## 1AC---Peninsula

### 1AC---Plan

#### Plan - Private entities should not appropriate lunar heritage sites

Harrington 19, Andrea J. "Preserving Humanity's Heritage in Space: Fifty Years after Apollo 11 and beyond." J. Air L. & Com. 84 (2019): 299. (Associate Professor and Director of the Schriever Space Scholars at USAF Air Command and Staff College)//Elmer

The issue of humanity’s cultural heritage in space has arisen as one of many unanswered questions in space law, with no international agreements specifically addressing it. With the beginning of the space age fifty-six years ago and a series of remarkable achievements in space exploration behind us, it is necessary to determine what should be done regarding the “artifacts” of this exploration. NASA has promulgated their recommendations for spacefaring entities with the goal of protecting the lunar artifacts left behind by the Apollo missions.8 These recommendations establish “keep-out zones” of up to a four kilometer diameter with the aim of protecting the artifacts, particularly from dangerous, fastmoving particles that arise as a result of craft landings.9 Experience has shown that even artifacts that are sheltered by craters can be significantly sandblasted and pitted as a result of the moving particles.10 These recommendations, supposedly drafted in conformity with the Outer Space Treaty, however, are completely nonbinding.11 Legislation that has passed the U.S. Senate and is under consideration by the House of Representatives as of July 2019 would make these recommendations binding on U.S. entities seeking to land on the Moon.12 Accidental damage from unrelated missions, however, is only one of many threats to space artifacts. With the impending return to the Moon, it is likely that individuals and corporations will be looking to turn a profit from space heritage, without concern for the protection of such heritage. Tourists may disrupt sites with careless expeditions and landing sites may be desecrated so that the items can be sold. A Russian Lunakhod lunar rover has already been sold at auction to a private party, though it has not yet been moved from its original position on the Moon.13 While national heritage legislation can protect space artifacts from citizens of their own countries, there is currently no effective means in the present space law regime by which a country can protect its heritage from other countries.14 Both California and New Mexico have added Tranquility Base to their list of protected heritage sites.15 However, this solution, and those proposed in the bill put forth to the U.S. House of Representatives, only serve to restrict the activities of a small subset of the potential visitors to the Moon. Though the Senate bill calls for the President to initiate negotiations for a binding international agreement, there is still a long road from this bill to a potential agreement.16 A solution is needed to prevent the damage, destruction, loss, or private appropriation of our cultural heritage in space.

### 1AC---Lunar Heritage

#### The Advantage is Lunar Heritage:

#### Global Moon Rush by private actors is coming now.

Sample 19 Ian Sample 7-19-2019 “Apollo 11 site should be granted heritage status, says space agency boss” <https://www.theguardian.com/science/2019/jul/19/apollo-11-site-heritage-status-space-agency-moon> (PhD at Queens Mary College)//Elmer

But protecting lunar heritage may not be straightforward. On Earth, the United Nations Educational, Scientific and Cultural Organisation (Unesco) decides what deserves world heritage status from nominations sent by countries that claim ownership of the sites. Different rules apply in space. The UN’s outer space treaty, a keystone of space law, states that all countries are free to explore and use space, but warns it “is not subject to national appropriation by claim of sovereignty”. In other words, space is for all and owned by none. Wörner is not put off and sees no need for troublesome regulations. “My hope is that humanity is smart enough not to go back to this type of earthly protection. Just protect it. That’s enough. Just protect it and have everybody agree,” he said. A no-go zone of 50 metres around Tranquility base should do the job, he added. Martin Rees, the Cambridge cosmologist and astronomer royal, said there was a case for designating the sites so future generations and explorers were aware of their importance. “If there are any artefacts there, they shouldn’t be purloined,” he said. “Probably orbiting spacecraft will provide routine CCTV-style coverage which would prevent this from being done clandestinely.” Beyond the dust-covered hardware that stands motionless on the moon, Lord Rees suspects future activity could drive calls for broader lunar protection. The Apollo 17 astronaut and geologist Harrison Schmidt has advocated strip mining the moon for helium-3, a potential source of energy. The proposal, which Rees suggests has raised eyebrows in the community, could potentially provoke a backlash. “There might be pressure to preserve the more attractive moonscapes against such despoilation, and to try to enforce regulations as in the Antarctic,” he said. Fifty years on from Apollo 11, the moon is still a place to make statements. In January, the Chinese space agency became the first to land a probe on the far side. On Monday, India hopes to launch a robotic probe, the delayed Chandrayaan-2 lander that is bound for the unchartered lunar south pole. Far more is on the cards. Major space agencies, including ESA and Nasa, plan a “lunar gateway”, described by Wörner as a “bus stop to the moon and beyond”. His vision is for a “moon village”, but rather than a sprawl of domes, shops and a cosy pub, it is more an agreement between nations and industry to cooperate on lunar projects. The private sector is eager to be involved. Between now and 2024, at least five companies aim to launch lunar landers. In May, Nasa selected three companies to design, build and operate spacecraft that will ferry scientific experiments and technology packages to the moon. The coming flurry of activity may make protection more urgent. Michelle Hanlon, a space lawyer at the University of Mississippi, co-founded the non-profit organisation For all Moonkind to protect, preserve and memorialise human heritage on the moon. While she conceded that not all of the sites that bear evidence of human activity needed protection, she said many held invaluable scientific and archaeological data that we could not afford to lose. “These sites need to be protected from disruption if only for that reason,” she added. The protection should be far wider, and more formal, than Wörner calls for, Hanlon argues. “It is astounding to me that we wouldn’t protect the site of Luna 2, the very first object humans crashed on to another celestial body, and Luna 9, the very first object humans soft-landed on another celestial body,” she said. The Soviet Luna programme sent robotic craft to the moon between 1959 and 1976. “The director general has a much more optimistic view of human nature than I do,” Hanlon said. “I completely agree that the entities and nations headed back to the moon in the near future will take a commonsense approach and give due regard to the sites and artefacts. However, that is the near future. We have to be prepared for the company or nation that doesn’t care. Or worse, that seeks to return to the moon primarily to pillage for artefacts that will undoubtedly sell for tremendous amounts of money here on Earth.”

