On the social impact of the Apollo 8 Earthrise photo, or the lack of it?[1]

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Summary
In this article, the various forms of contemporary news reports are explored of the Apollo 8 Earthrise pictures and whole Earth images photographed by the astronauts. Already during this flight to the Moon, that took place at the end of December of 1968, remarkable differences in perceptions, emotions, and interpretations emerged between the United States and Western Europe and, more likely than not, the rest of the world as well, concerning the Earth and humanity's place on it. Furthermore, it appears that within both continents a considerable portion of the population was hardly affected by these pictures, if at all. These differences in perceptions have evolved over the past fifty years, while many of them continue to exist today. All of this will be examined in some detail with emphasis on what happened during and right after the flight of Apollo 8.

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Introduction

On December 24, 2018, it was exactly fifty years ago that the astronauts of the Apollo 8 mission took the first pictures of Earth from lunar orbit. The astronauts were greatly impacted by what they saw, as witnessed by the voice recording while taking those pictures and their later testimonies (see for instance: Poole 2008, NASA 2012, Spier 2012, Vaughan-Lee 2018).

Already during their flight to the Moon, the images of Earth transmitted through 'live' black-and-white television had caused quite a stir on our home planet, especially within the United States. Yet after the Apollo 8 color pictures had been distributed by NASA, most notably the photo of the blue-and-white Earth rising above the stark gray lunar surface that soon became known as Earthrise, many people began to reconsider our position in space, now as joint inhabitants of a shared little, beautiful, but vulnerable planet with limited natural resources, moving through an inhospitable, dark, and mostly empty universe.

The Apollo 8 photos of Earth from lunar orbit were not the first such pictures. The unmanned US Lunar Orbiter 1 in August of 1966, and the Soviet Zond 6 spacecraft in November of 1968, had already delivered similar images in black and white, which had caused considerable social impact. But those effects were very limited compared to what happened as a result of the Apollo 8 pictures, presumably because those photographs had been taken by humans who had been witnessing our home planet themselves at considerable distance.

As mentioned in the *Preface* of my book *Big History and the Future of Humanity*, as an adolescent I watched all the available black-and-white Apollo 8 'live' transmissions from space in the Netherlands while snapping pictures from the screen with my Asahi Pentax 1a photo camera mounted on a tripod in front of our television set. This was before the days of home video recorders or any other devices that could record

Figure 1: The famous Earthrise photo shot by Apollo 8 astronaut William Anders on December 24, 1968. Source: NASA, Flickr.com, Project Apollo Archive. https://www.flickr.com/photos/projectapolloarchive/21713574299/in/

television pictures. I felt that I was witnessing events of great importance, while I was not certain whether these images would be preserved or be available to me (Spier 2010, 2015).

I took pictures of the launch; of the first 'live' broadcast from space, which included the first crude images of Earth; and of the two 'live' transmissions from lunar orbit showing the Moon's surface. On our family television set, Earth from space looked like a white blob, the result of overexposure by the rather basic Apollo television camera. I was very curious to know what the astronauts were really seeing, what the 'good Earth' looked like from space, as Apollo 8 commander Frank Borman called our planet during their famous 'live' Christmas Eve broadcast while orbiting the Moon. After the spacecraft had entered lunar orbit, my father installed his Elmo 8-SS double 8 film camera on the tripod and started making a home movie, now available on YouTube (H.L. Spier 1968), while I continued taking pictures with my camera, now holding it by hand in front of the screen.

I did not have to wait long. Soon my family received the January 10, 1969 issue of *Time* magazine which showed a selection of pictures taken by the astronauts. The opening picture of its 'lunar album' was the famous Earthrise photo with the caption: *The Awesome Views from Apollo 8*. This was a period in time when the word 'awesome' was used much more sparingly than today. While looking at this picture, I experienced

1. Ian Crawford, Edward van den Heuvel, Frans de Jong, Gijs Kalsbeek, Bob and Jet Shuman Spier, and Rudolf Spoor are gratefully acknowledged for their valuable commentary and contributions. Of course I remain responsible for the final text. For copyright reasons only NASA images are reproduced here. I dedicate this article to my father, without whom I would not be on this track.

a shock that I had never felt before and never have experienced since. Within a second, it changed my perspective of Earth beyond recognition. I tore the picture out carefully, stuck it on the wall of my room and looked at it for years. I still have this picture and treasure it greatly.

None of my education had prepared me for this new look at Earth. At school, I had received a classical Dutch, perhaps West European, education, which included Latin and ancient Greek; modern languages such as English, French and German; mathematics, physics, chemistry, geography and history. Yet these portions of discrete knowledge were never related to one another or presented from one single perspective. This had left me totally unprepared for the extraordinary sight of our blue-and-white planet surrounded by dark space, rising above the forbidding gray lunar landscape. These pictures showed for the first time to me how different Earth was from its cosmic surroundings. It also made other people around the globe wonder what we were doing to our home in space. This led to an unprecedented upsurge of environmental awareness, including the establishment of the first Earth Day in 1970.

Until that time, common depictions of the Earth had been mostly geographic in nature. Now, suddenly people saw Earth with their own eyes as a tiny colorful ball swinging through space. As a result of such photos, a major change in perception of Earth took place around that time, which appears similar to the one that happened after Europeans began to connect the world by trans-ocean voyages. Those earlier events led, among other things, to the first reasonably accurate world maps. Similarly, after the appearance of photos of Earth at a distance as witnessed by humans many of us started mapping our planet, our cosmic environment, and ourselves anew.

The Apollo photos of Earth at a distance, most notably perhaps Earthrise, did not only lead to a reappraisal of all of that. For some people it also raised the question of how to understand its past, in the hope that a better understanding of the history of ourselves and of our position in time and space at the grandest possible scale would lead to better decisions about how to act in the future.

In the United States, astrophysicist Carl Sagan was such a pioneer with his famous *Cosmos* television series, broadcast in the early 1980s (now available on YouTube). But other US natural scientists had already preceded him even before these famous Earth pictures had been shot, perhaps most notably US astrophysicist Harlow Shapley and US physicist Robert Jastrow, while another great pioneer, US astrophysicist Eric Chaisson, began teaching a *Cosmic Evolution* course at Harvard University in the 1970s together with astrophysicist George Field. Others soon followed.

However, none of that happened in the Netherlands. To be sure, a number of Dutch natural scientists and environmental activists were similarly impacted by those pictures. Yet none of the people I was surrounded by, including my teachers at secondary school and later at university, ever mentioned this profound change in perspective that the pictures of Earth from space had produced, but preferred to stick to their established educational programs. Given this situation, I kept most of my thoughts and feelings to myself.

Until the summer of 2018 I had simply accepted this state of affairs. Yet when I finally had some time to reflect on these matters while the 50th anniversary of the Apollo 8 moon flight was coming up in December, I posed myself the question why this had been the case. Why was it so difficult then –and now– to discuss such impressions with many Dutch academics, especially within the humanities and social sciences, while in the United States this was often not a problem at all? What had caused these differences? In other words, the central question of this article is: why has the reception of the Earthrise photo and similar pictures been very

different in the US compared to the Netherlands, and, quite possibly, also elsewhere in the world?

I am not aware of any publications that have already addressed this issue. In his excellent book *Earthrise: How Man First Saw the Earth* (2008), English historian Robert Poole provides detailed descriptions of the reception of these images within the United States. But with the exception of a few words about the United Kingdom, the British author does not say anything about their possible impact, or the lack of it, elsewhere in the world.

In a lecture for the 'European Big History Network' on October 6, 2018 in Salas, Asturias, Spain, I offered the first results of my investigation (Spier 2018a). As I see it, these differences in perceptions between the United States and the rest of the world concerning images of Earth at a distance already began to emerge during the flight of Apollo 8 as a result of the ways the news media were covering that spaceflight, in those days mostly television, newspapers and magazines. So what happened during those exciting days? To find out, let's explore the news coverage of the flight of Apollo 8 in more detail.

The flight of Apollo 8 and its media coverage

The launch of Apollo 8 took place on December 21, 1968, when the huge Saturn V rocket with the astronauts on top of it was launched into space at 7:51 a.m. Eastern Standard Time (EST), 13:51 Central European Time (CET). This monumental event was broadcast on 'live' color television in the US, and was covered by all the major TV channels: CBS, NBC, and ABC. A considerable portion of this 'live' TV coverage can now be watched on YouTube. Furthermore, virtually all US newspapers covered this flight as well. Many of those reports can now be found on www.newspapers.com.

In the Netherlands, we could watch this and other 'live' Apollo 8 TV broadcasts thanks to the fact that worldwide satellite TV connections had just become possible. For obvious reasons, the United States was interested in allocating (then) scarce and expensive satellite bandwidth for broadcasting these events around the globe, not least because the Apollo project represented a significant struggle for technological supremacy in the Cold War.

At that time there was hardly any color TV yet in most of Europe. After the TV signal for Europe had been received in Geneva, it was distributed on demand within Western Europe through the Eurovision network. In doing so, a West-European network of TV towers was used that were connected by antennas just in sight of each other. This relatively short distance was necessary because the TV signals traveled in straight lines, while the surface of the Earth is curved. This network of TV towers had just been constructed, which allowed for the first time 'live' TV transmissions within Western Europe. The system was called Eurovision, the remnants of which are still visible today in the 'Eurovision Song Contest.'

According to Rudolf Spoor (1938-), producer of all the Dutch Apollo TV programs, they could sign up for the available programs according to their preferences. Already before the Apollo project had taken off, young Rudolf Spoor had written letters to many prominent spaceflight pioneers in the United States. To his surprise and delight he received many friendly replies, which led to excellent contacts within NASA and its institutions (pers. com., summer and fall 2018).

In the meantime Spoor had been making a career within Dutch television. As a result, when the Apollo spaceflights started in 1968 he was put in charge of producing the Dutch Apollo TV programs. He used his NASA contacts to bring in the best and latest information as well as rocket and spacecraft models, and samples of space food, while in the United States

he met and interviewed prominent people involved in the Apollo project including the Apollo 8 astronauts, Mission Control in Houston, and Wernher von Braun (1912-1977), chief designer of the Saturn V moon rocket (pers. com. fall 2018, see also: Spoor & Titulaer 1973).

Rudolf Spoor was fortunate to be part of a small but talented team: presenter Henk Terlingen (1941-1994), who, because of his engaging style and expertise soon became known as 'Apollo Henkie' (cf. de Poel 2009), and the more reserved but thoughtful moon specialist Chriet Titulaer (1943-2017), who had built up his own international network of contacts and knowledge within the world of science and astronomy (cf. Titulaer 1969). For instance, Titulaer also contributed to an Apollo 8 article in the January 18, 1969 issue of the French weekly *Paris Match* (1969, p.32-37). This was part of a Dutch tradition of educating expert astronomers with an international outlook. Like Britain and some other European countries, good astronomical knowledge for celestial navigation was deemed very important by the Dutch, because its was a major precondition for making money in worldwide shipping and trade.

Rudolf Spoor and his team had signed up for all the available Apollo 'live' TV transmissions. This allowed me and others in the Netherlands to watch all those exciting events. Because the Dutch studio TV crew often knew only at the very latest moment whether the 'live' TV signal would come through or not, they had to improvise a great deal. But thanks to their expertise and the available NASA materials, Spoor and his team performed really well, as judged by the very high audience ratings, 82 to 83 (out of 100). In fact, these programs are still considered by many of those who watched them, me included, as among the best Dutch TV programs ever produced.

