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To the Moon and Back: The Impact of Moon Rocks on the Historical Legacy of NASA's Apollo Program

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TO THE MOON AND BACK: THE IMPACT OF MOON ROCKS ON THE HISTORICAL LEGACY OF NASA'S APOLLO PROGRAM

By

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ABSTRACT

Most would say that the pinnacle of the Space Race was when the United States landed on the Moon. Besides the countless videos and images, what is the proof that the U.S. was there? Moon rocks are tangible evidence that the U.S. was on the Moon. Once the moon rocks came to Earth, they were studied, distributed, and displayed. The goal of this research is to examine the displays and narratives of the Apollo lunar samples. Understanding where and how the rocks ended up in their earthly homes around the country allows for analysis of the historical and cultural impacts of these rocks. It is important to understand the Moon and its history because the lunar landings were a major part of the 1960s in the United States. My research involves hunting down the lunar samples that are across the U.S. and working with several institutions to gather the stories of their lunar samples. My research shows that the lunar samples are not only rocks and pebbles, but they are objects that share different stories about the history of Apollo and, therefore, are an important part of Apollo's legacy.

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INTRODUCTION

Almost every night when you glance up at the sky you will see the Moon, the only exception is a New Moon. But even when it is not reflecting the light of the Sun to us on Earth, we still know it is there. The Space Race had two of the world's most powerful nations focusing on developing rockets for space travel. The Apollo 11 lunar landing moonstruck the world, and it was the apex of the American space program at the time. The goal of this thesis is to examine how the Apollo lunar samples have been placed in the narrative of the Apollo program while having their own stories as important historical artifacts. To understand lunar samples as artifacts we must first understand the importance of the Apollo payload.[1] The Apollo lunar missions brought back about 842 pounds of lunar material. The collection of lunar materials was a key scientific goal of the Apollo missions. The significance of the lunar samples is undisputed because of their scientific contribution and their public display. The knowledge gained from the lunar samples and the distribution of that knowledge to the public through media and educational material has been a lasting part of the Apollo legacy. Lunar material that is on display connects the public with the past and is used to share the numerous achievements and research of the Apollo program even though it is just rocks and dirt.

The shared history of the lunar material is it was brought back during the missions to the Moon from 1969 to 1972. The history of the lunar material's journey to Earth is directly connected to that of the Apollo program. So, to examine the importance of the payload, expanding an understanding of the history of Apollo is vital. Studying the history of the Apollo

[1] It is important to emphasize that when I am referring to the Apollo payload, I am just talking about the lunar material collected by the twelve Apollo astronauts who landed on the Moon.

program realizes hidden links that connect the astronauts with the lunar samples they collected and what tales the samples can share about their human counterparts. There are several different approaches to the history of the Apollo program because the program is multifaceted. The historiography of Apollo has a range of methodologies, focuses, and narratives that they share with their audience. Historians have examined the history of the men, the rockets, and even the spacesuits. It is critical to assess the historiography of Apollo before understanding the roles that lunar samples play as key objects in the history of Apollo and the American space program.

Matthew Tribbe's book *No Requiem for the Space Age: The Apollo Moon Landings and American Culture* explains how NASA and the U.S. government failed to keep the American public interested in the American space program.[2] Tribbe's work looks at how the Apollo program initially gripped the lives of the American people during the 1960s. But even with the offer of optimism that a win over the Soviet Union was possible, it ultimately was not enough to prevent the decline of the public's interest. Tribbe seeks to explain the history of the space program through the lens of psychoanalysis of society. He examines both rationalism and neo-romanticism and how they were fluctuating during the period. Rationalism was the main trajectory of the Apollo program during the rise of the space age and neo-romanticism eventually led to the derailing of the program. It was the move from a designated goal and working to accomplish it to developing technology and letting society pick any new goals that caused the Apollo program to lose relevance. This book is key because how it explains how pop culture also played a role in society's goals and perceptions. He explains the philosophy in terms of pop

[2] Matthew D. Tribbe, *No Requiem for the Space Age: The Apollo Moon Landings and American Culture* (New York: Oxford University Press, 2014).

culture references to illustrate his points. His main argument is that Apollo fell from favor because it went from what mankind can do to what mankind did do. It is important to understand that public interest was vital to the survival of massive projects like Apollo and that the public's participation in igniting that interest is crucial in the survival and continuation of large technological development and exploration in this post-modern world.

Marketing the Moon: The Selling of the Apollo Lunar Program is a key source in the historiography of Apollo because it looks at NASA's and the U.S. government's goals to promote the space program to the public.[3] The authors, Daniel Scott and Richard Jurek, look at how Apollo and the space program influenced the public. It looks at Apollo's rise more positively than that of *No Requiem for the Space Age.* "Apollo is the largest, and we believe the most important, marketing and public relations case study in history."[4] The U.S. government had to convince the public – more specifically the American taxpayers – that going to the Moon was a good use of government funding. Scott and Jurek examine the role that the public played in the success of the Apollo program. The authors saw a hole in the history of the Apollo program from the lack of discussion about how the program was marketed to the public. The media and the contractors played a large role in how the Moon landing was presented to the public. NASA lacked the staff and money to keep up with the public demand for knowledge during the Apollo era, and many companies jumped on the opportunity to help NASA share the narrative of the Apollo mission. Because of NASA's limited focus on public relations for Apollo, the authors ran into problems with the lack of documentation and had to rely on the people who were still alive

[3] David Meerman Scott, and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (MIT Press: Cambridge, 2014).
[4] Scott, and Jurek, *Marketing the Moon*, ix.

to tell the story. This book benefits this thesis by showing how NASA influenced the narratives that were told to the public as a way to promote interest in space travel. This shows that NASA wanted the public to remain interested in the program, which has continued in the form of the 35th, 40th, and 50th-anniversary celebrations of the first lunar landing.

Rocket Ranch: The Nuts and Bolts of the Apollo Moon Program at Kennedy Space Center by Jonathan Ward addresses the organizational culture and impacts of the Apollo program on its employees and the people of the area.[5] Ward studies the lives of the people that worked on the program. He discusses men like Wernher von Braun and other important figures who worked on the space program but mostly focuses on those who worked at Cape Canaveral. This book explains the development of the space center and why NASA chose that location. He goes into detail on the construction of the launch pads and other buildings on the grounds and how they were used during the Apollo and the Shuttle program. This book takes a personal look at the space program through the eyes of the workers. Ward shows his reader the space program was not just a perfectly organized set of missions, departments, and projects, but examines how these people interacted with each other and how their work impacted their common goal. This book describes the Apollo 1 tragedy and its effects on the workers of the program.[6] Ward takes at look at the space program through the lens of the workers by using their voices and how much of their lives they put into the program. These workers did not see their time during the program as being buried in their work, but rather as a goal that was worth all the time, vacations, and holidays they missed with their families. This book influenced this thesis because of the importance of

[5] Jonathan H. Ward, *Rocket Ranch: The Nuts and Bolts of the Apollo Moon Program at Kennedy Space Center* (New York: Springer International Publishing, 2015).
[6] Ward, *Rocket Ranch*, 43-67.

examining the human side of the program. This thesis looks at the people just as much as it does the Moon rocks. The people are part of the history of Apollo.

This thesis fits within the historiography of Apollo, but it is also influenced by the historiography of museums and the purpose that they serve within society. The goal of displaying lunar material is to share knowledge and information about Apollo and the natural history of the Moon with the public. So, examining the historiography of museums is also a vital part of understanding why the lunar sample displays are so important to the history of Apollo. Since this thesis deals largely with displays in the United States, it is key to examine literature that focuses on museology in the United States as well.

Who Owns America's Past: The Smithsonian and the Problem of History by Robert Post can be summarized in the George Orwell quote in the epilogue: "Those who control the past control the future and those who control the present control the past."[7] In particular, Post examines the National Air and Space Museum in an effort to analyze how museums share history and who impacts it. Post explains that there were issues and obstacles that the museum had to overcome to be successful. The Smithsonian went from a museum that just presented its collection with simple labels to curating exhibits to present a narrative. Post looks at the museum's episode with the *Enola Gay*, the plane used to drop the atomic bomb on Hiroshima, Japan during World War II. The curatorial staff believed that it was important to present all the sides of the *Enola Gay* and its dark history, but Congress did not agree. The final result of the *Enola Gay* exhibit was a sanitized version of the original story. Post shows how the power and

[7] Robert Post, *Who Owns America's Past: The Smithsonian and the Problem of History* (Baltimore: Johns Hopkins University Press, 2013), 273.

influence of museums can be manipulated to tell a cleaner more positive narrative and forced to suppress any narrative that does not align with the ideas that may be deemed less popular. Post's purpose in retelling this painful episode is to highlight the dangers of sanitized control over history when that history is not entirely positive.

Life on Display: Revolutionizing U.S. Museums of Science and Natural History in the Twentieth Century by Karen Rader and Victoria Cain examines the changes in the mission, organization, and collections of museums of science and natural history.[8] The authors examine the changes that these museums went through between the late nineteenth century to the early twentieth-first century. The goal of Rader and Cain is to understand the relationship between how biological and live specimens are displayed and their impact on the museum's public outreach. They look at several museums using personal correspondence, journal articles, public press releases, and annual reports to "reveal when, why, and how museums struggled to define and redefine their public missions and their role in science education."[9] The authors stated that an important part of their approach to these institutions was that they tried to maintain the separation of each individual museum while still examining them as a whole. The first chapter focuses on the late 19th century and the early 20th century, and the reformers that pushed for museums to change from plain display spaces into institutions of education for the general public. These reformers were called museum men. Former Assistant Secretary of the Smithsonian George Brown Goode's impact as a reformer is heavily discussed in this chapter as well. Goode is recognized by several historians like Robert Post as a leader in the reformation

[8] Karen Rader and Victoria Cain, *Life on Display: Revolutionizing U.S. Museums of Science and Natural History in the Twentieth Century* (Chicago: University of Chicago Press, 2014).
[9] Karen Rader and Victoria Cain, *Life on Display,* 4.

and redesigning of museums. This work shows the push by museum staff to change from the spectacle to the educational and adopting the ideals of the "New Museum Idea," which emphasizes curating with the subject matter, specimens, and the public in mind. Throughout the twentieth century, museum staff focused on what displays they had and how the public could interact with and learn from these exhibits. Museums experimented with new ways to take the knowledge that they were gaining from the experts and presented it to the public. The authors note that the experts were vested in these displays because they helped bring attention to their research and funding. It is when the authors get to the end of the twentieth century into the twentieth-first century that there is a focus on the difference between the types of museums especially the delineation between a science museum and a science center. The authors analyze the methods and products that they advertise to get the attention of the public. This book helps emphasize a key goal in this thesis by explaining the mission of a museum, and the goal of its staff greatly influences what the public learns. Also, the public's interest can influence the method and approach that these institutions have when displaying objects.

Behind the Exhibit: Displaying Science and Technology at World's Fairs and Museums in the Twentieth Century embodies the goal of this thesis by sharing a key purpose: examining how museums play a role in presenting to the public objects and ideas that have both national and international significance. This book is an edited volume by Elena Canadelli, Marco Beretta, and Laura Ronzon.[10] The book focuses on the arguments made by historians, and curators during the Artefacts XX conference that was held between 20 and 22 September 2015. Several of the

[10] Elena Canadelli, Marco Beretta, and Laura Ronzon, *Behind the Exhibit: Displaying Science and Technology at World's Fairs and Museums in the Twentieth Century* (Washington D.C.: Smithsonian Institution Scholarly Press, 2019).

authors in this volume took place in the conference. They examine the interconnection between international and national museums and how they display science, technology, and history to the public. They look at the trends that are shared between several countries including Russia, the United States, and Japan. This book separates itself from the rest of the historiography and the focus of this thesis because the United States is not the only country that is discussed. Though the authors take case studies from around the world, it is important to understand that the goal to display process, invention, and production to the general masses is a global concept. This connects with the idea of distributing the Goodwill Moon rocks to the citizens of the world.

References to the lunar samples and their importance within the historiography are rare at best and the sources that do mention the Apollo lunar material only discuss it in passing. It is surprising that the lunar samples are not widely discussed even though the science experiments and scientific goals of the program were emphasized during the Apollo era. *Taking Science to the Moon: Lunar Experiments and the Apollo Program* by Donald Beattie discusses the arguments made by scientists to have equipment and tools brought up to the Moon with the astronauts.[11] Beattie explains how they were given a strict weight limit for the items that they would like to go to the Moon with the astronauts. It was through back-and-forth discussions between the scientists and NASA officials that they were able to increase the amount of space that could be filled with scientific supplies and eventually lunar materials. Beattie explains his background as a geologist and how they planned every experiment and scientific protocol for the astronauts to follow. He recalls the decision that had to be made to take science to the Moon. Beattie and other NASA

[11] Donald Beattie, *Taking Science to the Moon: Lunar Experiments and the Apollo Program*, (Baltimore: Johns Hopkins University Press, 2001).

geologists played a huge role in the lunar samples that were collected on the Moon even though they were thousands of miles away. This book contributes a background to a major objective of the lunar landing and seeks to explain why samples and experimentation were vital to the lunar landings and our understanding of the Moon.

A primary goal of this thesis is to compile and convey the stories of lunar samples that are on display across the United States to show that they are a valuable part of the history of the Apollo program. They are objects that are crucial to the legacy of Apollo, like many other artifacts such as the suits and rockets, because they directly connect mankind with the lunar landings as pieces of the Moon.

Each chapter focuses on a different group of lunar samples and unique stories surrounding those samples. These groups are the Goodwill Moon Rocks, Moon rocks that museums petitioned for exhibition, and the lunar samples associated with the Ambassador of Exploration Awards. The thesis will only discuss the samples that are in the United States or found their way back into the country. Chapter One focuses on the Goodwill Moon rocks and why the United States gifted pieces of the Moon to various nations during the 1970s. This chapter also examines the story of lawyer Joseph Gutheinz and his relationship to the Goodwill Moon rocks. Chapter Two discusses several institutions that petitioned NASA for a lunar sample for display to the public. Another focus of this chapter is explaining the process and the journey that museum staff took to gain their lunar sample and how they share it with the public. Finally, Chapter Three describes the relationship between the Ambassador of Exploration and the men who were presented with the award. This chapter also seeks to explain the reasons why the awards were donated to specific institutions based on their relationship with the recipient.

The purpose of this thesis is to emphasize that the lunar samples have a story to tell about their connection to the Apollo program and how they contribute to the dissemination of Apollo's history. Also, they are a prime part of the Apollo legacy, and it should be stressed that they are essential artifacts that share the knowledge gained from the missions, they represent the great accomplishments of the Apollo program, and they connect generation after generation with the actions that led mankind to the Moon. The significance of these Moon rocks goes beyond their scientific contributions. As objects that are displayed to the public, they continue the legacy of Apollo through the science and the history that staff members tell about them and their connection to the Apollo lunar landings.

