FOREVER FOR ALL

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MORAL PHILOSOPHY, CRYONICS, AND THE SCIENTIFIC PROSPECTS FOR IMMORTALITY

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Forever For All: Moral Philosophy, Cryonics, and the Scientific Prospects for Immortality

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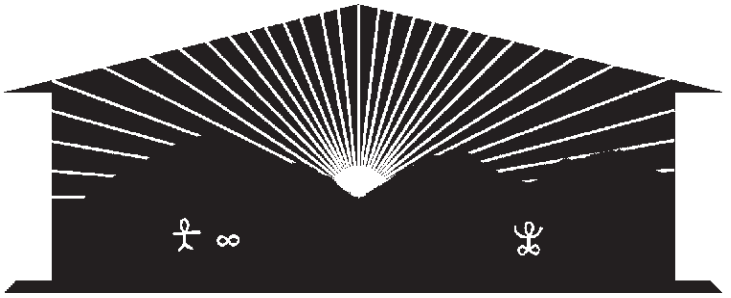
ILLUSTRATIONS

In addition, the Introduction and each chapter have a title illustration.

Introduction



The individual ought to endure—for a life rightly lived is never rightly ended. And life can be rightly lived, I will maintain—which involves much more than a simple release from pain or burdens. Rightly lived, life must offer positive value, a preponderance of satisfaction over dissatisfaction,[1] a meaningful experience that calls for something beyond immediate interests. There must be a growth process in which the prospect of constructive change and the mysteries to be solved are inducements to continue and progress. Living can then become an end in itself, as it should be, and we can shape our philosophy accordingly: Life is fundamentally good, and death, consequently, is a detriment. We can look forward, with joy, to a future with joy. Ongoing developments lend support to this position and call for a reassessment of life's deeper issues.

This book considers the problems of death and the hereafter and how these ages-old problems ought to be addressed in light of our continuing progress. A materialistic viewpoint of reality is assumed, denying the likelihood of supernatural or other superhuman assistance. Death, however, is not seen as inevitable or even irreversible; it is maintained that the problem can and should be addressed scientifically in all of its aspects. The book thus follows recent, immortalist thinking that places hopes in future advances in our understanding and technology. A common ground is sought between two independent strands of this scientific immortalism that so far have been largely separate. There is the cosmological camp that sees immortality, including resurrection of the dead, as a distant future possibility, though outside our

present control. There is another, transhumanist group, however, that maintains that our immortalization is much nearer at hand and supports such ongoing efforts as aging research and cryonics—freezing people at death for eventual reanimation.

Here I offer a philosophical system that incorporates and harmonizes both points of view. A functionalist, reductionist argument is developed for the possibility of resurrecting the dead through the eventual creation of replicas and related constructs. Meanwhile, it is urged, medical advances leading to the conquest of aging and biological death should be pursued. An advisable interim strategy is cryonics or some other means of biostasis—having one's remains preserved for reanimation when, in the relatively near future, technology will arguably be available to accomplish the task. The twin possibilities of eventual, universal resurrection and abolition of death starting from currently available means are not seen as competitive but complementary. Both have a vital role to play in the future that appears to be opening. Our resulting philosophy, encompassing both past and future, is directed toward the long-term interests of each sentient being. It thereby acquires a moral dimension. The immortalization of humans and other life-forms is seen as a great moral project and labor of love that will unite us in a common cause and provide a meaningful destiny.

The general plan of the book is first to lay groundwork, then treat the main topics, the Philosophies of Assurance, Aspiration, and Action, in greater detail. The book is intended for a general audience, and I have tried to make it reasonably self-contained. Interest and a willingness to do some hard thinking are more important than advanced learning in one specialty or another. Concepts and relevant details are introduced as needed, with references, and a glossary is included. The treatment will, of course, be far from exhaustive—many more questions are raised than are answered or can be at our present state of knowledge. I hope that brevity here, whether remedied in existing sources or not, will serve as a catalyst for more thought and action. I invite the reader to take part. The philosophical tradition I would establish needs much development.

Some starting familiarity with the ideas of modern physics and computer science will be helpful. A perusal of the glossary may be useful as a starting point (and will introduce philosophical as

well as scientific concepts). The following references are also recommended for a general background, to be consulted as the reader finds appropriate.