According to the *NTS Press Bulletin* of January 10, 1969 where these numbers were mentioned, the higher-educated viewers were over-represented. My family did not offer an exception in this respect. The percentages of all possible viewers varied from 32 percent for the 'live' launch on Saturday afternoon, 7 percent for the 'live' early Christmas morning broadcast at 3:30 a.m., to 31 percent for the December 25 program at 1 p.m. and 32 percent for the December 26 program at 23 p.m. The latter two broadcasts did not include 'live' transmissions. Both days were official holidays in the Netherlands, then as now.

Even though such viewer percentages would be considered spectacular today, in 1968 with only two TV channels available at that time this was not unusual in the Netherlands. In those years, prominent sporting events would, in fact, draw up to 65 percent of all viewers (van Meerwijk 1969, p.88). Unfortunately all the Apollo 8 tapes have been lost (Rudolf Spoor, pers. com. fall 2018). As a result, almost all the surviving images of the Dutch Apollo 8 TV programs may consist of my father's movie as well as the photos that I took off the screen.

The flight of Apollo 8 and its media coverage on their way to the Moon: the first wave of emotional responses

To stay in contact with the astronauts during their moon flights, NASA had installed three major communication stations with huge dish antennas that were strategically placed around the world: one near Madrid, Spain, another one near Canberra, Australia, and the third one near Goldstone, California. While the Moon was moving out of view from one such a station because of Earth's rotation, it came into view of the next one. This worldwide arrangement became known as the NASA Deep Space Network. For distributing this signal back to the United States, the very recent global network of communication satellites called Intelsat was used.

The first 'live' Apollo TV broadcast from space took place on December 22 at 31 hours Mission Elapsed Time (MET) –3 p.m. EST and 9 p.m. CET– while the astronauts were on their way to the Moon. During this broadcast, the Earth appeared as a white blob, the result of over exposure by their little black-and-white TV camera, which was very basic by today's standards. Again I took photos from the screen while wondering what the Earth looked like to the astronauts.

About 24 hours later, on December 23 at around 55 hours MET –again 3 p.m. EST and 9 p.m. CET–, there was a second 'live' TV broadcast while the astronauts were still on their way to the Moon. During this event the Earth was shown much more recognizably, thanks to improvements to the TV camera by using certain light filters. During this second broadcast,

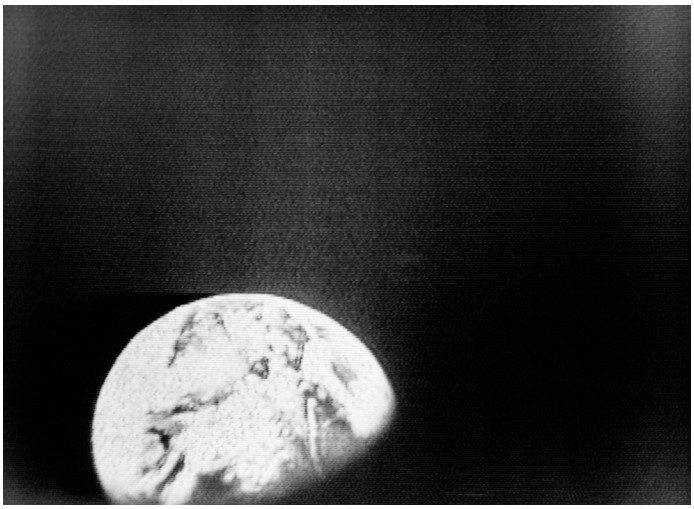

Figure 2: The Earth as shown on 'live' television during the second Apollo 8 broadcast on their way to the moon. Source: NASA, https://spaceflight.nasa.gov/gallery/images/apollo/apollo8/html/s68-55808.html

CBS anchor Walter Cronkite was audibly impressed as soon as he saw those better whole Earth images, which showed North, Central, and South America. US space philosopher Frank White (1944-), author of *The Overview Effect* (1984), was similarly impressed. In an interview on November 5, 2018, White stated that it was exactly this view of Earth that startled him, almost as much as Earthrise, because he had been totally unprepared for it while he did not expect it (Cogito in Space 2019, min 3:05). So the United States was suddenly looking at itself from a distance within a global setting using images that were produced by their own people.

In fact, both broadcasts happened at times during which the North American continent was in full view. Was this coincidence, or was this done on purpose? According to the *Apollo 8 NASA Mission Report* (Godwin 1998, p.33), the television broadcasts had been tentatively scheduled in advance at those times, but would only be officially scheduled after 12 hours MET. I have not been able to find any references to such a decision in the Apollo voice transcripts. Was this done on a back channel out of public reach?

In addition to finding suitable room within the astronauts' busy schedules during a daring space flight that had never been attempted before, a major deciding factor may have been that at those specific times the Apollo signal from space would directly go to the large Goldstone, CA, antenna. In consequence the 'live' signal would not require a satellite relay to reach the US (in those days that could easily lead to technical problems). Such a practical consideration would automatically produce an Earth image from Apollo 8 with the Americas in full view.

Whatever the reasons may have been, this choice had profound consequences. Already the next morning, December 24, these improved Earth images featured prominently on the front pages of a great many US newspapers. How did they get there so quickly? NASA was basically doing the same as I had been doing, namely shooting pictures from the TV screen. But while I was waiting patiently until my entire film roll of 36 images was fully exposed, the NASA photographers had their photos quickly developed and

printed. These images were immediately distributed through Associated Press's Wirephoto service to the news media.

Furthermore, the next day, December 25, the *New York Times* featured on its front page a *Reflection* by Archibald MacLeish, in which he declared that a new world view might have opened up. According to his final words:

> To see the earth as it truly is, small and blue and beautiful in that eternal silence where it floats, is to see ourselves as riders on the earth together, brothers on that bright loveliness in the eternal cold – brothers who know now they are truly brothers.

This fresh world view quickly became very influential in the United States, not least because of its endorsement two weeks later by Apollo 8 astronaut Frank Borman. After their successful return to Earth the intrepid space explorer read this quotation aloud during his presentation before a joint session of Congress on January 9, 1969 'because it captured the feelings that we all had in orbit' (Vaughan-Lee 2018, min. 25).

Archibald MacLeish's poetic vision was reprinted many times, including prominently underneath a full Earth image in the article by the USAF Apollo project director, Lt. General Sam Phillips (1921-1990) titled: '"A Most Fantastic Voyage:" The Story of Apollo 8's Rendezvous with the Moon' in the May 1969 issue of the *National Geographic* magazine. This article also also included a two page fold-out picture of Earthrise. These words were also reproduced in many other places, including in Macleish's own book *Riders on the Earth* (1978), while they provided a great deal of inspiration to both artists and activists.

In fact, MacLeish's *Reflection* is still remembered today. His eloquent prose can now be found on several web sites, while on December 24, 2018, almost exactly fifty years after its first publication, the *New York Times* ran an article on its front page with the headline: 'We Are All Riders on the Same Planet: Seen from space 50 years ago, Earth appeared as a gift to preserve and cherish. What happened?' (Boulton & Heithaus 2018).

Who was Archibald MacLeish, and how did he get his thoughts formulated and in print that quickly? According to Robert Poole he was both a poet and Librarian of Congress at the time of publication of his *Reflection* in the *New York Times* (2008, p.40-41). Already for decades MacLeish had contemplated views of Earth at a distance and their social consequences as he saw them, as part of a tradition among a small group of intellectual peace-loving people. He now saw his chance to get his thoughts in print. Apparently MacLeish was sufficiently well connected to the *New York Times* editorial staff to get his words out on their front page right after the astronauts showed a whole Earth image on 'live' television.

This raises the question why a tradition of contemplating such grand views would exist within the United States. In chapter three of his book *Earthrise*, Robert Poole makes a convincing argument based on a great many examples that for millennia people had been contemplating such views. After the Second World War the tireless efforts within the United States by intellectuals and others such as German rocket scientist Wernher von Braun to promote space flight including a trip to the moon –building on such a tradition in pre World War II Germany and Russia– would have stimulated US citizens to contemplate the emotional effects of the resulting fresh views of Earth.

Yet the famous rocket scientist himself does not appear to have entertained such views in public, but instead preferred to focus on technical aspects. For instance, in his article 'What the Apollo 8 Moon Flight Really Did for Us' in the March 1969 issue of *Popular Science* there is not a single word about a changed perception of Earth nor any pictures of

Earth at a distance. It is all about what was learned technically speaking from the flight of Apollo 8 to achieve a successful lunar landing, which was, of course, the official aim of the program as well as his ardent desire since the 1930s. This headline may, in fact, have expressed von Braun's possible frustration concerning the new perceptions of Earth that might distract the attention from the lunar landing still to be achieved.

Wernher von Braun's article in *Popular Science* was part of a series of technical explanations of manned spaceflight that he had been publishing in that magazine since January of 1963. Extremely lucid and well written, these articles provided his readers the best and latest insights into how it all worked, most notably the upcoming Apollo project and manned flights to Mars. Many of these articles were later jointly published in his book *Space Frontier* (1967). The translation of this book in Dutch titled: *Op de drempel van het heelal* was also published in 1967, which I then read, thanks to my father who gave it to me as a birthday present.

In fact, this book provided a wonderful overview of the new technologies being developed in the 1960s that were to change the world decisively. At the end of the book von Braun summarized in very clear terms many of the problems humanity would soon have to face while discussing the possible contributions of spaceflight to solving such problems – only five years later analyzed extensively in the famous *Limits to Growth* report of 1972 (1967, p.183-185). Apparently von Braun was already very aware of many of the environmental and social concerns stimulated by Earthrise before it had been shot and did not need such pictures to raise his awareness about these things. One wonders how many intellectuals worldwide were already thinking along such lines at that time, more or less isolated, perhaps.

Wernher von Braun's views about the future of humanity may have been influenced by watching the unmanned Lunar Orbiter 1 Earthrise picture from August of 1966. This photo featured prominently in the NASA brochure about the George Marshall Space Flight Center directed by von Braun at that time. Judging by the undated brochure's content, it was probably published in 1967. Starting from August of 1966, other intellectuals may have been similarly stimulated, possibly including Archibald MacLeish.

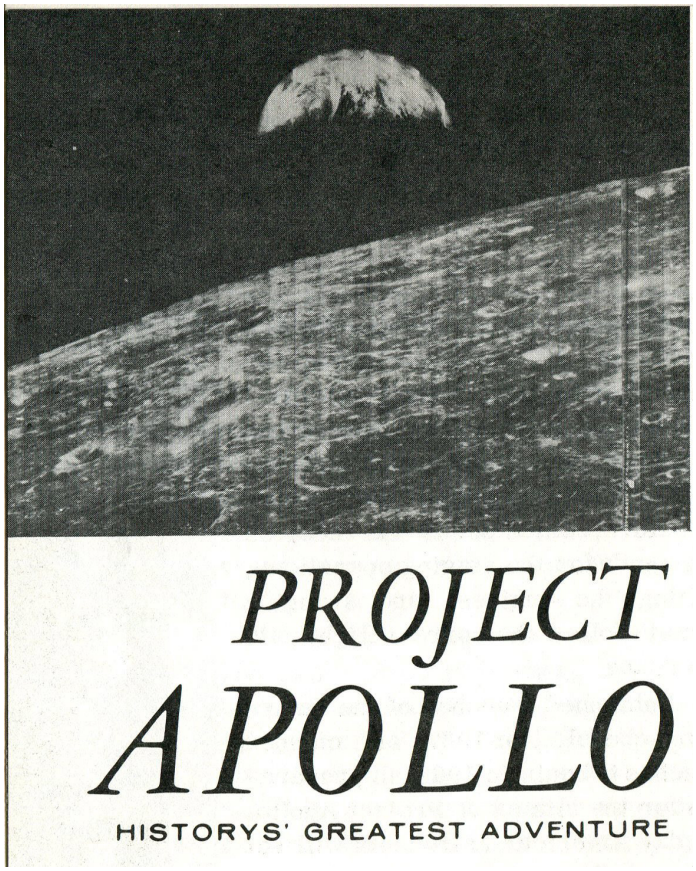

Figure 3: The Lunar Orbiter Earthrise photo on page 18 of the George Marshall Space Flight Center brochure.