CHAPTER 1: GOODWILL FROM THE MOON

The United States landed six successful lunar missions from 1969 to 1972. The missions brought back 382 kilograms of lunar rocks and other samples from the lunar surface. Between the first Moon landing (Apollo 11) in July 1969 and the final mission (Apollo 17) in December 1972, NASA marked a beginning and an end to a major stage in space exploration. While the Apollo program represented the final stage of the Space Race between the United States and the Soviet Union, the enduring message was that it would be for the "benefit of all mankind."[12] The U.S. government emphasized this as the goal of the lunar missions, which is represented through a plaque that remains on the Moon's surface attached to the Apollo 11 lunar module's landing gear. The plaque states, "We come in peace for all mankind."[13] Further, the message was embodied through samples given as gifts to 135 countries around the world and each of the 50 states, Washington DC, and the U.S. territories. These lunar samples became known as the Apollo Goodwill Moon rocks. These Goodwill Moon rocks and their accompanying plaques were presented to their respective states and nations on behalf of President Richard Nixon, who was in office during the years of the Moon landings themselves. These goodwill gifts represent a major part in how the Apollo missions' payloads were shared and presented to the public. They not only represent a part of the history of the Apollo missions, but they have their own narrative because of their distribution around the world. This chapter will examine the history and status of the Apollo Goodwill Moon rocks. At the center of that discussion is the relationship between the

[12]P. J. Blount and David Miguel Molina, "Bringing Mankind to the Moon," in *NASA and the Long Civil Rights Movement,* eds . Stephen Waring, and Brian Odom (Gainesville: University of Press of Florida, 2019), 19-34.
[13]NASA, "Apollo 11 Plaque Left on the Moon," last updated July 16, 2009, date accessed March 12, 2022, https://www.nasa.gov/centers/marshall/moonmars/apollo40/apollo11plaque.html.

U.S. government and the countries and institutions that received the rocks. The Goodwill Moon rocks should be evaluated both as celebratory gifts and political tools. This chapter will also discuss the Goodwill Moon rock recovery efforts of Joseph Gutheinz and NASA and how the results of those efforts have shaped our understanding of the ownership and security of the Goodwill Moon rocks as well as the Apollo program's legacy.

The United States and Lunar Goodwill

Although the outward expressions of the Cold War and the Space Race between the United States and the Soviet Union were international prestige and dominance, there also existed an underlying hope for peace. Presidential leadership in this era indicates as much. Although the popular image of President John F. Kennedy was that of an advocate for space exploration with a commitment to engaging the Soviet Union in the Space Race, his hope for a more peaceful world also came across in his speeches. He stated during his 1962 Rice University speech, "For the eyes of the world now look into space, to the [M]oon and the planets beyond, and we have vowed that we shall not see it governed by a hostile flag of conquest, but by a banner of freedom and peace."[14] President Kennedy was not the only U.S. president to state that space exploration should emphasize peaceful purposes. His predecessor President Dwight Eisenhower mentioned in his 1960 State of the Union speech that the United States should focus on laying "important foundation stones for more extensive exploration of outer space for the ultimate benefit of all mankind."[15] The phrase that President Eisenhower used during this speech – "for the benefit of

[14] John F. Kennedy, "Moon Speech at Rice University," September 12, 1962, date accessed March 12, 2022, https://er.jsc.nasa.gov/seh/ricetalk.htm.
[15] Dwight Eisenhower, "State of the Union Speech," January 7, 1960, date accessed March 12, 2022, https://www.eisenhowerlibrary.gov/sites/default/files/file/1960_state_of_the_union.pdf.

all mankind" – became a common phrase that others then used when justifying the importance of space exploration. In *NASA and the Long Civil Rights Movement,* P. J. Blount and David Miguel Molina explain the meaning of "for the benefit of mankind" and its use throughout the period within speeches and legislations. [16] Blount and Molina discuss how the phrase developed over the 1950s and into the 1970s. The original use of the phrase was in relation to the advancement in atomic energy and nuclear power. As the rhetoric shifted from nuclear development to space exploration, the use of the phrase followed. The authors also explain, like Kennedy did, that the flag planted on the Moon was intended as a symbol of the American ideology of freedom and liberty, but the meaning was, in fact, two-fold as it also represents the idea of the United States conquering the Moon. With the success of the lunar landings, the lunar samples that the astronauts brought back to Earth embodied that phrase of peace and those ideological concepts.

The Apollo program had two major goals: first, to land men on the Moon and bring them safely back, and second, to bring back geological samples. Only twelve humans to date have walked on the Moon. The idea of the Moon landings being "for all mankind" was represented by the objects that the astronauts took to the Moon, during the messages that the astronauts shared from the Moon, and in the objects and collections they brought back. The samples were brought back to be studied for the benefit of mankind.

But, how were the lunar samples supposed to communicate that message of unity and peace? President Richard Nixon used the idea of shared ownership of the Moon landings to make that happen. The Goodwill Moon rocks are lunar samples that were designated by Nixon to

[16] P. J. Blount and David Miguel Molina, "Bringing Mankind to the Moon," 29-34.

be gifts to other nations in celebration of the success of the Moon landing. Though these lunar samples were small, they represent a larger story.

Historians have rarely discussed the gifting of the Apollo Goodwill Moon rocks in works covering the period. Yet the rocks' story relates a powerful statement about the United States' success in landing on the Moon. The Goodwill Moon rocks represent only a small fraction of the over 380 kilograms of lunar samples that were brought back to Earth, but they have had a lasting impact on United States foreign relations regarding artifacts and items shared with other countries even decades after they were gifted.

Nixon's presentation of the Goodwill Moon rocks reiterated the American message of space exploration being for the benefit of all mankind. This can be seen especially in NASA Administrator Thomas O. Paine's presentation of an Apollo 11 Goodwill Moon rock to the United Nations on July 20, 1970, the first anniversary of the Apollo 11 Moon landing.[17] Paine addressed his audience of representatives and other diplomats with the following,

> The Congressional legislation which established the United States space program on October 1, 1958, and which subsequently directed our efforts, declared as our national purpose that activities in space should be devoted to peaceful purposes for the benefit of all mankind, and that the United States would cooperate with other nations and groups of nations in the exploration of space and in the peaceful application of the knowledge gained therefrom.[18]

[17] Thomas O. Paine, "Transcript of Thomas O. Paine's speech to the UN," July 20, 1970. date accessed July 8, 2020, https://historydms.hq.nasa.gov/sites/default/files/DMS/e000037782%20-%20508%20pass.pdf
[18] Paine, "Speech to the UN," 1970.

This statement shares the ideas of unity regarding space that Paine's predecessors had during their speeches. Paine ended his speech, "Therefore, it is especially appropriate that the United Nations, which has thus contributed so positively to the peaceful uses of outer space and has worked so energetically to establish peace and goodwill on our planet, now be the custodian of this Flag and Moon Stone. It is with the greatest solemnity, Mr. Secretary General, that I present these historical artifacts in the name of the President of the United States and all my fellow citizens."[19] These final few sentences reaffirmed the idea that through this gift the United States was spreading the idea of peace to the rest of the world. The fact that the presentation of this Goodwill Moon rock to the United Nations occurred on the one-year anniversary of the first successful lunar landing helped to connect the Goodwill Moon rocks to the legacy of the Apollo program.

Each of the Apollo missions brought back lunar rocks, soil, and core samples for study on Earth. All these samples were cataloged by NASA scientists, who recorded their size, chemical makeup, and where the sample was collected. The Goodwill Moon rocks came from only two missions, Apollo 11 and Apollo 17. The two missions brought back different types of samples that ultimately supplied the Goodwill Moon rocks. Before the launch of Apollo 11, scientists chose where and what samples would be appropriate as the Goodwill sample. For Apollo 17, these decisions were left to the astronauts.

The first Moon landing occurred on July 20, 1969, with Neil Armstrong serving as the commander and Edwin "Buzz" Aldrin as the lunar module pilot. (Michael Collins — the third

[19] Paine, "Speech to the UN," 1970.

crew member and the command module pilot — orbited the Moon while Armstrong and Aldrin were on the surface). What history remembers, though, are Armstrong's first words as he stepped off the ladder of the lunar lander and onto the lunar surface, the phrase; "for mankind" made its debut on the Moon. Armstrong's famous words, "That's one small step for [a] man, one giant leap for mankind," communicated that this mission was not just a victory for the American people, but for the people of the world. Armstrong's words were not the only symbol of unity that was a part of the first lunar landing. The astronauts had brought with them a silicon disk that contained goodwill messages from seventy-three nations.[20] This phrase of unity that Eisenhower first introduced and echoed by his successor became the hallmark of this mission and the Apollo program.

Aside from the prestige and the "win" for the United States in the Space Race, Apollo 11's primary purpose was scientific. To that end, it brought back a lot of different samples from the Moon. The last sample that the astronauts collected before returning to the Lunar Module (LM) was lunar sample 10002.[21] This sample functioned as a cushion to prevent the larger samples that were collected during the mission from bouncing around and getting damaged during the trip back to Earth. Dr. Ryan Ziegler, the curator for the Apollo samples at the Johnson Space Center (JSC) in Houston, Texas, notes that a large portion of lunar sample 10002 was separated into several different cataloged samples. The NASA scientists explained that they did not break down the whole sample into smaller samples. It was a requirement of scientists to leave a percentage of the sample intact. These smaller samples made from 10002 were then re-

[20]Sarah Loff, "Apollo 11 Mission Overview," NASA, latest updated January 5, 2022, date accessed February 21, 2022, https://www.nasa.gov/mission_pages/apollo/missions/apollo11.html.
[21] Ryan Ziegler, email to the author, October 24, 2020.

cataloged under the numbers of 10084-10086. The Goodwill Moon rocks from the Apollo 11 mission were from these groups, more specifically from sample 10085. Dr. Ziegler explains that "this sample represents the greater than 1 mm fraction of sample 10002,"[22] meaning the scientists filtered sample 10002 through a 1 mm sieve.[23] The larger samples left in the sieve were collected and used as the Goodwill rocks while the smaller portions of sample 10002 were kept by the scientists for study. In the end, however, Goodwill Moon rocks were not as well-documented as most of the other lunar samples that have remained in the United States. This is because they were intended as gifts and, therefore, they were separated from their sample sets and then sealed in lucite after they arrived at JSC.

The Apollo 11 Goodwill Moon rocks were distributed to their respective nations and states between the end of 1969 to 1970. They were sent incased in Lucite orbs attached to display stands.[24] Each rock was accompanied by a flag that had flown during the Apollo mission. The display also had a plaque that read, "Presented to the People of [receiving nation/state] by Richard Nixon, President of the United States of America. This flag of your [nation/state] was carried to the Moon and back by Apollo 11 and this fragment of the Moon's surface was brought to the Earth by the crew of that first manned lunar landing."[25] The flags that were presented with the Goodwill Moon rocks are another example of how the phrase of "for the benefit of all mankind" is represented through the Apollo program. The U.S. government and NASA

[22] Zeigler, email, October 24, 2020.
[23] C. Myers, "10002 Bulk Soil 5629 grams," *Lunar Sample Compendium,* 2009, date accessed March 12, 2022, https://www.lpi.usra.edu/lunar/samples/atlas/compendium/10002.pdf.
[24] Lucite is an acrylic resin that was used to preserve the Apollo Moon rocks that were placed on display for the public.
[25] Moon rock plaque, NASA, 1972, date accessed March 12, 2022, https://curator.jsc.nasa.gov/lunar/displays/.

prearranged for the flags to be carried to the Moon like the lunar lander plaque and the silicone disk. The decision to include the flags as a part of the cargo shows that the United States had plans for the Goodwill Moon rocks as gifts before the samples even arrived on Earth. It is worth noting that flags sent up as cargo for every Apollo mission, though the Apollo 13's batch of flags did not make it to the Moon due to the mission's failure. There was only one flag that was a part of the Apollo Goodwill gift that did not make it to the Moon and back on the first lunar landing and this flag belonged to Venezuela. Though this flag did not make on the first mission, it joined the Apollo 12 crew to the Moon.[26]

While both Apollo 11 and Apollo 17 crews brought back lunar rocks that became Goodwill rocks, Apollo 17 was special, even compared to the other five lunar landings. This mission was different because it was the only mission that carried a scientist to the Moon. Dr. Harrison "Jack" Schmitt was the first and only scientist-astronaut who went to the Moon. The final two men to walk on the Moon – Gene Cernan and Harrison Schmitt – sent a goodwill message from the Moon to the Earth that was just as important as Neil Armstrong's famous quote in relation to the idea of peace and goodwill. Regarding the rock that served as the source for the Apollo 17 Goodwill rocks, Commander Cernan remarked during the mission, "When we return this rock or some of the others like it to Houston, we'd like to share a piece of this rock with so many of the countries throughout the world. We hope that this will be a symbol of what our feelings are, what the feelings of the Apollo Program are, and a symbol of mankind: that we

[26] Robert Pearlman, "Where Are the Apollo 11 Lunar Samples Displays," *CollectSpace.com*, last modified 2022, date accessed January 28, 2022, http://www.collectspace.com/resources/moonrocks_apollo11.html; Sarah LeClarie, email, July 30, 2021; Robert Pearlman, email, August 2, 2021. It is through further research and communication with NASA, that I discussed that the lists that contained the names of the countries have since been corrupted due to aging technology.

can live in peace and harmony in the future."[27] Unlike the Apollo 11 Goodwill lunar sample that was a soil sample that the crew selected under strict guidance of NASA's geologists, Cernan and Schmitt got to hand-select sample 70017, the rock from Apollo 17 that was eventually fragmented into pieces for distribution as the Goodwill rocks for the mission. This rock is made of ilmenite basalt and has a mass of 2957 grams.[28] The Apollo 17 Goodwill Moon rocks were distributed around the world like the first set of Moon rocks, reiterating the unifying message that surrounded the Apollo program. This set of rocks plays a key role in how the ownership of gifts from the United States to other nations is impacted by both the policies of the United States and the receiving nations in relation to national patrimony. It was through a 1998 sting operation to recover a missing Moon rock that this role was brought to the front of the discussion about the Moon rocks and their ownership.

Like the Apollo 11 Goodwill Moon rocks, these Apollo 17 Goodwill rocks were delivered to their respective nations with flags that were flown to the Moon. However, unlike the Apollo 11 Goodwill Moon rocks which were mounted on display stands, this set of lucite orb were attached to plaques with their respective flags. The first message on these plaque states: "This fragment is a portion of a rock from the Taurus Littrow Valley of the Moon. It is given as a symbol of the unity of human endeavor and carries with it the hope of the American people for a world of peace."[29] This massage is different from the first set of Goodwill rocks in many ways.

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[27] This quote is from December 13, 1972. The quote comes from NASA's digital transcript archive. Eric Jones, *EVA-3 Close-out*, NASA, 1995, accessed March 12, 2022, https://www.hq.nasa.gov/alsj/a17/a17.clsout3.html.

[28] C. Myers, "70017 Ilmenite Basalt 2957 grams," *Lunar Sample Compendium*, 2009, date accessed March 12, 2022, https://www.lpi.usra.edu/lunar/samples/atlas/compendium/70017.pdf.

[29] Moon rock plaque, NASA, 1972, date accessed March 12, 2022, https://curator.jsc.nasa.gov/lunar/displays/.

