Building to Shape Civilization: Space Ethics and the Burden of the Highway Planner

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ABSTRACT

Taking, as a point of departure, a Peter Fleming quote, the prayerful attitude of infrastructure planning and development is considered, especially in the light of the future buildout of civilization that will follow in the wake of space exploration and development. How the space frontier is developed, now and in the near future, will determine how future generations live, work, and play in space. How these developments will unfold is examined through the lens of what philosophy of religion has said about prayer, and further through the lens of the Rawlsian conception of reflective equilibrium.

INTRODUCTION

In a 1943 speech, Philip B. Fleming said to the American Association of State Highway and Transportation Officials:

> The highway planner needs to approach his task in a prayerful attitude. He is building not only for the present but for the long future, and thereby helping to shape the coming pattern of our civilization.[1]

This observation provides our point of departure and can be seen in the light of subsequent events that transformed highway planning from a speculative exercise into actual highways built out of concrete and asphalt at a scale that shaped the landscape and the society of America. President Eisenhower signed the Federal Aid Highway Act on June 29, 1956, initiating the construction of the US Interstate Highway System (the full name of which is the Dwight D. Eisenhower National System of Interstate and Defense Highways). The following year, in a speech delivered in November 1957, Eisenhower had this to say of planning:

> Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: the very definition of "emergency" is that it is unexpected, therefore it is not going to happen the way you are planning.[2]

Today in regard to space we are in a similar situation to that of Fleming. For Fleming, there were automobiles, there were roads, and there were

1 Philip B. Fleming, speech of December 1, 1943 to AASHO (THM), quoted in Earl Swift, T*he Big Roads: The Untold Story of the Engineers, Visionaries, and Trailblazers Who Created the American Superhighways* (New York: Mariner Books, 2018), 143.

2 Remarks at the National Defense Executive Reserve Conference, November 14, 1957. In an earlier speech Eisenhower had quoted a soldier as saying, "Peace-time plans are of no particular value, but peace-time planning is indispensable."

plans for more of both, but as yet no grand undertaking to plan or build a highway system. Today, there are spacecraft and there is spaceflight, and there are plans for more of both, but there is as yet no grand plan undertaking the construction of a space infrastructure that would realize the dream of humanity living, working, and playing in space at the scale of civilization. That is to say, we are now at the point of making plans for humanity in space that will someday be useless, even while the exercise in planning may be useful, and indeed indispensable.

How shall we make our plans for humanity in space—plans that ultimately will be useless in the future—an exercise that was nevertheless indispensable? We can, following Fleming, seek to do so in a prayerful attitude. What does this mean for space development plans, or what ought it to mean?

One meaning can be found in the book *Chasing New Horizons: Inside the Epic First Mission to Pluto* by Alan Stern and David Grinspoon. The book described how the New Horizons team used the acronym SHBOT—pronounced like shabbat—for safe haven bail-out trajectory—in their scenario planning:

> [Alan Stern] loved the way this word injected a little note of prayerful hopefulness as they prepared to confront the unknown hazards.[3]

Our plans, then, may inject a note of hopefulness in spite of the unknown hazards—what Eisenhower called unexpected emergencies—that may help to get us through the rough patches of space development when things go awry. And events certainly will, at some point, go awry, dashing our hopes, and making our plans look foolish. As Robert Burns famously put it in "To a Mouse":

> The best laid schemes o' Mice an' Men
> Gang aft agley,
> An' lea'e us nought but grief an' pain,
> For promis'd joy![4]

Like Burns, we look backward on prospects drear and look forward in fear, but the prayerfulness remains, even when our plans fail us, and it is the prayerfulness that is passed along intact from planners to builders of infrastructure, and from builders to those who will use the infrastructure, so that there is a continuity of tradition implicitly invoked by prayer that informs our disappointed hopes in abortive plans and that allows us to carry on to plan again and to find a new receptacle for our hopes. Santayana formulated this admirably: "those pray most who care most, and who, having worked hard, find it intolerable to be defeated."[5]

The prayerful attitude, in contradistinction to prayer itself, is illustrated in a Preface to a collection of prayers of St. Anselm, which provides careful guidance on the proper frame of mind for prayer:

> The purpose of the prayers and meditations that follow is to stir up the mind of the reader to the love or fear of God, or to self-examination. They are not to be read in a turmoil, but quietly, not skimmed or hurried through, but taken a little at a time, with deep and thoughtful meditation.[6]

It may be difficult for us today to imagine someone of the eleventh century considering themselves to be so busy that they would skim and hurry through St. Anselm's prayers in a turmoil, but Anselm would not have made the admonition had he not experience of it. With the pressures of contemporary life, this tendency has only been magnified, and one can easily suppose that the highway planner, or the planner of space development, would succumb to this tendency if the effort is not made to pull back from the press of business and to pause for reflection.