#### Destroys scientifically rich Tranquility base artifacts.

Fessl 19 Sophie Fessl 7-10-2019 “Should the Moon Landing Site Be a National Historic Landmark?” <https://daily.jstor.org/should-the-moon-landing-site-be-a-national-historic-landmark/> (PhD King’s College London, BA Oxford)//Elmer

When Neil Armstrong set foot on the moon on July 20, 1969, the pictures sent to Earth captured a historical moment: It was the first time that any human set foot on another body in our solar system. Fifty years later, experts are debating how to preserve humankind’s first steps beyond Earth. Could a National Park on the moon be the solution to saving Armstrong’s bootprints for future archaeologists? Flags, rovers, laser-reflecting mirrors, footprint—these are just a few of the dozens of artifacts and features that bear witness to our exploration of the moon. Archaeologists argue that these objects are a record to trace the development of humans in space. “Surely, those footprints are as important as those left by hominids at Laetoli, Tanzania, in the story of human development,” the anthropologist P.J. Capelotti wrote in Archaeology. While the oldest then known examples of hominins walking on two feet were cemented in ash 3.6 million years ago, “those at Tranquility Base could be swept away with a casual brush of a space tourist’s hand.” Fragile Traces Just how fragile humankind’s lunar traces are was seen already during Apollo 12. On November 19, 1969, Charles “Pete” Conrad and Alan Bean manually landed their lunar module in the moon’s Ocean of Storms, 200 meters from the unmanned probe Surveyor 3, which was left sitting on the moon’s surface two years earlier, in 1967. The next day, Conrad and Bean hopped to Surveyor 3. As they approached the spacecraft, they were surprised: The spacecraft, originally bright white, had turned light brown. It was covered in a fine layer of moon dust, likely kicked up by their landing. Harsh ultraviolet light has likely bleached the U.S. flag bright white. Without Apollo 12 upsetting the moon dust, Surveyor 3 would likely have remained stark white. Unlike Earth, the moon has no wind that carries away the dust, no rain to corrode materials, and no plate tectonic activity to pull sites on the surface back into the moon. But the moon’s thin atmosphere also means that solar wind particles bombard the lunar surface, and harsh ultraviolet light has likely bleached the U.S. flag bright white. The astronauts’ first bootprints will likely be on the moon for a long time, and will almost certainly still be there when humans next visit—unless, by tragic coincidence, a meteorite hits them first. Had LunaCorp not abandoned the idea in the early 2000s, the company’s plan to send a robot to visit the most famous sites of moon exploration could have done a lot of damage. And with Jeff Bezos’ recent unveiling of a mock-up of the lunar lander Blue Moon, it is only a matter of time before corporate adventurers and space tourists reach the moon. Historians and archaeologists are keen to avoid lunar looting. Roger Launius, senior curator of space history at the National Air and Space Museum in Washington, D.C., warned: “What we don’t want to happen is what happened in Antarctica at Scott’s hut. People took souvenirs, and nothing was done to try to preserve those until fairly late in the game.” On the other hand, there is a legitimate scientific interest in investigating how the equipment that’s on the moon was affected by a decades-long stay there.

#### Heritage Sites are critical for science research around Dust.

OSTP 18 Office of Science and Technology Policy March 2018 “PROTECTING & PRESERVING APOLLO PROGRAM LUNAR LANDING SITES & ARTIFACTS” (The Office of Science and Technology Policy is a department of the United States government, part of the Executive Office of the President, established by United States Congress on May 11, 1976, with a broad mandate to advise the President on the effects of science and technology on domestic and international affairs.)//Elmer

The Moon continues to hold great significance around the world. The successes of the Apollo missions still represent a profound human technological achievement almost 50 years later and continue to symbolize the pride of the only nation to send humans to an extraterrestrial body. The Apollo missions reflect the depth and scope of human imagination and the desire to push the boundaries of humankind’s existence. The Apollo landing sites and the accomplishments of our early space explorers energized our Nation's technological prowess, inspired generations of students, and greatly contributed to the worldwide scientific understanding of the Moon and our Solar System. Additionally, other countries have placed hardware on the Moon which undoubtedly has similar historic, cultural, and scientific value to their country and to humanity. Three Apollo sites remain scientifically active and all the landing sites provide the opportunity to learn about the changes associated with long-term exposure of human-created systems in the harsh lunar environment. These sites offer rich opportunities for biological, physical, and material sciences. Future visits to the Moon’s surface offer opportunities to study the effects of long-term exposure to the lunar environment on materials and articles, including food left behind, paint, nylon, rubber, and metals. Currently, very little data exist that describe what effect temperature extremes, lunar dust, micrometeoroids, solar radiation, etc. have on such man-made material, and no data exist for time frames approaching the five decades that have elapsed since the Apollo missions. While some of the hardware on the Moon was designed to remain operational for extended periods and successfully telemetered scientific data back to the Earth, much of what is there was designed only for use during the Apollo mission and then abandoned with no expectation of further survivability. How these artifacts and their constituent materials have survived and been altered while on the lunar surface is of great interest to engineers and scientists. The Apollo artifacts and the impact sites have the potential to provide unprecedented data if lunar missions to gather and not corrupt the data are developed. These data will be invaluable for helping to design future long-duration systems for operation on the lunar surface. NASA has formally evaluated the possible effects of the lunar environment and identified potential science opportunities. For example, using Apollo 15 as a representative landing site, the crew left 189 individually cataloged items on the lunar surface, including the descent stage of the Lunar Module, the Lunar Roving Vehicle, the Apollo Lunar Surface Experiments Package, and a wide variety of miscellaneous items that were offloaded by the astronauts to save weight prior to departure. The locations of many of these items are well documented, and numerous photographs are available to establish their appearance and condition at the time they were left behind.