Whatever the case may have been, in Europe things went differently. In the late 1940s and 1950s, this continent was still emerging from the ruins of the Second World War. As a result there were other, more

immediate concerns than contemplating the luxury of spaceflight and its possible effects. For instance, NASA rocket scientist Jesco von Puttkamer (1933-2012), who became a close collaborator with Wernher von Braun during the Apollo project, was clearly impressed with the new views of Earth produced by the flight of Apollo 8, as witnessed in his book *Apollo 8 - Aufbruch ins All* (1969) that sported Earthrise on its cover while showing more such pictures and comments inside (114-115). Yet in the same book Jesco von Puttkamer also mentioned that while going to school at the Alexander-von-Humboldt-Gymnasium in Konstanz, Southern Western Germany, right after the Second World War he was asked by his study adviser: 'wann werden Sie endlich aufhören, sich mit so einem Quatsch wie künstlichen Erdmonden abzugeben und statt dessen Ihre Hausaufgaben machen?' [When will you finally stop keeping yourself busy with such nonsense as artificial Earth moons and do your homework instead?] (1969, p.10).

The emergence of social divergences in Earth perceptions

These fresh perceptions of Earth within the United States as a result of the media coverage of the flight of Apollo 8 may have contributed to strengthen some of its internal social differences. For surely not all US citizens read the *New York Times* or similar publications, while not all may have been equally sensitive to such comments. More likely than not, many of them would, in fact, have been rather suspicious of what today are considered the 'liberal' media (and quite likely then as well). In consequence, they may have avoided them. Such attitudes can clearly be witnessed today within the United States. My personal experiences in that large country have taught me that among such people any influence of these Earth images or poetic words appears virtually absent. Within US academic circles, by contrast, such views are often still very present.

These are preliminary observations, of course. To achieve further clarity about this issue more research is needed. Yet this view is confirmed by German journalist Hermann Schreiber's commentary on January 6, 1969 in the weekly magazine *Der Spiegel*, where he stated that on the one hand in the US many were overwhelmed by the feeling that all people were brothers and that they should behave like that while seeing the Earth on their TV screens, but that on the other hand 2000 Americans had complained to the CBS TV channel, because these TV images had interrupted the transmission of the [American Football] game between the Cleveland Browns and the Minnesota Vikings right before halftime (1969, p.73, my translation).

While this confirms my view about these social divisions, according to information available on the Internet no such game between those two teams actually took place during the flight of Apollo 8. Hermann Schreiber may have intended to refer to the game on December 22 between the Minnesota Vikings and the Baltimore Colts. But during that TV transmission, the Earth was shown as an unrecognizable white blob, which did not produce many immediate emotional reactions in the news media (Pro Football Reference 2019a&b). Yet whatever this particular situation may have been, it seems as if during the flight of Apollo 8 within the United States a social division of diverging perceptions of Earth indeed emerged.

It would not be correct to describe such a nationwide division mostly in terms of 'liberal' versus 'conservative' attitudes, although this may have been part of it. Surely the astronauts themselves, for instance, all former fighter pilots, could not possibly be described as 'liberals.' Yet as mentioned above, Frank Borman told a joint session of Congress only two weeks after their successful return to Earth that MacLeish's eloquent words had expressed well what they themselves had felt in lunar orbit while observing Earth from a distance. Although political attitudes will

not have been absent as part of this emerging social division, the major split may rather have been along the lines of the higher educated versus the rest. A similar situation could later also be witnessed in the Netherlands, as we will see below. This does not mean that all higher educated would have been similarly impressed. That was surely not the case anywhere. It was a certain selection of the higher educated who would have felt like that, while others did not, or to a far lesser extent. Why such a selection would have existed, and what determined it, is unknown to me.

For lack of any quantitative available evidence it is not possible to establish percentages of these social divisions as they emerged and began to develop, both in the United States and elsewhere. Based on the media reporting in different countries, shown below in some detail, as well as on my own experiences my preliminary guesstimate is that the percentage of the total population who felt affected by these Earth images was considerably larger within the USA than elsewhere in the world. In the Netherlands, for instance, no such emotional news media responses happened while Apollo 8 was on its way to the Moon, and, quite possibly, not in the rest of Europe either. Why not in Holland?

Until very recently I thought that the first immediate cause had been that the second 'live' Apollo broadcast on December 23 which showed the improved Earth images did not reach the Netherlands. I do not have any photos of it, and neither do I have any recollections of having watched such images at that time. If I had, I surely would have taken pictures of them. Dutch Apollo TV program director Rudolf Spoor does not remember them either. But for reasons unknown to me I apparently missed this broadcast. Thanks to a collection of old Apollo newspaper clippings kindly provided by Frans de Jong, in March of 2019, it turned out that on December 24, 1968 several Dutch newspapers had published such a TV Earth photo on their front pages, all acquired through Associated Press, while one of them, *Algemeen Handelsblad*, wrote in its caption that this was exactly what they had seen on Dutch television the night before.

Yet none of the accompanying Dutch descriptions showed any emotions in terms of that we were suddenly looking at ourselves from a distance and what that might mean. Also on December 24, the rather serious establishment newspaper *Nieuwe Rotterdamse Courant* that we received at home put a rather vague version of this photo on its front page with the caption 'The Earth photographed by Apollo VIII.' The more detailed descriptions in other newspapers were all strictly geographical in nature, in the sense of that 'we were looking at North and South America even though these continents could not be distinguished very clearly on the photo.' Apparently, which portion of the world was shown as well as the national identities of those who did that, and of those who distributed them, mattered a great deal for stimulating certain reactions or the lack of them. This situation would have led to the emergence of considerable social differences between the United States and the Netherlands concerning the perception of whole Earth images, and perhaps the rest of the world as well.

In lunar orbit: the shooting of the Earthrise photos

On December 24, already during their second lunar orbit the astronauts did a 'live' TV transmission starting at 71 hours 40 minutes MET (7:10 a.m. EST and 13:10 CET). This signal reached Earth through the large Madrid antenna. During this broadcast the astronauts showed images of the lunar surface as it slowly moved beneath their spacecraft while commenting on what they saw. We watched that in the Netherlands, while I took a few pictures. Much like the earlier two broadcasts, none of that was orchestrated other than by the astronauts themselves. This produced a very improvised and spontaneous atmosphere. It made me –and presumably many others as well– feel that

we were watching some of our fellow human beings in action during their space exploration. This was, in fact, the first time in human history that such 'real time' long-distance contacts were possible between courageous humans who were boldly going where no one had gone before and the great many others who stayed home.

During their fourth lunar orbit, after having circularized their initial elliptical orbit, the astronauts turned their spacecraft so that they could look forward. Until that time, their windows had been facing the lunar surface. While approaching the portion of the Moon's surface that is always visible from Earth, they suddenly saw our home planet rising above the stark lunar surface. This led to great excitement among the astronauts as well as a scramble to grab cameras and films to take pictures.

It was William Anders who took the famous Earthrise picture at around 75 hours 49 minutes MET (11:40 a.m. EST and 17:40 p.m. CET). In fact, he took two very similar pictures, known as AS08-14-2383 and AS08-14-2384 in NASA terminology, the first one of which became very famous. In doing so Anders used a Hasselblad 500 EL electronic camera equipped with a 250 mm Sonnar telephoto lens. He used a Kodak SO-368 color 70 mm negative film, ASA 64 sensitivity (outdoor), that was loaded in film magazine B, until then unexposed (later renumbered as magazine 14/B). The film exposure was 1/250th second with aperture f:11, according to the audio transcript. At that time none of the astronauts knew what the pictures looked like, because they first needed to be developed and printed, which could only be done back on Earth.

This event is well documented, most notably by a voice recording and its transcription using a tape recorder that was running while the spacecraft was behind the Moon and thus out of radio contact with Earth. Yet for decades this led to a rivalry among the astronauts about who had actually taken that picture, while errors in interpretations of the astronauts' voices during those moments continue to exist today, even in official NASA productions. This is partially caused by the fact that the voices of Borman and Anders sounded very similar (cf. Zimmerman 1999, Poole 2008, Spier 2012, NASA 2013, 2018).

Even though this excitement did not reach the news media at that time, because it had not been part of any conversations between the astronauts and Mission Control in Houston, there was at least one US newspaper that had anticipated such a view. On December 25, 1968 *The New Haven-Courier Journal* published on its front page a drawing of an astronaut looking out of the spacecraft window over the barren lunar surface with the Earth coming up. This image was attributed to Associated Press Wirephoto while it sported the caption: 'The astronauts' Christmas view of the earth – an artist's conception.'

The attribution to Associated Press shows that this image was, in principle, available to all the news media. It is unknown to me who the artist was, when it was made, or who the persons were that helped Associated Press make it available at that time. But surely, some of those people had considerable foresight and imagination. The depictions of the astronaut's hat and the spacecraft's interior do not faithfully reflect Apollo technology. This makes me wonder whether the drawing had been made before all of this had been designed. But it may also simply represent artistic license. Whatever the case, this may well have been part of the earlier mentioned tradition of imagining to look at Earth from lunar distance.

Interestingly, the *NASA Apollo 8 press kit* dated December 6, 1968 (meant for release on December 15) had already featured on its front page a black-and-white image of the spacecraft in lunar orbit with the astronauts looking at its surface while in the background the Earth was rising. The same picture, in color with much more detail, also appeared in the

December 27 issue of *Time* magazine, where it was attributed to North American Rockwell, builders of the Apollo spacecraft. Also that picture ended up in my Apollo scrapbook. Clearly such Earthrise-like images were not unknown at that time. Yet compared to Earthrise they caused very little emotional impact.

Furthermore, before the flight of Apollo 8 some NASA officials, most notably perhaps Richard Underwood, who was in charge of the Apollo photography in Houston, had urged the astronauts to take such pictures while providing the correct camera settings. Yet apparently witnessing the real thing still came as a big surprise to the crew (Poole 2008, p.23-24).

Right after the astronauts had taken these exciting pictures of Earth rising above the lunar surface, radio contact with Mission Control was reestablished. The crew immediately engaged in rather technical, but very important, exchanges about the specific parameters of their new circular lunar orbit. During further exchanges with Houston, including later TV transmissions, no mention was made of witnessing Earthrise and of trying to shoot pictures of it, even though it had affected all of them greatly. The great discipline required did not offer much room for digressing emotionally in such ways other than making a few observations. As a result, their Earthrise experiences could not have any direct effects back on Earth during the flight of Apollo 8.

Interestingly, during three subsequent orbits, five, seven, and nine, the astronauts shot another twenty-two Earthrise pictures using the standard Planar 80 mm lens that produced more-or-less the angle of view that humans have. The famous Earthrise pictures, by contrast, had been taken using the Sonnar 250 mm telephoto lens. This showed a much larger Earth, which enhanced its effect. Twenty of the other Earthrise pictures were in color, while two of them were in black and white. Although none of them achieved the same fame as Earthrise, one of these Earthrises, AS08-14-2392 in NASA terminology, shot during the seventh revolution presumably by Frank Borman, was, in fact, prominently reproduced in several publications, as we will see below.

