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PARADISE, THE APOCALYPSE AND SCIENCE: The myth of an imminent technological Eden

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Abstract: Scientistic authors in the latter half of the 19th century and the early 20th century, such as Ernest Renan and H.G. Wells, discounted revealed religion. Yet they believed in the secular myth of an imminent technological Eden and they elevated science itself to the dignity of a religion. In so doing, they shaped bold visions of the future, drawing heavily on a millenary store of Western myth and metaphor. In historical terms, the myth of an imminent technological Eden represents a survival and a fusion of the ancient Greek myth of the Golden Age along with three Judeo-Christian myths: Biblical time, Earthly Paradise and the Apocalypse. Since the Enlightenment, the process of secularization has drained the religious content of such myths, although it does not deprive them of any of their deeply emotional force. This explains why the 19th century myth of an imminent technological Eden has considerable staying-power, in spite of the many events since 1945 which seem to discredit it.

Résumé de recherche: Plusieurs auteurs "scientistes" de la dernière moitié du XIXe siècle et du début du XXe, dont Ernest Renan et H.G. Wells, dépréciaient la religion révélée. En adhérant au mythe sécularisé d'un Éden technologique imminent, et en conférant à la science elle-même la dignité d'une religion, ils développèrent des visions exaltantes du futur, visions s'appuyant notamment sur des mythes et métaphores qui remontent aux origines de la civilisation occidentale. Considéré sous l'angle historique, le mythe d'un Éden technologique imminent est enraciné dans plusieurs mythes à la fois: le mythe de l'Antiquité de l'Âge d'Or, et les mythes judéo-chrétiens du temps biblique, du paradis terrestre ainsi que de l'apocalypse. Depuis le Siècle des Lumières, le processus de sécularisation draine le contenu religieux de tels mythes, sans pour autant leur enlever leur prodigieuse puissance émotive. Voilà pourquoi, malgré tout ce qui semble depuis 1945 discréditer le mythe d'un Éden technologique imminent, un mythe bien du XIXe siècle, ce dernier perdure de nos jours.

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Ia. Introduction

The purpose of this essay is to explore the origins and development of a powerful modern myth: that a technological Eden will come into being through the concerted efforts of a community of technocrats, whose rigorous application of scientific knowledge will definitively resolve the problems of humanity in the future. This myth is bound up with the now obsolete idea of scientism, which had a certain following from the seventeenth to the mid-twentieth centuries, but which did not survive totalitarianism and the devastating application of military science during the two world wars.

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An early expression of this modern myth of a technological Eden was that of Francis Bacon (1561-1626). In *The New Atlantis*, Bacon imagined an ideal society devoted to the collective enterprise of science: "The End of our Foundation is the knowledge of Causes and secret motions of things, and the enlarging of the bounds of Human Empire, to the affecting of all things possible."¹ For Bacon, human knowledge was based on observation in fact or in thought in the course of nature. His vision of the New Atlantis provided a new focus for human activity, created the ideal closed conditions for man's observation of nature, and turned science to the task of perfecting the machine in order to support the methodical conquest of nature.

As we will show, this modern myth of a technological Eden (which is partly traceable to Bacon), sometimes consisted in treating science morally and allegorically as a new religion, in considerably exaggerating the role of the natural philosopher, and in projecting into an idealized future certain age-old wishes for peace, fulfillment and freedom from both want and suffering. In our view, this myth also represented a survival and indeed a fusion of the ancient Greek myth of the Golden Age with three Judeo-Christian myths which were gradually secularized and integrated into representations of modern science. The first of these Judeo-Christian myths was Biblical time moving forward from a past through a present to a culminating point in the future; the second was Earthly Paradise; the third was the Apocalypse.

¹ The New Atlantis in Francis Bacon: A Selection of His Works, p. 447

The Protestant theologian Rudolf Bultmann sought to "demythologize" religion; our intention is not to "remythologize" science, which only definitively emerged from magic in modern times. Rather, it is to identify intellectual structures, patterns of thought and mythical imagery which were borrowed or inherited from other sources and particularly from revealed religion, and in so doing, to better understand how the transcendental view of the secular future developed, along with the consecration of science (and its handmaid technology) as a religion in its own right.

