By the Light of the Silvery Moon

A CENTURY OF LUNAR PHOTOGRAPHS

From the moment photography was introduced to the world in 1839, photographers began dreaming of documenting the Moon's remote mystery. Initial experiments wrestled with the challenge of taking pictures of a distant, moving object in a nocturnal sky. By the 1850s, the first detailed photographs of the lunar landscape were achieved. Later in the century, astronomers employed photography to systematically map the entire visible lunar surface with greater accuracy than could be drawn by hand.

Fascination with the Moon endured into the twentieth century, inhabiting the popular imagination through science fiction literature and films. The allure of space travel reached new heights in the 1960s after President John F. Kennedy asked Congress to appropriate funds to facilitate a crewed Moon landing before the decade's end. The mission, launched within the framework of Cold War rivalry with the Soviet Union, was not merely one of scientific discovery and technical prowess. It was necessary, Kennedy explained, "to win the battle . . . between freedom and tyranny" and held nothing less than "the key to our future on Earth." Photography played a critical role in preparing for the successful Moon landing of the Apollo 11 mission and was central to the astronauts' documentation of the lunar surface. Photographs and film also helped shape public consciousness of the event, which reached more than 500 million people through live television broadcast.

Marking the fiftieth anniversary of the first landing of humans on the Moon on July 20, 1969, this exhibition includes photographs from the nineteenth century and the "space-age" 1960s. At the nexus of art, science, and popular culture, they have influenced the way we envision and comprehend the cosmos.

The exhibition was organized by the National Gallery of Art.

[DEX 10]

WARREN DE LA RUE

British, 1815 – 1889

Full Moon

1858 – 1859

stereoscopic glass transparency, printed 1862

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

De La Rue, a printer by trade, was a pioneer of astronomical photography, building his own reflecting telescope and, beginning in 1852, photographing the Moon. After several years of experimentation, he was the first to achieve lucid lunar photographs. In 1858, De La Rue made the first stereoscopic prints of the Moon, produced by carefully selecting two views made during similar phases, often months apart. Seen together through special lenses, the images combine to produce a three-dimensional image.

[DEX 6]

LEWIS M. RUTHERFURD

American, 1816 – 1892

Photograph of the Moon in Its First Quarter

March 6, 1865

albumen print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon and
Patrons' Permanent Fund

Trained as a lawyer, Rutherfurd devoted his time and wealth to astronomy. He built his own small observatory, outfitted with a substantial refractor telescope, at his home in Manhattan. Beginning to photograph the Moon in 1857, he developed several technological improvements. These included a lens for the telescope that was designed for rays of the light spectrum more sensitive to photographic chemicals than to human perception, which enabled him to produce extraordinarily clear photographs of the Moon.

[DEX 51]

DR. A. LE VENGEUR D'ORSAN

French, 1800 – 1899

Our Satellite.
A Selenography According to the
Present State of Science

1862

albumen print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

Our Satellite was the first installment of what had been conceived as a multipart publication that detailed the scientific mapping of the Moon (selenography). Only the first volume, however, appeared; further publication ceased after d'Orsan was accused of pirating photographs from Warren De La Rue, who likely made the photograph displayed here.

[DEX 4

LOEWY ET PUISEUX

MAURICE LOEWY

French, born Marienbad
(now Mariánské Lázně), 1833 – 1907

PIERRE HENRI PUISEUX

French, 1855 – 1928

Lunar Photograph
Tycho Radiation – Crescent Phase

1899

photogravure

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon and
Patrons' Permanent Fund

Loewy, director of the Paris Observatory, and lunar geologist Puiseux painstakingly photographed the Moon on nights with clear weather conditions using the large Coudé telescope developed at the observatory. With precisely positioned mirrors to reflect images from a rotating telescope to a fixed eyepiece, the instrument permitted viewers to remain stationary while observing celestial movement. In 1896 Loewy and Puiseux published the first installment of *Photographic Atlas of the Moon*, which over the next fourteen years would grow to include more than eighty photogravures. Several lunar atlases had been produced in the eighteenth and nineteenth centuries using hand drawings, but this landmark work was the first extensive photographic record of the visible areas of the Moon. It identified craters and other geological features, although the photogravures lacked a systematic arrangement by the Moon's geography. Produced from the glass plate negatives taken with the telescope, the prints exhibit remarkable clarity, even in the shadows.

[DEX 9

LOEWY ET PUISEUX

MAURICE LOEWY

French, born Marienbad
(now Mariánské Lázně), 1833 – 1907

PIERRE HENRI PUISEUX

French, 1855 – 1928

Lunar Photograph
Blancanus – Tycho – Schiller

1899

photogravure

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon and
Patrons' Permanent Fund

[DEX 27–50]

CHARLES LE MORVAN

French, 1865 – 1933

Photographic and Systematic Chart of the Moon, Plates I.A – XXIV.A

published 1914

photogravures

National Gallery of Art, Washington,
Pepita Milmore Memorial Fund

Le Morvan continued the work of Loewy and Puiseux, for whom he previously had worked as an assistant at the Paris Observatory. While his predecessors' atlas was inconsistently arranged, Le Morvan sought to produce the first photographic atlas of the Moon that systematically mapped its entire visible surface. Issued as a portfolio of forty-eight photogravures, the first twenty-four show the Moon in the phases between new Moon and full Moon, while the second twenty-four (seen here) show the phases between full Moon and new Moon. The photogravures were accompanied by corresponding transparent papers that outlined and named the Moon's geological features (see nearby case).