The rhetoric here ties into the ideas of peace and mankind that was common during the era. The most important part is how the words does not just state the current president or the crew, but it emphasizes the rock's purpose as a gift as coming from the American people instead of the American government. The gift did more than point of the success of the mission, instead the messages tried to emphasize the success as a human and global endeavor

Gutheinz: Moon Rock Hunter

The United States could have decided to only give goodwill rocks to ally nations but opted and said to give rocks to all countries represented by the United Nations. But the whereabouts of all the rocks are unknown. Joseph Gutheinz, a Texas lawyer, took up the task of searching for those missing samples. He started this search during his time as a NASA investigator and continued his work into his career as a professor at the University of Phoenix. At the university, he had the students work on trying to locate more missing samples. They were able to locate about 79 samples and some of the students are still searching.[30]

Due to their relative rarity and special status as foreign objects, Moon rocks have long been a hot commodity for space collectors. As a consequence, Moon rocks – including some Goodwill rocks – have gone missing. Gutheinz made it his mission to locate these missing Moon rocks and because of this he was given the nickname the "Moon Rock Hunter."[31] Gutheinz served as a special agent for several federal agencies, including NASA and the Office of the Inspector General. He was hired as a contract investigator for NASA during the 1980s and

[30] Joseph Gutheinz, email to the author, November 30, 2020.
[31] Joe Kloc, *The Case of the Missing Moon Rocks,* (Brooklyn: Atavist Inc, 2011), Kindle; Bill Newcott, "The Moon Rock Hunter is Coming for You," *Saturday Evening Post*, May 16, 2019, date accessed March 12, 2022, https://www.saturdayeveningpost.com/2019/05/the-moon-rock-hunter/.

1990s. His job was to investigate crimes for NASA, which included investigations into fraud and money laundering. Gutheinz is known for his work on investigations that put a stop to contracted companies mishandling government money and security threats. From 1992 to 1996 while Gutheinz was studying to be a lawyer, he led a nine-agency investigation into Omniplan, a subcontractor under Rockwell Space Operations Company, and the company's money laundering scheme. Gutheinz looked into Omniplan's misuse of government funding. This investigation ended with the largest count of indictments in the history of NASA. Omniplan's CEO at the time, Ralph Elias Montijo, Jr. was funneling NASA funding and equipment into other businesses and hiding this use of money on the company's audits. The final count of indictments for this case was about 170 indictments.[32] Gutheinz also led investigations into money laundering and fraud in other companies, such as Rockwell and Boeing. Other cases that Gutheinz worked on looked into fraudulent sales of space artifacts and astronaut impersonators. Astronauts became icons during the 1960s, and there was a growing problem of men taking advantage of people by pretending to be the heroes.[33]

A major case that Joseph Gutheinz worked on was the case of astronaut impersonator Jerry Whittredge in 1998. Gutheinz was the agent assigned to the case. He was one of the agents that had caught and arrested Whittredge after Whittredge used his con skills to try to break into the Pensacola Naval Air Station. As the arresting officer, Gutheinz participated in the

[32] Joseph Gutheinz, "NASA's Fallen Star the Investigation of Omniplan Corporation," *Paranoia Magazine*, May 9, 2016, date accessed April 6, 2021, http://www.paranoiamagazine.com/2016/05/nasas-fallen-star-investigation-omniplan-corporation/.

[33] The idea that astronauts have become icons is discussed in David Meerman Scott and Richard Jurek's book *Marketing the Moon: The Selling of the Apollo Lunar Program* (Cambridge: The MIT Press. 2014). The authors explain why the image of astronauts as heroes was important to the space program and why it must be managed.

competency hearing for Whittredge. He was there to testify for the prosecution. During the hearing Gutheinz and the others in the court room had to wait for Whittredge's lawyer, who had not appeared. As time passed, the court asked the defendant about who and where was his lawyer. Whittredge stated that his lawyer was then-president William "Bill" Clinton.[34] This baffling statement showed the court that Whittredge was not of sound mind, and he was ordered to undergo a psychiatric evaluation. It was during the wait for Whittredge's lawyer, who was not going to show, that Gutheinz jotted down some notes for an investigative operation. These notes turned into the plans for "Operation Lunar Eclipse." He handled many cases of fraud and Operation Lunar Eclipse shared a similar focus. The goal of this operation was to shut down the sale of bogus Moon rocks. Gutheinz saw these Moon rock scams as a growing problem. In the summer of 1998, he went to work putting an end to these Moon rock scammers. For Operation Lunar Eclipse, he developed the company John's Estate Sales to use as a cover. In addition, Gutheinz placed an ad in *USA Today*, stating that he was searching for Moon rocks. He worked alongside another agent named Bob Cregger. Both men had aliases to disguise their intentions. Gutheinz's alias was Tony Coriasso and Bob Cregger's alias was John Matria. Together the two agents caught several bogus rock scammers, but the highlight of Operation Lunar Eclipse was the Moon rock sting that resulted in the recovery and return of Honduras's Apollo 17 Goodwill Moon rock.

In September 1998, Joseph Gutheinz received a call on the bogus company's phone line that was used for Operation Lunar Eclipse. Most of the calls that the agents received were their

[34] Joe Kloc, *The Case of the Missing Moon Rocks,* (Brooklyn: Atavist Inc, 2011) loc. 108 of 748, Kindle.

prime targets, scammers selling regular rocks or fake space memorabilia, but this phone call was different. The man on the other line was Alan Rosen, who called Tony Coriasso in hopes to sell not a fake Moon rock; Rosen was in possession of the Honduran Goodwill rock. Like many of the other Moon rock salesmen, Gutheinz asked for proof of the Moon rock's legitimacy. Rosen sent him a link to a website that showed images of a lucite orb attached to a wooden plaque. The orb was accompanied by a flag and inscription panels describing the Moon rock. The name of the receiving nation and the center of the flag were hidden so as not to reveal the origins of this Moon rock. It was through research that the agents realized that this case was more than catching a thief, but it had international implications. Two important tasks that Gutheinz and Cregger had to plan out to secure the Moon rock were: one, to earn the trust of Rosen, and two, to physically obtain the object.[35]

As with most criminals, Rosen was suspicious of the two agents out of fear that they might be cops. But this was not Gutheinz's first investigation; he knew how to act and what to say when Rosen asked the agents to prove that they were not officers. He had Rosen call some of the satisfied customers of his estate sales. These fake customers were other agents who were in the same office where Gutheinz worked. The other agents were able to convince Rosen that Tony Coriasso could be trusted. Word of mouth was not the only part of gaining of the trust of this Moon rock bandit. Another part of gaining Rosen's trust was showing that they had the money that he was asking for the rock. Getting the funds for the sting was one of the hardest parts of the operation. Rosen was asking for $ 5 million for the Moon rock, and with that price tag the agents

[35] Joe Kloc, *The Case of the Missing Moon Rocks,* (Brooklyn: Atavist Inc, 2011) loc. 156 of 748, Kindle.

had to get a private donor or an agency to fund it. Gutheinz first asked federal agencies to fund the operation, but they declined. He knew that without the money the sting would be a bust and Rosen would find another offer and get away with a major artifact. Gutheinz believed, "these rocks … were not just detritus from outer space. They were relics of a singular time in world history, a temporary calm in the madness of an arms race."[36] Gutheinz knew that these objects were important to the legacy of Apollo and that losing one because of funding would be devastating. So, he decided to look outside the federal government to other people who could put up the money for the sting. The man that the agent found was H. Ross Perot. Perot was a Texas billionaire who had been in the news for funding the rescue of two of his employees who had been arrested and imprisoned in Iran in 1979. Perot also agreed with Gutheinz's sentiment and put up the money for the sting. With the money ready and Rosen's trust in them, the two agents prepared the time and place to procure the Moon rock and arrest Rosen.

The agents set up multiple rendezvous to meet Rosen in South Florida. The first meeting, on October 20, 1998, was to keep up the appearance that they were not cops. Rosen had stored the lucite orb in a bank vault in Miami. The date of the next meeting was November 18, 1998. Before Gutheinz could arrest Rosen and seize the Moon rock, he had to obtain a warrant. A Miami judge issued a seizure warrant the morning of the sting operation. Gutheinz and Cregger met Rosen and his associate at Tuna's Restaurant in North Miami where they discussed the sale and the location of the Moon rock. The two agents did not go the restaurant alone, they had two U.S. customs agents in disguise waiting at a safe distance. After the meeting, Rosen and the

[36] Joe Kloc, *The Case of the Missing Moon Rock,* (Brooklyn: Atavist Inc, 2011), loc. 227 of 748, Kindle.

agents went to the bank where the Moon rock was being stored. Once Rosen retrieved the orb from his safety deposit box and the agents had the orb in hand, they served Rosen the seizure warrant. Rosen led the agents to his car where the rock's plaque was waiting in his trunk. Arresting Rosen was not as simple as charging him with having a Moon rock that he was trying to sell on the black market. Rosen was arrested for illegally bringing an object into the United States without declaring it. The two agents had to figure out if Rosen actually committed a crime by having the Moon rock. The crime of smuggling was clear, but whether or not Rosen had the Moon rock illegally still needed to be investigated.

The court hearing for this case happened in 2003. During the hearing, Rosen revealed how he received the Moon rock. In the case, known formally as the United States vs One Lucite Ball Containing Lunar Material, the United States declared, "The United States seeks civil forfeiture *in rem* of one lucite ball containing lunar material, that is, a moon rock, and one 10 inch by 14-inch wooden plaque. It asserts that the moon rock and plaque are stolen property that were introduced into the United States in violation of 19 U.S.C. § 1595a(c)(1)(A)."[37] The prosecution's argument was that the Goodwill gift was stolen and then brought into the United States illegally. Alan Rosen claimed that he had legally purchased the Moon rock from a retired Honduran colonel and therefore should have the Moon rock returned to him. The case's filing documents stated the findings and the laws that they used to conclude that Rosen had no rights to the rock and that it should be returned to Honduras.[38]

[37] *United States of America v. One Lucite Ball Containing Lunar Material (One Moon Rock) and One Ten Inch by Fourteen Inch Wooden Plaque,* 252 F.Supp. 2d 1367 (2003) date accessed April 25, 2021, https://casetext.com/case/us-v-one-lucite-ball-containing-lunar-material.
[38] Joe Kloc, *The Case of the Missing Moon Rocks,* (Brooklyn: Atavist Inc, 2011) loc. 227 of 748, Kindle.

Rosen had been in Honduras in 1994 when he learned about a retired colonel named Roberto Ugarte who had a Moon rock for sale. After some investigation, he met Ugarte, in 1995 to negotiate the price of the Moon rock. Rosen believed that the $1 million asking price was too high. He had investigated other lunar material sales and revealed that a speck of lunar dust was sold at auction for only $500,000. This sample was only a few pieces no bigger than a grain of rice. Rosen explained during the trial that Colonel Ugarte had been given the rock as a gift during the coup d'etat in 1973 but he did not have any documents of ownership. Ugarte sold the rock to Rosen for $50,000 under the condition that the item would be returned to him. The document of the transaction was not a proper bill of sale and more of an assessment of the transaction. In April 1996, Rosen received the orb and plaque from one of Ugarte's associates at a Denny's in Miami. After Rosen had gotten the Moon rock, he went to Harvard University to verify that the item was actually a lunar sample. David Lange, the electron microprobe specialist who performed the study for Rosen, originally did not want to run the tests due to the possibility of real lunar material and the dubious provenance. On November 12, 1996, Lange sent Rosen his study, which verified that the material in the orb was in fact part of the Moon. Rosen also got a letter from the Smithsonian's Conservation Analytical Laboratory that also verified the rock's legitimacy.

Lange's verification of the rock was brought up during the court hearing and he was correct about the dubious provenance.[39] The case filing continued with the discussion of the sting operation and how Joseph Gutheinz got in contact with Rosen. The filing explained how

[39] *United States of America v. One Lucite Ball Containing Lunar Material (One Moon Rock) and One Ten Inch by Fourteen Inch Wooden Plaque*, 252 F.Supp. 2d 1367 (2003) date accessed April 25, 2021, https://casetext.com/case/us-v-one-lucite-ball-containing-lunar-material, 467.

the sting was organized and performed. It also stated the roles of the customs agents, specifically Special Agent David Atwood. After the Moon rock was seized, the acting vice-secretary of Honduras Juan Alberto Lara Buesco sent a letter to U.S. Customs Commissioner Raymond Kelly, asking that the Goodwill gift be returned. Honduras's grievance was that as the rock was part of the country's national endowment and therefore Ugarte did not have the right to give it to Rosen. Special Prosecutor for Ethnic Groups and Cultural Heritage Jany del Cid Martinez, who was a part of the Office of Public Prosecutor of Honduras, stated the Honduran laws were broken by Ugarte and Rosen.

The Honduran laws were one of the most important parts of this case because the U.S. was not the only country that had a stake. The prosecution had to use both American precedents and laws alongside Honduran laws because the Honduran government had the title to the Moon rock. As the gift was technically given to the people of Honduras, this left an opening for Rosen to argue that since he purchased the object it belonged to him. Rosen's lawyer argued that the people of Honduras could not own it because there was no way everyone could have the title to the rock. The evidence that was presented to the court revealed a trend of behaviors that leaned toward the idea that the rock was stolen, such as Ugarte's nervous desire to get rid of the gift and Rosen's concealment of the gift's true owner. To counter Rosen's defense, the prosecution referenced both the Honduran Constitution and the Civil Code of Honduras.[40] Some of the difficulties with using the Honduran laws was that some were put in place in 1997 and 1998 after Rosen already had the Moon rock. The prosecution had to look at provisions that were relevant

[40] *United States of America v. One Lucite Ball Containing Lunar Material,* 474.

to the period in which the rock disappeared along with when the rock was with Ugarte and Rosen. It was sometime between 1990 and 1994 that the rock disappeared from the presidential palace. The prosecution tried to cover the gift under the 1984 Honduran laws protecting objects under the national patrimony, but the provisions were not worded in a way allowed for protection of the Moon rock.[41] The main Honduran law that was used for the Moon rock and its plaque were covered under the statute related to national property of public use. The first provision referenced, Article 617, states,

> Property whose dominion belongs to the whole nation is called national property. If its use belongs to all the inhabitants of the nation, such as the streets, plazas, bridges and roads, the adjacent sea and its beaches, it is called national property of public use or public property. National property whose use does not belong generally to the inhabitants is called state property or government property.[42]

This article of the Honduran statute explained that the gift became the property of Honduras and its people upon its presentation to the country on behalf of President Nixon. Once it was established that the rock was covered under Honduran law as part of the patrimony, the prosecution could continue with other provisions that would verify that the object could not be legally sold or given away as Rosen and Ugarte had suggested. As the Goodwill rock was public property, the main crime that was committed was larceny, because the object was national property, taken without proper permission, and not returned to its proper place. Also, the court

[41] Honduran constitution was enacted in 1982. It has gone through several amendments since its conception. This is why the prosecution had chosen laws based on Rosen's timeline with the rock. *Constitution of the Republic of Honduras 1982,* date accessed: March 12, 2022, https://constitutionnet.org/sites/default/files/honduras%20constitution.pdf.
[42] *United States of America v. One Lucite Ball Containing Lunar Material*, 472.

filing explained that Rosen had no claims to the rock because it was either given to him by a thief or someone who had received it from a thief. The document also explained that Rosen went against the contract that he had with Ugarte because the rock and plaque were not sold in the 90-day period that he was given; Rosen was still in possession of the rock over a year after he received it.[43]

The conclusion of the court was that the United States was well within its rights to seize the Goodwill Moon Rock from Rosen.[44] The court found that Rosen's arguments were insufficient because they lacked the necessary evidence or precedents to back his claim of ownership. On September 22, 2003, NASA Administrator Sean O'Keefe presented the Moon rock and plaque to Honduran ambassador Mario Canahuati in a ceremony in Washington D. C.[45]