Let us turn to an explicit definition of prayer to understand how prayer can afford this withdrawal from the immediate demands of the world to pause for reflection. We find two definitions of prayer in *Basic Modern Philosophy of Religion* by Frederick Ferré:

> that aspect of worship involving the conscious entertainment in thought and affirmation in will of the sacred.[7]

Is this conception of prayer still possible given the disenchantment of the world? Arguably, naturalistic philosophy, and the science and technology built upon naturalistic philosophy, make this no longer a living choice for many. But Ferré offered another definition of prayer that remains a living option even in a naturalistic context:

> the affirmation, however it may be symbolized, of a value-ordering that, whether manifested well or badly in daily affairs, remains normative for one's life.[8]

3 Alan Stern and David Grinspoon, *Chasing New Horizons: Inside the Epic First Mission to Pluto* (New York: Picador, 2018), 205.
4 Robert Burns, "To a Mouse," 1785, https://www.scottishpoetrylibrary.org.uk/poem/mouse/.
5 George Santayana, *Reason in Religion* (New York: Collier Books, 1962), 32.
6 Saint Anselm, *The Prayers and Meditations of Saint Anselm with the Proslogion* (London: Penguin, 1973), 89.
7 Frederick Ferré, *Basic Modern Philosophy of Religion* (New York: Charles Scribner's Sons, 1967), 449.
8 Ferré, *Basic Modern Philosophy of Religion,* 449.

This points to both the continuing aspiration to an ideal and to the need to order our values in a way that allows us to make choices when faced with difficult decisions. And in difficult decisions we may find ourselves in two minds despite our attempt at an explicit value-ordering. Montaigne suggested he could light a candle to both Saint Michael and the dragon he slew:

> To tell the truth—and I am not afraid to confess it—I would as readily, in case of need, burn one candle to Saint Michael and another to the dragon.[9]

The value-ordering expressed by Montaigne's ambiguous and perhaps divided sense of the sacred is something we well recognize in our own complex and ambiguous time; Montaigne lived through social and religious conflict, plague, and political upheaval, and yet he retained his humor, his sanity, and this rationality intact, despite his tumultuous times. This is a lesson to all of us.

The divided sense of the sacred Montaigne countenanced might yet, through an effort of synthesis, be reconciled in a larger framework. The concept of prayer can encompass the personal growth that follows upon exploration, and it can restore the wholeness to which we aspire no less than we aspire to our ideal, as in this passage from Hegel:

> The absolute idea may in this respect be compared to the old man who utters the same creed as the child, but for whom it is pregnant with the significance of a lifetime. Even if the child understands the truths of religion, he cannot but imagine them to be something outside of which lies the whole of life and the whole of the world. The same may be said to be the case with human life as a whole and the occurrences with which it is fraught.[10]

For humanity in its infancy, most of the whole of life and the whole of the universe has stood outside and unconnected to our terrestrial experience. The prayerful attitude of the highway planner as applied to planning humanity's expansion into extraterrestrial space, subject as these plans will be to continual revision, is the child's prayer in the absence of experience only to be acquired with age.

There may come a day when humanity can look back upon its growth of spacefaring experience and all the hope and uncertainty that will accompany our expansion into extraterrestrial space. Like the old man reciting a prayer he knew already as a child, we may understand the same words in ways fulfilled by a lifetime of experience. The meanings of the words change, growing in meaning and gaining in depth, but the value-ordering, whether manifested well or badly in carrying through plans, remains normative. It, too, grows in meaning and gains in depth, but it is recognizable throughout as the ideal to which we aspire individually and collectively.

William James in *The Varieties of Religious Experience* identifies prayer in its "wide sense" as "every kind of inward communion or conversation with the power recognized as divine," insisting that "real work" is done is prayer:

> The fundamental religious point is that in prayer, spiritual energy, which otherwise would slumber, does become active, and spiritual work of some kind is effected really.[11]

James does not define what real work is in this context, but clearly, he intends that the prayerful attitude is not mere meaningless ritual. Despite the temperamental conflict between James and Santayana, Santayana *does* define the work that is done in prayer:

> In rational prayer the soul may be said to accomplish three things important to its welfare: it withdraws within itself and defines its good, it accommodates itself to destiny, and it grows like the ideal which it conceives.[12]