#### Moon Dust Research key to Moon Basing.

Smith 19 Belinda Smith 7-18-2019 “Who protects Apollo sites when no-one owns the Moon?” <https://www.abc.net.au/news/science/2019-07-19/apollo-11-moon-landing-heritage-preservation-outer-space-treaty/11055458> (Strategic Communications Advisor at Department of Education and Training at University of Victoria)//Elmer

It's not just about history Alongside heritage value, the bits and pieces left on the Moon have enormous scientific significance. Take moon dust. It's a real problem for moon-bound equipment because it's made of fine, super sticky and highly abrasive grains, which have a habit of clogging instruments and spacesuits. But as Armstrong and Aldrin trotted across the surface, the footprints they left behind gave us valuable information into the properties of moon dust, Flinders University space archaeologist Alice Gorman said. "The ridges on the boots were meant to measure how far they sank into the dust. "Then they used the light contrast between the ridges to measure the reflectance properties of the dust." A boot print in grey dust. This iconic photo of Buzz Aldrin's footprint is also a science experiment. (Supplied: NASA) It's data like this that will help if we want a long-term base on the Moon — we need to know how our gear will stand up to lunar conditions. Apart from the sticky, gritty dust, the lunar surface is also peppered with meteorites and cosmic rays. So, Dr Gorman said, one of the very few reasons to revisit a moon site is to collect some of the equipment left behind and see how it fared. "What has happened to this material in 50 years of sitting on the lunar surface? "This is going to be really interesting scientific information because it will help planning for future missions and get an understanding of long-term conditions." And NASA has already done this. The Apollo 12 mission, which landed on the Moon four months after Apollo 11, collected parts from the 1967 Surveyor probe and brought them back to Earth. An astronaut standing next to a piece of equipment on the lunar surface Along with rocks and soil samples, Apollo 12 astronauts collected pieces of the Surveyor 3 probe for analysis back on Earth. (Supplied: NASA) Another reason to preserve the equipment left on the Moon is to prove we really went there, Professor Capelotti said. "There's a lot of people out there who still don't believe it happened. "The stuff on the Moon is a testament to what we did and when we did it."

#### Lunar Basing solves Earth Observation is key to Atmospheric Science, specifically super volcanos

Hamill 16, Patrick. "Atmospheric observations from the moon: A lunar earth-observatory." 2016 Ieee International Geoscience and Remote Sensing Symposium (Igarss). IEEE, 2016. (Department of Physics and Astronomy at San Jose State University)//Elmer