"The future," wrote Albert Camus in *The Rebel*, "is the only transcendental value of men without God."² Camus was reacting to dogmatic Marxism and secular humanism, not to the rather crude scientism of Ernest Renan and H.G. Wells. By the time he wrote *The Rebel (L'homme révolté)* in 1951, Camus had severed connections with French Communists, and had come to believe in moral and metaphysical rebellion. But his words about the transcendent future still have resonance for scientism; Marxism and scientism alike claimed to replace religion with all-embracing "scientific" world-views, each of which would supposedly launch humanity into a glorious future of fulfillment and emancipation from false gods.

In the course of this essay, we will use several working definitions. First, it is important to remember that what had been known since Antiquity as "natural philosophy" only became organized and classified under general laws known as "science" over the last two hundred seventy years. Second, the older meanings in English of the word "science" - a state or fact of knowing, grounded in theoretic truth, as distinguished from art which is concerned with methods for effecting certain practical results, gradually gave way to a new meaning: in modern usage, science is "often synonymous with 'Natural and Physical Science', and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws."³ And third, derived from the modern idea of science is the ideology of "scientism", which has been defined by Tom Sorrell as follows: "Scientism is the belief that science, natural science, is much the most valuable part of human learning - much the most valuable part because it is much the most authoritative, or

² The Rebel, p. 166.

³ Oxford English Dictionary, article on Science: vol. 9, pp. 221-2

serious, or beneficial. Other beliefs related to this one may also be regarded as scientistic, e.g. the belief that science is the only valuable part of human learning, or the view that it is always good for subjects that do not belong to science to be placed on a scientific footing."⁴ This definition has the advantage of applying to Renan and Wells.

Evidently, an essay on the integration of certain religious myths into science, and therefore on patterns common to both revealed religion and science, is unlikely to pose problems in an either/or fashion. Such problems as: What is knowledge? Is there only one way of knowing? Is religious faith compatible with reason? Are the myths of the spiritual world falling one by one in the face of the cold hard facts of reality? Such questions are nevertheless fairly typical of our age's manichean approach (a sort of bastardized remnant of scientism), which presents problems as rationalistic dichotomies: faith OR reason; fable OR fact; superstition OR science; obscurantism OR enlightenment.

It should be pointed out that Francis Bacon did not hold such a view. On the contrary, living at a time when Europe as a whole still believed in God, he saw science, the knowledge of Nature, as only one of several equally valid kinds of knowledge: "Philosophy may therefore be conveniently divided into three branches of knowledge: knowledge of God, knowledge of Nature, and knowledge of Man, or Humanity.... Since the divisions of knowledge are not like several lines that meet in one angle, but are rather like branches of a tree that meet in one stem (which stems grows for some distance entire and continuous, before it divide itself into arms and boughs)....¹⁵

Our point of view is that religion and science often operate simultaneously at very different levels of understanding. In 1893, the Anglo-Argentine naturalist W.H. Hudson wrote: "Doubtless man is naturally scientific, and finds out why things are not what they seem, and gets to the bottom of all mysteries; but his older, deeper, primitive, still persistent nature is non-scientific and mythical, and, in spite of reason, he wonders at the change; - it is a miracle, a manifestation of intelligent life and power that is in all things."⁶ According to Hudson, an accomplished scientist, man has two complementary natures, not just one.

⁴ Scientism: Philosophy and the Infatuation with Science, p. 1.

⁵ De Dignitate et Augmentis Scientiarum, in Francis Bacon: A Selection of His Works, p. 412.

⁶ Idle Days in Patagonia. p. 33

Moreover, there is more reason in "normative" religion and more belief in "descriptive" science, than many adherents of scientism would have been willing to admit. It has become apparent since the downfall of scientism, in the mid-twentieth century, that science cannot make sweeping, universal claims; at the same time, religion for its part must learn to accommodate scientific discoveries. Over the last few decades, mutual compromises have taken some of the sharpness off the debate about "science vs. religion." As Georges Minois has written recently: "At the close of the twentieth century, the decline of the institutional Church has been accompanied by a considerable rise in spiritualism, which affects scientific circles in particular. Distinguished scholars believe in a spiritual force in the material world. For some, this force is the Christian God; for others it is a spirit having nothing to do with the Lord of the Bible. At the same time, within the Church, theologians are pushing for the results of modern science to be taken into account."⁷

In fact, as we shall see, the mythical content of science has actually increased in recent years as science has moved far beyond the realm of individual observation and experience to embrace astrophysical cosmologies which can only be constructed by means of myth and metaphor.