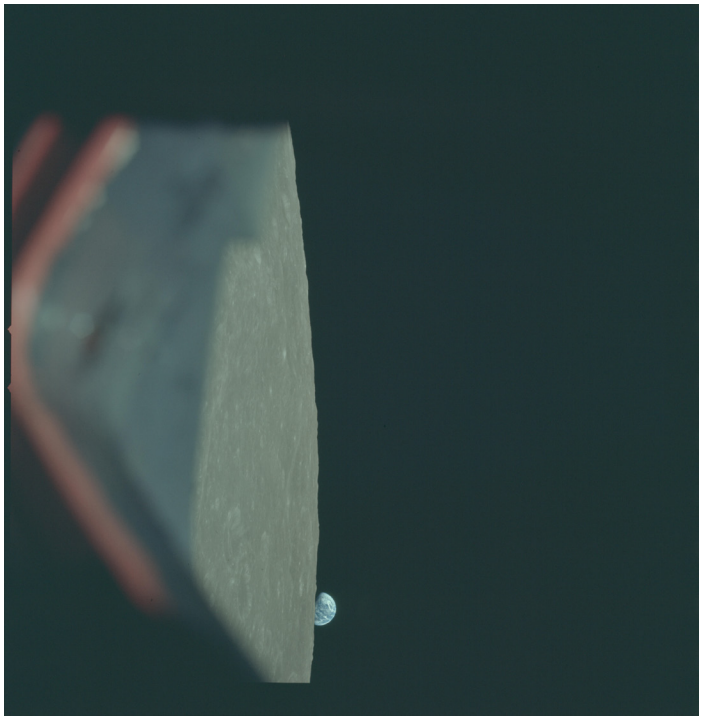

Figure 4: The Earthrise photo AS08-14-2392 presumably taken by Frank Borman. Source: NASA, Flickr.com, Project Apollo Gallery.
https://www.flickr.com/photos/projectapolloarchive/21900445315/in/album-72157658985288718/

Surprisingly, the shooting of these subsequent Earthrise pictures appears to have escaped the attention not only of all authors about Earthrise whose work I have read over decades, including the official NASA photo analysis of that flight (NASA 1969), but it was not mentioned either in any of the astronauts' later conversations that I have heard. As part of that, no one appears to have inventoried yet all those Earthrise pictures, including most notably: at what times they were shot and by whom, even though this can be established relatively easily using information

available on the Internet. In Appendix 1, my results are shown. Apparently the lure of the famous Earthrise photo has been so strong that this subject may have been neglected until today.

The reading of Genesis in lunar orbit: a second wave of emotional reactions

During their ninth lunar orbit, on December 24, starting at 85 hours 43 minutes MET (9:34 p.m. EST, Christmas Eve in the US, and 3:34 a.m. CET early Christmas morning), the astronauts realized a second 'live' TV transmission, which they started by showing a fuzzy image of the Earth, quickly followed by images of the lunar surface while commenting on what they saw. Finally, while approaching lunar sunrise, clearly visible on the TV screen, Bill Anders informed the viewers that the crew of Apollo 8 had a message that they would like to share with us. He then read the first four lines of the bible book Genesis. Jim Lovell followed by reading the next four lines, while Frank Borman read another two lines. The commander then finished the TV transmission by saying: 'And from the crew of Apollo 8, we close with good night, good luck, a Merry Christmas and God bless all of you - all of you on the good Earth.'

This produced an extraordinary emotional impact back on Earth. My father and I watched that while taking pictures. We looked at each other – what is happening now? I will never forget those moments, including the setting of our living room I found myself in. This happened to a great many other people as well, especially in the United States but also elsewhere. In other words, this produced strong emotional waves worldwide with clear religious overtones (cf. for instance Poole 2008, NASA 2012).

NASA had not scheduled this bible reading in advance. Even though they had told the astronauts that they could expect the largest ever 'live' audience with their broadcast on Christmas Eve, the only instruction that NASA gave them, according to Frank Borman, was 'to do something appropriate.' Because Borman had been too busy preparing for this flight, he had asked some of his friends to come up with ideas, one of whom made this suggestion. Also because the astronauts were all active Christians, while, in their view, the first lines of Genesis offered the foundation of three major world religions, they decided to do that. But the astronauts had informed in advance only very few people within NASA. As a result, even for most members of Mission Control in Houston this came as a total surprise. In fact, as can be seen in the voice transcript, right before the 'live' TV began there was a discussion among the astronauts about what they would exactly do (Poole 2008, p.133-140, Woods & O'Brien 2017, page: orbit nine).

Clearly, reading Genesis at that moment can be interpreted as a reflection by the astronauts on humanity's place in the Cosmos, including its presumed history. And only five orbits earlier, the Earthrise photos had been taken by astronauts, producing an extraordinary emotional effect among them, while they had been trying to snap a few more of such pictures during the orbits five and seven. In fact, right before this second 'live' TV broadcast from lunar orbit began, they appear to have taken another set of such shots (see: Appendix 1). One wonders to what extent all of this may have contributed to the intensity of their reading of Genesis and its effects back on Earth.

Within the United States, as Robert Poole pointed out, all of this very soon stimulated many people to combine religious views with pictures of Earth at a distance, most notably Earthrise, as soon as they became available. Perhaps the clearest example is offered by the post stamp produced by the US Postal Service in the spring of 1969 showing Earthrise together with the words "In the beginning God..." . By contrast, very little of that happened in the Netherlands,

if at all, and perhaps not elsewhere in the world either, probably because the earlier whole Earth TV pictures had not elicited a great deal of emotions either. As a result, a further deepening took place between the often intense emotional responses to these events within the United States and the far smaller effects in the Netherlands and, quite possibly, also in most of the rest of the world.

On their way back to Earth, the astronauts did two more 'live' transmissions. During the first one, starting at 104 hours MET (December 25, 4 p.m. EST and 10 p.m. CET), no images of Earth or the Moon were shown, because, as Borman said right before the transmission began: 'We're just going to have to just do it inside today because there are no good shots of the Moon or the Earth; the Sun's too darn bright.'

At 128 hours MET (December 26, 4 p.m. EST, 10 p.m. CET) there was another 'live' transmission, about 97,000 nautical miles (about 180,000 km) from Earth, in which relatively good images of Earth were shown, thanks to camera improvements and the fact that Earth was getting closer, thus resulting in a bigger image, while the astronauts rather freely commented on what they saw and how they felt. Again, the Americas were in full view. However, for the United States such images were no longer new, so they did not produce a new wave of emotional reactions in the news media.

The publication of Earthrise in black and white: a third wave of US emotional reactions

A third wave of emotional responses took place in the US after the Earthrise photo was made available. The astronauts had returned to Earth by splashing down in the Pacific Ocean on December 27 right before dawn, at only a few miles' distance from the aircraft carrier Yorktown that had been sent there to pick them up. Within two hours they stood on its flight deck, while a few hours later also the spacecraft was recovered. A movie that they had taken was quickly developed onboard and shown to the astronauts before they left the ship the next day. But the photos were not developed on the Yorktown.

The astronauts could not immediately leave the ship, because the aircraft carrier was still too far from Hawaii for any of its small passenger airplanes to reach those islands. So the aging Yorktown went full steam toward the archipelago, blowing its main water pipes in the process, which very much limited water consumption on board. The next morning the astronauts flew to Hawaii. Within two hours after arrival they boarded a plane that took them back to Houston together with their photographic materials. The next day these were developed and printed. The pictures deemed newsworthy were immediately distributed through Associated Press together with hastily made descriptions. This included the Earthrise photo, numbered AS08-14-2383 in film magazine 14/B in NASA terminology (NASA 2015).

Many of these photos received a great deal of attention, but none of them approached Earthrise in that respect, presumably because of the stark contrast between the barren gray lunar surface and the colorful image of Earth, both surrounded by pitch black space.

Interestingly, NASA did not make much of an effort to publicize Earthrise. As Robert Poole formulated it, the description of the 'Apollo 8 Earth View' as supplied by the photographic service was informative rather than poetic, emphasizing the specific position of the spacecraft over the lunar surface as well as what was in view. A later version by the Public Affairs Office added the sentence: 'This view of the rising Earth greeted the Apollo 8 astronauts as they came from behind the Moon after the lunar orbit insertion burn.' (Poole 2008, p.28-29). However, this was not entirely correct, because the photo had been shot during their fourth orbit, so not right after insertion into lunar orbit. This NASA statement may have signaled the beginning of a considerable number of misrepresentations of this famous picture over the past 50 years, including by NASA itself.

According to what can be found on www.newspapers.com, the next day, December 30, at least sixty US newspapers put Earthrise on their front page, including the *New York Times*, even though all these picture were in black and white. Some newspapers may have featured color photos, but I have not seen any of them. This can be interpreted as a third wave of emotional responses to whole Earth images. To be sure, all these emotional responses by the printed news media including the earlier ones must have had a financial incentive as well, namely to sell as many issues as possible. Yet the perception of such anticipated effects provides a clear indication of the recognition by the printed news media of the potential impact of such emotions.

It is difficult to assess the effects of this new wave of emotions within the United States caused by the publication of Earthrise in black and white by the newspapers. Yet it seems likely that the new black-and-white Earthrise photo was interpreted in the United States within the same wide range of emotional and cognitive contexts that had emerged the week before while contemplating the black-and-white TV photos of Earth at a distance.

This relative mild wave of emotions may also have happened because the first version of Earthrise was distributed through Associated Press had to be in black and white. This was necessary for a quick worldwide distribution, given the limitations of such technology at the time and the connected fact that virtually all newspapers then printed only photos in black and white. Color versions of Earthrise were made available few days later. Unfortunately I do not know how exactly Associated Press distributed those pictures to the press.

In the Netherlands, the black-and-white Earthrise photo did not lead to a a great deal of emotions. On December 30, newspaper *De Tijd* showed Earthrise on its front page together with another photo of the barren lunar surface with the headline: 'Rare Moon Photos' without any further reflections. On the same day, the commercially-oriented *Algemeen Handelsblad* published a small Earthrise on page 5, section 'Foreign Affairs,' in the orientation preferred by Bill Anders, namely with a vertical horizon on the right, while summarizing the rather technical NASA description. And on December 31, the leftist-leaning newspaper *Het Vrije Volk* published it on its front page with the headline: 'Look, the Earth is coming up,' again without any further reference to the fact that we were looking at ourselves from a distance.

Furthermore, on December 31, 1969, also the *Nieuwe Rotterdamse Courant* that my parents were subscribing to published a rather small Earthrise photo. This photo was part of their sixteen-page long annual overview titled: 'The Year 1968.' Earthrise featured as a relatively small image at the bottom of page 9 in the 'Foreign Affairs' section, surrounded by mostly larger photos of social action. It was described as: 'The year was ended by a successful trip around the Moon by three Americans in the Apollo capsule.' To the best of my knowledge, none of that led to any perceptible emotional wave in the Netherlands.

What, one wonders, was different in this little part of the world? A lack of data always leaves a great deal of room for speculation unconstrained by observational evidence. My current thinking is as follows. First of all, the Dutch were not doing it themselves. Also, on the Earthrise photo Holland was not visible, situated too much to the north and just in the dark portion of Earth, because when the picture was taken at 17:40 p.m. CET night had already fallen in the Netherlands. All of that made it a little harder to identify with those pictures, not least because notwithstanding it international outlook, Dutch elite culture was – and still is – very much centered on itself, including mostly reading materials in Dutch, including translations into Dutch.

The idea of the importance of 'doing it themselves' in eliciting such emotional reactions is strengthened by what happened during, and after, the much later space flight by Dutch ESA astronaut André Kuipers,

who went to stay at the International Space Station between December 21, 2011 and July 1, 2012. During his flight and even more so after his return to Earth, Kuipers' eloquent descriptions as well as his evocative photos and movies, some which can now be seen on his website https://andrekuipers.com, did lead to emotional responses in the Netherlands that were a little similar to those that had happened in the United States during and after the flight of Apollo 8.