ABSTRACT A telescope placed on the Moon would be valuable tool for studies of the atmosphere and climate. In this paper, we consider an observatory placed on the Moon to make observations of the Earth’s atmosphere. We discuss the properties of such a telescope, the types of observations to be made, the benefits of having a telescope on the lunar surface and difficulties that may be encountered. Index Terms— Lunar Telescope, Atmospheric Science, Climate Studies, Earth Observatory 1. INTRODUCTION Measurements made by a telescope looking at Earth from the surface of the Moon would be beneficial to atmospheric scientists studying weather, atmospheric composition and the climate. Due to the geometry of the system, the entire disk of Earth is always visible from most locations on the Earth-facing side of the Moon. During the 28 day orbital period of the Moon, both the daylight and dark sides of Earth are visible. This allows one to observe the entire disk of the Earth (half of the surface) at any given time, and during one orbital period of the Moon, to observe both the day and night sides. Since the Earth’s rotation rate is much faster than the Moon’s orbital motion, nearly every point on the surface of Earth is in sight during each 24 hour period. It should be noted that a telescope has already been placed on the surface of the Moon, namely, the 15- centimeter UV telescope on Chang’e 3, the Chinese lander that touched down on the lunar surface on December 14, 2013. (See Figure 1.) The telescope was still operational by early 2016. This telescope was designed to monitor bright variable stars in the near UV for periods of up to 12 days and to carry out a near UV sky survey at low Galactic latitude [1]. Figure 1. Photograph of the lander of Chang’e-3 taken from the Yutu rover. The DSCOVR satellite (previously known as TRIANA) was placed at the Lagrange L1 point and observes the entire disk of Earth with a 30.5 cm telescope. The primary objective of the DSCOVR mission is to study “space weather,” i.e., the properties of the solar wind and the interplanetary magnetic fields. A secondary objective is to generate data for atmospheric science and climate studies. To accomplish these goals it not only has an optical telescope, but also a cavity radiometer to measure the irradiance reflected and emitted from the face of the Earth. Due to its location in space, between the Sun and Earth, DSCOVR at all times observes the illuminated face of Earth. In 2007 NASA considered sending astronauts to the Moon to establish a moon base and requested that the scientific community suggest scientifically valuable activities. A meeting of the NASA Advisory Council (NAC) in February 2007 considered a variety of suggestions, including proposals for a lunar telescope. However, the idea of manned flights to the Moon and the establishment of a lunar base were later abandoned. Many of the ideas described in this paper are based on concepts described at the NAC meeting [2]. As mentioned, a telescope placed on the near side of the Moon can observe the entire disk of Earth. No satellite in low Earth orbit can do this. A satellite in geosynchronous orbit observes one third of the total area, but is limited to the same view at all times. A satellite at the unstable Lagrange point between Earth and Sun (L1) only sees the sunlit side of Earth and cannot be permanent because of the need for continuous orbital corrections leading to the eventual depletion of fuel. L1 is about a million miles from Earth. The Earth-Moon distance is somewhat less than one fourth of this value. From the Moon, over the course of a day as the Earth rotates, all sublunar points are visible. During the course of a month, due to the tilt of the Moon’s orbit by about 5 degrees relative to Earth’s equator, the two poles alternately point towards the Moon, giving excellent coverage of these important regions every 14 days. (As seen from the Moon, Earth exhibits phases, from “new Earth” through “full Earth” to “waning Earth” until it presents its dark side to the Moon. For example, in late spring, an observatory on the Moon would be looking “up” at the Antarctic region during “new” Earth; at “full Earth” it would be over the equator, and as the Earth wanes, the observatory would be looking “down” on the Arctic region.) An interesting feature of the observations of Earth’s night side will be the quantification of artificial illumination related to population growth and industrialization. Over the course of a year, the view of Earth varies in an interesting way as the Sun illuminates the Earth from different angles, due to the 23.5 degree tilt of Earth’s axis of rotation relative to the ecliptic. The varying views of Earth, the visibility of the entire disk, the relatively rapid rotation of Earth and the stability of the lunar surface make the Moon an ideal location for longterm monitoring of the Earth. In Section 2 we consider the expected characteristics of the lunar telescope and the associated sensors, in Section 3 we discuss the benefits that are expected from placing an Earth Observing telescope on the Moon and in Section 4 we consider some difficulties and problems associated with this proposed project. 2. THE INSTRUMENT The Lunar Earth-Observatory is essentially a telescope placed somewhere on the surface of the Moon and focused on the Earth. The observatory would consist of a telescope and a number of standard instruments such as a diffraction grating with an associated CCD array, a CCD camera, a radiometer, and the associated telemetry. The telescope diameter should be between 0.5 and 0.75 meters, this being a compromise between the desire for a small instrument and the desire of high resolution. For the sake of comparison, a telescope with a diameter of only 0.25 meters has a theoretical resolution of about 1km X 1km on the Earth’s surface. The Ozone Measurement Instrument [3] (OMI on AURA) has a nadir pixel of 13km X 24km and it scans the entire Earth once per day. If the Lunar telescope had a resolution of 100km X 100km, and the CCD array were integrated over 1 sec, the entire disk of Earth, could be scanned in about 3.5 hours. The telescope would scan the disk of the Earth and the light from different points on the Earth would be sent through a diffraction grating onto the CCD array. This allows one to determine the column amounts of various atmospheric gases, such as ozone, CO2, SO2, NO2, as well as aerosols. When the opportunity arises, the telescope could be used to track the image of a bright star as it is occulted by Earth [4]. Such scans are best carried out as the star descends onto the dark limb of Earth to avoid “earthshine” and to obtain maximum contrast. From the vantage point of a satellite in a 500 km orbit, a star descends through the atmosphere at a speed of about 8 km/sec. From the vantage point of the Moon, a star descends at about 1 km/sec, that is, eight times slower. Thus since stellar occultation is possible from artificial satellites (the GOMOS instrument on ENVISAT [5], for example), it will be even easier from the surface of the Moon. Note that a star is always a point source, so scanning is not required, as in most solar occultation measurements. (One cannot carry out solar occultation from the Moon because it only occurs during “Earth eclipses.”) Infrared measurements usually require cooling instruments with cryogens, but on the lunar surface extremely low temperatures are obtainable by simply shading the instrument during the day. Furthermore, the side of the Moon facing Earth is dark for half of the month, so cycling between extreme cold and extreme heat allows one to consider the possibility of some sort of heat engine operating in (perhaps) a Stirling cycle to power various components. The surface of the Moon is a highly stable platform, so the observatory should be built to operate for a very long time (decades rather than years). This is reasonable when one considers that many satellite observing systems have lasted much longer than their expected lifetimes. (For example, the SAM II system lasted 15 years before it was turned off due to orbit degradation. The instrument was still operational.) Therefore, the instrumentation of the observatory should be standard and well developed rather than innovative. Although the surface of the Moon is certainly a difficult environment, it is perhaps more benign that the environment of an artificial satellite. The Moon is a stable platform not requiring corrections for drift nor subject to the vibrations of satellites. The temperature extremes on the Moon have a periodicity of a month rather than several hours. There are many reasons for placing an Earth atmospheric observatory on the Moon. Perhaps the most obvious reason is that from the Moon one can observe a single location on Earth for a relatively long period of time (hours, rather than seconds for a satellite in LEO). During a 24 hour period, nearly every point on the surface of Earth can be monitored, and during one month, both the sunlit and night sides of the Earth will have been observed. Further, there will have been excellent views of the polar regions. The visible images of the entire illuminated surface of Earth will allow one to evaluate in an unambiguous manner the total cloud fraction of Earth’s atmosphere. The scans will allow one to determine the composition of the Earth’s atmosphere in terms of the major trace gases and aerosols. The polarization of the scattered light will also yield information on the aerosol type. Stellar occultation allows one to determine profiles of extinction from aerosol particles, and the altitude dependence of concentrations of gas species such as O3, CO2, etc. Profiles of stratospheric particle extinctions are of particular interest following energetic volcanic eruptions that inject large amounts of SO2 into the stratosphere. Profiles of O3 allow one to determine the vertical structure of the Antarctic ozone hole and “mini ozone holes” in the Arctic. Stellar occultation is a valuable technique for studying the formation and structure of polar stratospheric clouds. The GOMOS instrument on ENVISAT was operational from 2002 to 2012 and during that time it observed well over 10,000 stellar occultations. Perot et al. [6] present a polar mesospheric climatology based on these measurements. The formation of dust clouds, particularly from regions such as the deserts in Northern Africa and Central Asia, and their atmospheric dispersion is an important scientific and environmental problem. The lunar observations could shed light on the relationship between the presence of dust and the formation of hurricanes in the Atlantic Ocean. The fact that the entire disk of the Earth is visible from the Moon make it an excellent location to measure the radiation balance of the Earth. Consequently, a component of the observatory would be an ERBE/CERES type of radiometer to measure short and longwave radiation [7]. The goal would be to monitor, on a continuous basis, the global energy balance, planetary brightness, regional forcings and the net radiative effect of clouds [8]. The fact that during the course of a month Earth presents both day and night faces to the Moon allows one to determine emitted and reflected radiation under a variety of solar illuminations. Volcanic plumes are a well-known danger to aircraft. Some regions of Earth that are not well monitored, such as the Arctic regions between North America and Asia, are locations of frequently occurring volcanic eruptions. Monitoring of the Earth from the Moon would offer an early warning system for volcanic plumes reaching aircraft altitudes. The atmosphere above a low earth orbit satellite is tenuous but not entirely negligible. The fact that the Moon has essentially no atmosphere, means there is no interference of measurements of the radiation emitted from the surface of Earth.