Moon Rock in Sin City

This case was one of the most successful recoveries of Goodwill Moon Rocks that Joseph Gutheinz worked on during his time as the Moon Rock Hunter, but it is not the only one. There are other cases of missing Moon rocks that have been found in places that were not their intended homes. The case of Nicaragua's missing Goodwill rock shares a similar path as the Honduran rock. Black market transactions were common among the lunar samples that Gutheinz found during his search. In the 1980s, there was a casino in Las Vegas with something so unique, that it was out of this world. Bob Stupak, a casino mogul had a Moon rock on display in his Moon Rock Café, which was a part of Stupak's Vegas World casino. This Goodwill Moon rock

[43] *United States of America v. One Lucite Ball Containing Lunar Material,* 478.
[44] *United States of America v. One Lucite Ball Containing Lunar Material,* 479.
[45] United States Department of State, *Honduran Envoy Calls Rock a Symbol of U.S. - Honduran Solidarity,* (Washington DC: Sept. 24, 2003), 465 .

belonged to the set of Apollo 11 Goodwill gifts. Stupak had both the lucite orb and the full display. The rock did not stay on display the whole time that Stupak had it in his possession. It was put in storage after the café was replaced by the Stratosphere tower in the 1990s. The rock was not reported to NASA as "recovered" until 2011, a couple of years after Stupak's death in 2009. It was Stupak's attorney Richard Wright who reported the rock to NASA. He believed the display and Moon rock should be returned to the country that it belonged to even if it meant returning it himself. As Wright was the attorney in charge of Stupak's estate after the mogul's death, he had access to documents that revealed the story of the rock journey to the United States from Nicaragua.[46]

There was an investigation into this missing Moon rock's journey and the information that Wright had was part of the affidavit for the case. The investigation revealed that the Goodwill Moon rock passed through many hands on its journey to Stupak. The Moon rock was original taken from Nicaragua by a Costa Rican mercenary who was fighting alongside Nicaraguan soldiers during the 1970s Nicaraguan revolution and the sacking of a Somoza compound in 1979.[47] The loot from the raids in Nicaragua traded hands during the period before a Costa Rican Baptist minister and missionary, Harry Coates, acquired the Goodwill gift from another Costa Rican named Bob Stone. It is unclear how Stone received the lunar sample and there is very little known about this transaction between these two men. The story about the transaction between Stone and Coates came from Coates' widow, who was recounting the trade over 20 years later for the investigation. Stupak bought the rock from Coates in 1987, purchasing

[46] Richard Wright, email, May 3, 2021.
[47] Somoza was a family of dictators that controlled Nicaragua for four decades from the 1930s to the 1970s. Their control ended in 1979.

it in for $10,000; Wright kept a copy of the check from Stupak to Coates's business, Midway Development Inc. Stupak wanted to sell the Moon rock at one point. But Wright suggested to Stupak that selling the rock would be a bad idea because it was not clear that Stupak had a right to own it, much like the case of Rosen and the Honduran rock. When Wright surrendered the rock to NASA in April 2012, he attained a written promise from NASA attorney Cedric Campbell that the rock would be returned to Nicaragua. The people of Nicaragua got the rock back in November 2012.[48]

No Rest for Cyprus Lunar Sample

Unlike the other two Goodwill Moon rocks, the journey of Cyprus's rock is different in one major aspect, the gift was never presented to the country. Similar to the Nicaraguan case, the Cypriot case reveals how civil unrest and United States politics can impact an artifact and change its intended path.[49] Like the Honduran Moon rock, Gutheinz was on the hunt for this gift. The rock was supposed to be presented to the country between 1973 to 1974, but the country was politically unstable at the time. Christian Greeks and Turkish Muslims made up the two major factions on the small island nation. The major conflict began with the United States backing the Greeks during an attempted coup, which led to the Turkish army's retaliation. With the growing unrest in the country, rioters attacked the American embassy in the city of Nicosia. The United States ambassador Rodger Paul Davis was assassinated on August 19, 1974, during the attack. It was Davis's job to present the Goodwill Moon rock to the president of Cyprus. Both the U.S.

[48] "Moon Rock Chips from Vegas Casino Mogul Sent to NASA," AP, May 23, 2012, date accessed March 12, 2022, https://www.cbsnews.com/news/moon-rock-chips-from-vegas-casino-mogul-sent-to-nasa/.
[49] Jennifer Knotts, email to author, July 14, 2021.

embassy and the presidential palace were destroyed during the attack. The rock had left the embassy with another U.S. diplomat when the embassy was evacuated during the assassination of Davis. The son of the U.S. diplomat had found the rock Had found the rock in a storage locker after his father died in 1996.[50]

In 2003, Robert Pearlman, avid space collector and editor of Collectspace.com, had notified NASA of the Moon rock's location. Gutheinz contacted Pearlman about finding this missing Moon rock about six years after Pearlman had been contacted by a broker who was trying to sell it. Gutheinz was surprised that the Moon rock was not returned even though NASA knew where it was located. At this time, Gutheinz was working for the University of Phoenix and no longer a part of NASA, so he had to use different methods to get the missing Moon rock returned to Cyprus. He contacted a Cyprus news reporter to see if they could investigate NASA's inaction pertaining to retrieving the rock from the diplomat's son. *Cyprus Mail* reporter Lucy Millett had been following the story of the rock and was familiar with the foreign relations in Cyprus because her father is a former British ambassador to Cyprus. She found several reasons that the rock had not be presented to the country. One reason was the flag that was take to the Moon. The flag was a source of controversy for the Greeks in Cyprus because they were fighting to become part of mainland Greece and did not want the official flag of Cyprus. The United States government decided to wait for the tension between the two major factions to settle before presenting the Goodwill gift. Millett and Gutheinz worked together to write several articles about the missing Goodwill gift and how NASA had known its location. It was after the buzz from the

[50] Moon Rock Chips from Vegas Casino Mogul Sent to NASA," AP, May 23, 2012, date accessed March 12, 2022, https://www.cbsnews.com/news/moon-rock-chips-from-vegas-casino-mogul-sent-to-nasa/.

articles that NASA retrieved the Moon rock. The rock was handed over on April 16, 2010.[51] This rock like the Honduran rock was examined by former lunar curator Gary Lofgren and who confirmed it as a real Goodwill Moon rock. As of April 2021, Gutheinz explained that last time he heard that the Cyprus Goodwill Moon rock was still with the lunar curator at Johnson Space Center and if it had been returned it would have been done quietly due to the situation with the diplomat's son and the fact that Cyprus is still a divided nation. The most recent location of the Cyprus Goodwill Moon rock is the vault in the Astromaterials Acquisition and Curation Office as of July 2021.[52] This rock still remains in the United States awaiting the day that it might be gifted to its respective country.

The Goodwill Moon rocks have a history of peace and unity, but this has not stopped several from going missing and those that have been recovered from having a rocky journey. The Goodwill rocks are part of Apollo's legacy for "the benefit of all mankind." These gifts were not used for scientific purposes but to share the celebration of the lunar landings with the world. These objects remain symbols of Apollo and will continue to spread the American idea of peace and harmony.

[51] Joe Kloc, *The Case of the Missing Moon Rocks*, (Atavit Inc, 2012) 463.
[52] Jennifer Knotts, email to author, July 14, 2021.

CHAPTER 2: MUSEUMS AND MOON ROCKS

Good things come to those that ask and this holds true to with several lunar samples that are on display. Museums had to request NASA to be a repository for these pieces of the Moon. The lunar samples on public come in a variety of shapes and sizes, some being much larger than the Goodwill Moon rocks. There are some lunar samples among the décor for President Biden's Oval Office that the president requested for display.[53] The focus of this chapter will be on lunar samples that are displayed across the United States. Examining these lunar sample displays reveals multiple reasons why certain lunar samples are on display, but not others. This chapter will examine how the institutions display the samples, what stories the institutions tell within their exhibits, and how these rocks relate to the history of Apollo. Some of the other factors that will also be discussed relate to when the lunar sample arrived at its museum or state-building, and the process to get a lunar sample from NASA.

While all the Moon rocks and lunar samples come from the same place, the Moon, the narratives that their new homes share about them vary. Their stories of how they arrived at their locations are also unique to each lunar sample. Unlike the Goodwill rocks, which only came from Apollo 11 and Apollo 17, the other Moon rocks were collected during all six successful missions. Moon rocks, which is the colloquial name for the samples, have been preserved in museums and state buildings along with other distinct Apollo artifacts such as spacesuits and capsules.[54] The difference between each museum and institution gives the public a range of

[53] Robert Pearlman, "A moon rock in the Oval Office: President Joe Biden's lunar display," Space.com, January 22, 2021, https://www.space.com/president-biden-moon-rock-oval-office.
[54] Anne Rayca, email to author, October 13, 2020.

knowledge and understanding about the Apollo program and the relationship between the Moon and the Earth. This is one of the most important parts of the history of the lunar samples because they are used to spread the knowledge of the missions during which they were collected. They are a key part of the Apollo program's legacy. The Apollo Moon rocks are not only a part of the history of Apollo, but they have a history of their own that should be brought into the spotlight.

Museums evolved from a pastime for the elite filled with displays of scientific knowledge and foreign objects collected from expeditions during colonialism.[55] As the institutions moved into the 20th century, the goal shifted from this segregated place of status to a more egalitarian place for educating the public about history, art, and science. Though it is argued by authors like Joe Kember, John Plunkett, and Jill A. Sullivan that in the 21st century, museums began to cater more to entertaining their audiences, there still is the goal of education.[56] Several others like Robert Post and Mike Neufeld discuss the importance of the public's interaction with the museum and its exhibits. This historiography will play an important part in the analysis of the current displays of the samples. This chapter will be looking at the relationship between the public, the staff, and the objects. The narrative of an object can be affected by both the curator's decisions and the perception of the visitors. Scholars Kevin Walsh and Tony Bennett agree that the ways an object is displayed and the narrative that is told have control over the public's

[55] Thomas R. Adam, *The Museum and Popular Culture,* (New York: American Association for Adult Education, 1939).

[56] In "The Romance of Technological Progress: A Critical Review of the National Air and Space Museum", Michal McMahon argues that the interference of popular culture into the museum setting has been detrimental to the educational purpose of the institution. Michal McMahon, "The Romance of Technological Progress: A Critical Review of the National Air and Space Museum," *Technology and Culture,* Vol. 22 no. 2 (1981): 281-296. This work influenced the work of Joe Kember, John Plunkett, and Jill A Sullivan, *Popular Exhibitions, Science and Showmanship, 1840-1910* (Pittsburgh: University of Pittsburgh Press, 2015).

understanding of the past. Walsh, who leans on the work of Marx and Hobsbawm, explains in his book how capitalism and hegemony play a large role in what narratives are told.[57] Walsh describes the way that those that create, and fund display take a top-down approach to influence the public. Bennett adds to this argument but uses the methodologies of Foucault by examining the power structures.[58] He explains that even though museums are an elite tool there is still a potential for the public to impact the narratives by fighting against the censorship and white lens that has often been used in the design and creation of exhibitions.

There are several kinds of museums: those that include art, science, or natural history. These museums all have unique missions and audiences that they build their displays which is important to the narratives and goals that is projected from the exhibits. When thinking about the Moon, one would think that the lunar samples would only be displayed in science museums because of how they relate to scientific research and discovery. But this is not the case. There are lunar samples in each type of museum across the country (as well as more unusual places such as the National Cathedral in Washington DC). Because museums are the main way that lunar samples are presented to the public, they will be the main focus of this analysis of Moon rock displays across the country.

Lunar Samples in the Western United States

Though the Moon rocks reside mostly in science and natural history museums, there is one in an art museum in the American Southwest. The Roswell Museum and Art Center

[57] Kevin Welsh, *The Representation of the Past: Museums and Heritage in the Post-Modern World* (London: Routledge, 1992).
[58] Tony Bennett, *The Birth of the Museum: History, Theory, Politics* (London: Routledge, 1995).

currently house the Apollo 17 Goodwill Moon rock that was dedicated to the state of New Mexico. The museum received the Goodwill Moon rock in 1972. Roswell, New Mexico has a close connection with space history because it was the location of America's early rocket testing. It is where Robert Goddard researched and developed different types of rockets and fuel sources. Goddard is considered the father of American rocketry.

According to Dr. Aubrey Hobart, the curator of collections and exhibitions for the museum, the acquisition of their Moon rock is rather "contentious."[59] As their Moon rock is the Apollo 17 Goodwill Moon rock given to New Mexico, it belongs to the state. She explained that she contacted the state government to look into the background of the rock because she believed that the rock would be better placed in a different type of museum. She also noted that the exhibit is awkwardly placed in their recreation of Goddard's workshop. The exhibit is also quite dated given that it has not been updated or changed since it was made in the early 1970s. The style of the information panels and the décor of the area "remain as a sort of time capsule."[60] The exhibit focuses on Apollo 17 and astronaut-scientist Harrison Schmitt because he was born in the state. Schmitt was also a senator for New Mexico after his time at NASA. The exhibit contains Schmitt's spacesuit from his mission to the Moon, which is on long-term loan from the Smithsonian Institution, and a bust of Schmitt alongside the Moon rock. This exhibit's outdated appearance has led to the Moon rock being relatively ignored by the public visitors to the museum. It is Dr. Hobart's hope that she can get funding to improve the exhibit, or it will be transferred to the New Mexico Museum of Space History, where it can be better appreciated by

[59] Aubrey Hobart, email to author, October 8, 2020.
[60] Hobart, email, October 8, 2020.

guests. Though an odd place to house a lunar sample, the Roswell Museum and Art Center is a part of the history of the Apollo Moon rocks. It shares a connection with two men who contributed to the history of Apollo and, more importantly, it represents the story of Harrison Schmitt's contribution to the history of these lunar samples.

The lunar sample display at this museum has a multifaceted narrative that is presented to the guests. There are three major parts to the narrative that it presents: the science, the astronauts, and love. Two of these are regular themes in lunar sample displays, but the last one is unique to the rock. The story told by museum docent Linda Walton about the museum patron A. E. Thomas who helped petition for the sample recounts a promise of love.

> A.E. 'Tommy' Thomas wanted a very special 65th wedding anniversary gift for his wife, a woman who already had everything, including his love pledged to her in the second grade. With funding from Thomas, the Astronomy Center [the museum's planetarium] was able to lease and receive the Moon rock as a long-term loan from NASA. When Mura Thomas came to see the special gift that had been given in her name, Tommy said, "Darlin' 65 years ago I promised you the Moon and the stars—and it's about time I delivered.[61]

This story shows one of the major motives for bringing the Moon rock to the museum. It was not just about bringing science to the public, but it is about a husband sharing his love for his wife with the public. The adage said that love finds us in the strangest places; this lunar sample is a prime example of that phrase. When Thomas made the promise, it was only a metaphor. But the Apollo program transcended the impossible and made it a reality. The sample shows that Apollo's legacy even impacted two lovers many years after the lunar landings. A. E. Thomas's

[61] Linda Walton, "The Inside Story: The Moon Rock," from the museum's docent handbook which is internally published for docents and volunteers. Jayne Aubele, email to author, Jan. 6, 2021. This quote mentions the Astronomy Center which is the planetarium that is attached to the museum.

love story also emphasizes that the path from the Moon to NASA lunar sample repository to their new homes is not always cut and dry business deals. Instead, there is a very human side to the lunar samples' journey.