[DEX 64]

CHARLES LE MORVAN

French, 1865 – 1933

Photographic and Systematic Chart of the Moon

published 1926

photogravures with tissue paper overlays

From the Collection of Mary and Dan Solomon

Le Morvan's supplement to the larger atlas displayed on the nearby wall shows the Moon in its successive phases. Each photogravure was accompanied by a tissue transparency outlining the named geological features, as shown on half of the photogravures displayed here. For example, the Sea of Tranquility, where Apollo 11 would land decades later, is identified in this way.

[DEX 1]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Day 320, Survey I, Sectors 3 and 4

1967

78 gelatin silver prints

National Gallery of Art, Washington,
Gift of Joyce and Robert B. Menschel

In preparation for the 1969 Apollo 11 crewed landing on the Moon, NASA launched seven Surveyor missions to achieve soft lunar landings (in which the spacecraft remained intact) between May 1966 and January 1968. Surveyor VI was the fourth mission to accomplish such an objective, touching down on the Moon on November 10, 1967. It also made a "space hop" of 2.4 meters from its original landing position, an early testing of a lunar launch. The spacecraft transmitted 29,952 photographic stills by video camera over the course of two weeks from these two distinct positions. The images were printed at small scale and assembled in mosaic-like patterns, as seen here, to gather information on the surface characteristics of the Moon in order to plan the landing of Apollo lunar modules and astronaut surface activities.

[DEX 65]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Surface of the Moon

July 1969

stereoscopic glass transparency slides

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

In addition to collecting physical samples of "Moon dust," Apollo 11 astronauts took color negatives just inches above the lunar surface using a specially designed Kodak stereo camera to document the surface in three dimensions. The stereoscopic transparencies, which were created back in Houston, correspond to three-inch-square areas of the Moon. Like Warren De La Rue's stereoscopic glass slide on display in the previous room, they create an immersive experience. Visitors are invited to look in the viewer to observe the three-dimensional effect.

[DEX 21]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Lunar Orbiter, Medium Resolution, LO V-24 M-099

1967

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 56]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Lunar Orbiter, Medium Resolution, LOIV M-082

1967

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

The group of medium-resolution photographs on this wall, made with an 80 mm focal-length lens, represents the final two Lunar Orbiter missions, which produced photographic surveys of the lunar surface. The robotic spacecraft were equipped with remote-controlled equipment that produced, processed, and scanned the photographs. The pictures were then transmitted back to Earth, one strip at a time, to create a comprehensive lunar atlas. Launched on May 4, 1967, the Lunar Orbiter IV studied the Moon's gravitational field, measured micrometeoroid activity, and conducted radiation experiments. The project's last mission, Lunar Orbiter V, began on August 1, 1967. It recorded potential Apollo and Surveyor landing sites before it was commanded six months later to crash on the Moon's surface.

[DEX 19]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Lunar Orbiter, Medium Resolution, LOIV M-187

1967

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 20]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Lunar Orbiter, Medium Resolution, LO V M-066 V-14

1967

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 54, 53, 55]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Lunar Orbiter, High Resolution, LOIV H-150
Lunar Orbiter, High Resolution, LOIV H-194
Lunar Orbiter, High Resolution, LOIV H-177

1967

gelatin silver prints

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

Lunar Orbiter spacecraft were put in elliptical orbits that brought them between 100 and 6,000 kilometers from the Moon, capturing images of its near and far sides. Outfitted for the harsh, frigid conditions of space, an elaborate photographic system — including a 610 mm focal-length lens, an internal developer, a dryer drum, and a humidity control system — broadcast high-resolution photographs back to Earth via television signals. NASA's receivers printed the images in ten segments and combined them to create sectional views of the Moon. These topographical representations were studied closely to locate sites smooth enough for landing future spacecraft.