In addition, in the 1960s many people in Europe felt that they were 'lagging fifty years behind the United States,' an expression that I remember well, while they looked with admiration and a certain degree of jealousy to that large, wealthy, and powerful country. All of this contributed to a considerable interest in the technical achievements of the Apollo 8 flight, which featured prominently in the European news media, including the Dutch. Yet Europeans also felt themselves to be 'culturally' different from the United States, often to some extent superior, then as now. All of this went hand-in-hand with a considerable degree of cultural self confidence, none of which would have heightened their sensitivity when exposed to the American wave of Earthrise emotions.

Furthermore, a certain arrogance and self-confidence characteristic of many Western Dutch known in the Anglo-Saxon world as the 'Dutch uncle' mentality may have played a part as well. When I recently questioned a few Dutch citizens of my age about this lack of cognitive and emotional reception, almost invariably the answer was: 'because we knew that already.' By this they meant that they knew already about the Earth and its geography as well as its position in the universe thanks to their general education at school. That is how these new images were mostly interpreted. More of such examples will be shown below. Yet quite often, in my experience, such people may not always take sufficient time to wonder what they actually know as well as what they might have missed. As a result, there was a remarkable lack of surprise, wonder, fresh emotions, and openness for new views of the Earth and our place on it.

To be sure, the Western Dutch tradition of engaging in worldwide trade and gathering all the available knowledge about it, including the astronomical expertise necessary for long-distance navigation, had contributed to a Dutch global and cosmic awareness already for centuries. A similar argument can be made for Spain and Portugal (Spier 2017), and perhaps also to some extent for the United Kingdom, France, and (former) Western Germany. But in contrast to these other European countries, the Western Dutch middle classes ruled themselves while engaging in all of that, which would also have bolstered their particular form of self-confidence.

Dutch universities, and also their academy of science, where such activities were undertaken, were dominated by the middle classes and not by other elites, a landed nobility, for instance, who may have felt themselves to 'be above such mundane knowledge.' Wherever nobilities and their cultural expressions have dominated the academic world, they have tended to develop and display their own particular types of self-confidence, by others often perceived as their own particular types of arrogance. None of such attitudes would be helpful in reappraising our position in space and time as a result of images of Earth at a distance, photographed by fellow human beings that were not considered to be part of their 'own' societies.

All of this, including the teaching of astronomical cosmography at some Dutch secondary schools – which was being abolished around the time when the flight of Apollo 8 took place, probably because navigation by artificial satellite signals was becoming a reality– may well have contributed to the Dutch feelings of that 'we knew this already,' even though as a result many of them may have missed a reevaluation of our position in space of sharing life on a planet with limited resources within an inhospitable universe. For

their own particular reasons, similar situations may also have existed in other West European countries. All of that would need to be further investigated. Yet whatever the causes may have been, clearly such new views could be witnessed in the Netherlands, and quite possibly also in the rest of Western Europe, to a far lesser extent than in the United States.

The publication of Earthrise in color: a fourth wave of US emotional reactions

Color versions of Earthrise together with other Apollo 8 photos both in color and black-and-white were also immediately made available by NASA. Their distribution and reproduction in the printing press took about a week. As a result the glossy magazines lagged behind the newspapers, which could immediately feature Earthrise in black and white. It is unknown to me how Associated Press distributed those pictures to the press, quite possibly by mail which worked quickly and efficiently in those days.

In many of those lunar photos, colors appeared that did not correspond with what the astronauts had seen. As they stated themselves in the 1969 NASA Analysis of Apollo 8 photography and visual observations: 'Our photographs on black-and-white film illustrate observed general lunar color more closely than do the initial printings of the color films. Neither were specific colors observed associated with any particular lunar features' (1969, p.10). Yet such false lunar colors began to appear in Apollo 8 pictures all over the place, thus adding some emotional impact.

To my great surprise, at the beginning of 2019 it turned out to be possible to purchase through eBay the issues of a considerable number of magazines, ranging from the United States, Britain, France, Germany, Spain, Italy and Yugoslavia, that had featured Apollo 8 photos and articles at the beginning of 1969. These are described below. Unless referenced by another source, all these weeklies are currently in my possession.

The first to produce Apollo 8 special issues in color in the United States were the major newspapers. In doing so they could beat the weeklies, who were tied to their specific production and publication schemes. Even though the *New York Times* had already published Earthrise on its front page on December 30, in early January they also produced a full 72 pages Apollo 8 special issue in cooperation with the glossy biweekly *Look* magazine, a direct competitor of *Life* magazine, with the headline: 'Apollo 8: Voyage to the Moon.' This *LOOK special* was not part of the regular publication scheme of *Look* magazine, but it was brought out separately as a large-size booklet. No specific date of publication was mentioned, only the year 1969. Its main text was provided by a team of authors from the *New York Times* led by science news coordinator Henry Lieberman (1969). According to the information supplied, they had acquired their Apollo photos through Wide World Photos owned by Associated Press.

This *LOOK special* opened with Archibald MacLeish's *Reflection* printed over two full pages. Its cover did not feature Earthrise (which was already prominently shown on the *New York Times* front page a week earlier) but another Apollo earthrise photo shot with a regular lens and framed by the spacecraft's window. This was photo AS08-14-2392 mentioned earlier, probably shot by Frank Borman during their seventh lunar orbit. This astronaut's perspective lent it a personal touch. Yet inside, the Earthrise was prominently shown in color over two pages in mirror image. On other pages, more large Apollo 8 photos in color and black-and-white were shown. This issue offered a detailed and intelligent contemporary report of the Apollo 8 flight. It explained, for instance, Apollo space navigation technology by placing it into the historical perspective of how to determine one's position on the globe spanning two millennia. This special issue also contained a considerable amount of

personal information gleaned from public sources as well as some emotional editorial descriptions.

The *New York Times* was not the only newspaper producing an Apollo 8 special issue in color. On January 5, 1969 the *Chicago Sun Times* published a similar 'Special Edition, Apollo 8's Epic Flight' with color photos and the headline: 'Voyage To The MOON.' It prominently featured Earthrise on its cover, depicted however with a light blue sky and a light brown lunar surface. It is unknown to me whether this might have been caused by a deterioration of the colors over time, or whether this was done on purpose. Inside, the other earthrise photo framed by the spacecraft's window was shown with the caption: 'Earthrise! Astronauts' view of the Earth as it rises above the lunar horizon.' This may have been the first time that the word 'Earthrise' appeared in print, only one week after these pictures had been published. Yet in this case it was not used for the iconic picture now known as Earthrise. Emotions were not lacking either, most notably the astronauts' reading from Genesis.

On January 7, 1969 also the *Detroit News* published a special issue in color with a similarly impressive Earthrise on its front page headlined: 'The Moon and Beyond. A specially prepared Detroit News photo and word history of the flight of Apollo 8 and what it means.' In its mid double page fold out (p.8-9), impressive images of Earth were shown with the caption: 'The Good Earth - A Beautiful Orb.' Also this magazine paid ample attention to the astronauts' Genesis reading, yet they also offered a 'Dissenter's Opinion: ''I think that the astronauts were not only ill-advised but that it was a tragic situation . . . it seems to me when man is expanding human knowledge and attempting to explore so that we can find answers that it is extremely unfortunate . . . that they should read portions of the Genesis Bible which is accepted by a very minor number of persons in the total world.' – Mrs. Madalyn Murray O'Hair, the woman who got prayer removed from public schools' (p.6).

There may well have been more such glossy magazines cooperating with, or produced by, US newspapers that paid color attention to Earthrise. For the mostly black-and-white newspapers this was a way of competing with the popular weeklies such as *Time*, *Life*, and *Newsweek*, who all routinely published color pictures.

Those three major US weeklies lagged a few days behind the newspapers. Because the reproduction of color pictures in the printing press took about a week, and because most of them published their issues on a weekly basis, these magazines were only able to get their Apollo 8 color issues out starting January 10, 1969. As a result, they found themselves at the tail of this emotional wave. Much like what the glossy specials had just done, this situation may also partially explain the remarkable emotional content in these weeklies which, in doing so, also sought to capitalize on these earlier waves to sell their copies, many of which were sold at newsstands.

Life magazine did it as follows. The cover of its January 10, 1969, issue featured a huge Apollo 8 color photo of Earth at a distance, with the text 'The earth as seen from Apollo 8 in space, showing the outlines of North and South America,' together with the headline: '*Incredible Year '68*.' Furthermore, within an article of 12 pages it sported a full two-page Earthrise photo with the headline 'Discovery,' while on the next pages more photos of this mission were shown. It also prominently featured a poem by James Dickey (1923-1997) over three pages titled: 'So long,' which described in strong poetic terms the starkness of the Moon and the great adventurers who had dared to go there.

Life magazine had a special position among the US weeklies, because it held an exclusive contract with the NASA astronauts providing the magazine privileged access to their personal lives in exchange for a financial remuneration that made it possible for

these intrepid space explorers to buy life insurances - surprisingly, to me, their NASA salaries and benefits did not include this. In their January 10 issue *Life* magazine could not yet include much of such private information, but it did so in their subsequent January 17 issue (Borman, Lovell, Anders 1969). This privileged access of *Life* magazine to the astronauts' private lives may explain why *Look* magazine in cooperation with the *New York Times* went all out in producing their 72 page issue just mentioned, in doing so seeking to compete as effectively as possible for the attention and money of the American public. At that time, an issue of *Life* magazine cost $ 0.40, while the *Look* special was sold for $ 1.25.

Newsweek's issue of January 13, 1969 ($ 0.50) also featured a series of Apollo 8 color photos. It opened on page 17 with a partial color photo of Earth with a large blazing Saturn V rocket racing out of the atmosphere into the black sky. In reality, it never happened that way, because the Saturn V rocket did not go any higher than 40 miles before shedding its first stage – by then its fuel had been depleted. The next two pages featured a whole Earth photo with the text: 'Against the backdrop of a deep black sky, the earth shows itself to Apollo 8.' Over the next two pages, the Earthrise photo in color was featured with the text: 'The astronauts looked up from the dead sandy-gray Moon passing 70 miles below them and see the earth 240,000 miles away–a brilliant agate floating in the blackest ink. The oceans of earth are vibrantly blue; continents are brown, brushed with pink beneath swirling white clouds.' And on their last page of the series of color photos, it featured another Earthrise picture, this time photo AS08-14-2392 presumably made by Frank Borman during their seventh lunar orbit.

The January 13 issue of *Newsweek* did not show anything like that on its cover. But it had already done so one week earlier on its January 6 issue, prominently featuring the Moon (with a spacecraft added orbiting it), Earth (as seen on color television), and the astronauts with the caption 'Apollo Triumph.' That January 6 issue had just missed Earthrise and the other Apollo color photos. But it did contain more TV Earth pictures, while emotions and reflections were not lacking either.

In keeping with this trend, the January 10, 1969 issue of the rather serious *Time* magazine ($ 0.50) –not known for its strong emotional or poetic expressions–, started its 'lunar album' in color (six pages for the US edition, and only four in the Atlantic edition that I saw) with the Earthrise photo sporting the caption: 'The Awesome Views from Apollo 8.' The text below the photo described it as: 'the first "earthrise" that any man has ever seen.' This may have been the first time that the word 'earthrise' was used in print for characterizing that particular photo.

Yet this issue did not contain any further emotions or reflections, while it did not put anything related to Apollo 8 on its front cover either. But that was probably related to the fact that only one week earlier, *Time* magazine had shown the three astronauts very prominently on its January 3 cover, nominated by them as 'Men of the Year' (1968). That January 3 issue did contain more emotions and reflections, for instance by stating in its *Time Essay*: 'Nothing comparable has happened in man's history, except possibly the great ocean voyages that led to the discovery of the New World –and to the transformation of Western Man' (1969, p.17). But none of that was accompanied by photos of the Earth at a distance, which made it very difficult for me to assess such a statement in the Netherlands because I had not yet seen such images. This situation offers another warning that one should always try to understand cultural expressions first of all from within their 'own' social context, while outside of such a context they can lead to very different understandings.