For quantum mechanics—the most important part of physics for purposes here—a short, readable reference is *Quantum Reality* by Nick Herbert. For additional background on the important many-worlds hypothesis, which is somewhat inaccurately treated in the otherwise excellent book by Herbert, I recommend *The Fabric of Reality* by David Deutsch. A good, short introduction to computer science is *The Pattern on the Stone* by Daniel Hillis; a useful longer reference is *The Turing Omnibus* by A. K. Dewdney. Other pertinent references are *The Physics of Immortality* by Frank Tipler, *Engines of Creation* by Eric Drexler, and *The Prospect of Immortality* by Robert Ettinger.

Occasionally in the text there is a need for large numbers, and standard scientific notation is used. Therefore, thirty-one million (31,000,000) is written 3.1×10^7. More generally, 10^n with n a positive whole number means 1 followed by n zeros or 10 multiplied by itself n times. More generally still, m^n (m to the n or nth power) means m multiplied by itself n times; n itself is rarely a number that is also expressed in this way, that is, as p^q, so that we have m^{p^q}. In addition, subscripts are occasionally used in the usual way, that is, with no special mathematical meaning but only to distinguish one object or thing from another: persons P_1 and P_2 ("p-one" and "p-two") for instance.

Superscripts are also used in a nonmathematical sense to indicate endnotes; the distinction should be clear. Endnotes are essentially referential; I have made an effort to incorporate all relevant, expository material in the main text.

Following this Introduction, immortalization is presented as a scientific and technological problem, and a more detailed overview is given of the main topics covered. Next is a summary of related ideas stretching back to ancient times. A discussion then follows of the surprising resistance that is often seen to the idea of immortality, particularly to achieving it scientifically, with some thoughts on how the objections might be answered. The philosophical system of the book, which is given the name Yuai, is then outlined in detail. An important issue is that of personal identity. I offer a theory, based on functionalism, in which psychological connectedness with the past self is crucial, but continuity,

whether physical or psychological, is not essential. This is further developed in later chapters.

A discussion of scientific perspectives then leads to a chapter on Unboundedness—that in some reasonable sense, all the possible histories are real. One physical theory that strongly favors Unboundedness is the Everett many-worlds formulation of quantum mechanics. It also has interesting scientific support and has been endorsed by some leading physicists, including most quantum cosmologists, though I do not think the case for it is closed. But it does furnish significant evidence that the viewpoint developed here is valid, and I have devoted extra space to it, while not overlooking alternatives. A chapter then follows on Interchangeability—that like objects share "identity." This is the link between the ideas on personal identity and those of physics, and it supports the possibility of resurrections of past individuals under general conditions.

Next is a chapter dealing with persons as digital phenomena, supporting psychological reductionism and functionalism. Chapters follow on nanotechnology, theological implications of immortality, the ultimate prevalence of good over evil, resurrection, the desirability of preservation or biostasis after death, and immortality. A more detailed treatment then follows, in three successive chapters, of the Philosophies of Assurance, Aspiration, and Action. Some deeper ontological issues are addressed, with an eye toward tying loose ends and forming a unified whole, and matters of a more practical nature are then considered.

Nanotechnology and other advances, I argue, offer a coming age of immortality and place it near the present, perhaps within decades, and also require active participation. A program for one's personal immortality is indeed a realistic and advisable course to follow. Morals, logic, basic physics, and our advancing capabilities all play a part in what I advocate as a Philosophy of Action. Along with sensible, benevolent conduct and the fostering of research I make an appeal for the practice of cryonics or some other strategy of biostasis. In these ways a bridge can be formed between our present condition and a wonderful Apocalypse that surely is coming. A concluding chapter contrasts the present world situation with what the future might and ought to bring, with a final appeal to take seriously the prospect of a transition to a more-than-human status.

Today the thinking is often far removed from the viewpoint that a beneficent Apocalypse is soon to happen, one that will be engineered by our own civilization. In fact, swaying opinion in the direction of seeking immortality through science will no doubt continue to prove difficult, as it has during the several decades that the cryonics movement has been in existence. A good part of the problem, no doubt, is that advances are required that have not yet been made. Scientific research—always of a constructive sort—should accordingly be commended and encouraged. It will be the ultimate arbiter. But it will not happen unless it is seen as worth pursuing.