[DEX 22]

UNKNOWN 20TH CENTURY

Warrior on a Moon Beam

July 20, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 12]

WILLIAM E. SAURO

American, 1929 – 2001

Spectators on the lawn at the Stephen Armstrong home

July 20, 1969

gelatin silver print

Courtesy of Howard Greenberg Gallery
and Mary and Dan Solomon

[DEX 26]

AMERICAN 20TH CENTURY

President Nixon aboard USS Hornet

July 24, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 62]

WILLIAM PAUL TAUB

American, 1923 – 2010

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Apollo 11 in Quarantine

July 27, 1969

chromogenic print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 23]

WILLIAM PAUL TAUB

American, 1923 – 2010

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Celebration after Apollo 11 made flawless splashdown

July 24, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 25]

AMERICAN 20TH CENTURY

Apollo 11 Astronauts in Houston

August 16, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

{this is text for dex 22, 12, 26, 62, 23, 25}

Apollo 11 captured attention worldwide, and press photographs of the mission and its aftermath such as these were widely distributed. Soldiers in the battlefields of Vietnam followed reports of the landing by radio, while in Ohio a television was set up on the front lawn at the home of Neil Armstrong's father. President Richard Nixon, just six months in office, made sure to be present for the astronauts' splashdown in the Pacific Ocean. Initial greetings by the president and the astronauts' wives were filtered through a quarantine unit, which the men had to endure for twenty-one days because of concerns about space pathogens. Splashdown after the perilous reentry into the Earth's atmosphere was cause for celebration, especially at the Apollo Mission Control Center in Houston. After the astronauts' quarantine had ended, the city feted its hometown heroes with a ticker tape parade.

[DEX 61]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Neil Armstrong and Buzz Aldrin Deploy Flag on the Moon

July 20, 1969

chromogenic print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 58]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Earthrise across Mare Smythii

July 16 – 24, 1969

chromogenic print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 57]

EDWIN E. ALDRIN JR.

American, born 1930

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Buzz Aldrin's Footprint

July 20, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 60]

NEIL ARMSTRONG

American, 1930 – 2012

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Buzz Aldrin Poses with Flag

July 20, 1969

chromogenic print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 24]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Stars and Stripes on Moon

July 20, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

[DEX 59]

NEIL ARMSTRONG

American, 1930 – 2012

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Buzz Aldrin, Moon Walk Reflection

July 20, 1969

chromogenic print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

{this is text for dex 61, 58, 57, 60, 24, 59}

While Michael Collins orbited the Moon in Command Module *Columbia*, Neil Armstrong and Edwin "Buzz" Aldrin landed the Lunar Module *Eagle* in the Sea of Tranquility, an impact basin that had been identified by many observers of the Moon, including Maurice Loewy, Pierre Henri Puiseux, and Charles Le Morvan. The landing site was tested and mapped by NASA's Surveyor and Lunar Orbiter missions. The two men gathered lunar specimens, performed physical tests, and deployed the American flag. Using Kodak film and a Hasselblad camera specially modified for their bulky, gloved hands, they also recorded one another and their individual marks on the Moon.

[DEX 63]

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

American, established 1958

Ranger IX, A-16

1965

gelatin silver print

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

The robotic Ranger IX launched on March 21, 1965, and impacted the Moon's surface three days later. This was the last mission of the Ranger program, which had the primary objective to acquire and transmit photographs of the lunar surface. In the final twenty minutes of flight, the spacecraft's six cameras were turned on, and in that short time they transmitted 5,814 images. Ranger IX positioned its cameras in the direction of travel, providing NASA with vital visual information about its flight path and what a human mission might encounter on its way to the lunar surface.

[DEX 11]

AMERICAN 20TH CENTURY

Live from the Surface of the Moon

July 20, 1969

gelatin silver print

National Gallery of Art, Washington,
Gift of Robert E. Jackson

Film of the Apollo 11 mission

July 1969

5 minutes

Apollo 11 images courtesy of NASA

The Apollo 11 mission captivated audiences across the globe. Blast-off was a major televised event, and live broadcast footage of the arrival four days later, on July 20, 1969, was viewed by more than 500 million people. The above snapshot, taken by an unknown photographer to commemorate the moment, shows the nearly indecipherable form of the lunar module, dubbed *Eagle*.

The source of some of the most indelible images of the twentieth century, the lunar footage was shot with a special television camera made to withstand the extreme forces of the launch and temperature fluctuations, and designed to transmit information across the long distance from the Moon to the Earth.

LEWIS M. RUTHERFURD
American, 1816 – 1892
View of the Moon
1860

LEWIS M. RUTHERFURD
American, 1816 – 1892
Full Moon
1864

JOHN P. SOULE
American, 1828 – 1904
Full Moon
1863

JOSEPH L. BATES
American, active 1850s – 1870s
The Moon
1860

HENRY DRAPER
American, 1837 – 1882
Full Moon
1860

KEYSTONE VIEW COMPANY
American, 1892 – 1963
The Full Moon, Yerkes Observatory
after 1897

stereoscopic albumen prints

National Gallery of Art, Washington,
Gift of Mary and Dan Solomon

Stereoscopy offers the means to see a three-dimensional image. Two photographs are placed side by side, separated by a distance equal to that between human eyes, and then are viewed together through special lenses so that they appear as one image in three dimensions. To produce a stereo of the Moon that would successfully combine optically, the two photographs had to record similar views, even though they were often made months apart.

Like Warren De La Rue (on wall, far left), Rutherfurd and Draper (whose father, John Draper, had made the first successful daguerreotype of the Moon) were amateur astronomers who pursued improvements in astronomical photography. Other photographers, such as Soule and Bates, served as printers and distributors of lunar stereos, which were widely sold and popular with the public.