The space wing within the museum focuses on lunar science and includes a large lunar sample and image mosaic taken by Apollo 17 astronauts. The sample on display in the museum is "part of a 'rake sample'" that was collected by Dr. Schmitt during the last Apollo mission.[62] Dr. Schmitt trained as a geologist, but he is best known for his Apollo journey and his impact on Apollo's legacy. Apollo 17's mission was to explore the Taurus-Littrow Valley. This is where Dr. Schmitt found orange soil on the Moon that is theorized to have come from the period when the Moon was still molten and cooling down. The museum's photomosaic was taken during the Apollo 17 lunar mission. Jayne Aubele, a senior educator and a planetary geologist at the museum, has interpreted the mosaic for Museum visitors by explaining that although it looks like a black and white photograph. But the image is actually in color. The Moon is mostly gray, but viewers can see hints of orange on the lunar surface in the mosaic. Dr. Aubele explains that "the 'orange soil' is interpreted to be volcanic glass beads (titanium, magnesium, and iron-rich silicate glass) from the early lunar volcanism. The glass has been dated at 3.5 to 3.7 billion years."[63] The museum focuses on the science performed on the Moon and back on Earth. This is why the museum emphasizes the role played by Dr. Schmitt. He was the only trained geologist who has stepped on the Moon so far.

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[62] Jayne Aubele, email to author, Jan. 6, 2021. A rake sample from the lunar sample collection where the astronauts used special rakes to collected small pebbles. Using rakes was one of the many methods that the Apollo astronauts uses to collect lunar samples. "Collecting Moon Rocks," *Lunar Science and Exploration,* date accessed: July 15, 2021, https://www.lpi.usra.edu/lunar/samples/apollo/tools/.

[63] Aubele, email, January 6, 2021.

Schmitt also has a connection to the state as he was born in Santa Rita, New Mexico.[64] Schmitt was not the only geologist in his family; his father, also Harrison H. Schmitt, was a mining geologist at the copper mines in Santa Rita. His father's work had a great impact on his career, which led to his selection to the Apollo 17 crew over the other five scientist-astronauts who joined the astronaut corps in 1965.[65] Dr. Schmitt since has seen the sample collected as a part of his mission on display at the museum. Aubele says that they are very grateful to Dr. Schmitt since he was the one that collected the sample, making the donation to the museum possible. The museum is also very proud of the sample since it is one of the largest on display to the public anywhere. Museum visitors are always amazed when they discover this piece of the Moon. It looks so Earth-like that they will frequently ask if it is a "real" Moon rock. Grandparents bring their grandchildren to look at the exhibit and talk about where they were during the lunar landings. Scientists and NASA personnel who visit the museum are equally amazed by the sample's size and beauty.

Jayne Aubele describes the museum's exhibition of the lunar sample in detail, explaining that a key goal of the display is the science behind the Apollo missions and the knowledge that has been gained by studying the Apollo payload. The sample – number 71566 – is a lunar volcanic rock called a high-titanium basalt.[66] The sample was studied by NASA scientists to examine the chemical makeup. The research revealed several minerals that can be found within

[64] According to Ms. Aubele's email, Santa Rita no longer exists due to the expansion of the open pit copper mine located there.
[65] There were over 1000 scientist applicants that had applied to be sent to the Moon during the Apollo missions. NASA went through a several months-long selection and training process that choose a few men. Harrison Schmitt was concerned during this process because the NASA physicians found an issue with his heart but after receiving the okay from a doctor, he proceeds through the selection process.
[66] Aubele, email, January 6, 2021.

the sample.[67] Each of these minerals is made up of several different types of elements that can be found on the Moon and the Earth. Although the minerals in the sample can also be found on Earth, the Moon's basalt is different because it has higher levels of Titanium. Apollo contributed a lot of scientific research that would have remained unknown if we had not returned lunar samples to Earth. The lunar samples' impact on the geological community by the discoveries made since the Apollo program is important to their history. Moon rocks' influences on science did not just stop in the 1970s after the Apollo program ended but they continue to be studied and change our understanding of extraterrestrial and terrestrial geology even decades later. Scientists across the world are still studying these samples.

The primary way that institutions are granted lunar samples involves petitioning NASA for the sample. An example of the effort that it takes to receive a lunar sample is the story of the rock at the Griffith Observatory located in Los Angeles, California. Kara Knack, a board member at the observatory, wrote an article about how the institution received the lunar sample in 2006. Getting a lunar sample is an exciting time for any institution, especially after the institution previously had a sample on a temporary loan. Knack recounted her experience traveling to Johnson Space Center to retrieve a lunar sample that NASA agreed to give to the observatory for permanent public display.[68] Knack described the process of going to Houston and picking up the lunar sample. She explained how exciting it was "that such a beautiful lunar

[67] Aubele, email, January 6, 2021. Dr. Aubele also sent an information sheet for the sample. The sample was collected at Station 1. "Normative mineralogy (Walker, et al, 1975) included olivine, armalcolite, hiCapx, loCapx (high and low calcium pyroxene) and ilmenite." Ilmenite is a high Ti-basalt which appears shiny. She also gives the modal mineralogy for the sample, which is "(Lindstrom and Haskin 1978) 22% ilmenite, 40% augite, 26% plag, 5% olivine."

[68] Kara Knack, "The Rock and I: Eight Hours in Cislunar Space," *Griffith Observer,* January 2007.

sample was going to be at the Griffith Observatory."[69] The article tells something about the rock sample that is important to the history of all the samples across the nation, specifically that the rocks are precious material, and their security is of the utmost importance when an institution is gifted a sample. All the institution employees discussed in this chapter mentioned that NASA has strict security policies for the lunar samples as a whole, but a couple have also explained the level of security involved in obtaining the sample from NASA for public display. Knack was the most forthcoming about the process. With lunar samples having gone missing in the past, understandably, NASA would make sure that those who are granted samples take the utmost care with their safety.[70]

Objects have both their own story and a story that is created when people interact with them. The journey of the sample and the journey of Kara Knack are intertwined because of their interaction. Knack's story shares her relationship with a Moon rock and how she impacted its story. The rock's travels began with the Apollo 14 astronauts who brought it to Earth. It continued with Knack bringing it to the Griffith Observatory. From journey to display, the sample transformed from a simple rock that was on the Moon, to an object that is on display in front of more people than the average person will ever meet.

Though Kara Knack was the board member who retrieved the sample from Houston, she was not the person who petitioned for the sample to be displayed at the observatory. Mark Pine, the deputy since October 2006, "shepherded the acquisition"[71] of the lunar sample. The Griffith

[69] Knack, "The Rock and I," 2007.
[70] Astromaterials Acquisition and Curation Office, *Lunar Sample Allocation Guidebook*, (Houston: NASA) 2007.
[71] E.C. Krupp, email to author, October 5, 2021.

Observatory, like the Cosmosphere and New Mexico Museum of Space History, had to petition for their lunar sample. That process involved proving to NASA that they had the security, staff, and funds to properly protect and maintain the lunar sample in its display case. The display for the lunar sample was designed with tight security measures so they can ensure that the Moon rock is safe and can continue to be enjoyed by its guests.

The observatory's gallery containing the lunar sample display is called "The Edge of Space," which contains other space displays. These displays have "samples of various extraterrestrial materials [that] permit visitors to observe close at hand object[s] from outer space meteorites, cosmic rays, Brownlee particles (comet dust), and moon rock."[72] Along with the Moon rock itself is a large relief model of the Moon to give visitors an idea of the textures of the lunar surface. Dr. E. C. Krupp, the director of the Griffith Observatory, explained, "In particular, the moon rock punctuates a watershed event in the history of the planet, the first-time organisms from [E]arth left the planet and landed on another world. That is part of a process that has forever altered human perspective."[73] This statement emphasizes this thesis's argument that the lunar samples are a key artifact in the history of the Apollo program because they are physical representations of the success of the lunar landings. By being on Earth, the samples can remind humans for generations of what came from a great period of space exploration. The rocks were gathered for research that would benefit mankind's understanding of our closest neighbor and displayed to increase the connection that the public has with those who gathered the sample and those who study the rocks. The public is able to share in the knowledge that is gained from the

[72] Krupp, email, October 5, 2021.
[73] Krupp, email, October 5, 2021.

sample through the labels and charts displayed in museums across the country. The rocks have become the embodiment of the concept of "the benefit of all mankind" because they can connect with mankind through public displays.

Lunar Samples in the Middle of the United States

Another museum that focuses on the science and history of the lunar samples along with its history is the Armstrong Air and Space Museum in Wapakoneta, Ohio. The museum petitioned for its lunar sample prior to its grand opening on July 20, 1972. The loan was secured by the Ohio Historical Society, now known as the Ohio History Connection. A key part of the loan process that was mentioned by Greg Brown, the Experience Coordinator for the Armstrong Air and Space Museum, is that the museum has to regularly renew the loan. That renewal process helps NASA keep track of the lunar samples and their security. The Armstrong Museum's lunar sample was presented to the staff by Patricia Nixon Cox, the daughter of President Richard Nixon who was the sitting president during the Apollo Moon landing. This sample is from the first Apollo Moon landing and was collected by Neil Armstrong. The sample is part of a Moon rock that was cut down into smaller samples.[74] This sample is a 4-ounce piece of the original rock. An interesting part of this lunar sample display is that it moved locations within the museum. The sample was originally located on the first floor just inside the entrance of the museum because NASA initially did not want the public to have to pay to see the lunar sample. Brown explains that at one point the display was moved and placed in a more secure part

[74] This sample's number is 10017. "The original sample was a 34 oz ilmenite, vesicular basalt. It contains some things titanium ('ilmenite'), it contains tiny vesicles, or cavities, from which CO_2 gas bubbled out before it solidified, and it is a lava rock (basalt)." Greg Brown, email to author, January 6, 2021.

of the museum. The sample is protected in a containment system that seals the sample in a nitrogen atmosphere to protect the sample from degradation. The new location has the lunar sample displayed along with a large graphic of the Moon that shows viewers the locations of each of the six lunar landings. Other objects that are exhibited with the lunar sample includes cameras like those used during the missions and tools, such as a scoop and other collection tools. These items show visitors the science and collection processes that were performed during the Apollo missions. This museum presents a narrative that encapsulates both the history and the science of the Apollo missions. The scientific research and the collection of the lunar samples became an important part of the missions' legacy as shown in displays across the country.

Another science museum that houses a lunar sample is the Cosmosphere located in Hutchinson, Kansas. The Cosmosphere houses the largest collection of U.S. and Russian space artifacts in the country. In the 1970s, it became the first museum to be affiliated with the Smithsonian. When the museum got its lunar rock in 1985, the local news covered the extensive process of petitioning for the lunar sample.[75] The coverage explained the Cosmosphere proposal and discussed the process by which NASA granted the sample. Petitioning for a lunar sample is no easy task. As explained in Chapter 1, Moon rocks and other samples from the Moon are a hot commodity on the black market. Because of this, museums and other institutions have to prove that they can protect the sample from the natural effects of Earth and also those who might want to take the little piece of history. Max Ary, the director of the Cosmosphere in the 1980s, explained in the news article the process and the work that went into securing the lunar sample

[75] Duane Schrag, "Hard work pays off; Cosmosphere receives approval for Moon rock," *The Hutchinson News*, (Hutchinson, Kansas), November 20, 1984, 113.

loan. It took nearly two years of petitioning NASA for the Cosmosphere to be granted a lunar sample. The news coverage of the Cosmosphere and its lunar sample also revealed the Moon rock's background. The sample – number 10020 – is much bigger than the Goodwill Moon rocks. The article described the sample as an "egg-sized chuck of lunar basalt."[76] During its time in the Johnson Space Center repository, it was accidentally exposed to air, which made the sample a candidate for public display. The sample was exposed when a glove for the glove box ruptured.[77] For research purposes, the rocks and other samples needed to remain secure from exposure to the Earth's atmosphere. This is because Earth's air can greatly affect the materials and potential water that can be found in the sample. If the rocks became exposed to air, they could not be studied in the same capacity as other samples that were still in their natural condition. Even though the rock was contaminated, NASA still made sure that it was secured in a steel and glass container that preserved the sample in Nitrogen. This prevented any further decay of the sample. Something else that is important about NASA's approach to the lunar sample was that the agency did not want it presented as an artifact but rather as "an oddity."[78] The goal was to see the sample as a part of scientific research. This begs the question, what defines an artifact and what defines an oddity.

Like all modern museums, science museums developed from the personal collection and great exhibitions of the 19th century. *Science Museums in Transition* by Berkowitz and Lightman

[76] Alan Montgomery, "Moon Rock Lands in Planetarium," *Kansas City Times,* March 4, 1985
[77] A glove box is an inert atmosphere separated from the outside environment in order to avoid oxidative damage from the air. There is no oxygen in space, so to maintain the integrity of the sample we want to avoid sample reaction with the compound. It's like stopping iron from becoming rust.
[78] This quote comes from Dr. Max Ary in the article, "Long-awaited moon rock makes its way to Cosmosphere collection" by Brad Swisher, *The Hutchinson News* Vol. 113 no. 230 (Feb. 18, 1985), 1.

discussed the development and changes that science museums went through since the 1800s.[79] Museums came from the collections of oddities and miscellaneity of that period, such as P. T. Barnum's American Museum.[80] The objects and exhibits were a mix of technology, objects from expeditions, taxidermized animals, live animals, and other foreign objects. As science became more prominent in the twentieth-century museums started to move away from these random exhibits of objects to planned and controlled exhibitions to educate the public. The idea of oddity comes from these original museums that displayed science research and objects as the oddities of the future. It seems like this concept of oddity is what Ary was referring to when he discussed how NASA wanted the rock to be displayed. Though the lunar sample was intended to be viewed as an oddity instead of an artifact, in the decades after the lunar sample arrived at the Cosmosphere, the Moon rock has become more of a part of the past and, therefore, should be viewed as an artifact instead of an oddity. By approaching the sample as an artifact, we can see its impact on the history of the Apollo program as a part of its legacy.

