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NATURE'S LAW AND THE NATURE OF THE COSMOS: ANCIENT HUMAN STORIES ABOUT PERENNIAL MORAL CONCERNS

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When I had to learn English, one of the most difficult words for me was goodbye. There is no corresponding word for goodbye in Minbari. All our partings contain within them the possibility of meeting again: in other places, in other times, in other lives. So you will excuse me if I do not say goodbye.¹

In the Beginning

When I was twelve years old, I was a guest at an unknown installation managed by the U.S. Air Force. The installation harbored a precious instrument: a solar telescope. I stood in front of the telescope while looking into outer space, and I was both excited from my visit and anxiously hoping for a better future for humanity. This experience opened up for me a world of new perceptions about the cosmos. I had wondered before about the mysteries of the universe. Since that time, new technologies have been developed and the achievements of human ingenuity have been fascinating, but remain of limited value, when one considers what would be required for our successful journey into neighboring galaxies. In a way, any human

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¹ *Babylon 5: Objects at Rest* (PTEN television broadcast Nov. 18, 1998). Dalenn plays a central role in the Babylon 5 universe. *Babylon 5* is a registered trademark of PTN Consortium and Warner Bros. Television. *Id.*

endeavor requires—first of all—an understanding of our existence as a species. Our sense of being alive, for example, permeates our perceptions of reality and our behavior in life.

When I was a little older, I attended a presentation by my esteemed colleague, John Makdisi. His lecture was about natural law and how it permeated our understanding of human interactions. I was deeply fascinated, and I became enchanted by what the legal thought of philosophers such as St. Thomas Aquinas had to offer. Listening to John was like searching for new planets and his lecture was like my childhood telescope.

One way or another, thoughts about humanity always bring me back to technology. The peaceful exploration of outer space, for example, promises to take human beings to more than one thousand discovered exoplanets.² There awaits an opportunity to further develop the human race, beginning possibly with the mining of helium-3, which would meet our global energy needs for hundreds of years.³ Plato noted that “astronomy compels the soul to look upward, and leads us from this world to another.”⁴ The immeasurable expanse challenges our notions of time and space. If Thomas Hobbes had attended John’s lecture, he would have added that it is challenging to conceptualize infinite time or space.⁵ This is clearly more than a cosmological matter. It is a view of the human person against the background of outer space’s distant horizons. For Hobbes, these perceptions challenged our notions of knowledge.⁶ He nevertheless insisted that humanity should not renounce its senses, reason, or experience, in any spiritual flight, since these are the tools of justice

² Press Release 16-051, NASA, *NASA’s Kepler Mission Announces Largest Collection of Planets Ever Discovered* (May 10, 2016), <http://www.nasa.gov/press-release/nasas-kepler-mission-announces-largest-collection-of-planets-ever-discovered>.

³ Kathryn Nave, *Space Mining Will Take a Giant Leap in 2016*, WIRED (Jan. 5, 2016), <http://www.wired.co.uk/article/space-mining-a-reality-in-2016>.

⁴ PLATO, *THE REPUBLIC* 504 (Benjamin Jowett trans., Floating Press 2009) (1892).

⁵ See THOMAS HOBBS, *LEVIATHAN* 23 (Richard Tuck ed., Cambridge U. Press 1996) (1651).

⁶ *Id.*

and peace.⁷ Reason and experience continue to challenge our understanding of the universe.

Lessons in Mythical Cosmology

It would be ideal to live long enough to see the development of humanity in peace and the span of the next space age, and to learn of those new worlds known as exoplanets orbiting red giants.⁸ But this outcome will be possible only if humanity survives its own destruction. The idea that humanity may explore planets while becoming one with the Divine is compatible with Aquinas' views. For Aquinas, natural law infused humanity with the reason of Divine Law.⁹ Natural Law, thus, enabled humanity's participation in the Divine.¹⁰ The fact is that an examination of the stream of scientific thought in historical perspective offers a startling awareness of how little we understand the most terrifying dangers assailing human existence. This difficult question also reminds us of how science should be tempered by the goodness of the human heart. I believe that June Mary Makdisi, another esteemed colleague of mine, would agree. Scientific thought offers us a future of great possibilities, but these should be possibilities wherein we also keep righteousness abreast.