#### Volcano explosions cause Civilizational Collapse – Extinction – predicting and mitigating are key.

Pamlin and Armstrong 15, Dennis, and Stuart Armstrong. "Global challenges: 12 risks that threaten human civilization." Global Challenges Foundation, Stockholm (2015). (Entrepreneur and Founder of 21st Century Frontiers, Senior Associate at Chinese Academy of Social Sciences, Visiting Research Fellow at the Research Center of Journalism and Social Development at Renmin University)//Elmer

3.2.2.1 Expected impact disaggregation 3.2.2.2 Probability The eruption which formed the Siberian Traps was one of the largest in history. It was immediately followed by the most severe wave of extinction in the planet’s history, 374 the Permian– Triassic extinction event, 375 where 96% of all marine species and 70% of terrestrial vertebrate species died out. Recent research has provided evidence of a causal link: that the eruption caused the mass extinction.376 There have been many other super-volcanic eruptions throughout history.377 The return period for the largest supervolcanoes (those with a Volcanic Explosivity Index378 of 8 or above) has been estimated from 30,000 years379 at the low end, to 45,000 or even 700,000 years380 at the high end. Many aspects of super-volcanic activity are not well understood as there have been no historical precedents, and such eruptions must be reconstructed from their deposits.381 The danger from super-volcanoes is the amount of aerosols and dust projected into the upper atmosphere. This dust would absorb the Sun’s rays and cause a global volcanic winter. The Mt Pinatubo eruption of 1991 caused an average global cooling of surface temperatures by 0.5°C over three years, while the Toba eruption around 70,000 years ago is thought by some to have cooled global temperatures for over two centuries.382 The effect of these eruptions could be best compared with that of a nuclear war. The eruption would be more violent than the nuclear explosions,383 but would be less likely to ignite firestorms and other secondary effects. Unlike nuclear weapons, a super-volcano would not be targeted, leaving most of the world’s infrastructure intact. The extent of the impact would thus depend on the severity of the eruption - which might or might not be foreseen, depending on improvements in volcanic predictions384 - and the subsequent policy response. Another Siberian Trap-like eruption is extremely unlikely on human timescales, but the damage from even a smaller eruption could affect the climate, damage the biosphere, affect food supplies and create political instability. A report by a Geological Society of London working group notes: “Although at present there is no technical fix for averting supereruptions, improved monitoring, awareness-raising and research-based planning would reduce the suffering of many millions of people.” 385 Though humanity currently produces enough food to feed everyone,386 this supply is distributed extremely unevenly, and starvation still exists. Therefore a disruption that is small in an absolute sense could still cause mass starvation. Mass starvation, mass migration, political instability and wars could be triggered, possibly leading to a civilisation collapse. Unless the eruption is at the extreme end of the damage scale and makes the planet unviable, human extinction is possible only as a consequence of civilisation collapse and subsequent shocks.387

**1AC---Framework**

**The standard is consistency with utilitarianism**

**Prefer:**

**1] Pleasure and pain are intrinsic value and disvalue – everything else regresses. Evolutionary knowledge is reliable – broad consensus and robust neuroscience prove.**