Lunar Samples in the Eastern United States

There are many museums and institutions that have received a lunar sample through the hard work that the staff has put into petitioning for their sample. It gives the staff members of the museums the feeling of great pride to be able to have a lunar sample. For these museums, the lunar sample that they have displayed was worth every penny that it took to bring the rock to its

[79] Carin Berkowitz, and Bernard Lightman, *Science Museums in Transition: Cultures of Display in Nineteenth Century Britain and America*, (Pittsburgh: University of Pittsburgh Press, 2017).
[80] The Merriam-Webster Dictionary defines oddity as an odd person, thing, event, or trait or the quality or state of being odd. https://www.merriam-webster.com/dictionary/oddity.

new home. Curator Ryan Roney at the Tellus Museum in Cartersville, Georgia is one of the many staff members that share in the joy of having a lunar sample on display. Though he joined the museum in 2018, which was several years after the lunar sample was received by the museum, he can still recount the story of the lunar sample that the Tellus Museum has on display.[81] The museum received its lunar sample in 2013 after the curators used their affiliation with the Smithsonian to make their proposal more convincing. They were able to secure a lunar sample for display from NASA, but it was not as simple as retrieving the sample from Houston. The process, as described by Kara Knack, requires the sample to be placed in a special carrying case. When the Tellus staff members went through TSA security at the Houston Airport for their flight back to Georgia, they were stopped but not made to open the case. Instead, they had their hands swabbed, to confirm that the case did not contain explosive material. Knack experienced this same procedure, but she also added that the sample included a letter from NASA explaining the origins of the sample and the reason for the secure case. Keeping the sample closed and protected during its travel was practically a matter of national security. Ryan Roney mentioned that the nitrogen-sealed container and the special carrying case were both paid for by the borrowing institutions, a fact that few people know. Roney also stated that the sample is not exhibited in their mineral gallery, which would seemingly fit the rock since it is a geological sample of the Moon. Instead, the lunar sample is on display in the museum's "Science in Motion Gallery," surrounded by images of the Apollo missions and is accompanied by some of the tools that were used by the astronauts during training for their missions. He noted that "the Moon Rock is central to the area in which it is displayed," allowing visitors to get a full view and

[81] Ryan Roney, email to author, September 27, 2021

emphasizing its special nature by serving as a focal point of the exhibit.[82] The remainder of the exhibit is filled with other space memorabilia, images of astronauts collecting Moon rocks, data from all of the Apollo missions, and a video monitor that shows guests clips from the missions.

Roney strongly believes that the Moon rocks are important to the history of Apollo because they are "direct evidence of our visit to the Moon."[83] The lunar samples are proof that humans were able to do something that even Jules Verne only dreamed about in the 19th century and wrote about as science fiction. Roney laments, however, that some still believe that the lunar landings were a lie, a hoax made up by the government. It is an odd reaction to see the sample and state that the lunar landings never happened. Roney acknowledged, "We have sadly received comments from visitors who think we are part of some conspiracy to spread the supposed lie of humans reaching the [M]oon! (To these people that I have spoken with directly I tell them, aside from the piece of the [M]oon they had just seen on our exhibit, the fact that the Russians congratulated the U.S. on its success is proof enough to me.)" He goes on with a more positive outlook, "The awesome experience of seeing a piece of the [M]oon up close does more than any lecture or presentation can in testifying of the results of human ingenuity."[84] Though Roney gets these reactions, he does not miss a beat and explained how he approaches these people. He tells patrons that the samples are a direct result of the U.S.'s success in the Space Race. Roney revealed how the lunar samples are more than just rocks but objects that have interacted with and impacted the people who have seen or touched them. These lunar samples can share their stories

[82] Roney, email, September 27, 2021.
[83] Roney, email, September 27, 2021.
[84] Roney, email, September 27, 2021.

and connections to Apollo with the public, which is important to how people learn the history of the Apollo missions and the reasons we went to the Moon.

One lunar sample, in particular, shares a much deeper meaning than being just a rock. Its story begins in the nation's capital. It is fair to assume that there would be lunar samples on display in Washington, DC. In fact, DC hosts several lunar sample displays. One of the most accessible lunar samples is the sample at the Smithsonian Institution's National Air and Space Museum. Originally founded in 1846 upon the bequest of John James Smithson, the Smithsonian is now a public institution funded annually as part of the national budget and is free for all visitors.[85] The National Air and Space Museum, which opened its doors in 1976, was created specifically to preserve the history and artifacts related to aviation and spaceflight.[86] That mission is the major reason why NASA gave the Air and Space Museum a lunar sample. This sample is among a several pieces of the Moon that the public can actually touch. Two other well-known locations in the United States are Johnson Space Center and Kennedy Space Center.

Former NASA geologist Dr. Farouk El-Baz was a key player in the Smithsonian's acquisition. Dr. El-Baz recounts how he was asked to get the lunar sample for the museum. When he worked for NASA, he did not get to study the samples because he was in charge of training the astronauts in "orbital visual observations and photography."[87] He joined the museum in January 1973 right after the end of the Apollo program. It was another famous Apollo program alumni, Michael Collins, the Command Module pilot of Apollo 11, that

[85] "About: the Smithsonian," *Smithsonian Institution*, date accessed: May 23, 2022, https://www.si.edu/about.
[86] "Mission: 'Commemorate, Educate, Inspire,'" *Smithsonian National Air and Space Museum*, date accessed: May 23, 2022, https://airandspace.si.edu/about.
[87] Dr. Farouk El- Baz, email to author, November 11, 2021.

suggested that El-Baz should be the one to petition NASA for the Air and Space Museum to have a lunar sample. Dr. El-Baz explained:

> As to the Smithsonian Institution's sample, its story started just after the end of [A]pollo in December 1972, when I joined its National Air & Space Museum in D.C. in January 1973. As I participated in planning the space exhibits, I thought that we should have one sample of lunar rock for visitors to touch! The museum Director Michael Collins of Apollo 11 said you are the only one that can get us one… go convince your fellow geologists. My argument to my colle[agu]es at Houston was that "the American taxpayers paid for Apollo… they must have the opportunity to touch a Moon rock (in the only 'National Museum') for which they paid the dollars to get it!" It took me nearly two years of back and forth but [it] worked.[88]

Dr. El-Baz emphasized how important it was to share the samples with the public and allow them to feel connected to the space program since their tax dollars funded Apollo. The goal to share the touchable Moon rock with the public helps shape the Apollo program's legacy by reinforcing the relationship between the American taxpayers and the development and success of the Apollo lunar landings.

The lunar sample that is on display at the museum's flagship building located on the National Mall was collected during Apollo 17 mission. The display at the museum is currently minimal because of the museum's new renovation.[89] The Moon rock's display case is very

[88] El-Baz, email, November 11, 2021.

[89] Docent Bud Holloway, in an interview with of author, November 6, 2021. Currently, as of fall 2021, the Smithsonian is under currently renovation to remove the asbestos that the building was constructed with in the 1970s. Holloway explained that during the 1960s and 1970s, a major part of the building code for government buildings was added the flame retardant material. During the 1980s, when the government enact laws against the cancerous material, Congress began to allocate funding to eventually renovate those government buildings. Over the course of about 7 years, Congress had allocated $7 million to remove the asbestos which has been repeatedly matched by private corporations to turn these repairs into a $1.2 billion renovation project. The Smithsonian is the last building to be repaired during this project, and this has led the museum to be seemingly missing a lot of artifacts. The artifacts are currently in storage awaiting the repairs. Bud Holloway stated that each section of the museum will be closed for a few months at a time while they work to remove the asbestos. He also mentioned that on July 4, 2026, the museum will be having a grand reopening along with a ribbon-cutting ceremony to celebrate the new completely renovated museum.

simple and has the sample embedded into the display case with the top of the rock exposed. Above the rock display reads, “Touch a Piece of the Moon.” The display tells briefly about Apollo 17 and shows a picture of the Moon with an arrow pointing to the rock before it was collected and brought to Earth where it was cut, polished, and displayed. This display, even without signage and being separated from the major exhibits and other displays, has been very popular with guests.

As of November 2021, the sample was on display right next to nuclear missiles in the Boeing Milestone of Flight Hall at the front of the museum and about 50 feet away from the lunar lander display in one direction and another 25 feet from the exhibit space for the Space Race. Carl Clarke, a docent at the museum, explained the connection between the missiles and Apollo.[90] Mr. Clarke believed that the messages of unity in the exploration of Space during the 1960s and 1970s moved the Soviet Union and the United States away from nuclear war and toward the phrase that has been repeated in the context of the Apollo program: the benefit of all mankind. He also pointed out the rhetoric of the two presidents most closely associated with the Apollo program, Kennedy and Nixon. He explained that Nixon’s message leaned more toward American power and advancement, which led to the success of the space race while Kennedy’s message was more about the unity of the people as the key to American success in the exploration of Space. It is important to remember that Apollo developed from the rocket technology that was built for war. This is the dark side of the history of rockets but ultimately,

[90] Carl Clarke, in an interview with of author, November 6, 2021.

they allowed humans to travel to the Moon and back along with the lunar samples that are now displayed.

Museums are a prime part of the distribution of history to the public. They also play a key role in the preservation of historical objects. There are numerous museums that had to petition for a lunar sample to be displayed in their institutions, though only seven were discussed in this chapter. These petitions often took years and were very expensive. The staff of these institutions had to consider the preservation needs and security measures required for receiving a lunar sample. The museums that petitioned for lunar samples understood that these objects are important and should be shared with the public. They knew the time and money that they put into requesting a lunar sample was worth it because of the impact that the sample could have on their audience. The Apollo Moon rocks are part of the program's legacy because they are what were brought back from the lunar landings. The displays that present these samples are key to the history of Apollo because they help communicate that history to members of the public who visit these museums lucky enough to have a sample. The museums interpret their sample's story differently because each sample is different and can provide unique perspectives on Apollo. From scientific study to a love story, the lunar samples are a part of something bigger than themselves.

The museums that present the samples share the tales of the astronauts, some explain Earth's geological connection with the Moon, and some reveal the link between the American people and the Apollo program even decades after the program ended. These institutions have different missions and goals that culminate in the different approaches that go into designing their displays. Even with these differences, these institutions have a shared history because of

their lunar sample displays. They contribute to the public's understanding of the events of Apollo and the results of humans landing on the Moon.

CHAPTER 3: MEN, MUSEUMS, AND THE MOON

The lunar landings were major events during the 1960s and early 1970s, and they shaped how we view the night sky. Approximately 400,000 men and women contributed to the success of the Apollo program.[91] Museum exhibits display the stories of these people and the program. These public displays have become a part of Apollo's legacy. The exhibits use objects to tell these stories, and the lunar samples are key objects used to illustrate the lives of people who worked to get the astronauts to the Moon. Several men have been recognized for their contributions to the success of the lunar landings. The most notable of these men are the Apollo astronauts who stepped on the lunar surface. During the 2000s, NASA awarded these astronauts or their families along with Apollo 13 Flight Director Gene Kranz and CBS news anchor Walter Cronkite with the "Ambassadors of Exploration Award." According to the NASA webpage on the "Ambassadors of Exploration," which chronicles the award ceremony for Walter Cronkite and his contributions to the broadcasting of the Apollo 11 Moon landing, "The award celebrates the realization of a vision for exploration first articulated by President John F. Kennedy in May 1961, when NASA's fledgling human space flight program had little more than 15 minutes of experience [Alan Shepard's suborbital flight]." As part of the Ambassador of Exploration award, each recipient was "presented a lunar sample, part of the 842 pounds of Moon rocks and soil returned during the six lunar expeditions from 1969 to 1972."[92]

[91] Richard Hollingham, "Apollo in 50 Numbers: The Workers," July 19, 2019, date accessed: May 30, 2022, https://www.bbc.com/future/article/20190725-apollo-in-50-numbers-the-full-list.
[92] "Ambassadors of Exploration," NASA, last modified July 14, 2004, date accessed December 17, 2021, https://www.nasa.gov/news/special/exploration_ambassadors.html.

Much like the Goodwill Moon rocks which were designated by the Nixon administration, President George W. Bush designated the Ambassadors award as a reminder of what Americans can achieve when they work together. The awards were meant to inspire Americans to push for greater achievements in space. Some of the award recipients represented the sacrifice instead of the glory of Apollo. They included the Apollo 13 astronauts whose spacecraft experienced an explosion en route to the Moon, which put their lives in danger and forced the Moon landing to be scrubbed. In the case of the Apollo 1 astronauts, their families accepted the award after the astronauts perished in a fire during a test on the launchpad in 1967. NASA felt it was important to present the award to the Apollo 1 astronauts because their sacrifice was important to the Apollo program and future space exploration. The lessons the engineers learned when they investigated the cause of the fire led to improvements in the capsule design to prevent the loss of more lives. NASA wanted to honor these men who knew the risks and still stepped up to the challenge.

The Ambassador of Exploration awards were dedicated to sharing the stories of men that changed and impacted the Apollo program. Some of them even became household names. These awards started as a part of the 35th anniversary celebration of the Apollo 11 lunar landing, which like the 50th anniversary in 2019, hoped to revitalize the vigor that the country had for space exploration during the Apollo era.

This chapter discusses the designated repositories for some of the Ambassador of Exploration awards along with the accompanying lunar samples and their relationship with the award recipients. Unlike the Goodwill Moon rocks that were given directly to the recipient and the lunar samples, loaned to museums after curators petitioned for them, the Ambassador of

Exploration samples are displayed, and places specifically designated by the recipient as the depository. For example, the sample that accompanied the late Apollo 1 astronaut Gus Grissom's award was put on display in the America Pavilion at Walt Disney World's Epcot Park in Orlando, Florida.[93] These locations are meant to publicly display the sample as part of an effort to inspire a new generation of explorers. This effort has added to the Apollo program's legacy.

First Man on the Moon

One of the most recognizable names from the Apollo program is Neil Armstrong. He received the Ambassador of Exploration award in April 2006 for being the first man on the Moon. The ceremony marked the 35th anniversary of the Apollo 11 mission on which he served as Commander. Armstrong chose to designate the Cincinnati Museum Center as the home for the sample. Neil Armstrong was born in Wapakoneta, Ohio, and he spent the remainder of his life after NASA in Cincinnati. Brian Pollock, the manager of STEM resources at the museum, stated, "[The] Cincinnati Museum Center was chosen by Neil Armstrong as the location for the sample as part of the Ambassadors of Exploration award celebrating the first generation of NASA astronauts."[94] Pollock explained that Armstrong selected the museum because he was a resident of Cincinnati and a member of the Cincinnati Museum Center Advisory Board. Armstrong was able to contribute to the exhibit's design, something that many others did not. The exhibit was

[93] The sample is currently not on display. It was a part of the "National Treasures" exhibit that opened in July 2007. Disney changed their exhibit in the American Adventure pavilion to "Creating Tradition: Innovation and Changes in American Indian Art" in July 2018. According to Dr. Ziegler, the lunar sample curator at JSC, Disney sent the sample back to JSC, where it is currently being housed until Grissom's family and NASA decide the new home for the sample. Ryan Ziegler, email to author, January 24, 2022.
[94] Brian Pollock, email to author, September 24, 2021.

designed to celebrate the first generation of astronauts and to create more generations of astronauts and explorers. The exhibit embodies the goal of the award.

The exhibit, located in the Neil Armstrong Space Exploration Gallery at the museum, is like many other Apollo exhibits around the country as it has other Apollo artifacts to help tell the story of Armstrong and the Apollo program. These artifacts displayed within the space include Armstrong's communications carrier, which is a snug-fitting cap with the communication headphones and microphone built-in, his flight jacket, some training tools, and a replica EVA suit like the one he wore on the Moon's surface.[95] Armstrong donated both his communications carrier also known as a "Snoopy Cap" and his flight jacket to the museum.[96] The gallery underwent major renovation in 2016 after Armstrong's death in 2012 and was re-opened in 2019. According to Pollock, "The new gallery highlights the achievements of Neil Armstrong and the more than 400,000 people that help make the Apollo 11 mission a success."[97] This new emphasis could encourage young museumgoers to pursue careers in aerospace.