The mythological story of Thor's hammer reminds us of the moral ambiguity associated with modern technology, since unlike today, it was Thor alone who would manage to lift the hammer and make use of its powers.¹¹ As the story goes, Thor's hammer was made to be used by a *worthy* wielder only, and crafted from the Asgardian

⁷ *Id.* at 255-56.

⁸ Blaine Friedlander, *Giant Red Stars May Heat Frozen Worlds Into Habitable Planets*, NASA (May 17, 2016), <https://exoplanets.nasa.gov/news/1349/giant-red-stars-may-heat-frozen-worlds-into-habitable-planets>.

⁹ THOMAS AQUINAS, *SUMMA THEOLOGIAE* II, Part I, Q. 91, arts. 2-4 65 (Fathers of the Eng. Dom. Province Trans., Christian Classics 1981) (1485).

¹⁰ *Id.*

¹¹ James Kakalios, *Finally, Science Explains Why No One Can Lift Thor's Hammer*, WIRED (Nov. 12, 2014), <https://www.wired.com/2014/11/can-hulk-lift-thors-hammer/>; See also Alexander Foden et al., *A4_8 The Power of Mjolnir*, 13:1 J. PHYSICS SPECIAL TOPICS 1 (2014).

metal *Uru*, forged in the heart of a dying star.¹² Some physicists have speculated about this old story, potentially unraveling its mystery. It has been suggested that such a hammer could actually be made of material from a neutron star, probably the densest substance in the universe—except for black holes.¹³ In 1931, Lev Landau hypothesized about the reason for the high density matter that seemed to be found in neutron stars.¹⁴ The hammer's heavy weight could be attributed to the effects found in red giant stars, having similar properties to neutron stars.¹⁵ Physicists often speculate on the connection between Thor's hammer and astrophysics.¹⁶ One theoretical experiment envisioned Thor wielding his hammer for purposes of weather manipulation and energy redistribution.¹⁷ Other astrophysicists have theorized that the core could not be of neutron star material, since “[t]hese occur after a star has lost its outer atmosphere or gone supernova . . . [and thus, as an alternative noted that the core and mold were comprised of iron] as a dying star would be at the end of its lifetime [during] its red giant phase.”¹⁸ This red giant reference, on the one hand, adds further scientific veneer to the Norse saga and enriches the story of humanity's survival embodied by it. On the other hand, it raises concerns about technology, especially now, in light of the emerging considerations of outer space warfare.

Mythological stories are often portentous and pithy grasps of cosmological reality and, notably, tend to portray some races “as being old and wise since their stars are aged, and nearing the end of their lives.”¹⁹ This last assertion is a suggestive one. While astronomers have defined the *habitable zone* concept of a solar system as one within “the range of orbits that leads to planets with liquid water,” including stars like our sun, some have reassessed and expanded the

¹² Kakalios, *supra* note 11. See also Foden, *supra* note 11.

¹³ Kakalios, *supra* note 11 (noting observations by Dr. Neil DeGrasse Tyson).

¹⁴ PAWEL HAENSEL ET AL., *NEUTRON STARS 1: EQUATION OF STATE AND STRUCTURE 1-2* (Springer Science 2007).

¹⁵ Foden, *supra* note 11, at 1.

¹⁶ *Id.*

¹⁷ *Id.* at 2.

¹⁸ *Id.*

¹⁹ Bill Christensen, *Red Giants and Planets to Live On*, SPACE.COM (Apr. 1, 2005), <https://www.space.com/920-red-giants-planets-live.html>.

concept.²⁰ Researchers have noted that “aged red giant stars could harbor exoplanets suited to the evolution of extraterrestrial life.”²¹ The formula presented by them included advanced stellar evolution models based on three main considerations: the boundaries of the habitable zones (“HZ”); the post main sequence (“MS”) of the ancient red giant;²² and the fascinating consideration that “planets in a post-MS HZ could remain habitable for anywhere between 200 million to 9 billion years.”²³ This gives credit to the hypothesis of likely older and advanced civilizations inhabiting planets around red giants.²⁴ In other words, even after our planet’s evolution into a red giant, the habitable zone in our solar system would be maintained, albeit with changes. Astrophysicists have argued that the search for planets should not be limited to clusters with stars like our sun and, instead, encourage the exploration of stars in their Main Sequence or second period—after they have become red giants, or beyond their first stable period.²⁵ It is in this second period that “the star’s core increases as it shrinks, but the outer layers expand and cool [and for this reason] its ‘habitable zone’ . . . extends from about 630 million miles to 2 billion miles.”²⁶ Thus, once a star like our sun moves beyond the main sequence becoming a red giant, it will produce a habitable zone extending outward into outer space, with increased habitable conditions at greater orbital distances.²⁷ The impressive amount of exoplanets already discovered hints at the potential presence of life around red giants.²⁸ NASA seems to agree and points to a report that observed the potential emergence of life on planets orbiting within the red giant phase, with an estimate of more than 150 red giant stars close