**Blum et al. 18**

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**Pleasure** is not only one of the three primary reward functions but it also **defines reward.** As homeostasis explains the functions of only a limited number of rewards, the principal reason why particular stimuli, objects, events, situations, and activities are rewarding may be due to pleasure. This applies first of all to sex and to the primary homeostatic rewards of food and liquid and extends to money, taste, beauty, social encounters and nonmaterial, internally set, and intrinsic rewards. Pleasure, as the primary effect of rewards, drives the prime reward functions of learning, approach behavior, and decision making and provides the **basis for hedonic theories** of reward function. We are attracted by most rewards and exert intense efforts to obtain them, just because they are enjoyable [10]. Pleasure is a passive reaction that derives from the experience or prediction of reward and may lead to a long-lasting state of happiness. The word happiness is difficult to define. In fact, just obtaining physical pleasure may not be enough. One key to happiness involves a network of good friends. However, it is not obvious how the higher forms of satisfaction and pleasure are related to an ice cream cone, or to your team winning a sporting event. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure [14]. Pleasure as a hallmark of reward is sufficient for defining a reward, but it may not be necessary. A reward may generate positive learning and approach behavior simply because it contains substances that are essential for body function. When we are hungry, we may eat bad and unpleasant meals. A monkey who receives hundreds of small drops of water every morning in the laboratory is unlikely to feel a rush of pleasure every time it gets the 0.1 ml. Nevertheless, with these precautions in mind, we may define any stimulus, object, event, activity, or situation that has the potential to produce pleasure as a reward. In the context of reward deficiency or for disorders of addiction, homeostasis pursues pharmacological treatments: drugs to treat drug addiction, obesity, and other compulsive behaviors. The theory of allostasis suggests broader approaches - such as re-expanding the range of possible pleasures and providing opportunities to expend effort in their pursuit. [15]. It is noteworthy, the first animal studies eliciting approach behavior by electrical brain stimulation interpreted their findings as a discovery of the brain’s pleasure centers [16] which were later partly associated with midbrain dopamine neurons [17–19] despite the notorious difficulties of identifying emotions in animals. Evolutionary theories of pleasure: The love connection BO:D Charles Darwin and other biological scientists that have examined the biological evolution and its basic principles found various mechanisms that steer behavior and biological development. Besides their theory on natural selection, it was particularly the sexual selection process that gained significance in the latter context over the last century, especially when it comes to the question of what makes us “what we are,” i.e., human. However, the capacity to sexually select and evolve is not at all a human accomplishment alone or a sign of our uniqueness; yet, we humans, as it seems, are ingenious in fooling ourselves and others–when we are in love or desperately search for it. It is well established that modern biological theory conjectures that **organisms are** the **result of evolutionary competition.** In fact, Richard Dawkins stresses gene survival and propagation as the basic mechanism of life [20]. Only genes that lead to the fittest phenotype will make it. It is noteworthy that the phenotype is selected based on behavior that maximizes gene propagation. To do so, the phenotype must survive and generate offspring, and be better at it than its competitors. Thus, the ultimate, distal function of rewards is to increase evolutionary fitness by ensuring the survival of the organism and reproduction. It is agreed that learning, approach, economic decisions, and positive emotions are the proximal functions through which phenotypes obtain other necessary nutrients for survival, mating, and care for offspring. Behavioral reward functions have evolved to help individuals to survive and propagate their genes. Apparently, people need to live well and long enough to reproduce. Most would agree that homo-sapiens do so by ingesting the substances that make their bodies function properly. For this reason, foods and drinks are rewards. Additional rewards, including those used for economic exchanges, ensure sufficient palatable food and drink supply. Mating and gene propagation is supported by powerful sexual attraction. Additional properties, like body form, augment the chance to mate and nourish and defend offspring and are therefore also rewards. Care for offspring until they can reproduce themselves helps gene propagation and is rewarding; otherwise, many believe mating is useless. According to David E Comings, as any small edge will ultimately result in evolutionary advantage [21], additional reward mechanisms like novelty seeking and exploration widen the spectrum of available rewards and thus enhance the chance for survival, reproduction, and ultimate gene propagation. These functions may help us to obtain the benefits of distant rewards that are determined by our own interests and not immediately available in the environment. Thus the distal reward function in gene propagation and evolutionary fitness defines the proximal reward functions that we see in everyday behavior. That is why foods, drinks, mates, and offspring are rewarding. There have been theories linking pleasure as a required component of health benefits salutogenesis, (salugenesis). In essence, under these terms, pleasure is described as a state or feeling of happiness and satisfaction resulting from an experience that one enjoys. Regarding pleasure, it is a double-edged sword, on the one hand, it promotes positive feelings (like mindfulness) and even better cognition, possibly through the release of dopamine [22]. But on the other hand, pleasure simultaneously encourages addiction and other negative behaviors, i.e., motivational toxicity. It is a complex neurobiological phenomenon, relying on reward circuitry or limbic activity. It is important to realize that through the “Brain Reward Cascade” (BRC) endorphin and endogenous morphinergic mechanisms may play a role [23]. While natural rewards are essential for survival and appetitive motivation leading to beneficial biological behaviors like eating, sex, and reproduction, crucial social interactions seem to further facilitate the positive effects exerted by pleasurable experiences. Indeed, experimentation with addictive drugs is capable of directly acting on reward pathways and causing deterioration of these systems promoting hypodopaminergia [24]. Most would agree that pleasurable activities can stimulate personal growth and may help to induce healthy behavioral changes, including stress management [25]. The work of Esch and Stefano [26] concerning the link between compassion and love implicate the brain reward system, and pleasure induction suggests that social contact in general, i.e., love, attachment, and compassion, can be highly effective in stress reduction, survival, and overall health. Understanding the role of neurotransmission and pleasurable states both positive and negative have been adequately studied over many decades [26–37], but comparative anatomical and neurobiological function between animals and homo sapiens appear to be required and seem to be in an infancy stage. Finding happiness is different between apes and humans As stated earlier in this expert opinion one key to happiness involves a network of good friends [38]. However, it is not entirely clear exactly how the higher forms of satisfaction and pleasure are related to a sugar rush, winning a sports event or even sky diving, all of which augment dopamine release at the reward brain site. Recent multidisciplinary research, using both humans and detailed invasive brain analysis of animals has discovered some critical ways that the brain processes pleasure. Remarkably, there are pathways for ordinary liking and pleasure, which are limited in scope as described above in this commentary. However, there are **many brain regions**, often termed hot and cold spots, that significantly **modulate** (increase or decrease) our **pleasure or** even **produce the opposite** of pleasure— that is disgust and fear [39]. One specific region of the nucleus accumbens is organized like a computer keyboard, with particular stimulus triggers in rows— producing an increase and decrease of pleasure and disgust. Moreover, the cortex has unique roles in the cognitive evaluation of our feelings of pleasure [40]. Importantly, the interplay of these multiple triggers and the higher brain centers in the prefrontal cortex are very intricate and are just being uncovered. Desire and reward centers It is surprising that many different sources of pleasure activate the same circuits between the mesocorticolimbic regions (Figure 1). Reward and desire are two aspects pleasure induction and have a very widespread, large circuit. Some part of this circuit distinguishes between desire and dread. The so-called pleasure circuitry called “REWARD” involves a well-known dopamine pathway in the mesolimbic system that can influence