When Armstrong gave his acceptance speech for the Ambassador of Exploration award, he told the story of one of the rocks he collected while on the Moon. He called the rock – sample number 10071 – Bok the Rock. He talked about Bok's life on the Moon and his journey to Earth. The sample contained within the award is a 2.039 g chip of the original Bok. During his speech, Armstrong cracked the joke that it's "a chip off the old Bok, you might say."[98] Armstrong

[95] EVA stands for extravehicular activity. These are any activities outside the spacecraft. They are more commonly called Spacewalks.
[96] Brian Pollock, email to author, September 24, 2021
[97] Pollock, September 24, 2021.
[98] Neil Armstrong, "Acceptance Speech," *CMC Facebook page*, Facebook, July 15, 2019, date accessed January 1, 2022, https://www.facebook.com/watch/?ref=saved&v=370816190284619.

explained that he was the one who "kidnapped" Bok from the Moon and believed that Bok had an important story of its own to tell. Armstrong wanted the audience to understand how much he supported the science and the Apollo missions. He hoped that donating the sample to the museum meant Bok the Rock could continue the work started by of the Apollo astronauts and the NASA employees and contractors. In February 2022, the Cincinnati Museum Center released a book based on Armstrong's speech titled *Bok's Giant Leap: One Moon Rock's Journey Through Space and Time.*[99] The museum has a recording of Neil Armstrong reading the "Bok the Rock" story playing in the gallery space. This sample connects museumgoers to the Moon and its geological history but also to the first man on the Moon and the Apollo program. Even long after Armstrong's death, the rock will continue to tell Armstrong's story while his voice tells the rock's story. Their connection is much like the story of the Apollo 17 Goodwill rock, which was hand-selected by the astronauts to be shared with the public. This is a relationship that will hopefully continue for many decades to come and inspire more generations of astronauts, which would fulfill the goal of the Ambassador of Exploration awards.

Before Neil Armstrong stepped on the Moon there were many engineering challenges that NASA and the astronauts had to solve, they needed skills in rendezvous long duration flight and space walks. The astronauts from the Mercury and Gemini programs were responsible for the testing and perfecting those skills before the Apollo astronauts attempted them in lunar orbit. These first steps toward the Moon earned some of those Mercury and Gemini astronauts Ambassador of Exploration awards.

[99] Neil Armstrong, *Bok's Giant Leap: One Moon Rock's Journey Through Space and Time*, (New York: Penguin Random House, 2022).

Mercury Astronauts

Alan Shepard became the first American in space and the second man ever in space in 1961. In early 1971, Shepard also served as an Apollo 14 astronaut, colloquially remembered for playing a bit of golf on the Moon during his EVA time. Shepard's award was "presented to the Naval Academy Museum on 11 April 2011 in memory of RADM Alan Shephard."[100] He earned a Bachelor of Science degree from the United States Naval Academy in 1944. After graduating he joined the U.S. Navy where he started pilot training. He then advanced to test pilot training at Patuxent River, Maryland. This experience contributed to his selection as a Mercury astronaut in 1959 and his later selection for the Apollo program. In Pebble Beach, California, Shepard passed away in 1998 from leukemia. So, the award was accepted and donated to the museum by his family. Shepard's Ambassador sample has been placed within an exhibit that honors "the many Naval Academy graduates who participated in the 'Race to the Moon'" at the USNA's museum on its campus in Annapolis, Maryland.[101] It is the connection with the Naval Academy as a stepping-stone toward Shepard's first space flight and his journey to the Moon that the Naval Academy was chosen to display his lunar sample award in honor of his impact on the exploration of space.

The exhibit containing the lunar sample is called "Alumni in Space" and is located on the first floor referred to as the "deck" of the museum. Grant Walker, the curator at USNA Museum, argues that the lunar sample could be considered the centerpiece of the whole exhibit because it

[100] Grant Walker, email to author, October 5, 2021. RADM stands for Rear Admiral which is a 2-star rank within the U.S. Navy. USNA stands for the United States Naval Academy.
[101] Walker, October 5, 2021.

"is situated front and center in a large exhibit case that also contains scale models of the three kinds of rockets used to get astronauts into orbit and on the [M]oon, academic papers written by Jim Lovell when he was a midshipman, a model of the lunar lander, etc."[102] The exhibit's display recognizes two important Apollo astronauts, one that made it to the Moon and Lovell who showed great bravery during the Apollo 13 and is discussed later in this chapter.

Another Mercury astronaut who was awarded an Ambassador of Exploration Award was John Glenn. Though he was not an Apollo astronaut and never made it to the Moon, he still contributed to the American space program during his life. Glenn was the first American to orbit the Earth. He also flew into space as a civilian in 1998 during the Shuttle Program, making him the oldest man to fly in space at the time at the age of 77.[103] John Glenn – like Jack Swigert and Harrison Schmitt – was a politician specifically a U.S. Senator representing the state of Ohio. Glenn became a senator in 1974 and served for 25 years.[104] After his time in Congress, Glenn joined the faculty of Ohio State University which is also the home he chose for his Ambassador of Exploration Award. The award is currently on display at the John Glenn College for Public Service and Public Policy along with other items, such as Glenn's publications, from the John Glenn Archives, also at Ohio State. According to Carly Dearborn, the head archivist for the John Glenn Archives, "The Glenn Archives is physically located off of the main part of campus, so the College [for Public Service] has become a museum of sorts due to its centralized location and administrative connection to John Glenn."[105] These displays have become an important part of

[102] Walker, October 5, 2021.
[103] Flint Wild, "Who Was John Glenn?" NASA, last modified December 8, 2016, date accessed February 7, 2022, https://www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/who-is-john-glenn-k4.html.
[104] Wild, "Who Was John Glenn?," 2016.
[105] Carly Dearborn, email to the author, October 4, 2021.

the Ohio State tours of the campus for prospective students and visitors. Dearborn also mentions that because Glenn never made it to the Moon, they emphasized the fact that the lunar sample is an award Glenn received and not a piece of the Moon that Glenn brought home. The display containing the award is a part of a larger display about the lives of John Glenn and his wife, Annie Glenn.

Glenn was presented his Ambassador of Exploration Award, at Ohio State University on February 20, 2006, the 44th anniversary of his historic Friendship 7 flight. The main panel on the award's display states, "Former astronaut Neil Armstrong, the first man to walk on the [M]oon, and shuttle astronaut Steve Robinson presented the award to Senator Glenn on behalf of NASA."[106] Robinson was a part of the STS-95 space shuttle crew alongside Glenn. The panel goes on to say, "In accepting the award, Senator Glenn noted how much it signified the importance of education, research, and exploration. He hoped that young people viewing the piece of the [M]oon in the award 'will be reminded of how far people can go and how much they can accomplish.'"[107] Ohio State and John Glenn wanted the award and display to inspire young people to look toward the future and explore any opportunity. Even though Glenn never stepped on the Moon, his contribution to the space program was a part of what made Apollo possible. Even after his time in space, he continued to be involved in educating future generations. He embodied the goal of the Ambassador of Exploration Award, and his legacy is tied to the Moon through the lunar sample that continues to share his story even after his death in 2016.

[106] Carly Dearborn, "Display Panels", email to the author, October 10, 2021.
[107] Dearborn, October 10, 2021.

Risk and Award

As with many things, the exploration of space was not without its risks and changes. Gus Grissom said in an interview ahead of the Apollo 1 capsule fire, which claimed his life as well as the lives of his two other crew members, Ed White and Roger Chaffee, "If we die, we want people to accept it. We're in a risky business, and we hope that if anything happens to us it will not delay the program. The conquest of space is worth the risk of life."[108] The interview took place months prior to the accident on January 27, 1967. Grissom had no way of knowing what was going to follow that interview. Regardless, his statement echoed throughout the end of the decade and into the 1970s. The Apollo 1 tragedy was certainly not the last Apollo mission that faced peril. But, it left a lasting impression on the legacy of Apollo.

Edward (Ed) White was selected in 1962 as part of the Group 2 astronauts (the group after the Mercury Seven. White flew as part of Gemini 4, the second manned Gemini flight, and in 1965, became the first American to conduct a spacewalk. This mission was his first and only space flight. But because of White's successful spacewalk scientists and astronauts knew that EVAs were possible, which was one of the key skills need for men to walk on the Moon. In an article on the website Collectspace.com, editor Robert Pearlman explains that "White's excursion into space put America on pace to walk on the [M]oon four years later, capture and repair satellites in orbit, build the International Space Station, and prepare for NASA's future planned missions to Mars."[109] Unfortunately, White did not see the lunar landing because two

[108] John Barbour, *Footprints on the Moon* (New York: The Associated Press, 1969), 125.
[109] Robert Pearlman, "NASA honors America's first spacewalker with a moon rock award," *CollectSpace.com*, last modified June 5, 2015, date accessed January 28, 2022, http://www.collectspace.com/news/news-060515a-edward-white-ambassador-exploration.html.

years after his flight in 1965, White died in a fire during a test on the launch pad. The Apollo 1 tragedy shook the world, but it is because of this event that NASA's engineers and scientists examined and redesigned the command module so that no others would meet the same fates as Grissom, Chaffee, and White. Gus Grissom's and Roger Chaffee's final resting place is at the Arlington National Cemetery in Arlington, Virginia while Ed White is buried at the West Point Military Academy.

White was a cadet at West Point Military Academy in New York State before joining the U.S. Air Force. White graduated from the academy in 1952 and was selected for the astronaut corps in 1962 while he was an Air Force Major. The West Point Museum, located near the academy, was chosen by White's family to display the award. It was presented to the museum on June 3, 2015, as a part of the 50th-anniversary celebration of White's historic spacewalk. Lt. General Robert Caslen, the superintendent of West Point at the time, and White's daughter Bonnie Baer presented the award. They both talked about White's connection to West Point. Caslen detailed how White's personal character and courage were assets to the space program and how important his sacrifice was to the success of Apollo. During her speech, Baer described how she had recently watched the footage of the Gemini 4 mission and admired what her father and all the other Mercury, Gemini, and Apollo astronauts did and how the flights were stepping-stones toward mankind landing on the Moon. The Ambassador of Space award was not presented to White just because he was just an astronaut during the Apollo era, but because his spacewalk helped make the Moon landing possible. Also, his and his crewmates' deaths made the men and women working on Apollo more determined to see it through so that the Apollo 1 men did not die in vain. Baer declared, "His legacy serves as a reminder that when you set a goal

and believe you can do it, you can accomplish anything — even step out and touch the stars."[110] As she dedicated the award to the museum on behalf of her late father, it is important to acknowledge the significance of Baer's comments. Even though many of the Mercury, Gemini, and Apollo astronauts have since passed away, their legacies should continue to inspire the world. Though White died relatively young (36 years old), his role in the space program can show what mankind can accomplish.

Apollo 1 was not the only Apollo mission that reminded Americans about the risks involved with spaceflight. On Day 3 of its journey to the Moon, an oxygen tank exploded on the service module, which provided O_2 for propulsion and life support. "Houston, we've had a problem," spoken by Jim Lovell, the Apollo 13 Commander, is perhaps one the most remembered moments in space history. His crewmates were John "Jack" Swigert, the Command Module pilot, and Fred Haise, the Lunar Module pilot. In 1995, producer Brian Grazer and director Ron Howard retold the story of the mission in the motion picture, *Apollo 13*.[111] Kranz called Apollo 13 a "successful failure." It was through the engineering and quick thinking of the people in Mission Control and the three astronauts working together that the Apollo 13 crew was able to make it back to Earth alive. They splashed down in the Pacific Ocean on April 17, 1970.[112] The crew waited over three days for instructions from the ground on how to safely plot their return home, all the while with growing concern about the Command Module's condition

[110] Pearlman, "NASA honors," 2015.
[111] *Apollo 13* directed by Ron Howard (Universal Pictures, 1995).
[112] Elizabeth Howell and Kimberly Hickok, "Apollo 13: The Moon Mission that Dodged Disaster," last modified October 30, 2021, date accessed February 2, 2022, https://www.space.com/17250-apollo-13-facts.html. This article discusses the journey of the astronauts and the reasons they were able to survive.

and ability to safely reenter the atmosphere.[113] Like with Apollo one engineers deconstructed the root problems with Apollo 13 and made vital changes to protect other crews. In the thick of it though, these three men showed great courage as they face adversity that efforts made by the crew and the engineers in Mission Control are the reason the flight director gene Kranz called Apollo 13 a successful failure."[114]

Apollo 13 was Jim Lovell's second mission to the Moon. Lovell was the Command Module pilot for Apollo 8, which was the first manned mission to orbit the Moon. Though Lovell never landed on the Moon, his flights showed that travel to the Moon was possible. Lovell's impact as a crew member of the first manned mission to the Moon and the bravery he showed during the Apollo 13 mission are two of the reasons that he was presented an Ambassador of Space award.

Lovell was presented with the award on April 3, 2009, almost forty-nine years after the Apollo 13 mission. The award ceremony took place at the Patuxent River Naval Air Museum in St. Mary County, Maryland. Dan Bramos, a senior volunteer at the museum, explained that Patuxent River is strongly connected to the space program and stated that "[its] biggest contribution to the space program [is]-its people."[115] Bramos explained that connection further:

> [T]he reason why we have the spaceflight display here at the Patuxent River Naval Air Museum is because of the way that our area is tied to spaceflight. And that's because here at Patuxent River Naval Air Station is the U.S. Naval Test Pilot School, where they train

[113] "Apollo 13 Timeline: The Hectic Days of NASA's 'Successful Failure' to the Moon" last modified April 11, 2020, last accessed June 16, 2022
[114] "Apollo 13 Timeline," 2021.
[115] Donna Cipolloni, "Museum Exhibit Tells of Pax River's Role in Space Flight," Naval Air Patuxent River Tester. last modified July 18, 2019, date accessed September 12, 2021, https://www.dcmilitary.com/tester/news/local/museum-exhibit-tells-of-pax-river-s-role-in-space-flight/article_f9baf250-3582-5f82-bd2e-25492841182e.html.

> all the navy, marine corps, and army test pilots. And so, through here, over 100 astronauts have trained to be test pilots.[116]

Lovell chose this museum because of its proximity to his Lexington Park home after he retired, and he enjoyed going to the museum. Bramos recalled that he contacted Lovell about putting the Moon rock on display and how the museum staff wanted to do right by him. Lovell responded by email stating that they could start by calling it a lunar sample, not a Moon rock. While in general conversation any piece of the Moon is likely to be called a Moon rock. But Lovell insisted on accuracy. Bramos went on to explain that they try their best at the museum to refer to the piece of the Moon as a lunar sample because this is what Lovell wanted. This sample comes from a 1.2-kilogram lunar rock that was picked up by Apollo 16 astronaut Charles Duke. The lunar sample is only a 1.145-gram piece of the original rock, which is the main reason that the samples are not called rocks. The lunar samples presented in these awards are much more like pebbles, but this does not symbolize the great achievement that they represent. The lunar samples are on display to inspire the public. Even though the lunar sample is the proper term for them, "Moon rock" captures the accomplishment of Apollo much better than the official term. It is also definitely better than "Moon pebbles."

Powerful Voices and Apollo

Space exploration has become an important part of American history. The astronauts were named the Ambassadors of Exploration because they were the explorers. They voyaged beyond what was previously possible, but Apollo is much more than the astronauts. There were

[116] Ayla Anderson, "Episode 1- Patuxent River Naval Air Museum," *Curator's Choice*, last modified September. 1, 2020, Podcast audio, date accessed October 8, 2020, https://curatorschoice.buzzsprout.com/1285394/5030612-episode-1-patuxent-river-naval-air-museum.

so many important figures that contributed to the space program during the Apollo era. Promoting or designing for spaceflight became the life's work of figures like Margaret Hamilton, Katherine Johnson, and Lyndon Johnson. Even though these people never went to space, the program's success relied on their contributions. While many important figures during the Apollo era did not receive an Ambassador of Exploration award, there were a few men who were granted a lunar sample in their honor. Men like Walter Cronkite and President Kennedy are considered essential parts of the Apollo era because they put words to the indescribable.