²⁰ *Id.*

²¹ *Id.*

²² Ramses M. Ramirez & Lisa Kaltenegger, *Habitable Zones of Post-Main Sequence Stars*, 823:6 *ASTROPHYSICAL J.* 1 (2016).

²³ Anthony Wood, *Could Life Exist Around Ancient Red Giant Stars?*, *NEW ATLAS* (May 18, 2016), <http://newatlas.com/red-giant-life-discovery/43406/>; See also Ramirez, *supra* note 22.

²⁴ Christensen, *supra* note 19.

²⁵ *Id.*

²⁶ *Id.*

²⁷ Wood, *supra* note 23.

²⁸ *Id.*

enough—within 100 light years—for upcoming or proposed missions of exploration.²⁹ For humanity this is relevant, once it is considered that our civilization may evolve within an extended habitable zone. Indeed, when the sun that now sustains humanity's life begins to decay, it will eventually transform into a red giant.³⁰ While Mercury, Venus, Earth, and Mars will be uninhabitable, the areas around Jupiter, Saturn, and Neptune will sustain life in a new habitable zone.³¹ This will be inextricably related to our future as a species and the decisions we make as we enter our second space age.

Moments of Transition

If history teaches us anything, it is the moral implications of the use of technology and the knowledge it provides, including how its misuse can ensure our ruin. If we are to achieve a better future, perhaps all projected incursions into outer space should be informed by the moral from *Gilgamesh*.³² John Makdisi's natural law lecture reminded me of the three thousand year-old tale, suggesting what the global community could achieve by cooperation, and what it could lose in the alternative.³³ The story recounts the very close friendship between Gilgamesh and Enkidu and their reliance on each other:

Trust not, Gilgamesh, in your own strength. Let your vision be clear, take care of yourself. Let Enkidu go ahead of you, He has seen the road, has traveled the way.³⁴

Gilgamesh and Enkidu began their adventure and, one day, the unthinkable happened. Ishtar, the goddess of love, noticed Gilgamesh,

²⁹ *New Frontier Opens in the Search for Life on Other Planets, NASA* (Mar. 28, 2005), <https://www.nasa.gov/vision/universe/starsgalaxies/frozenworlds.html>.

³⁰ Wood, *supra* note 23.

³¹ *Id.*

³² *See generally* THE EPIC OF GILGAMESH: A NEW TRANSLATION, ANALOGUES, CRITICISM (Benjamin R. Foster ed. & trans., W. W. Norton & Company 2001) [hereinafter *Gilgamesh*].

³³ *Id.*

³⁴ *Id.* at 28.

and offered wealth and even herself to Gilgamesh in marriage.³⁵ He reminded her of having mistreated prior suitors and rejected the offer,³⁶ noting that, “[a]s for me, now that you’ve fallen in love with me, you will treat me like them!”³⁷ Rebuffed and incensed, she pleaded with her father, Anu, to unleash the Bull of Heaven upon the earth.³⁸ The formidable Bull of Heaven then ravaged the land and killed men by the hundreds.³⁹ Gilgamesh and Enkidu faced it together. Enkidu first seized the Bull by the horns, circled the Bull, and then grabbed it once again by the tail.⁴⁰ It was at this moment that the mighty Gilgamesh thrust his dagger between its neck and horn, defeating it.⁴¹ This mythical story no doubt demonstrates the strength of cooperation in overcoming difficult odds, as well as references human weapons allegorically. The new space age is aided by the benefit of better technologies, while human development requires that we return to space and venture beyond the solar system. The human race will once again become one with exploration, adventures, and new discoveries, because of cooperation toward a common goal.⁴² Yet, the concept of human dignity associated with our interstellar future is threatened by the dangers and conflicts in our current global situation.

Grotius saw natural law as foundational and as the “[l]aw derived from nature, the common mother of us all, whose bounty falls on all, and whose sway extends over those who rule nations, and which is held most sacred by those who are most scrupulously just.”⁴³ It was

³⁵ *Id.* at 46.