⁷ L'Église et la science: histoire d'un malentendu, vol. II, pp. 11-12 (in this and many cases below, I have provided my own translation from French to English - in each case, the footnotes read "author's translation").

Ib. Attempts to turn science into a "religion"

In 1925, Alfred North Whitehead wrote that "it seems as though, during the last half-century, the results of science and the beliefs of religion had come into a position of frank disagreement, from which there can be no escape, except by abandoning either the clear teaching of science, or the clear teaching of religion."⁸

Whitehead, who had moved from the Church of England to just short of Roman Catholicism before settling briefly on agnosticism, ended up with a personalized sort of metaphysics. The either/or character of his remark on the antagonism between religion and science can be explained by the fact that he was determined to trace the rise of scientific materialism, of the view that an abstract system of mathematical physics could be transposed onto the reality of nature itself. The antagonism referred to by Whitehead was not altogether unprecedented, however. Instead, the antagonism represented a widening of the rift between science and religion, between human and divine knowledge, between faith and reason, that had been latent long before Christianity even came into being. If science is understood as man's systematic and free pursuit of knowledge about nature, then the rift between religion and science was evident as early as the Book of Genesis, in which the Lord God commanded Adam, saying: "You may eat freely of every tree of the garden [of Eden]; but of the tree of the knowledge of good and evil you shall not eat, for in the day that you eat of it you shall die."⁹ According to Genesis, those who ate of the tree gained the power to know, to penetrate, to experience good and evil for themselves, thus becoming like God. According to this account, man fell from a state of grace, was expelled from the Garden of Eden, became imperfect and mortal, by yielding to the temptation to know as much as God; which amounts to saying that man was perfect as long as he accepted his own limits and did not seek to penetrate divine mysteries. Suffice it to say that the Scriptures of Judaism and Christianity frequently affirmed the ambivalence and indeed the dangers of human knowledge. One has only to think of Paul's warning to the Colossians:¹⁰ "See to it that no one makes a prey of you by philosophy and empty

⁸ Science and the Modern World, p. 210.

⁹ Genesis 2:16-17.

¹⁰ Colossians 2:8

deceit, according to human tradition, according to the elemental spirits of the universe, and not according to Christ." This distrust of human knowledge was reaffirmed even by such a scientific figure as Bacon, who however drew a distinction between natural (i.e. scientific) and moral knowledge: "For it was not that pure and uncorrupted natural knowledge whereby Adam gave names to the creatures according to their propriety, which gave occasion to the fall. It was the ambitious and proud desire to judge of good and evil, to the end that man may revolt from God and give laws to himself, which was the form and manner of his temptation."¹¹

Long after Genesis was written down, but prior to the advent of Christianity, there was an alternative, atheist view in Antiquity which stood completely outside of the context of Jewish monotheism. Lucretius (fl. 1st century BC), an early philosopher of nature, sought to explain the main principles of the atomic universe, the atomic structure and mortality of the soul, the nature of sense perception, the creation of the world and natural phenomena such as thunder and lightning, while consciously denying any possibility of divine intervention. In On the Nature of the Universe, Lucretius wrote, "our world has been made by nature through the spontaneous and casual collision and the multifarious. accidental, random and purposeless congregation and coalescence of atoms whose suddenly formed combinations could serve on occasion as the starting-point of substantial fabrics - earth and sea and sky and the races of living creatures."¹² "Religio" was presented as a hideous monster, crushed underfoot by the courageous and liberating force of Epicurean science, whose victory lifts humanity to the skies. Indeed, Lucretius denied that "the holy dwelling-places of the gods are anywhere within the limits of the world. For the flimsy nature of the gods, far removed from our senses, is scarcely visible even to the perception of the mind. Since it eludes the touch and pressure of our hands, it can have no contact with anything that is tangible to us. For what cannot be touched cannot touch."¹³

It should be noted that Lucretius did not consecrate science as a new religion. Rather, he clearly mapped out the difference between science and religion, and validated

¹¹ The Great Instauration, in The New Organon, p. 15.

¹² On the Nature of the Universe, p. 91.