News reporters were key players during the broadcasting of the Mercury, Gemini, and Apollo program. Public relations played an important role in the success of the space program because it inspired enthusiasm among Americans. The authors of *Marketing the Moon: The Selling of the Apollo Lunar Program* discuss how broadcasting and the press were major parts of Apollo and shared the space program with the public.[117] The authors argue that it was crucial for the U.S. government and NASA to be transparent with the public about the space program and its goals because they wanted to ease public fears about what this technology could do especially since the Space Race played a visible role in the Cold War. A major player in broadcasting these space missions was veteran CBS News anchor Walter Cronkite. Apollo affected the lives of so many people around the world because journalists like Cronkite brought it into their living rooms. Cronkite idealized and humanized the Apollo program for his audience.

Cronkite's journalism career spanned eight decades. During his time on the air, Cronkite reported on several major events from World War II to the space program. He became one of the

[117] David Meerman Scott and Richard Jurek, *Marketing the Moon: The Selling of the Apollo Lunar Program* (Cambridge: MIT Press, 2014), 79-89.

most influential news anchors of his generation. His face and voice an icon of the Space age. During his career, he covered twenty-one manned missions to space including Apollo 11. Cronkite was known for his ability to cover a variety of events and he never seemed to lack words for each case. He reported on the German V-2 rockets and the assassination of President John F. Kennedy with grave intensity. Scott and Jurek state in their book that "Cronkite was normally a man with no trouble finding words to describe historic events. In what many consider the central moment of his career, Cronkite personified composed professional competence as he had to announce live to the nation the death of President Kennedy in November 1963."[118] But the Apollo 11 lunar landing, the news anchor found himself at a loss for words. Like many people around the world, Cronkite was speechless and astonished by the *Eagle* landing on the Moon. Cronkite's relationship with the Apollo program was the reason that he was presented with an Ambassador of Exploration award.

Walter Cronkite's Ambassador of Exploration award is displayed at the Briscoe Center for American History, a part of the University of Texas at Austin. The Center's Associate Director Allison Beck explained in a news article preceding the ceremony for the veteran news anchor on February 28, 2006, "[He] will become the first non-astronaut and the only non-NASA individual to receive the award."[119] This quote reveals the unique nature of this recognition. Cronkite was the only person outside the U.S. government and NASA who was awarded an Ambassador of Exploration award, and this was because of the hours that he committed to

[118] Scott and Jurek, *Marketing*, 80.
[119] Allison Beck, "Newsman Walter Cronkite to be Honored by NASA for His Coverage of the American Space Program," Briscoe Center Austin, last modified: February 27, 2006, date accessed: January 28, 2022, https://briscoecenter.org/about/news/newsman-walter-cronkite-to-be-honored-by-nasa-for-his-coverage-of-americas-space-program.

covering the space programs generally and the Apollo 11 lunar landing specifically. His commentary not only introduced Armstrong's and Aldrin's images of the Moon to the world, but his reaction and own sense of wonder humanized the experience for his viewers. Cronkite designated the University of Texas as his award's depository. "Cronkite attended The University of Texas at Austin in the 1930s and worked as a student reporter for *The Daily Texan* campus newspaper. Although he did not graduate from the university, he has never forgotten his alma mater."[120] Like those awarded to White and Lovell, Cronkite's sample was donated to the school that impacted his career. Cronkite chose to entrust the history center with the sample because the center had already served as the repository for his professional and personal papers. The center's collection also includes films of Cronkite's coverage of the space program for CBS News. Cronkite was in attendance at the award ceremony and presented the sample to university president William Powers Jr., who accepted the award on behalf of the Briscoe Center. The acknowledgment of Cronkite's contribution to the Apollo program and his lunar sample shows the public that being an astronaut was not the only way an individual could benefit the space program and the world. This sample provides the public with a sense of pride that even a regular civilian can be just as important to the space program. In awarding Cronkite for his service, the sample may inspire new generations of journalists to explore great news stories with the charisma that Cronkite had while reporting on the space program.

While Walter Cronkite may have been the public's escort to the lunar experience, Kennedy set the world on its path to the Moon. That kind of greatness is built on both actions

[120] Beck, "Cronkite," 2006.

and words. An inspirational speech can rally people to a cause. There were several powerful speeches during the 1960s that greatly impacted the public and the world. President John F. Kennedy's Rice University Speech is one of the most important speeches that he made during his time in the Oval Office. Kennedy answered the question "Why go to the Moon" during his 1962 speech at the university. He stated,

> We choose to go to the [M]oon in this decade and do the other things, not because they are easy, but because they are hard because, that goal will serve to organize and measure the best of our energies and skills, because that challenge is one that we are willing to accept, one we are unwilling to postpone, and one which we intend to win, and the others, too.[121]

He knew – like many others, did – that the journey to the Moon was one full of risk, but that with unity it would be successful. Support for Apollo had started to wane in the face of other problems on the Earth's surface. JFK's purpose with this speech was to provide the public with the sense that the mission to the Moon was not a waste of money. Instead, Apollo showed that the American idea of freedom was a powerful force and that the United States must make it to the Moon before the Soviet Union. He was committed to the idea that space exploration will be and remain for freedom and peace.

It is because of the impact of Kennedy's speech at Rice University and its connection to the space program that Kennedy's family choose it as the depository for the award. Rice

[121] John F. Kennedy, "Moon Speech," Rice University, September 12, 1962, date accessed January 1, 2022, https://er.jsc.nasa.gov/seh/ricetalk.htm.

University is about thirty miles away from the Johnson Space Center in Houston. And like the Pax River Naval Base and West Point Academy, its biggest contribution to the space program has been people. Greg Marshall, the director of University Relations, explained that there were two ceremonies for Kennedy's Ambassador of Exploration award which was unique for the initiative. The first presentation took place in New York on July 20, 2009, on the 40th anniversary of the Apollo 11 lunar landing. The award was accepted by Kennedy's family and a representative from the university, after which the award was taken to Johnson Space Center.

Marshall describes how as the University Relations Director he was tasked with working on the display proposal. He recounted how he worked with NASA to prepare the sample for display at the university. The display was planned as a part of the Woodson Research Center, which is located inside the university's Fondren Library. Marshall recalled his adventure to JSC to obtain the sample and his task to safeguard it.[122] He explained that he was not able to display the sample right away because the library was closed on the weekend during the university's summer semester. He had to keep the sample at his home for two days, and he slept with it under his pillow to keep it safe. Marshall's wife works in the JSC Mission Control and was quite excited to have the sample as a centerpiece on their dining room table for a short time. After the weekend, Marshall and the staff worked on the display while the award was stored in the library's vault. The second ceremony for Kennedy's award took place on what Marshall referred to as a "NASA Night" football game in Rice Stadium. During the event on October 10, 2009, the Ambassador of Exploration award was presented to the university by the director of JSC. NASA

[122] Greg Marshall, email to the author, October 6, 2021.

required that the sample be accessible to the public. Marshall's subsequent exhibit design contextualized the sample as a part of Rice University's history with the space program. The university's community takes pride in that relationship, so much so that the welcome center has a replica of the lectern used by JFK during his speech and a plaque at the stadium that commemorates the speech as well. Marshall's goal was to "place the sample in a larger historical context and emphasize the contributions that research institutions like Rice made to the success of our nation's human spaceflight effort and that Rice, in particular, made to the Apollo 11 landing (and others), and to making Houston 'Space City USA'."[123] Rice's proximity to JSC led to its contribution to the Apollo program and the people, there are committed to continuing their work contributing to the exploration of space. Their legacy is tied to JFK and NASA, and because of this, the university has a lunar sample to show the public its connection to space and the future.

The impetus behind the Ambassador of Exploration awards is that greatness is not for one person alone to have, but something that many people work together to achieve. Greatness can be shared with future generations to inspire them to follow in the footsteps of their predecessors and accomplish great things as well. Even the smallest objects can be used to tell the tales of greatness. This is true for the lunar samples that are on display, most of which are less than a gram in mass. NASA recognized the connection between Apollo, the lunar samples, and great men and how they can be used to inspire new generations. The goal of the Ambassador award was to share the story of Apollo and how the contributions of so many people made the lunar

[123] Marshall, October 6, 2021.

landings successful. The lunar samples contained in the awards are just as important as the men that they represent. The samples connect the award recipients with each other and the Moon. Though the samples were collected by the twelve men who stepped on the Moon, they shared their experiences with those who did not. Some of them even were at the ceremonies to present the awards to their peers, like Armstrong presenting Glenn his sample.

It is important to clarify that this chapter is not intended to be a *Great Man* history[124] but a discussion of the lunar samples, the men who were awarded them, and their location's relationship with those men. Though this chapter is not a *Great Man* history, it cannot be understated that the Apollo program did achieve something great and that even though several men became icons, there are thousands of men and women whose contributions were the reason that Apollo was a success. It was the hundreds of thousands of people who put their whole lives into the program to make space exploration happen. The Ambassador of Exploration award has helped the public understand how the men who received the award were one small part of the many who accomplished greatness. The purpose of the award and the sample encased in them is to inspire the future to continue the work of the Apollo men and women and revitalize the desire to explore. Just a plaque would not have the same effect that the lunar sample has because the sample is a piece of the Moon and a place that took courage and risk to step foot on.

[124] Great Man Theory of History states that history is made by great and powerful individuals most of which are men.

CONCLUSION

Mankind's journey to the Moon was a great accomplishment that showed the world what humans can achieve and expanded our knowledge of Earth's closest neighbor. What scientists have learned from their research on the lunar material has revealed some secrets about how the Moon and the Earth are related. Several pounds of lunar material were also designated to be preserved for future research. The collection of lunar soil, core, and rocks was one of the major objectives of the program. In *Taking Science to the Moon: Lunar Experiments and the Apollo Program,* NASA geologist Beattie recounts the hard work that his fellow NASA scientists put into proposals requesting certain tools and experiments that they would like to be taken to the Moon.[125] The scientists knew that the lunar samples could have an important impact on mankind's because of their understanding of the geology of our nearest neighbor and its impact on how we understand our own planet. But, the lunar samples have historical significance in addition to their scientific importance. Hundreds of lunar samples have been put on display across the United States and around the world to tell the history and the science, including experiments and geology, behind the Apollo program. These displays continued to share the legacy of Apollo decades after man first landed on the Moon and hopefully, they continue after man returns to the Moon with the Artemis program.

This thesis argues that the lunar samples should be considered an important artifact of the Apollo era. They contribute to the distribution of Apollo's history, lunar science, and the

[125] Donald Beattie, *Taking Science to the Moon: Lunar Experiments and the Apollo Program* (Baltimore: Johns Hopkins University Press, 2001).

importance of space exploration being for the "benefit of mankind**."** There are three main groups of lunar displays across the country: the Goodwill Moon rocks, the lunar samples that were petitioned for by museums, and the Ambassador of Exploration Award. These groups of displays serve different purposes within the history of Apollo and their goals when connecting with the public.

The Apollo Goodwill Moon rocks are the only lunar samples that are referred to as rocks even though their sizes are no bigger than a grain of rice. These samples represent something much bigger than themselves because they embody the hope for peace and goodwill around the globe. President Richard Nixon's gift of the Apollo Goodwill Moon rocks 135 nations across the world serves an important historical role because they were how the U.S. shared Apollo with the rest of the world. These gifts were dedicated to the people. This fact became quite obvious during the historic case Joseph Gutheinz's sting operation that recovered the lunar sample that was gifted to the people of Honduras. This sample's story reveals that these gifts do not belong to any one person but to the citizens of those nations that received them. Several of the Goodwill Moon rocks remain missing because of conflict, poor government management, fire, and theft. Gutheinz's search for these lunar samples shows that they are important even if the recipient nations do not have the resources to pursue the investigation themselves. His mission to find these missing Moon rocks brought together several agencies in the search for these irreplaceable gifts. This thesis addressed a few Goodwill Moon rocks and revealed that these objects have unique stories that have contributed to the history of Apollo and its goal of unity.

The second group of samples that this thesis discusses is the lunar samples that museums petitioned NASA for public display. These lunar samples are crucial to the dissemination of

Apollo's history and scientific knowledge more than that of the other two groups. This is because of the influence of the museums' staff. These curators and exhibit designers had to write proposals to show NASA that they could care for and protect the lunar sample whilst educating the public. NASA's main goal when approving these lunar sample displays was that the public have access to them and that museum visitors could learn something about Apollo and why man went to the Moon. Their experiences that museum staff members had with those samples emphasizes that these samples affect people. Without these museums working to share Apollo with everyone, the program's impact would wane. The lunar sample on display at the Smithsonian's National Air and Space Museum is a prime example of how persuasive museum staff need to be to get a sample, emphasizing the role of Smithsonian as the American people's museum and the National Air and Space Museum as the premier museum for aerospace. These museums present a variety of narratives that tell the story of the Moon and Earth, the astronauts, and the Apollo program. The narratives are a part of how museums share Apollo's legacy with the public.

The final group of samples that this thesis focuses on is the Ambassador of Exploration Awards. These samples, like many of the others that are on display, are encased in lucite to preserve them from Earth's atmosphere which contains elements like oxygen that can degrade the samples. This award was dedicated to forty-one men who contributed to the success of the Apollo program. Thirty-eight astronauts, a NASA director, a U. S. president, and a civilian news anchor received recognition for their contributions to Apollo. The goal of this award was to show the greatness that men can achieve when they have a goal and work together. These lunar samples were bestowed to institutions that shared a special connection with the awards

recipients. This award was designed to revitalize the legacy of Apollo and have future men and women inspire to achieve great feats in space travel again. NASA wanted to inspire future generations to continue what was started during Apollo and reach for the stars. These samples are not just limited to museums or state buildings but can be found in universities and even in high schools, places that emphasize education and encourage future generations who will inherit the legacies of the past. This award connects the men with these special places and allows young explorers to stand where those men stood as the world looks up at the same Moon.

This thesis explains that the lunar samples should be brought into the spotlight as important artifacts that share the history of Apollo. They are more than just pebbles or grains of sand; they share the legacy of Apollo with the public. The lunar samples were designated by NASA and the U.S. government to educate and inspire the people of the world. This thesis addresses the historiography gap that leaves out how significant these samples are to understanding Apollo, and how important they are to those who have inherited the space program. Fifty years after the Apollo 11 lunar landing NASA announced that mankind was working on a new program to the Moon. The Artemis program shows that NASA's goal to share Apollo's legacy through artifacts has once again inspired humankind to aim for the stars with the fire that fuels space exploration. The goal is to land humans back on the Moon by 2024. Artemis, named after the twin sister of Apollo in Greek mythology, seeks to redefine the exploration mission of the space program and bring mankind closer to the stars just as Apollo had brought us closer to the Moon. The success of Artemis would be a great symbol of how Apollo's legacy has impacted the world and the return of more lunar samples will be a part of that culture as well.

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