³⁶ *Id.*

³⁷ *Id.* at 48.

³⁸ GILGAMESH, *supra* note 32, at 48.

³⁹ *Id.*

⁴⁰ *Id.* at 49.

⁴¹ *Id.* at 50.

⁴² *See generally* JOHN HEMMING, THE SEARCH FOR EL DORADO (Phoenix Press, 2001) (1978).

⁴³ *See* HUGO GROTIUS, THE FREEDOM OF THE SEAS 5 (James Brown Scott ed., Ralph Van Deman Magoffin trans., Oxford University Press 1961) (1609). *See also* Joanna Kulesza & Roy Balleste, *Signs and Portents in Cyberspace: The Rise of Jus Internet as a New Order in International Law*, 23 FORDHAM INTELL. PROP. MEDIA & ENT. L.J. 1311, 1315 (2013).

a matter of stewardship to be required of nations acting in trust for all humanity.⁴⁴ Something similar is reflected in the epic of Gilgamesh. The Bull was beaten, but Enkidu succumbed to injuries, struck down by the angry gods.⁴⁵ Gilgamesh, highly distraught and saddened, cried “[Y]ou, who stood by me when we climbed the mountain, seized and slew the Bull of Heaven . . . What now is this sleep that has seized you?”⁴⁶ Gilgamesh spent the rest of his life searching for the source of immortality, while lamenting the loss of his friend.⁴⁷ The story of his loss teaches us that cooperation itself is meaningless, except as a means to human development and the things humans value most—friendship and fellowship, in Gilgamesh’s case. What point in defeating the Bull, if the world thus saved would be devoid of one’s friends? There is no doubt that our capacity to develop and reach into outer space is also tied to human dignity as the *telos* of the international legal order, and requires us to place humanity at its center.⁴⁸ The challenge remains for humanity to learn its moral responsibility in realizing its vision—hopefully the *right* one—of the second space age. Each stakeholder involved in space activities has an opportunity to participate in the formation of international law by demonstrating their special stake in that future.

Identifying Future Trajectories

Our driving force and commitment should be one of honoring and contributing to the efforts of many institutions and individuals who, then and now, continue to address the challenges associated with the governance of outer space. The point of departure should always be the global public interest in outer space recognized in the 1967 Outer Space Treaty.⁴⁹ Ram Jakhu noted that the global public interest

⁴⁴ *Id.*

⁴⁵ GILGAMESH, *supra* note 32, at 53.

⁴⁶ *Id.* at 61.

⁴⁷ *Id.* at 66.

⁴⁸ See Myers S. McDougal & Leon S. Lipson, *Perspectives for a Law of Outer Space*, 52 AM. J. INT’L L. 407, 414 (1958).

⁴⁹ Ram Jakhu, *Legal Issues Relating to the Global Public Interest in Outer*

assures “all States the right of free access to outer space without discrimination of any kind.”⁵⁰ Perhaps it is simply a matter of addressing aggression with diplomacy. Historian Ray Raphael has explained how a particular mission during the early days of the American Revolution is illuminating on this point.

In the early days of the war, it was the hope of General George Washington that French Canadians would join the rebellion against the British.⁵¹ In his desire to achieve this, while facing uncertainty, Washington organized—in September of 1775—an invading expedition to take Quebec City.⁵² While the ill-fated mission was considered a blunder by an otherwise brilliant strategist, it actually showcased his genius as a military commander.⁵³ Washington was concerned with the actions of his soldiers while engaging the enemy.⁵⁴ In his letter to Colonel Benedict Arnold, Washington issued fourteen orders that could be considered “rules of the road” for the soldiers on the Quebec expedition. From these, Raphael culled five rules necessary for a humanitarian military engagement. Some of them could be understood as natural law principles viable for operations in outer space.⁵⁵

The first rule is to *respect the dignity of civilians*. For example, should civilians’ lives be put at risk during times of conflict? Washington ordered: “You are by every means in your power to endeavor to discover the real sentiments of the Canadians towards our cause, and particularly as to this expedition, ever bearing in mind, that if they are averse to it and will not cooperate, it must fail of success.”⁵⁶

The second rule is to *respect indigenous peoples*.

Space, 32 J. SPACE L. 31, 37 (2006).

⁵⁰ *Id.* at 32.

⁵¹ Ray Raphael, *Washington's 5 Rules for Honorable War*, HISTORYNET (Dec. 11, 2009), <http://www.historynet.com/washingtons-5-rules-for-honorable-war.htm>.