¹³ Ibid., p.175.

empirical explanations of natural phenomena, downplaying any possibility of divine intervention as mere fable.

Origen, an early father of the Church (c. 185-255 AD), established a completely different framework for understanding the relationship between faith and reason. He did not do so in order to articulate a new role for scientific knowledge, but rather to combat heresy, to discredit Jewish objections to Christianity and to buttress Christian orthodoxy with rationality as it was then understood. It is interesting to note that Origen, writing well before the doctrine of the Trinity had been established, allowed each individual Christian, as long as he adhered to the faith passed down by the apostles, a good deal of speculative latitude within the bounds of that faith. We mention Origen here because some of his thinking is central to our essay.

"It is necessary," Origen wrote in On First Principles,¹⁴ "to discuss the manner in which [the divine scriptures] are to be read and understood, since many mistakes have been made in consequence of the method by which the holy documents ought to be interpreted not having been discovered by the multitude. For the hard-hearted and ignorant members of the circumcision have refused to believe in our Saviour because they think that they are keeping closely to the language of the prophecies that relate to him, and they see that he did not literally 'proclaim release to captives' or build what they consider to be a 'real city of God' or 'cut off the chariots from Ephraim and the horse from Jerusalem' or 'eat butter and honey, and choose the good before he knew or preferred the evil'."

According to Origen, Scripture has a three-part nature (body, soul and spirit) just as men do. At a first level of understanding, the body of Scripture is its literal meaning. At a second level of understanding, the soul of Scripture is its moral meaning. At a third level of understanding, the spirit of Scripture is the spiritual or allegorical meaning. As Henry Bettenson has written, "Origen is mainly concerned with the allegorical method, revealing the hidden spiritual meaning, the device whereby difficulties and inconsistencies of the

¹⁴ On First Principles, p. 269.

scriptures, and even what are, from a Christian standpoint, the immoralities, can be harmonized with the Faith.¹⁵

Origen was said to have castrated himself, in order to feel more comfortable working with young women catechumens. This self-mortification with a blade suggests that he took some of Paul far too literally! But Origen's distinction was convenient for the Church. It meant that there was no single way to interpret the Scriptures. The Church could always focus on the most convincing meaning at any given moment, whether that meaning be literal, moral or allegorical. The evident contradictions and obscurities of the *Bible* could be contextualized, rationalized, cast aside. Given that the "Word of God" was always "true" in at least one of the three ways Origen identified, then the believer was allowed a certain latitude in his questioning of the Scriptures, as long as he focused on the one "true" meaning. But this approach to interpretation opened up a difficulty: there was little point basing religious doctrines solely on morals or allegory if those doctrines meanwhile flatly contradicted the dictates of reason itself. Thus Christian doctrines concerning nature were inherently weak whenever they were based on a strictly literal reading of allegorical passages in the Scriptures.

We may note that Origen's third-century choice of how to interpret the Scriptures, while controversial, nevertheless withstood a series of councils which crystallized Christian beliefs into dogmas. Origen's choice was still current, although in a modified form, at the time of Thomas Aquinas (1225-1274). Aquinas, who held that faith could certainly operate in its own way within reason, stated in the *Summa Theologica* that the "first signification whereby words signify things belongs to the first sense, the historical or literal. That signification whereby things signified by words have themselves also a signification is called the spiritual sense, which is based on the literal, and presupposes it. Now this spiritual sense has a threefold division.... So far as the things of the Old Law signify the things of the New Law, there is the allegorical sense; so far as the things done in Christ, or so far as the things which signify Christ, are signs of what we ought to do,

¹⁵ Bettenson, ed. The Early Church Fathers, p. 21.

there is the moral sense. But so far as they signify what relates to eternal glory, there is the anagogical sense."¹⁶