In this book I have attempted to offer at least some new possibilities for trying to influence public opinion in the right directions. With acceptance of the right outlook, necessary progress will be fostered, and something better subsequently will be made of the situation that confronts us today. Hopefully some who have not otherwise been interested will find what is said here reassuring and decide to make a bid for whatever science can offer them toward personal immortality. In addition to the humanitarian aim this would serve, if the quest for extended life should prove successful, a more favorable public will benefit the existing immortalist movement, promoting progress and creating a better world for all.

On a personal level, I hope you, the reader, will think over the ideas offered here and be assured, despite any initial misgivings. Resolve to stay as healthy as possible and be optimistic about the prospects of research that will lengthen the life span. But do not hesitate to go further. Choose a biostasis program for yourself as a backup if you have not already done so. Try to influence others into habits favoring life extension, along with other good behavior, and remind them of the biostasis option too.

We have a world to gain, the like of which has not been seen. It is in no sense improper that we should seek this immortal habitation on our own. Such an outcome is good and proper and to seek it morally exemplary. Anything less is both inadequate and unworthy. We will have to make it happen ourselves—and there is reason to think we can. It is comforting, once we are past the initial barriers, to approach this great and beneficial project in the best way possible. An important part is to do what we can to

further our own participation. We need to plan and act, as far as possible, for our continuing presence in this world.

CHAPTER 1.

Heaven by Design

Science, technology, and other rational pursuits are making unprecedented strides in our time, conferring great and growing powers to achieve desired aims. The potential for misuse abounds, and is tragically realized from time to time, yet overall the trend can be viewed with optimism and hope. For an Apocalypse is looming, one of our own choosing and making, that will radically transform life as we know it. Handled correctly it will bring no catastrophe—except to the minions of tragedy itself—but will instead herald the fulfillment of many ancient dreams, and furnish the gateway to a glorious, more-than-human future.

It is fitting and proper that we pursue an inspired course of development and seek to transform ourselves into greater beings. Many may think it unlikely, but the means to accomplish this—literally remaking ourselves as higher creatures—appear within reach, if not yet realized or guaranteed. Much remains unknown and undeveloped, yet by serious estimates the prospects are awesome. Such fundamentals as human biology and physiology could be greatly enhanced or bypassed, and life could advance in ways now scarcely imaginable.

Many approach such possibilities with foreboding, conjuring up nightmare visions of technological horror, as if only bad could

ever come from sweeping change. This, I submit, is unduly pessimistic and one-sided. Surely a more sensible reaction is first to reflect upon our current status and then ask if reasonable improvements could be made and ought to be pursued. A basic question then arises: what ought we to want? What ought to be that we should be devoting our best efforts toward bringing it about and resting our hopes and aspirations in the successful outcome?

It is no small matter to address the question of what ought to be, especially when we try to look beyond immediate concerns to a larger and more meaningful picture. Here, however, we are in good company: The great question has been contemplated through the ages, and there is something to gain by studying opinions both ancient and modern from an objective standpoint. One of the things that strikes the inquirer is how fantastic are many of the common notions of what ought to be and how seemingly remote their possibilities of realization.

The reason seems simple enough. Many would agree that there are shortcomings in the human condition that one might like to overcome—but the means are not at hand. The main shortcoming of this sort is the finite life span. People seek something more than this present existence. They would instead prefer a reasonable immortality, a good life beyond the death that up to now has been the lot of living things on Earth. That immortality in some form is our rightful destiny is, to such a viewpoint, no idle thought or daydream but a deep-seated conviction of the most serious sort. This conviction has been arrived at often and independently, as the records of numerous cultures attest, and in it people have seen fit to rest and defend their hopes, in the face of formidable obstacles. Indeed, many have willingly faced death rather than renounce their particular ideas and practices regarding a hoped-for immortality. This is all the more remarkable in that no shred of material, verifiable evidence exists that anyone has ever achieved immortality or a life after death. Something so problematic and challenging, a hope up to now unsubstantiated, has been a necessity to many; among them I number myself.

