER  
 Dimensions: 12.5 x 19.5 cm  
 Date: [1871–1874]  
 Process: HELIOTYPE  
 Maker: J. Nasmyth; [Heliotype Co. Ltd, London]  
 Inscription: [n/a]  
 Notes: not tipped, page rotated 90° CCW, The heliotype is an image reversal process, this image is flipped horizontally.

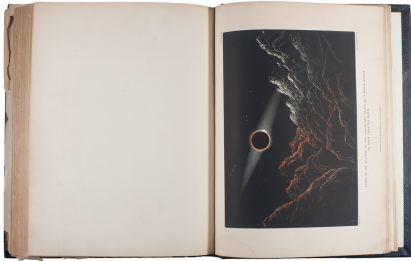


**2nd Edition**  
 Plate: XXI  
 Page: [156]  
 Title: NORMAL LUNAR CRATER  
 Dimensions: 14.2 x 20.2 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [signed] J.N.  
 Notes: tipped, page rotated 90° CCW,



**3rd Edition**  
 Plate: XXIII  
 Page: [176]  
 Title: NORMAL LUNAR CRATER  
 Dimensions: 13.2 x 10 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]  
 Inscription: [signed] J.N.  
 Notes: tipped, page rotated 90° CCW

Notes: See the different plate number in the third edition. Also, James Nasmyth has signed the glass negative for the second edition, which has been carried over onto the reproduction Woodburytype in the third edition (see plate XXIII).



### 1st Edition

Plate: XXII

Page: [164]

Title: ASPECT OF AN ECLIPSE OF THE SUN BY THE EARTH AS IT WOULD APPEAR AS SEEN FROM THE MOON

Dimensions: 15.3 x 21.7 cm

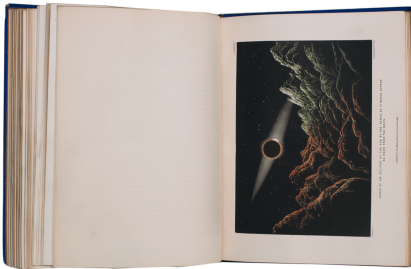
Date: [1867–1874]

Process: [chromolithograph]

Maker: J. Nasmyth, del; Vincent Brooks Day & Son Lith.

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: not tipped, page rotated 90° CCW



### 2nd Edition

Plate: XXII

Page: [164]

Title: ASPECT OF AN ECLIPSE OF THE SUN BY THE EARTH AS IT WOULD APPEAR AS SEEN FROM THE MOON

Dimensions: 15.4 x 21.6 cm

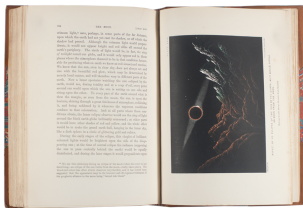
Date: [1867–1874]

Process: [chromolithograph]

Maker: J. Nasmyth, del; Vincent Brooks Day & Son Lith.

Inscription: Published by John Murray Albemarle Street Piccadilly

Notes: not tipped, page rotated 90° CCW



### 3rd Edition

Plate: XXIV

Page: [184]

Title: ASPECT OF AN ECLIPSE OF THE SUN BY THE EARTH AS IT WOULD APPEAR AS SEEN FROM THE MOON

Dimensions: 10.8 x 15.3 cm

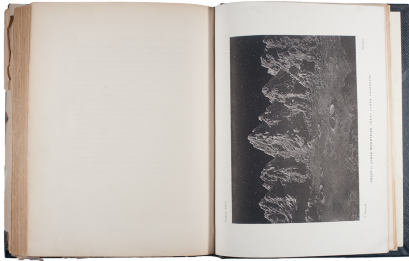
Date: [1867–1874]

Process: [chromolithograph]

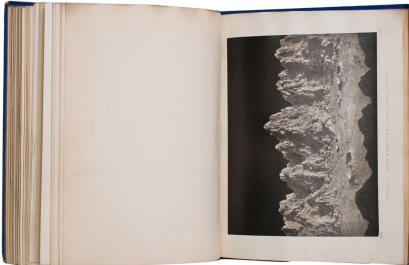
Maker: J. Nasmyth, del; VINCENT BROOKS DAY & SON LITH.