both pleasure and motivation. In simplest terms, the well-established mesolimbic system is a dopamine circuit for reward. It starts in the ventral tegmental area (VTA) of the midbrain and travels to the nucleus accumbens (Figure 2). It is the cornerstone target to all addictions. The VTA is encompassed with neurons using glutamate, GABA, and dopamine. The nucleus accumbens (NAc) is located within the ventral striatum and is divided into two sub-regions—the motor and limbic regions associated with its core and shell, respectively. The NAc has spiny neurons that receive dopamine from the VTA and glutamate (a dopamine driver) from the hippocampus, amygdala and medial prefrontal cortex. Subsequently, the NAc projects GABA signals to an area termed the ventral pallidum (VP). The region is a relay station in the limbic loop of the basal ganglia, critical for motivation, behavior, emotions and the “Feel Good” response. This defined system of the brain is involved in all addictions –substance, and non –substance related. In 1995, our laboratory coined the term “Reward Deficiency Syndrome” (RDS) to describe genetic and epigenetic induced hypodopaminergia in the “Brain Reward Cascade” that contribute to addiction and compulsive behaviors [3,6,41]. Furthermore, ordinary “liking” of something, or pure pleasure, is represented by small regions mainly in the limbic system (old reptilian part of the brain). These may be part of larger neural circuits. In Latin, hedus is the term for “sweet”; and in Greek, hodone is the term for “pleasure.” Thus, the word Hedonic is now referring to various subcomponents of pleasure: some associated with purely sensory and others with more complex emotions involving morals, aesthetics, and social interactions. The capacity to have pleasure is part of being healthy and may even extend life, especially if linked to optimism as a dopaminergic response [42]. Psychiatric illness often includes symptoms of an abnormal inability to experience pleasure, referred to as anhedonia. A negative feeling state is called dysphoria, which can consist of many emotions such as pain, depression, anxiety, fear, and disgust. Previously many scientists used animal research to uncover the complex mechanisms of pleasure, liking, motivation and even emotions like panic and fear, as discussed above [43]. However, as a significant amount of related research about the specific brain regions of pleasure/reward circuitry has been derived from invasive studies of animals, these cannot be directly compared with subjective states experienced by humans. In an attempt to resolve the controversy regarding the causal contributions of mesolimbic dopamine systems to reward, we have previously evaluated the three-main competing explanatory categories: “liking,” “learning,” and “wanting” [3]. That is, dopamine may mediate (a) liking: the hedonic impact of reward, (b) learning: learned predictions about rewarding effects, or (c) wanting: the pursuit of rewards by attributing incentive salience to reward-related stimuli [44]. We have evaluated these hypotheses, especially as they relate to the RDS, and we find that the incentive salience or “wanting” hypothesis of dopaminergic functioning is supported by a majority of the scientific evidence. Various neuroimaging studies have shown that anticipated behaviors such as sex and gaming, delicious foods and drugs of abuse all affect brain regions associated with reward networks, and may not be unidirectional. Drugs of abuse enhance dopamine signaling which sensitizes mesolimbic brain mechanisms that apparently evolved explicitly to attribute incentive salience to various rewards [45]. Addictive substances are voluntarily self-administered, and they enhance (directly or indirectly) dopaminergic synaptic function in the NAc. This activation of the brain reward networks (producing the ecstatic “high” that users seek). Although these circuits were initially thought to encode a set point of hedonic tone, it is now being considered to be far more complicated in function, also encoding attention, reward expectancy, disconfirmation of reward expectancy, and incentive motivation [46]. The argument about addiction as a disease may be confused with a predisposition to substance and nonsubstance rewards relative to the extreme effect of drugs of abuse on brain neurochemistry. The former sets up an individual to be at high risk through both genetic polymorphisms in reward genes as well as harmful epigenetic insult. Some Psychologists, even with all the data, still infer that addiction is not a disease [47]. Elevated stress levels, together with polymorphisms (genetic variations) of various dopaminergic genes and the genes related to other neurotransmitters (and their genetic variants), and may have an additive effect on vulnerability to various addictions [48]. In this regard, Vanyukov, et al. [48] suggested based on review that whereas the gateway hypothesis does not specify mechanistic connections between “stages,” and does not extend to the risks for addictions the concept of common liability to addictions may be more parsimonious. The latter theory is grounded in genetic theory and supported by data identifying common sources of variation in the risk for specific addictions (e.g., RDS). This commonality has identifiable neurobiological substrate and plausible evolutionary explanations. Over many years the controversy of dopamine involvement in especially “pleasure” has led to confusion concerning separating motivation from actual pleasure (wanting versus liking) [49]. We take the position that animal studies cannot provide real clinical information as described by self-reports in humans. As mentioned earlier and in the abstract, on November 23rd, 2017, evidence for our concerns was discovered [50] In essence, although nonhuman primate brains are similar to our own, the disparity between other primates and those of human cognitive abilities tells us that surface similarity is not the whole story. Sousa et al. [50] small case found various differentially expressed genes, to associate with pleasure related systems. Furthermore, the dopaminergic interneurons located in the human neocortex were absent from the neocortex of nonhuman African apes. Such differences in neuronal transcriptional programs may underlie a variety of neurodevelopmental disorders. In simpler terms, the system controls the production of dopamine, a chemical messenger that plays a significant role in pleasure and rewards. The senior author, Dr. Nenad Sestan from Yale, stated: “Humans have evolved a dopamine system that is different than the one in chimpanzees.” This may explain why the behavior of humans is so unique from that of non-human primates, even though our brains are so surprisingly similar, Sestan said: “It might also shed light on why people are vulnerable to mental disorders such as autism (possibly even addiction).” Remarkably, this research finding emerged from an extensive, multicenter collaboration to compare the brains across several species. These researchers examined 247 specimens of neural tissue from six humans, five chimpanzees, and five macaque monkeys. Moreover, these investigators analyzed which genes were turned on or off in 16 regions of the brain. While the differences among species were subtle, **there was** a **remarkable contrast in** the **neocortices**, specifically in an area of the brain that is much more developed in humans than in chimpanzees. In fact, these researchers found that a gene called tyrosine hydroxylase (TH) for the enzyme, responsible for the production of dopamine, was expressed in the neocortex of humans, but not chimpanzees. As discussed earlier, dopamine is best known for its essential role within the brain’s reward system; the very system that responds to everything from sex, to gambling, to food, and to addictive drugs. However, dopamine also assists in regulating emotional responses, memory, and movement. Notably, abnormal dopamine levels have been linked to disorders including Parkinson’s, schizophrenia and spectrum disorders such as autism and addiction or RDS. Nora Volkow, the director of NIDA, pointed out that one alluring possibility is that the neurotransmitter dopamine plays a substantial role in humans’ ability to pursue various rewards that are perhaps months or even years away in the future. This same idea has been suggested by Dr. Robert Sapolsky, a professor of biology and neurology at Stanford University. Dr. Sapolsky cited evidence that dopamine levels rise dramatically in humans when we anticipate potential rewards that are uncertain and even far off in our futures, such as retirement or even the possible alterlife. This may explain what often motivates people to work for things that have no apparent short-term benefit [51]. In similar work, Volkow and Bale [52] proposed a model in which dopamine can favor NOW processes through phasic signaling in reward circuits or LATER processes through tonic signaling in control circuits. Specifically, they suggest that through its modulation of the orbitofrontal cortex, which processes salience attribution, dopamine also enables shilting from NOW to LATER, while its modulation of the insula, which processes interoceptive information, influences the probability of selecting NOW versus LATER actions based on an individual’s physiological state. This hypothesis further supports the concept that disruptions along these circuits contribute to diverse pathologies, including obesity and addiction or RDS.