Santayana's conception of prayer is integral with

9 Michel de Montaigne, T*he Autobiography of Michel de Montaigne,* ed. and trans. Marvin Lowenthal (London: George Routledge & Sons, 1935), 273. Montaigne has been translated many times. Other translations clarify that, in this passage, Montaigne is referencing a story told by John Calvin (Michel de Montaigne, *The Complete Essays* [London: Penguin Books, 1991], 894). However, Lowenthal's rendering best suited present purposes. This remark by Montaigne occurs in the first essay of Book III; earlier in Book I, in essay fifty-six, Montaigne devoted an entire essay to prayer, revised in later editions in light of criticism. Montaigne's essay "Of Prayer" is largely concerned with the hypocrisy of those who fail to be equal to their prayers, venturing that, "Our soul must be pure, at least for that instant when we make our prayer, free from the weight of vicious passions" (Montaigne, *Complete Essays*, 356–57). Believed to be a secret rigorism on Montaigne's part, this drew the attention of censors.

10 G. W. F. Hegel, *Hegel's Logic: Being Part One of the Encyclopedia of the Philosophical Sciences* (1830) (Oxford: Clarendon Press, 1975), 293, para. 237. This work is often referred to as the "Lesser Logic."

11 William James, *The Varieties of Religious Experience* (1902; repr. New York: New American Library, 1958), 361. Two other passages in *The Varieties of Religious Experience* echo this idea: "Through prayer, religion insists, things which cannot be realized in any other manner come about: energy which but for prayer would be bound is by prayer set free and operates in some part, be it objective or subjective, of the world of facts" (353). And, "prayer or inner communion with the spirit thereof— be that spirit 'God' or 'law'—is a process wherein work is really done, and spiritual energy flows in and produces effects, psychological or material, within the phenomenal world" (367).

12 Santayana, *Reason in Religion*, 34.

his conception of the life within which prayer is effective, and it moreover converges upon a mature, rational, and refined spiritual life on the part of humankind, in which:

> Prayer, by confronting the ideal with experience and fate, tends to render that ideal humble, practical, and efficacious.[13]

Bringing together the ideal with experience, as Santayana suggests takes place in prayer, involves a process of arriving at what John Rawls called *reflective equilibrium,* in which, according to Rawls:

> By going back and forth, sometimes altering the conditions of the contractual circumstances, at others withdrawing our judgments and conforming them to principle, I assume that eventually we shall find a description of the initial situation that both expresses reasonable conditions and yields principles which match our considered judgments duly pruned and adjusted. This state of affairs I refer to as reflective equilibrium. It is an equilibrium because at last our principles and judgments coincide; and it is reflective since we know to what principles our judgments conform and the premises of their derivation.[14]

In other words, the value-ordering reflected in prayer engages with the actual experience of values as experienced and realized in life, and this engagement takes the form of pruning and adjusting both until they coincide. For the planner of highways or space development, what this means is that the dialogue among stakeholders in the planning process will be a give and take of both principles and judgments that we wish to see exemplified in the completed development. The dialogue forces us to take account of the views of others—"an equilibrium that is both wide—in the sense that it has been reached after careful consideration of alternative views—and general—in the sense that the same conception is affirmed in everyone's considered judgments," in the words of Hao Wang.[15] We sometimes revise our principles, and we sometimes revise our judgments. Over time, this back and forth of revision of principles and judgments brings us closer to an equilibrium in which our principles explain our judgments and our judgments bear out our principles.

We can use the Rawlsian conceptions of reflective equilibrium, considered judgment, and due reflection to illuminate the concept of due regard as it appears in the 1967 Outer Space Treaty (Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies), which we may regard as the minimal framework within which initial space exploration and development has taken place and will continue to unfold. The treaty states:

> States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the Moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty.[16]

If we view due regard as roughly equivalent to Rawls's due reflection, we can see that due regard would mean a reflective equilibrium among states party to the treaty, achieved presumably from a wide and general consideration of the principles and judgments held by states party to the treaty, in which corresponding interests have been brought to something like an equilibrium through a process of the mutual revision of principles and judgments that bring the two nearer until they approximately coincide.

We have no guarantee that such an equilibrium can be achieved, or that our principles and our judgments can be made to converge, and indeed Rawls observes that reflective equilibrium is an ongoing process, which we would expect in the light of changed circumstances. Any great change in civilization, in society, in culture, entails changed social roles, and perhaps also changed principles and changed judgments. Space development at the scale of civilization would be such a change that would entail ongoing disequilibrium of the society engaged in large scale space development; we return to this below.