Time magazine's rather concise caption: 'The Awesome Views from Apollo 8' on top of the Earthrise

photo was the emotion that hit me when we received that copy in the Netherlands, thanks to the fact that my parents were subscribing to *Time* magazine. I had also read the preceding issue, as witnessed by the clippings from that issue in my Apollo scrap book. But it had not impacted me that much, probably because of the lack of whole Earth photos. In retrospect, fifty years later, it may have then have hit me especially hard because I had virtually entirely missed the earlier emotional waves that had taken place in the United States, while I had only seen the initial very blurry TV images of Earth. But I did not know any of that back in 1969, and began to realize this only in the summer of 2018. But even though I realize all of this now, I still experience *Time*'s Earthrise picture as a most powerful image.

Within the United States, the publication of Earthrise in color in all these glossy magazines –while more likely than not it was also shown extensively on color television– led to another considerable, and very varied, wave of emotions and comments. It was suddenly seen by many as Apollo 8's major accomplishment, even though this mission had been planned as the first exploration into lunar orbit for a later landing on the Moon –which was and remained the main goal of the Apollo project, but had not yet been achieved.

As an example of that new trend may serve the fact that on January 9, 1969, the three astronauts presented a large framed photo of Earthrise to the outgoing president Lyndon B. Johnson during an official reception at the White House as a symbol of summarizing their flight. Many more examples of the sudden prominence of Earthrise exist, many of which were mentioned by Robert Poole. Furthermore, as the British historian argued, Archibald MacLeish's poetic words in the *New York Times* were soon conflated with the Earthrise picture, not least because Frank Borman did so himself during his presentation before a joint session of Congress on January 9, as mentioned earlier. Many others started interpreting Earthrise in terms of the astronauts' reading of Genesis in lunar orbit.

As part of all these developments, within the United States many of its citizens began ascribing an increasing variety of meanings to the Earthrise picture, ranging from science, environmentalism, world citizenship, to religion and spiritualism. This trend has continued up until today. In doing so, it has produced a remarkably rich harvest of cultural expressions, many of which are mentioned by Robert Poole in his book *Earthrise*. If the reader wants any further quick confirmation of this trend, a search for 'Earthrise' on www.ebay.com and www.amazon.com is recommended. My recent research on www.ebay.com yielded, for instance, no fewer than five different Earthrise LP music albums produced in the 1970s. One of them, by US singer Chris Ruhe, known as compadre Chris in Peru and Chile because of the radio shows that he had produced there, featured the song 'Anthem of the world citizen,' now available on YouTube (Ruhe 1969).

In sum, all these whole Earth images, including the subsequent ones from later Apollo flights, had a huge impact among many people in the United States, probably first of all among the higher educated who read newspapers such as the *New York Times* and weeklies such as *Time*, *Life*, and *Newsweek*. Yet by contrast, it seems as if the sizable portion of the US population that did not read such publications was far less affected by these fresh world views. In consequence, this cultural divide within the United States would further have deepened, a situation which has continued to exist until today, or so I suspect.

What happened in the Netherlands?

Much like the reactions to Earthrise and similar pictures in the United States were interpreted within the framework of their national and regional cultures, the same can be said for European reactions to these photos.

Let us begin with the Netherlands. As far as I have been able to ascertain, in Dutch publications from that period, mostly newspapers, there was a great deal of prominent reporting on the flight of Apollo 8. Yet none of the US emotional reactions could be witnessed. By contrast, the Dutch glossy magazines paid little attention to this flight, if at all. The major Dutch weekly *Elseviers Weekblad*, modeled on *Time* magazine, did not show any Apollo 8 Earth photos at all in its January 1969 issues.

However, in their January 4 issue they did feature a commentary on page 44, written by their 'scientific collaborator,' saying that 'now we have seen the Earth in its true form, like a tiny, glittering, fragile Christmas ornament against a pitch black background – this has forced the reality upon us human beings of our limited existence in a Cosmos, in many little corners of which, perhaps at this moment, thousands of spacecraft with thousands of living beings who think differently are visiting thousands of sister planets.' (1969, p.44, my translation). Such a comment may have been inspired by the Dutch tradition of long-distance ocean voyages. Yet *Elseviers Weekblad* did feature Earthrise on the cover of their February 8, 1969 issue together with a lunar module spacecraft prominently pasted in front of it, headlined: 'The First Landing.' Again there were no cognitive or emotional reflections about that we might be looking at ourselves and what that might mean. All the further comments were either technical or referred to the courageous behavior of the astronauts.

In fact, I have not been able to trace any Dutch magazines that featured color pictures of Earthrise or other similar Apollo Earth and Moon photos in January of 1969. Perhaps I have missed them, but certainly I did not see them at that time, or I would have put such pictures in my Apollo scrap book. My research in the Royal Library in The Hague in March of 2019 has shown that no Apollo 8 photos featured in the January issues of the Dutch weeklies *De Groene Amsterdammer*, *Haagsche Post*, *Panorama*, and *Nieuwe Revu*. The latter two weeklies were rather middle of the road socialite magazines that most Dutch intellectuals would avoid.

However, in the January 25, 1969 issue of *Panorama* there was an article titled 'How good is our Earth?' – apparently a reference to Frank Borman's closing-off words 'all of you on the good Earth' at the end of their second 'live' TV transmission in lunar orbit. This article provided an overview of all states on Earth, alphabetically arranged, specified according to the following criteria: population size, political system, free press, annual income per capita, percentage of analphabetism, war or peace, and life expectancy. On both page 18 and page 20 these data were accompanied by an Earthrise photo on the left without further commentary, but with the article's title placed above it, while the question mark was inserted into its black sky. So clearly, the editorial staff of *Panorama* staff knew about this photo and came up with their own interpretation of it in combination with Frank Borman's eloquent words.

A little later in 1969, however, both *Panorama* and the *Nieuwe Revu* did pay attention in color to Earthrise or similar photos. The February 1, 1969 issue of *Panorama* surprisingly featured an Apollo 8 article with the headline 'Eye in Eye with the Moon' (p.33-37). It showed some of the familiar NASA Apollo 8 photos including an Earthrise in color over two pages, with the description: 'The vision of Jules Verne is now an historical reality. From their spacecraft the astronauts are looking down onto the terrifying landscape of the moon, while in the immeasurable distance the half-obscured Earth is speeding along in its orbit. The fairytale of the Man in the Moon has now forever been cast aside.' Surely emotions of some sort, but no reflections al all about a possibly changed perception of our position in space and its possible consequences. Why this article was published comparatively late is unknown to me. The 'vision of Jules Verne' referred to the novel written by this world famous French

author titled *De la Terre à la Lune* (1872), in which he had described a manned circumlunar flight that was remarkably similar to the flight of Apollo 8 about one century later. I knew that at the time, because my father had read that book to me in 1965 in a Dutch translation.

Furthermore, in their July 17, 1969 issue the *Nieuwe Revu* published a twenty-page special section in color 'Nieuwe Revu Exclusive: Day of the Moon' about the flight of Apollo 10, which took place between May 18 and 26, 1969, seen in the light of the upcoming Apollo 11 moon landing. The Apollo 10 flight to the Moon, the first after Apollo 8, was the final rehearsal for the Apollo 11 lunar landing. Like Apollo 8, the Apollo 10 astronauts went into lunar orbit, but then partially descended to the surface, however without actually landing on it. This special section of the *Nieuwe Revu* was published only one day after the Apollo 11 flight had been launched, so only three days before Neil Armstrong and Edwin 'Buzz' Aldrin were scheduled to land on the Moon. It contained a full-page whole Earth photo as well as an even larger earthrise in color shot by the Apollo 10 crew, without, however, commenting in any way that we were looking at ourselves.

In fact, after the flight of Apollo 8 all the Apollo crews that went to the Moon tried to take such earthrise and whole Earth pictures. The Apollo 10 astronauts, for instance, shot no fewer than 40 earthrises and 120 Earth photos out of a total of 413 pictures, about 26 percent of all photos, which provides an indication of the importance the astronauts attached to taking pictures of such unscheduled 'targets of opportunity.' By contrast, Apollo 8's images of this type represented only 17 percent of all photos taken. Most notably the full Earth picture taken by Apollo 17 has become very influential as well. To the best of my knowledge, a comprehensive study of all these Apollo photos is still lacking.

Figure 5: The Apollo 17 Full Earth known as the 'Blue Marble.' Source: NASA, Flickr.com, Project Apollo Archive.
https://www.flickr.com/photos/projectapolloarchive/sets/72157659085112111/with/21517731239/

Let's return to what happened in the Netherlands in 1969. A color photo of the Apollo 8 Earthrise and an Earth photo did feature prominently in Titulaer's book *Operatie Maan* published later in 1969, but again without saying anything about that we were looking at ourselves (1969, in-between p.150-151). Like virtually all other Dutch reporting concerning the Apollo 8 flight, it was first of all technical in nature. Yet a number of Dutch natural scientists and some activists would have felt such an impact. Earthrise was featured, for instance, very prominently on the 1969 cover of the *Winkler Prins Gezinsatlas* (Family Atlas). And in the 1970s, the Dutch government used images of the Earth as a symbol for the coming exhaustion of resources, as a planet in need of protection. But none of those campaigns ever worked well.

Again, finding an explanation for this absence of such considerations is difficult. But my suspicions go along the same lines as those mentioned earlier.

Whatever the causes may have been, these fresh Earth perceptions did not become part of wider Dutch popular culture at that time, which explains why I felt so lonely then, and why it is still difficult in the Netherlands today to explain all of this to the lay public including virtually all scholars from the humanities and social sciences, while within the United States this is often not a problem at all. To the contrary, such conversations with elderly US colleagues often offer an almost instantaneous and pleasant recognition of shared experiences.

As a result, in the Netherlands the Earthrise photo became mostly associated with science and environmental activism but rarely with religion or spiritualism, if at all. Also in other West European countries such American emotional fresh perceptions of our home planet were mostly lacking, as we will see below. All of this led to remarkable differences of perceptions about these things between the Dutch and probably also other West Europeans on the one hand, and their American counterparts on the other hand.

What happened elsewhere in Europe?

In Britain, the reactions to Earthrise that I have been able to trace can be summarized as a fresh, 'humbling' perspective on Earth and its position within the universe. Compared to all the other European reporting known to me, the British comments were perhaps the closest to the more emotional US perspectives mentioned earlier in terms of that we were suddenly looking at a fresh perspective of Earth and its inhabitants. This can perhaps be seen as part of their 'special relationship with the USA, including sharing the same language. Yet the British views should also be seen within the context of the United Kingdom losing its status as a world colonial power at that time while trying to preserve as much of it as possible by creating the British Commonwealth.

I have not yet encountered any British statements or emotions such as that we were looking at ourselves from a distance, and that we were now all brothers. Furthermore, while discussing the contributions of people to Apollo 8's success, much like most of the American reporting the British media attention was mostly focused on individuals and their achievements and contributions, even though astronauts such as Frank Borman kept emphasizing the importance of the joint, collaborative efforts of all the people involved in the Apollo project.

On December 31, 1968, the prominent newspaper *The Times* commented on the color picture of Earthrise that had been shown the night before by BBC television as 'a humbling reminder of the world's insignificance,' while on January 6, 1969, the newspaper produced 'four pages of color photographs from Apollo, led by a full page Earthrise' (Poole 2008, p.31-32).