Increasingly we face a challenge to such a hope: Scientific evidence casts doubt on the possibility of supernatural or other superhuman assistance in our quest to overcome death. Without such assistance, many have assumed that our chances of success must be nil. This has never been demonstrated, however; the lim-

its to what are achievable scientifically and technologically, by ourselves, are unknown. Astonishing advances have already occurred, particularly over the last century, and appear to be accelerating. Moreover, any assessment of our ultimate potential must take into account possible enhancements we could engineer in our own physical makeup, including improvements in intelligence. Arguably, such enhancements will become feasible as our knowledge increases and will then help further both understanding and progress. Where it will lead will depend on the values and aspirations that come into play as the advances are made. Immortality is not precluded; even self-engineered, eternal salvation must be regarded as a possibility.

The recognition of this possibility, and, more generally, of both the promises and the perils of the developing technological picture, becomes a vital issue in its own right. It is something we must undertake, to reassure us and to help inform and guide our decision-making, and it calls for an appropriate philosophical outlook. Such an outlook—in which scientific methods, generally yet to be developed, are to be employed to accomplish what had been thought to be the prerogative of mystical forces or higher powers—attaches to what may be called a *scientific teleology*.[1] More generally I would define scientific teleology as the branch of philosophy dealing with the possible role of sentient agents in shaping the reality they inhabit to suit their own, long-term needs and purposes. Specifically it concerns our efforts to become immortal and more-than-human through scientific means and to create habitations and develop lifestyles conforming to this sought-after status. Some works devoted wholly or in part to scientific teleology in this intended sense are John Barrow and Frank Tipler's *Anthropic Cosmological Principle*, Freeman Dyson's *Infinite in All Directions*, Hans Moravec's *Mind Children*, Tipler's *Physics of Immortality*, and David Deutsch's *Fabric of Reality*. Somewhat older works exploring interesting areas of scientific teleology are Robert Ettinger's *Prospect of Immortality* and its sequel, *Man into Superman*.

Among these writers, Tipler in *The Physics of Immortality* offers an explicitly theological, if still scientific, vision of the future and also has the most elaborate and daring scenario for a life beyond current limits. His viewpoint is that "theology is nothing but physical cosmology based on the assumption that life as a

whole is immortal."[2] He offers "a testable physical theory for an omnipresent, omniscient, omnipotent God who will one day in the far future resurrect every single one of us to live forever in an abode which is in all essentials the Judeo-Christian Heaven."[3] He proposes to define all his theological terms, including God and Heaven, as "pure physics concepts," and in all arguments to appeal only "to the reader's reason."

The present work, though related in scope and purposes, is more conservative scientifically and more skeptical theologically than Tipler's, a position that seems warranted by both the extent and lack of our knowledge and by the way the world seems to work. I offer a scientific teleology but with the emphasis on philosophy rather than hard science. There is no attempt to encompass the whole in a testable, physical theory. Such efforts as Tipler's are useful and even commendable but also hazardous given present uncertainties and the difficulties of trying to do so much in one mighty swoop. Instead, I think there is need for a more general, more robust if less scientifically ambitious approach. Our hoped-for scenario should be realizable in more than one version of reality and adaptable to a variety of "the shafts of impartial evidence"[4] that scientific probing may present. As for the theological issue, along with some others and contrary to Tipler, I will argue against the existence of God as traditionally understood, though not against all possible conceptions of what can be considered divinity. But the focus is on our developing selves as the rightful shepherds of our own future, and the scientific methods by which we will arrive there.

Though the emphasis is to be philosophical, the position I wish to articulate is to have a rational, materialistic basis—something that may be reducible to a testable theory when more is known. There are real prospects for solving the problem of death and other human limitations through scientific means, as the authors cited and others have ably argued. We will explore these arguments, which are interesting enough, though often remote from everyday experience. A case will be made that immortality for all who have ever lived is attainable and quite possibly inevitable. But I will argue, additionally, that there are things we can and should be doing now to further our cause in eternity, though much that now engages the popular imagination is excluded.

Thus there will be no appeal to the possible utility of super-

natural powers, paranormal abilities or mechanisms, violations of generally accepted physics, and such fantastic occurrences as visits by spacefaring aliens. Mysticism, in the sense of belief or trust in a reality that is not accessible through reason, is not accepted as a valid approach to solving problems, including the problems of death and the hereafter. Wonder, awe, fascination, and reverence for the majesty and mystery of existence are not at all precluded by the rational approach I propose as a substitute. Instead, we can feel a keen and even enhanced appreciation of the reality that surrounds us as we strive to attain a greater presence within that reality through our own, rationally guided efforts. In place of the God of tradition, I echo the thought that we are becoming a sort of deity ourselves—and we must help ourselves. Progress now demands a fresh, new viewpoint. A supreme privilege and opportunity is presenting itself—but it also carries an awesome responsibility.