⁵² *Id.*

⁵³ *Id.*

⁵⁴ *Id.*

⁵⁵ See also JOHN JOSEPH HENRY, ACCOUNT OF ARNOLD’S CAMPAIGN AGAINST QUEBEC IN 1775 3 (Joel Munsell ed., 1877).

⁵⁶ *Id.*

The lives of the indigenous population of any region may suffer the same tragic fate as the rest of the civilian population. Washington observed:

Conciliate the affections of those people and such Indians as you may meet with by every means in your power, convincing them that we come, at the request of many of their principal people, not as robbers or to make war upon them; but as the friends and supporters of their liberties, as well as ours. And to give efficacy to these sentiments, you must carefully inculcate upon the officers and soldiers under your command that not only the good of their country and their honour, but their safety depends upon the treatment of these people.⁵⁷

The third rule is to *give prisoners good treatment*. War and the fatalities that it may cause will not discriminate between combatants and non-combatants. Washington noted:

Any other prisoners who may fall into your hands, you will treat with as much humanity and kindness, as may be consistent with your own safety and the public interest. Be very particular in restraining not only your own troops, but the Indians from all acts of cruelty and insult, which will disgrace the American Arms, and irritate our fellow-subjects against us.⁵⁸

The fourth rule is to *consider the unforeseen hazards of the mission*. Human conflict in outer space is a real possibility. It is a fact that the disruptions of satellite transmissions are possible and a real threat for all phases of satellite operations.⁵⁹ Once disrupted, the damage caused by unforeseen difficulties cannot be undone. Washington observed: “If unforeseen difficulties should arise or if the weather should become so severe as to render it hazardous to proceed,

⁵⁷ *Id.*

⁵⁸ *Id.* at 4.

⁵⁹ Deborah Housen-Couriel, *Cybersecurity and Anti-Satellite Capabilities (ASAT): New Threats and New Legal Responses*, 4 J. L. & CYBER WARFARE 116, 119 (2015).

in your own judgment and that of your principal officers, whom you are to consult, in that case you are to return, giving me as early notice as possible, that I may give you such assistance as may be necessary.”⁶⁰

But then again, space exploration will lead humanity to many resources, and the potential to benefit from them will be tied to natural law considerations. International Court of Justice Judge Manfred Lachs once observed that, if “[o]ne accepts the view that life appears at a determined stage of cosmological development, then the possibility of its existence beyond our planet should not be ruled out.”⁶¹ Lachs understood life as a “[p]ervasive constituent of the universe.”⁶² Indeed, in 1961 Professor Frank Drake proposed a mathematical formula to estimate the number of technological civilizations that could exist in our galaxy.⁶³ Today known as the *Drake Equation*, it identified specific factors considered necessary in the development of an advanced civilization.⁶⁴ The equation is a formula for determining “the odds of finding intelligent life in the universe.”⁶⁵ The formula is as follows:

$$N = R^* \cdot f_p \cdot n_e \cdot f_i \cdot f_l \cdot f_c \cdot L,$$

Where:

N = The number of civilizations in the Milky Way Galaxy whose electromagnetic emissions are detectable. (Number of advanced technical civilizations.)

R* = The rate of formation of stars suitable for the development of intelligent life.

⁶⁰ Raphael, *supra* note 51.

⁶¹ MANFRED LACHS, *THE LAW OF OUTER SPACE: AN EXPERIENCE IN CONTEMPORARY LAW-MAKING* 21 (Tanja L. Masson-Zwaan & Stephan Hobe eds., Martinus Nijhoff Publishers 2010) (1972).

⁶² *Id.*

⁶³ *Drake Equation*, SETI INSTITUTE, <https://seti.org/drake-equation-index> (last visited Feb. 24, 2019) [hereinafter *Drake Equation*].

⁶⁴ *Id.*

⁶⁵ Elizabeth Howell, *Drake Equation: Estimating the Odds of Finding E.T.*, SPACE.COM (Apr. 6, 2018), <https://www.space.com/25219-drake-equation.html>.

f_p = The fraction of those stars with planetary systems.

n_e = The number of planets, per solar system, with an environment suitable for life.

f_l = The fraction of suitable planets on which life actually appears.

f_i = The fraction of life bearing planets on which intelligent life emerges.

f_c = The fraction of civilizations that develop a technology that releases detectable signs of their existence into space.