The *Evening Post* newspaper published a January 6, 1969 Apollo 8 special issue with the headline: 'Moonshot: a 16 - page souvenir Evening Post reading.' It featured on its front page a large color picture of the launch, while on its backside a large color photo of Earth was shown shot by the astronauts soon after leaving Earth orbit. This picture was described as: 'EARTH –in all it's glory–from Apollo 8.' For additional clarity, a traditional globe was depicted showing the portion of Earth that was visible on the photo. Inside, it featured a similarly large photo of our planet, this time in black and white, with the headline: 'In focus–a space man's profile of Mother Earth, one of the dramatic pictures taken by the astronauts.' No Earthrise, however, and none of the other American emotions and perceptions either, but instead a great deal of personal info presented in a sensationalist style. Their historical depiction of the Sputnik 1 flight was wildly off the mark, however, while their historical overview of important explorers placed the astronauts right after Columbus, (Sir Francis) Drake, and (James) Cook.

The January 10, 1969, weekly issue in color of the *Daily Telegraph* newspaper featured on its cover an enlarged picture of the Langrenus lunar crater with terraced walls (in false color), named after Michael van Langren (1598 –1675), Dutch lunar cartographer and royal cosmographer in Spanish service. This spectacular photo was often reproduced at that time. The caption below stated: 'In July the first man should set foot on a place close to this crater on the face of the Moon [which was not correct]. In this first full report in colour we commemorate the epic six-day flight of America's Apollo 8.' Furthermore, as part of the article 'Aiming for the Moon' a full two-page color photo of a very much enlarged Earthrise (again in false color) was shown with the description: 'First sight of earth from another planet, huge and marbled in the jet cold infinity of space. In the foreground the burnt-out desert of the Moon's surface is 80 miles wide and the horizon is 485 miles from Apollo 8's camera lens. Earth is 240,000 miles and two days away. The photograph was taken by astronaut Anders with hand-held Hasselblad..'

There may have been more of such issues in color in the United Kingdom. But whatever else may have been reported in Britain at that time, these examples clearly show that at least some media were impressed by the change in perspective, yet without stating any of the emotional or social effects as interpreted by Americans on the other side of the big pond.

In Western Germany, the media reporting in the weeklies that I have found can be described as technical and/or sensational, depending on the news outlet, with an emphasis on technical cooperation while confronting the difficulties of spaceflight, but again without any of the emotions or changing perceptions of Earth and of humanity's place within it as shown in the US media.

In their January 6, 1969 issue, the prominent and rather serious weekly *Der Spiegel* –modeled on *Time* magazine– provided extensive and rather detached reporting while seeking to portray various points of views within the United States. In their main article 'Ein Salto Mortale vor den Augen der Welt' [A salto mortale in front of the eyes of the world], there was relatively little attention to Earthrise, however, which was shown on less than a quarter page. An Apollo 8 photo of Earth at a distance was allotted another quarter page, while half a page was devoted to a photo of the partial Earth as photographed soon after translunar injection. None of these photos were accompanied by comments or emotions in the sense of that we were looking at ourselves.

Yet *Der Spiegel* did devote two pages to an interview with medical doctor Charles Berry from Mission Control about space sickness. Instead, the magazine first of all focused its attention on the technical aspects of spaceflight including its difficulties. On its cover Apollo 8 was not mentioned. Instead it featured rather graphic images of how Moscow would be viewing the Western German leaders with the caption: 'Nazis, Räuber, Revanchisten: Moskaus Bild der Deutschen' [Nazis, Robbers, and Revanchists: Moscow's Image of the Germans]. Apparently, such concerns were deemed more important than a possibly changed view of Earth and its inhabitants.

The socialite and more sensationalist weekly *Bunte Illustrierte* featured on its January 15, 1969 cover a large photo of the then Dutch crown princess Beatrix (married to German nobleman Claus von Amsberg) showing her recently baptized son Johan Friso. Yet a large text box on the left announced: 'Der erregende Farbbericht – Die Sensation des Jahrhunderts: Der Flug zum Mond' [The exciting story in color: The sensation of the century: The flight to the Moon]. Inside, the article opened with a large photo of Wernher von Braun, chief designer of the Saturn V rocket, joined by Apollo program director San Phillips and by another German, Kurt Debus, then head of the Kennedy Space Center. Below, another photo showed

the Apollo astronauts seriously preparing themselves for navigating through space as part of a larger team. In short, an emphasis on human technical cooperation with special attention to German contributions.

On the opposite page a full Earth photograph was shown, described as: 'the good mother Earth as seen from 35,000 km distance.' This was, however, not an Apollo 8 picture but the first whole Earth color photo ever made, in 1967, by the unmanned US ATS-III geostationary satellite. While most of the photos and the article were about the astronauts and their experiences, on p.35 some sort of an Earthrise photo was shown in black and white accompanied by the statement: 'Das hat noch nie ein Mensch gesehen!' [No man has ever seen that!]. However, this was not the famous Earthrise but a combination photo in black and white of a graphic lunar surface picture shot by Apollo 8 and the Earth as seen on Earthrise.

In France, the leading French glossy magazine *Paris Match*, was (and still is) a socialite magazine similar to *Life* and *Look* magazine, yet aiming at a French 'refined' cultural level. On the cover of its Jan. 11, 1969 issue it featured the earthrise photo framed by the spacecraft window with the caption: 'Lever de Terre sur la Lune. En couleurs, les photos les plus bouleversantes jamais faites' [Earth rising above the Moon. In color: the most staggering photos ever made]. This issue further contained the article 'En couleur de la Terre a la Lune: Les photos rapportées par les cosmonautes.' This article was clearly added at the latest possible moment, because it appears right in the middle of the issue, in fact stapled in the middle of an article about the introduction of plastics as a construction material for small boats. Several Apollo 8 moon shots as well as whole Earth photos were shown, while Earthrise was featured over two full pages, describing it as 'Pour les astronautes en orbite lunaire, la Terre se leve avec une majesté bouleversante [For the astronauts in lunar orbit, Earth rises with a staggering majesty].

Their January 18 issue provided further detailed coverage of the mission, the astronauts, and their personal relationships, including a photo of a broadly smiling Frank Borman during his formal presentation at the joint session of Congress on January 9, with the caption (p.23): 'C'est le jour de gloire de Borman, Lovell et Anders.' Furthermore, on four densely printed pages a summary of the communication between the astronauts and Mission Control was provided, while this issue also featured a photo of astronaut Lovell presenting the Earthrise picture to the outgoing President Johnson, while quipping: 'Une photo de votre ranch' (p.24). In none of the US news media that I have seen was such a joke mentioned. In sum, considerable reporting, with considerable emotions, yet no mention of any of the reflections that had abounded in the US news media. Interestingly, other than implicitly in its headline, the *Paris Match* did not mention Jules Verne's novel.

In Spain, the glossy weekly *Blanco y Negro* had been established as an illustrated magazine already in 1891. In 1969 it was an independent publication similar to *Life* magazine or the *Paris Match*. On its January 11, 1969 cover it featured a full (green) moon shot by Apollo 8 with the caption: "La luna y la tierra en color.'. Inside, its main article 'De la tierra a la luna: El <<Apolo 8>> en la senda que soñara Jules Verne ' [From the Earth to the Moon: Apollo 8 on the track dreamt by Jules Verne] described this flight within the context of the great Frenchman's imaginary circumlunar flight a century earlier. Several photos of the moon and of Earth are shown, all in false colors, while pointing out the visible geographic features of the Hispanic world, most notably Andean South America and the Spanish Sahara.

Furthermore, both earthrise photos mentioned earlier were shown, with Earthrise in color over a whole page with the headline: La tierra aguarda a los bravos astronautas' [The Earth awaits the brave astronauts] (1969, p.26). Earthrise was further described as: 'el

horizonte de nuestro satéllite da a la imagen un marco de espectacularidad jamás soñado' [the horizon of our satellite provides a spectacular frame to the image never dreamt of]. This was a clear emotional recognition of a change in perspective. Yet there were no further emotions or reflections expressed about that we were looking at ourselves other than from a geographical perspective and what consequences that might entail. In two subsequent articles the personal adventures of the astronauts were recounted in 'La gran hazaña ha sido cumplido' [The great feat has been accomplished] as well as the history of spaceflight in 'La conquista del espacio' [The conquest of space].

In Italy, *La Domenica del Corriere* (the weekly magazine edition in color produced by the Milanese *Corriere della Sera* newspaper) published an Apollo 8 article in its January 14, 1969 issue with the headline 'E dopo la luna?' [And next the Moon?] (Goy 1969, 17-23). The article opened with Earthrise in color over a full page, yet with the lunar horizon vertically, and prominently, on the left and Earth on the lower right (the only time I have seen Earthrise portrayed like that – artistic license Italian style?). It also showed another Apollo 8 full Earth photo, both accompanied with rather factual descriptions. On its cover titled: 'Interroghiamo Il 1969,' however, spaceflight and the Apollo 8 astronauts featured only marginally. Also in this case there were no emotions or reflections American-style whatsoever.

In Central Europe things may have gone differently. Hungary, then under severe repression by the USSR, produced an Apollo 8 post stamp in 1969, which was perhaps a way of protesting Soviet occupation. In Yugoslavia, by contrast, which then tried to maintain a political balance between East and West as a 'non-aligned' country, the glossy magazine in Serbian *Politika* produced a January 12, 1969 special issue about the Apollo 8 flight that featured on its front page a color photo of the full Earth, no further information supplied. However, much like what happened in the *Bunte Illustrierte*, this was the whole Earth color photo taken in 1967 by the unmanned US ATS-III geostationary satellite. This image was accompanied by the famous quote from the great Russian space pioneer Konstantin Tsiolkovsky (1857-1935): 'Earth is the cradle of humanity, but one cannot remain in the cradle forever.'

Inside, a similar balance between East and West was maintained. On the one hand, the magazine featured a full two-page Earthrise photo accompanied by other Apollo pictures and text while describing the spaceflight and the astronauts' heroism without any further Earth-view related emotions or reflections. On the other hand, it also paid extensive attention to the achievements of Soviet spaceflight, while it placed both programs within a larger historical context. In doing so, the magazine kept its Yugoslavian readership remarkably well informed about what was happening in the world of spaceflight. The issue also featured a cartoon of the three astronauts standing in line in their space suits, all of them with crowns on top of their helmets. The first in line, Borman, is holding the moon in his hands as if he is offering it as a gift, without further explanation. Were the astronauts portrayed here as the Magi, the Kings from the East (in the astronauts' case: the 'Kings from the West'), bringing a gift to the newly born Jesus, an end to the Cold War, perhaps, starting a period of peace and prosperity? We may never know.

Whatever else may have occurred in the rest of the whole wide world, which also then represented by far the largest portion of humanity (in 1969 about 3.5 billion people, in 2019 more than 7 billion), is virtually unknown to me. My preliminary investigation has yielded that a few African countries produced commemorative post stamps, while a glossy magazine from Lebanon in Arabic published by the end of 1968 paid attention to the flight of Apollo 8 including an image of Earth from space as seen on television. But this is all extremely flimsy and fragmentary evidence. There must have been much more reporting. As a result, there is a great deal of room for further research,

and no room al all yet for any preliminary conclusions about what happened in this respect in the world at large.

All of these observations are, of course, no more than first impressions. It is unknown to me what further happened in Europe, most notably how all of this was received. Much more research is needed to provide a more substantiated view. Yet we should also keep in mind that all historical research is built on fragmentary sources, mine not excepted. But at least we now know that there was such reporting, and that none of that contained any of the emotional changes in perception that were expressed in American news media.

Yet also in Europe there was clearly such an emotional and cognitive impact among scientists and business leaders, which led to the establishment of the 'Club of Rome' in 1970. In fact, an earlier meeting on discussing global interconnected problems had already taken place in 1968, today described on their website as 'a monumental flop' (Club of Rome 2018). Yet in 1969 their meetings suddenly became much more focused. That was probably not a coincidence. However, in none of their writings have I found any mention of a change of Earth-related views. But that may not have been the right European thing to say then as now. One wonders how many of them may have been influenced by the US media reporting of the flight of Apollo 8.