We must put our trust in material reality and the rules that govern its properties, but I do not mean by this to suggest a light or superficial treatment of the issues at hand. As for personal survival, I firmly discount a reinterpretation such as "survival" through works, offspring, reputation, or an essence or "further fact" that carries no memory of an earlier existence. The requirements of survival can only be met by a functioning individual with characteristics reasonably connected to, and who identifies with, some previously extant, actual person. There must be authentic recollections of an earlier self, a genuine and accepted feeling that "I was there and I am now here."

Infinite or unbounded survival becomes immortality, a state that, as will be understood here, does not preclude the possibility of death or a cessation of vital functions. But if death comes it must be temporary, to be terminated always by a suitable reanimation or resurrection, with consciousness, recollection, and self-awareness. The problems associated with immortality are challenging ones, at least if they are to be treated scientifically, as I propose here and others have attempted. Conventional approaches involving familiar things are inadequate. There must be some appeal to extraordinary means, though I insist that it need not transgress the bounds of scientific plausibility, if we use a reasoned approach and allow for extrapolation beyond our present level.

The Paranormal versus the Scientific

Some clarification of terminology will be useful. By *supernatural* I refer to any phenomena that are incomprehensible through a scientific approach. I mean by this that not only is scientific understanding lacking now, but that it is impossible in principle. Something significant must be involved that is inherently beyond our powers, even allowing for reasoned advances we may make in the future, including the improvement of our intellect. Typically the significant something is a mind or sentient agent, for example, a God, angel, or ghost, which is not subject to the usual scientific laws and cannot be understood on those terms. This then is a kind of animism, or belief in extracorporeal, largely unseen, intelligent agents. It is probably the principal supernatural belief, though other forms are possible too. Synonyms for *supernatural*, in this intended sense, are *parascientific* and *mystical*.

Paranormal, on the other hand, will have larger scope and refer to such additional effects as alien visitations, which might indeed, if they occurred, have a scientific explanation but appear highly unlikely for other reasons. Included also are the more "usual" paranormal effects, such as clairvoyance, telekinesis, and (literal) out-of-body experiences—all of which do, at present, seem scientifically untenable. Logically, there could be a scientific explanation of these effects and others, including even a sentient God, but all would still qualify as paranormal in the intended usage. The paranormal thus will be inclusive of all the commonly alleged features of reality that I feel are doubtful and thus not to be taken seriously, whether we regard them as within the scope of understandable science or not.

Many claims of the paranormal, of course, are advanced by sincere advocates who are convinced of their truth. These claims are deserving subjects of rational inquiry and should not be dismissed out of hand. A few organizations, such as the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) have taken up the challenge and tested such claims as best they could. So far, no paranormal effects have been scientifically verified or demonstrated.

It is worth noting too that some scientific possibilities seem remote but perhaps are not to be dismissed lightly, an example

being backward time travel. Strictly speaking, I think it is ruled out by the "grandfather paradox" in which the time traveler changes history—family history, in this case, say, by kidnapping her infant grandfather—thus preventing her own existence! However, something close to backward time travel may be possible (and there may even be ways a traveler could avoid the grandfather paradox, if careful). Such possibilities, though, I have conservatively ruled as unlikely and not to be relied on. Other projected advances such as nanotechnology (the controlled manipulation of matter at the atomic scale, demonstrated to a limited though impressive extent already) do seem feasible and will be important. In any case, claims today of having traveled back in time or visited distant galaxies will and should be classed as paranormal, and are discounted accordingly.

"Extraordinary claims require extraordinary evidence," astronomer Carl Sagan was fond of saying,[5] following Enlightenment philosopher David Hume.[6] This is a good principle always to keep in mind; I will try to heed it here. Many extraordinary claims, of course, lack the corroborating, extraordinary evidence they ought to have and thus may be discounted, but not all. One well-known extraordinary claim, for which extraordinary evidence was found, was that stones fall from the sky—meteoric impacts have been well documented. Another is that species originated by evolution, which has been backed rather spectacularly by the fossil record and other biological clues. Another still is that material objects are made of atoms, a hypothesis that much physical and chemical evidence now supports, including direct inspection with scanning probe microscopes. Still another, that a moon landing is possible, was established beyond dispute by doing it, though in this case we had good evidence it could be done before it actually was. The list goes on.