Inscription: PUBLISHED BY JOHN MURRAY ALBERMARLE STREET PICCADILLY

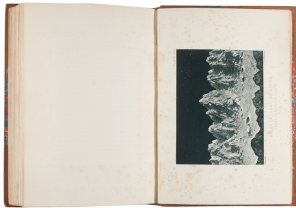
Notes: not tipped, page rotated 90° CCW



**1st Edition**  
 Plate: XXIII  
 Page: [170]  
 Title: GROUP OF LUNAR MOUNTAINS. IDEAL  
 LUNAR LANDSCAPE  
 Dimensions: 15.1 x 21.2 cm  
 Date: [1871–1874]  
 Process: Heliotype  
 Maker: J. Nasmyth; [Heliotype Co. Ltd, London]  
 Inscription: [n/a]  
 Notes: not tipped, page rotated 90° CCW, The heliotype is  
 an image reversal process, this image is flipped horizontally



**2nd Edition**  
 Plate: XXIII  
 Page: [170]  
 Title: GROUP OF LUNAR MOUNTAINS. IDEAL  
 LUNAR LANDSCAPE  
 Dimensions: 17 x 22.4 cm  
 Date: [1872–1874]  
 Process: (Woodbury) [Woodburytype]  
 Maker: J. Nasmyth; [Photo Relief Company]  
 Inscription: [signed] J.N.  
 Notes: tipped, page rotated 90° CCW, foreground added

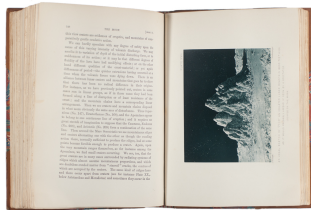


**3rd Edition**  
 Plate: XXV  
 Page: [At end]  
 Title: GROUP OF LUNAR MOUNTAINS IDEAL LUNAR  
 LANDSCAPE  
 Dimensions: 12.9 x 9.8 cm  
 Date: [1878–1885]  
 Process: “Woodburytype” [2nd generation Woodburytype  
 from Photo Relief Company Woodburytype]  
 Maker: J. Nasmyth; [Woodbury Permanent Photographic  
 Printing Co]  
 Inscription: [signed] J.N.  
 Notes: tipped, page rotated 90° CCW

Notes: See the different plate number in the third edition. Also, James Nasmyth has signed the glass negative for the second edition, which has been carried over onto the reproduction Woodburytype in the third edition (see plate XXI).

1st Edition - N/A

2nd Edition - N/A



**3rd Edition**

Plate: XVII

Page: [148]

Title: AN IDEAL SKETCH OF "PICO" AN ISOLATED LUNAR MOUNTAIN 8000 FEET HIGH AS IT WOULD PROBABLY APPEAR IF SEEN BY A SPECTATOR LOCATED ON THE MOON

Dimensions: 12.6 x 9.7 cm

Date: [1878-1885]

Process: "Woodburytype"

Maker: J. Nasmyth; [Woodbury Permanent Photographic Printing Co]

Inscription: [n/a]

Notes: tipped

Notes: This is the only additional plate added to the third edition. This illustration does appear in the first and second edition as a lithographic diagram from a line drawing on p. 132, next to plate XVII 'Wargentini'. This may be the only first generation Woodburytype in the third edition.

## 6. CONCLUSION

The three consecutive editions of *The Moon: Considered as a Planet, a World, and a Satellite*, provide a historical reference to the evolution of print processes, and how reproduction practices in illustrated books result in aesthetic changes as well as information loss. If, or when the editions are dismantled and the plates sold as art objects, this important information will be separated from the plates. Furthermore, Nasmyth's original intention to illustrate a scientific hypothesis will be distanced, making way for new ideas to be placed upon the illustrations, similar to those of the 'issue of trust' that has already been so firmly attached to these images by contemporary scholars. This thesis provides the detailed information needed to secure these plates within the history of photography as they were originally intended, as valid scientific illustrations using the most up to date print processes of the time.

The digitization of the three editions has secured important clues into the history of photomechanical printing within scientific texts, and reveals important characteristics needed to identify the processes. Comparison is the only sure way to identify the many differences in each print technique. I urge anyone interested in the processes described, to look at original objects whenever possible, as this thesis only provides reproductions.

This thesis is intended as a reference for any institutions or individuals who hold copies of the publication or individual plates and who are creating a catalogue record. While it only focuses on the processes used in Nasmyth's three editions of *The Moon*, it still also provides a broad introduction to the many different components of a nineteenth century illustrated book. I hope that it may inspire many to pursue those components in depth.

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