**[2] Only natural observable moral facts exist:**

**Papineau 07, David Papineau, “Naturalism,” Stanford Encyclopedia of Philosophy, 2007//SSMoore took this argument to show that moral facts comprise a distinct species of non-natural fact. However, any such non-naturalist view of morality faces immediate difficulties, deriving ultimately from the kind of causal closure thesis discussed above. If all physical effects are due to a limited range of natural causes, and if moral facts lie outside this range, then it follow that moral facts can never make any difference to what happens in the physical world (Harman, 1986). At first sight this may seem tolerable (perhaps moral facts indeed don't have any physical effects). But it has very awkward epistemological consequences. For beings like us, knowledge of the spatiotemporal world is mediated by physical processes involving our sense organs and cognitive systems. If moral facts cannot influence the physical world, then it is hard to see how we can have any knowledge of them**

**Two implications: A) Substantively affirms since we need the natural world to derive moral facts from it, so environmental destruction eliminates our ability to perceive and interact with those facts to create morality. B) Proves Util since we physically know the pleasure is good and pain is bad.**

**3] Lexical Prerequisite – suffering creates lifelong conditions and threats on life that preclude the ability of actors being able to engage in other ethical evaluations since they are in a constant state of crisis.**

**4] Actor specificity:**

**A] Governments must aggregate since every policy benefit some and harms others, which also means side constraints freeze action.**

**B] States lack wills or intentions since policies are collective actions. Actor-specificity comes first since different agents have different ethical standings. Link turns calc indites because the alt would be *no* action.**

**5] No act-omission distinction—governments are responsible for everything in the public sphere, so inaction is implicit authorization of action: they have to yes/no bills, which means everything collapse to aggregation.**

**6] No intent-foresight distinction— If we foresee a consequence, then it becomes part of our deliberation which makes it intrinsic to our action since we intend it to happen.**

Theoretically Justified Frameworks first-- they assume what's good for debate in the first place which is a sequencing question to substantive justifications

1] Prep – small school debaters only need a few good generics like deterrence, the innovation disad, and the ICJ counterplan to win every util round. But under intent based frameworks, since contentions are less variable and analytics are more important, big-school block-writing wrecks them every round. Blocks don’t matter nearly as much for util since innovation checks coaching bias.

2] Innovation – there are simply more articles written in the context of util than in intent based frameworks – simple Google search proves. Proves util incentivizes a wider variety of arguments than intent based frameworks, which causes recycling of old args – proven by the fact that the same intent based frameworks justifications have been read every phil round for decades. Think about it – new advantages are broken often, but phil contentions are established at the beginning of the topic and never change for two months.

3] Ground – non-util philosophies conclude overwhelmingly on one side of most topics – for example, Kant won every neg round on the national service topic. Only util generates robust debates with equitable ground.

4] Real-world – abstract debates about philosophy have much less grounding in the real world than util – discussing consequences gives students education about fopo, economics, IR, etc. Outweighs since portable skills are the ultimate goal of debate.

### UV

#### **1] 1AR theory is legit – anything else means infinite abuse – drop the debater – 1AR are too short to make up for the time trade-off – no RVIs – 6 min 2NR means they can brute force me every time – competing interps – otherwise the 2NR could drown the aff in arguments while playing defense. Aff theory first – much larger strategic loss – ¼ of the 1AR vs. 1/7 of the 1NC.**

#### Permissibility and presumption affirm –

#### A] neutrality- otherwise we would not be able to justify morally neutral actions like drinking water since there isn’t a prohibition and we would needlessly have to prove an obligation.

#### B] Trivialism- statements are true until proven false, if I told you my name you’d believe me.

#### C] Affirming is harder – that was above

#### D] Negation Theory- Negating requires a complete absence of an existing obligation

Negate [is to]: to deny the existence of

That’s Dictionary.com- “Negate” https://www.dictionary.com/browse/negate.

#### Interp – negs must concede the aff’s framework if it is not morally repugnant or descriptive, and the advocacy is topical and disclosed

#### Violation: they didn’t

#### Prefer-

#### 1] Time skew- Winning the negative framework moots 6 minutes of 1AC offense – that outweighs on quantifiability and reversibility – I can’t get back time lost and it’s the only way to measure abuse

#### 2] Topic Ed- Every debate would just be a framework debate which means we never get access to core topic lit – that outweighs on time frame – we only have 2 months

#### 3] Prep skew- We can’t predict every single negative framework before round but they know the aff coming into round which makes pre-tournament prep impossible. Especially true since there are millions of K’s and NC’s that could negate.

#### F and E Ci DTD - the sole purpose of 1ac theory is to deter arguments and anything else lets the 1nc read it regardless No RVIs - otherwise they can spend 7 minutes on the shell and the debate ends right there

#### Appropriation means taking from others without the owners permission. O/Ws since it’s first definition which is most predictable

Oxford. Lexico. Appropriation. https://www.lexico.com/en/definition/appropriation

the action of taking something for one's own use, typically without the owner's permission.

### Shell

#### Interp – debaters must disclose all theory interpretations.

#### Violation – they read new offs but don’t tell us

Graphical user interface, text, application, email

Description automatically generated

Graphical user interface, text, application, email

Description automatically generated

#### 1] norming – not knowing what shells are read means your theory norm cant spread or that people will misconstrue what shells you read which creates worse prep

#### 2] predictability – we cant meet the shell before the round which a] takes away from topic ed since you will just find a violation and b] kills theory recourse since we cant substantively engage in the shell and you will always be ahead on prep