L = The length of time such civilizations release detectable signals into space.⁶⁶

In 1962, doctoral student Carl Sagan gave a presentation at the American Rocket Society titled *In Direct Contact Among Galactic Populations by Relativistic Interstellar Spaceflight*.⁶⁷ He explained that, while utilizing “interstellar spaceflight at relativistic velocities,” a human crew would manage to reach all points in the Galaxy within their lifetime.⁶⁸ He further explained the need to discuss and study the possibility of other diverse civilizations in existence and the statistical likelihood that Earth would be visited by an advanced extraterrestrial civilization.⁶⁹ Carl Sagan, as if he could foresee the struggles and challenges of future international space law, mathematically analyzed the possibility of life in the universe, noting that “[e]stimates . . . lead to [one million] advanced technical civilizations in our Galaxy.”⁷⁰ He would revise this number thirty years later, in considering the number of planets suitable for intelligent life.⁷¹ Sagan added one observation to the Drake Equation—based on variables $f_l \cdot f_c$, showing that the number of inhabitable worlds producing technical civilizations within

⁶⁶ *Drake Equation, supra* note 63.

⁶⁷ Carl Sagan, *Direct Contact Among Galactic Civilizations by Relativistic Interstellar Spaceflight*, 11 PLANETARY & SPACE SCI. 485, 485 (1963) (originating in a presentation at the American Rocket Society’s 17th Annual Meeting in Los Angeles, California, on November 15, 1962).

⁶⁸ *Id.* at 486.

⁶⁹ *Id.*

⁷⁰ *Id.*

⁷¹ CARL SAGAN, COSMOS 316-19 (Ballantine Books 2013).

the Milky Way could be in the millions.⁷² The end result of the equation would be $N \sim \text{millions}$, assuming the inhabitants of these planets would not always destroy themselves shortly after discovering radio astronomy.⁷³ Assuming they would survive their “[t]echnological adolescence,” then there would be the possibility of existing civilizations older and wiser than our own.⁷⁴ Such possibilities could be endless, when considering that our own Milky Way contains one trillion stars.⁷⁵

Conclusion: Remembering Good Friends

The vastness of the cosmos is “[b]eyond ordinary understanding.”⁷⁶ The cosmos reminds us of our fleeting nature as a living species and of our great potential.⁷⁷ Humanity’s future in outer space is tied to surviving its technological adolescence and avoiding total self-destruction. Such destruction would mean both the end of humanity as a species and its history. The entire record of human existence would be gone in an instant and erased forever. For these reasons, humanity must breach new frontiers in fraternity and continue to move beyond in search of farther ones. We must continue to study the mysteries with which science and engineering partly engage—cyberspace and energy. Immanuel Kant would probably think these mysteries are tied to *how* humanity will apply reason—whether morally and autonomously—to protect a future of significance wherein dignity remains at the center.⁷⁸

⁷² *Id.*

⁷³ *Id.*

⁷⁴ *Id.*

⁷⁵ KIP THORNE, *THE SCIENCE OF INTERSTELLAR* 19 (2014).

⁷⁶ *Cosmos: A Personal Voyage: Heaven and Hell* (PBS television broadcast Oct. 19, 1980).

⁷⁷ *Id.*

⁷⁸ See Roy Balleste, *War in the Expanse: The Metaphysics of Cyberspace*, 15 CAN. J. L. & TECH. 1, 4 (2017). See also *Human Dignity, International Protection*, MAX PLANCK ENC. PUB. INT’L L. ¶ 5 (2012). The concept was further elaborated by Immanuel Kant in his work, *GROUNDWORK FOR THE METAPHYSICS OF MORALS* (H. J. Paton ed., Harper & Row 3d ed. 1956) (1785).

These observations have been a token of affection for my colleagues; a vision guided by the aspirations that all humans share and their underlying wish that peace be eternal and boundless. Perhaps Voltaire was right and “[i]llusion is the first of all pleasures.”⁷⁹ Humanity is going to the stars to find a special place—that mythical place of dreams, while facing new dangers in outer space, on land, and at sea. But there is still hope, and to my friends—John and June Mary, many blessings. You remain with us always, in memory always bright.

⁷⁹ Voltaire, *The Maid of Orleans* (1899), reprinted in VOLTAIRE, 41 THE WORKS OF VOLTAIRE 290 (E. R. Dumont ed., 1901).