The position that the problem of death is solvable by ourselves, scientifically, certainly makes some extraordinary claims and indeed, is one itself—though not about things that have been seen or that are outside rational understanding. Instead it is about things that could happen, and hopefully will, and certain, observed features of reality that are understandable through reason. It thus does not fall within the scope of the paranormal as I have defined it, though this, of course, is not by itself a vindication. Evidence for and against the position and its supporting claims must be

considered. Extraordinary and, I will maintain, interestingly favorable and confirming evidence comes from an appraisal of reality as it appears to be, something that is subject to empirical testing, with the possibility of falsifying cherished hypotheses. Some of this evidence, amply tested already, is simply the incredible things uncovered in our scientific investigations and our dazzling technological achievements, both of which point to things even more amazing.

Still, the picture is incomplete. Ideally we would hope that the scientific principles on which we base our projections would be thoroughly tested and verified first. Someday this may be so, but for now some compromises are necessary if, in our philosophy of what is to come, we are to arrive at anything approaching a satisfying completeness. Although it might then be objected that we are building castles in sand, I think that the evidence, such as it is, is enough to warrant the sort of optimistic synthesis I have attempted.

Some of the scientific underpinnings I will rely on, then, are presently controversial and lack anything approaching full verification. I expect that evidence increasingly favorable to them, and to the overall case to be made, will be obtained over time through research and development. Yet there is also the possibility of contrary and invalidating evidence, or continuing, unyielding uncertainty. Care is needed to make the arguments as sound as possible in the face of these difficulties.

Toward this end I will call upon, and present arguments for, two principal hypotheses about reality, the "UI" assumptions, as follows: (1) *U*nboundedness—in the whole of existence, all possible, finite histories actually happen; and (2) *I*nterchangeability—like entities share "identity," or a variant of the pattern or form theory of identity. How these principles are to be understood will become clearer as we proceed.

Unboundedness is a claim about physical reality. It asserts that, in the whole of existence, not necessarily confined to the visible universe, a very wide variety of conditions and happenings must occur and recur. So wide are the possibilities that beings like ourselves must also occur and recur, accompanied by essentially all variations of events, including but not limited to the happenings we have actually observed. Though it may seem farfetched, Unboundedness is not at variance with some of our present physi-

cal theories, which postulate a profusion of universes besides our own, opening the door to alternate histories. These theories are straightforwardly materialistic, invoking no supernatural or paranormal elements.

Interchangeability is a philosophical position that is a strong version of the "Identity of Indiscernibles." Based on a theory of mental processes known as functionalism, it is intended mainly to apply to persons as they perceive themselves—self-perception seen as of primary importance in defining a person. Interchangeability will open the possibility of resurrecting a person by creating a copy. Unboundedness meanwhile will ensure that the necessary conditions for creating the copy occur. Taken together, the UI assumptions imply Tipler's conclusion that life "as a whole" is immortal—and, very significantly, that each of us individually is immortal.

Naturally, such sweeping conclusions call for substantial supporting arguments. The two assumptions, in any case, must not be taken as dogmas but instead are to be viewed as working hypotheses. More will be said later that bears on them, and relevant scientific and philosophical arguments will be examined at length. More generally, the whole system developed here will rest on various working hypotheses, as must any system claiming a scientific grounding. These hypotheses can be questioned and possibly, though not necessarily, modified, discarded, replaced, or supplemented. Meanwhile, and always provisionally, they can furnish assurance about life and its meaning.

In this work the assurance will depend, in large part, on a claim about what we can accomplish for ourselves with a rational approach and continuing, dedicated commitment. This claim itself, that we can engineer our own, meaningful, immortal existence, is most extraordinary, and requires extraordinary evidence, which I will try to provide. Yet it is a limited claim, calling upon nothing beyond our own efforts using reason, critical inquiry, scientific methods, and technology—though generally at levels not yet achieved or even, in many cases, remotely approached. Thus I imagine a vast project, starting with ourselves of today and all our limitations, but expanding, adapting, developing, over unlimited reaches of space and time. The desired, happy outcome should be achievable, given enough time and dedication, and provided we do not destroy ourselves instead. The realization of this