Whatever the case may have been, already during the first official meeting in 1970 the Club of Rome commissioned the Massachusetts Institute of Technology to perform a computer study financed by the Volkswagen Foundation into what was called the 'present and future predicament of man,' none other than the planetary worries that had been stimulated by watching Earthrise. This US-European cooperation resulted in the famous 'Limits to Growth' report, which generated an extraordinarily amount of attention and discussion worldwide. Interestingly, the US version showed an Earth image on its cover surrounded by black space, while on the cover of the Dutch version Earth was totally lacking (Meadows 1972).

More recently Dutch public culture appears to be catching up with these developments, perhaps also stimulated by Dutch ESA astronaut André Kuipers' spaceflight of 2012 mentioned earlier. A few of such examples were mentioned in my public presentations in English about this subject in Salas and at Astron, Dwingeloo, the Netherlands, the latter now available on Vimeo (Spier 2018a&b). Yet in the United States today, such cultural expressions would appear 'old hat,' or so it seems to me. In 2018 several African countries, including Congo, Djibouti, Guinea, Guinea-Bissau, Mali, Mozambique, Niger, Togo, Sao Tomé and Príncipe, Sierra Leone as well as the islands St. Thomas and the Maldives all issued Apollo 8 commemoration stamps, and perhaps other countries as well. Are they also trying to catch up, one wonders? To my knowledge, none of such stamps have ever been issued in Western Europe, not in 1969, and not in 2018 either. And the US Postal Service has not yet issued such a stamp recently either.

Yet today, many adolescents from anywhere in the world that I have been in contact with through teaching and exchanges of various kinds appear to be sensitive to these now fifty-year old images. But that is only a very small and relatively well-educated fraction of the world population.

Conclusions

Although there is ample room for further research, it seems as if already during, and right after, the flight of Apollo 8 a considerable cultural divide developed between the United States and Europe, and within these continents as well, in terms of perceptions and emotions concerning photos of Earth at a distance. Among the better educated in the United States, a wide range of such perceptions emerged, varying

from religiously and spiritually inspired to changing academic views of Earth and environmental concerns. Yet a considerable portion of US citizens may completely have missed or ignored such views. Today, some impressions of this range of cultural responses within the United States can easily be found by typing in 'Earthrise' on a search engine or, for instance, on Amazon.com or Ebay.com.

Within Europe, by contrast, the cultural reactions were far more limited and less emotional, mostly limited to science and environmentalism. Furthermore, the percentage of people in Europe that were not influenced by these views, or only to a limited extent, may have been considerably larger than in the United States.

The first US academic responses, most notably cosmic evolution and similar approaches including serious academic big history, in principle combine well with the European academic traditions. Yet there has been a clear lack of such European academic responses so far to cosmic evolution and especially big history in Britain, France, and former Western Germany, where Earthrise and similar photos were displayed in the news media right after the flight of Apollo 8. By contrast, there have positive responses to academic big history in the Netherlands, where that was apparently far less the case. Today, in fact, the Netherlands has by far the highest big history density per capita of any country in the world. This suggests that the situation concerning the acceptation of big history is more complicated. As I argued elsewhere, the earlier academic cosmographic traditions of both Spain and the Netherlands may have provided such fertile ground for big history in both countries (Spier 2017).

In Europe, Earthrise and academic big history combine well, while in the United States a great many cosmic perspectives, of which academic big history is only one, have been combined with Earthrise and similar photos. Within the United States, religiously and spiritually inspired people, academics, and environmental and social activists have all claimed to derive their inspiration from Earthrise and similar pictures, while in Europe this has happened to a far lesser extent. This situation may have been contributing to recent transatlantic academic differences, including the remarkable variety of US citizens that have tried to promote their equally varied views of big history within the International Big History Association.

Yet even though the impact of these images has been very different depending on the social situations, there can be no doubt that Earthrise, often described as one of the most influential photos of the twentieth century, has had a huge, lasting, and very varied impact. As Richard Underwood, in charge of the Apollo photography, formulated it in 1997: 'It all ended up that nineteen cents worth of film became the most important part of a multi-billion dollar project. I think that is rather neat.'

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Appendix 1:
Inventory of Earthrise and whole Earth photos taken by the Apollo 8 crew

All the NASA Apollo 8 photo scans can be found at the *Project Apollo Archive* on *Flickr*, where NASA put them: https://www.flickr.com/photos/projectapollo-loarchive/albums.The Apollo 8 voice transcripts can be found at the *Apollo 8 Flight Journal*: https://history.nasa.gov/afj/ap08fj/index.html. The NASA *Analysis of Apollo 8 photography and visual observations* is available at: https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19700005062.pdf.

The (in total) 862 photos taken by the Apollo 8 astronauts include 22 earthrises and 125 whole Earth photos. They jointly represent 17 percent of all the photos. None of those pictures were part of the official photo plan, even though most notably Richard Underwood had urged the astronauts to take such photos.

The Apollo Hasselblad photo magazines were specially constructed for the Apollo project to contain a 70 mm film that provided room for as many as 200 images.

1. Magazine 14/B

Photo Magazine 14/B contains a total of 152 color photos. The first two photos are the two famous Earthrise pictures AS08-14-2383 and AS08-14-2384, both taken with the Sonnar 250 mm telephoto lens during the fourth lunar orbit. The first Earthrise is the one most often reproduced. Right after these photos there are more four earthrises, all taken with the regular Planar 80 mm lens. These are numbered AS08-14-2385 to AS08-14-2388. These photos must have been taken during a later orbit, because on all of them the Earth is closer to the lunar surface than on Earthrise. These earthrises are followed by a set of eight similar pictures numbered AS08-14-2389 to AS08-14-2396, which must have been shot during a

subsequent orbit, for the same reason. Much farther down in the same magazine there is another series of eight earthrises numbered AS08-14-2510 to AS08-14-2517.

At what times were these other earthrises shot, and by whom? Below are my answers, based on scrutinizing those pictures as well as the astronauts' conversations.

Earthrises AS08-14-2384 to AS08-14-2387

During the fifth revolution, two hours later, according to the onboard voice recorder transcription at 77 hours, 36 minutes, 56 seconds MET, so almost exactly one lunar orbit after Earthrise had been shot, Bill Anders said: 'Okay, f – f:11. 250th' (This meant: lens aperture 11, shutter speed 1/250 second). This happened almost exactly at the time when the Earth came into view again, as shown on the four photos AS08-14-2384 to AS08-14-2387. Compared to Earthrise, the rotation of Earth and its cloud pattern as seen on these earthrises corresponds to a time difference of about two hours. It therefore seems likely that Bill Anders took those photographs during the fifth lunar orbit at the time mentioned.

Earthrises AS08-14-2388 to AS08-14-2396

During their seventh lunar orbit at 81 hours 21 minutes 45 seconds MET Bill Anders suggested:

> 'You've got color film. Why don't you get a picture of the earth as it comes up the next time?' About twenty-one minutes later, at 81:43:06 MET –exactly at the time when the Earth started rising above the lunar surface– Borman said: 'Oh, brother! Look at that!' Lovell: 'What was it?' Borman: 'Guess.' Lovell: 'Tsiolkovsky?' [a prominent crater]. Borman: 'No. It's the earth coming up.' Lovell: 'Oh.' Anders: 'Augh! Quit rocking the boat!'

These shots would have been the photos AS08-14-2388 to AS08-14-2396, this time presumably taken by Frank Borman. The Earth's further rotation seen on those pictures corresponds with about four hours' difference compared to the earlier four earthrises.

Earthrises AS08-14-2510 to AS08-14-2517

During their ninth orbit, starting at 85 hours 40 minutes 11 seconds MET, when again the Earth started appearing, the following conversation was recorded:

> Borman: 'Here it comes!' Anders: 'Okay.' Borman: 'Oh boy!' Lovell: 'Get a good shot of her?' Borman, 'Yes, see it?' Lovell: 'Well, keep the camera there, keep the camera.' Anders: 'Here it comes. Here it comes. But you're not on yet.' Anders: 'You got it – you got to do something.' Anders: 'Pitch up or yaw –.' Borman: 'Yaw right?' Anders: 'Yaw right.' Lovell: 'Oh Jesus.' Borman, 'Oh, I get it off this camera – window over here.' Anders: 'Okay.'

At that time, the astronauts were getting the TV camera ready for their second 'live' transmission from lunar orbit. But while doing so, they apparently also shot eight more Earthrises, AS08-14-2510 to AS08-14-2517. These images correspond well with Earth's further rotation of about 4 hours compared to the previous series. Again it may have been Frank Borman who took those photos.

Whole Earth photos

Fairly soon after the broadcast from lunar orbit nine had ended, or so it seems, the astronauts shot no fewer than seventeen pictures of Earth, AS08-14-2518 to AS08-14-2534. All of these pictures show a further rotation of Earth corresponding with a time period of less than two hours after the previous series of earthrises, now with mostly South America in view (where it stayed light longer than in North America because it was in the middle of the summer there).

However, no traces of taking such pictures can be found in the voice recordings.

2. Magazine 12/D

This magazine contains 171 black-and-white photos. Only one of them is an earthrise, AS08-12-2188. It must have been made during the fifth lunar orbit, around the same time as the four earthrises in color mentioned above, because its cloud pattern looks very similar to those photos. It is unclear who took it.

3. Magazine 13/E

This magazine contains 168 photos in black-and-white, including one earthrise photo: AS08-13-2329. On this photo the Earth is just coming up from the lunar horizon. Because its cloud pattern is virtually the same as on the famous two Earthrise photos, it must have been shot right before those pictures, presumably by Frank Borman, according to Robert Zimmerman (1998, p.173). At the end of this photo magazine there are fourteen whole Earth pictures, all shot with the 250 mm telephoto lens: AS08-13-2369 to AS08-13-2382. It is unknown to me who took them.

4. Magazine 15/F

This magazine contains 46 photos in color, all whole Earth photos taken from considerable distance, some of them shot with the 250 mm telephoto lens, but most with the 80 mm regular lens. Again it is unknown to me who took them.

5. Magazine 16/A

This magazine contains a total of 75 photos in color, 62 of them whole Earth photos, some from close by right after trans lunar injection. Also in this case it is unknown to me who took them.

Further comments

There is a discrepancy between the Magazine 14/B photos available on Flickr and the photos of that same Magazine shown in the NASA Analysis of Apollo 8 photography and visual observations (NASA 1969, p.205). The photos AS08-14-2481 and AS08-14-2482 in the online Magazine are shots of the moon, while in the NASA document they are photos of the Earth taken with the telephoto lens. Yet in the inventory of that the same document on p.142, these photos are described much like those that appear in the online Magazine. All the other photos and numbers in both versions of Magazine 14/B correspond well with each other.

The Analysis of Apollo 8 photography and visual observations prominently displayed Earthrise on its cover. Yet it contains no comments whatsoever about it, or about other earthrises and whole Earth photos, even though all three astronauts as well as Richard Underwood contributed to this document. All the attention was focused on the quality of the pictures as well as on what could be learned from that regarding future moon flights. Although this is understandable, given their mission, this totally ignores the huge social impact that those photos were having.

In the inventory of that document, both Earthrise photos at the beginning of Magazine 14/B are mentioned as: 'Earth above hor, good 250-mm' (NASA 1969, p.138). The other earthrises in Magazine 14/B are not mentioned at all, while only the whole Earth photos at the end of the Magazine are mentioned as 'Earth'. Their reproductions in the document are of poor quality, which makes it hard to recognize them. Their quality may have been better in the original document.