In the planning of a future human civilization in space, we try to anticipate, to manage, to organize, and to tame social change that could be chaotic if it is allowed to get out of hand. This is very much of a piece with the scientific effort to manage and to organize our experience. Science has a dual role in both exploring the world and organizing the knowledge gained through exploration. There are many parallels

13 Santayana, *Reason in Religion,* 35.
14 John Rawls, *A Theory of Justice* (Cambridge, MA: Harvard University Press, 1971), 18.
15 Hao Wang, *A Logical Journey: From Gödel to Philosophy* (Cambridge, MA: MIT Press, 1966), 349–50.
16 United Nations, "Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," January 27, 1967, United Nations Treaty Series, vol. 610, no. 8843, https://www.unoosa.org/oosa/en/ourwork/spacelaw/treaties/introouterspacetreaty.html.

here with space exploration and space development. Space planning, exploration, and development will have a dual role of discovery and organization of the cosmos beyond Earth; for organization we can plan, but discovery is a wildcard that can throw our plans into confusion.

This is a familiar theme that is related to the Eisenhower quotes above about plans and planning. Before Eisenhower, Helmuth von Moltke wrote in 1871 the now well-known observation: "No plan of operations extends with any certainty beyond the first encounter with the main enemy forces" ("Kein Operationsplan reicht mit einiger Sicherheit über das erste Zusammentreffen mit der feindlichen Hauptmacht hinaus").[17] We know that our plans for space development will not survive their first encounter with the actual history of human beings in space, so that our carefully planned agenda will have to be altered continually in the light of unexpected developments. The discoveries we make will influence our judgments, and we may see the need to engage in less programmatic efforts at discovery, i.e., efforts less carefully constrained by an explicit agenda, to anticipate the unexpected better. That is to say, ultimately, we may be forced to plan less and to explore more.

There is a sense in which exploration is the acting out of scientific experimentation. In experimentation, the observer remains constant, part of the controlled conditions of the observation, while the independent variable is allowed to run its course and the dependent variable in the experiment is monitored; in exploration, the observer is immersed in the world observed, and so becomes the dependent variable responding to the independent variables encountered in exploration; exploration is a role reversal of experimentation. Historically, the Age of Exploration coincided with the Scientific Revolution; we should see both exploration and experimentation as two aspects of the same human impulse to discovery.

We have something to learn about the relationship between planning and exploration from the relationship between experimentation and exploration. Scientific experimentation, especially in the big science of today, using instruments that cost billions of dollars, is a carefully planned enterprise. The large hadron collider (LHC) was built not to explore, but to confirm or disconfirm several well-established theories about fundamental particles. That is to say, the research program of the LHC, and thus the specifications to which it was built, is freighted with presuppositions, and observations made at the LHC are heavily theory-laden, much more so than the observations of ordinary experience. Still, the LHC is the world's most advanced instrument for exploring the world of high-energy particle physics, and, as a consequence, it makes discoveries.

The spacecraft that we build, and the space transportation infrastructure that will be part and parcel of space development, will also be heavily freighted with presuppositions. The design specifications for our space transportation infrastructure will be derived from the planning we do now for space development. This will constrain exploration at the same time that it will make further exploration possible. At least for the time being, we will not be able to engage in exploration as we engaged during the Age of Discovery, or even when the Norse built their longships along sheltered fjords and then raided and traded from Byzantium to Greenland. Because of the changed state of scientific knowledge in the interval between the Age of Discovery and today, we already know a great deal about the environments to which we may travel, and some of what we will find there.

Our planning for space development focuses on founding and developing a stable and prosperous human society beyond Earth, but the unexpected discoveries that will be made in the process of attempting any orderly expansion of human beings into the cosmos will be, in a sense, disorderly. All history is chaotic to a greater or lesser degree. We ourselves may have to adopt a more disorderly approach to exploration to accommodate unexpected discoveries; hence, the reference above to the need for less programmatic efforts at discovery.

An idea that has gained some currency among transhumanists, futurists, and long-termists is that of *moral enhancement* or *moral augmentation*.[18] In some versions of moral augmentation it is argued that we ought to engage in biomedical interventions into human nature to secure a better outcome for the future. While I do not endorse pharmacological or neurobiological interventions in pursuit of the moral augmentation of human beings, what I want to suggest here above all is that exploration is itself a form of moral augmentation. We are *changed* by exploration, and fundamentally we are changed because our world is expanded by exploration, including the expansion of our moral world.

In the expansion of our world gained through exploration we are forced to alter our deliberations for practical reasons. Specifically, according to Aristotle,

17 Helmuth von Moltke, *Kriegsgeschichtliche einzelschriften* (Berlin: Mittler und Sohn, 1883).

18 Ingmar Persson and Julian Savulescu, *Unfit for the Future: The Need for Moral Enhancement* (2012; repr. Oxford: Oxford University Press, 2014).

"What we deliberate about is practical measures that lie in our power.… The effects about which we deliberate are those which are produced by our agency but not always in the same way."[19] With the expansion of human powers due to technology, and the expansion of the scope of human actions due to these powers of technology, the scope of our deliberations is greatly expanded.

Space development, following from human activities facilitated by our technological powers, and space exploration made possible by this facilitation, expands the scope of moral deliberation. There are at least four ways in which this could occur:

1. Space development enables an unconstrained enlargement of the scope of moral deliberation already initiated by existing technological civilization (quantitative increase in moral scale).
2. Space development provides for the indefinite continuity (in space and time) of the enlargement of the existing trend of moral scope enlargement (extrapolation of quantitatively increased moral scale over space and time).
3. Space development enables the enlargement of the scope of moral deliberation in unprecedented directions (qualitative increase in moral scope).
4. Space development provides for the indefinite continuity of moral scope enlargement in unprecedented directions of development (extrapolation of qualitatively increased moral scope over space and time).

The absolute enlargement of human activity (in scope and scale, qualitatively and quantitatively) means an absolute enlargement of human ethical deliberation (in scope and scale, qualitatively and quantitatively). It has been customary for human beings to work through their moral growth through prayer, seeking a reflective equilibrium in our moral growth. Growth is, by its nature, a process of disequilibrium, but we cannot rest in disequilibrium. Prayer, as Santayana argued, "withdraws within itself and defines its good."[20] But after withdrawal, it again projects itself outward into the world.

D. M. Mackinnon wrote, "Moral discovery, growth, advance, however one describes it, is a fact; and if one concedes its possibility, one's general view has to make room for its occurrence."[21] Space exploration is one way in which we can make room for moral discovery, growth, and advance, and space exploration will thus go hand in hand with moral discovery, growth, and advance. We need to recognize this function of exploration, and, as Mackinnon says, make room for its occurrence within our conceptual framework, as we must also make time for the work of reflective equilibrium.

One could argue that space exploration to date, even if it is not authentic human life in space (i.e., not life in an organically emergent human community), has already contributed to moral discovery. Here Exhibit A would be the Overview Effect,[22] which has profoundly influenced the lives of some astronauts, and has influenced the rest of us through photographs like the "Blue Marble" and "Earthrise," both of which are commonly cited in relationship to the environmental movement.[23]

Groping our way toward reflective equilibrium in the context of a society in continual disequilibrium due to change such as exploration, expansion, economic transformation, and so on, means that reflective equilibrium becomes a trajectory of adjustment rather than a fixed goal upon which we converge. It is a moving target as we strive to bring together changing principles and changing judgments. At times, our principles will outstrip our judgments; at other times, our judgments will confound our principles. And here, again, uncomprehending of our principles and perplexed by our judgments, we find prayerfulness, as illustrated by this passage from Gotthold Lessing:

> Not the truth which someone possesses or believes he possesses, but the honest effort he has made to get at the truth, constitutes a human being's worth. For it is not through the possession of truth, but through its pursuit, that his powers are enlarged, and it is in this alone that his ever-growing perfection lies. Possession makes us inactive, lazy, and proud. If God held fast in his right hand the whole of truth and in his left hand only the ever-active quest for truth, albeit with the proviso that I should constantly and eternally err, and said to me: "Choose!", I would humbly fall upon his left hand and say: "Father, give! For pure truth is for you alone!"[24]

Insofar as we extend our powers toward ever-growing perfectibility, without ever achieving a fixed and final perfection (without, that is to say, achieving reflective equilibrium), in our steady and diligent drive, coupled with perpetual error, we clasp the left hand, not the right.

19 Aristotle, *Ethics* (Harmondsworth, UK: Penguin Books, 1984), 118.
20 Santayana, *Reason in Religion,* 34.
21 Donald M. Mackinnon, *A Study in Ethical Theory* (New York: Collier Books, 1962), 278.
22 Frank White, *The Overview Effect: Space Exploration and Human Evolution,* 3rd ed. (Reston, VA: American Institute of Aeronautics and Astronautics, 2014).
23 Robert Poole, *Earthrise: How Man First Saw the Earth* (New Haven, CT: Yale University Press, 2008).
24 Gotthold E. Lessing, *Philosophical and Theological Writings,* ed. and trans. H. B. Nisbet (Cambridge: Cambridge University Press, 2005), 98.