We may at this point ask what was the original intention of the authors of the books of the Bible. Were Origen, Aquinas and others like them really in touch with this original intention? Was the intention to give a literal account of objective reality? Were the faithful meant to take at face value such stories as the Fall from Paradise, the way Daniel killed a Babylonian dragon with a concoction of fat, pitch and hair, the existence of Behemoth, Leviathan and Satan, not to mention various detailed prophecies about apocalypses and the Last Things and the Resurrection itself? Or were these various accounts intended to be taken at an allegorical or moral level? These are very difficult questions, since the Bible contains more than one hundred books, recounted and written by mostly unknown authors over the space of two thousand years or so, in circumstances and with motivations which we can only guess at. Several books were written, edited, rewritten, corrupted, merged with others, translated, lost and refound. Some may have been falsely attributed to authors retroactively for political reasons. Other books were rejected by the Church as not belonging to the accepted "canon". Many books of the Bible are extremely obscure, the *Revelation to John* being possibly the most obscure of all. It is little help to visit John's cave in Patmos: its celebrated painted and gold plated icon depicting John receiving his revelation in the cave from an angel of God, and dictating that revelation to his dutiful scribe and disciple Prochoros, is indicative of the layer upon layer of traditions that colour our current-day understanding of the Bible.

If we cannot answer the question directly about the original intentions of the authors of the books of the *Bible*, at least we can answer indirectly: their intentions and mindset were certainly very different from our own at the end of the twentieth century; they may have been comfortable building up dramatized accounts of events, using the colorful language of allegory and symbolism, in order to evoke by indirect means certain fundamental experiences and cosmic dimensions of life which could not be described by a dry recitation of "fact". This allegorical tendency is by no means uncommon. Allegory, C.S. Lewis wrote, was not at all unique to medieval poets: "It is of the very nature of

¹⁶ The Summa Theologica, Q.I.Art. 10, in Introduction to St. Thomas Aquinas, p. 18.

thought and language to represent what is immaterial in picturable terms. What is good or happy has always been high in the heavens and bright like the sun. Evil and misery were deep and dark from the first."¹⁷

Yet allegory smacks of genteel, mannered conventions, as if the fire of inspiration had puttered out. More important than the vehicles of expression used is the authenticity of prophetic writing; the author in search of absolutes acknowledges the poverty of words, yet he believes in the reality of what he is seeing. William Blake (1757-1827) alluded to this authenticity in terms reminiscent of Plato (428-348 BC), in the manuscript on The Last Judgment, a picture which is now lost: "The World of Imagination is Infinite & Eternal, whereas the world of Generation, or Vegetation, is Finite & Temporal. There Exist in that Eternal World the Permanent Realities of Every Thing which we see reflected in this Vegetable Glass of Nature."18

The latent rift between science and religion, between divine and human knowledge, was smoothed over during the first thirteen hundred years of Christian hegemony. But the combined effects of the Renaissance and the Reformation widened the rift considerably, since they called into question the literal meaning and value of many Christian conciliar dogmas based on the "Word of God." Moreover, a profound misunderstanding about religion developed when for reasons of Church power, allegorical accounts were strictly interpreted at a succession of councils and defended as literally true. Starting with the Renaissance, a time when men wanted to pursue knowledge for its own sake, Origen's more than thousand-year-old distinction between the literal, moral and spiritual meanings of the Bible had lost much of its relevance, although, as we shall see, it could be applied to science.

During the eighteenth-century Enlightenment, Reason became a secular cult; the Apostolic faith was something of an embarrassment in intellectual circles. But in the

¹⁷ The Allegory of Love, p. 44. ¹⁸ The Last Judgment, in Poems and Prophecies, p. 358.

century just prior to the Enlightenment, the controversy over faith and reason came to a head, at a time when Europe as a whole still believed in God. Reconciling the discoveries of science with revealed religion was in the seventeenth century a huge dilemma for scientists who were also Christian believers. Reason frequently contradicted the literal meaning of the Scriptures upon which Christian tradition was based.

Several leading scientific thinkers were caught up in this dilemma. We may here cite four approaches to the rift between science and revealed religion since they are indicative of a common struggle:

- to insist that it was wrong to wish to harmonize religion and science in every respect, since natural philosophy would end up teaching us about God's power in any case (Bacon);
- to claim that an empirically demonstrated scientific hypothesis was literally true (Galileo);
- to suspend belief (including religious belief) until rigorous self-questioning, based on carefully laid-out rules of rationality, could establish its validity (Descartes);
- and to tightly circumscribe reason itself, thus removing religion from the purview of rationality altogether (Pascal).

We have already mentioned that Francis Bacon saw philosophy as a great tree, consisting of three branches: the knowledge of God, of Nature and of Man. As if to emphasize the separate but complementary character of each of these branches of knowledge, Bacon included a scientist's prayer early on in *The Great Instauration*¹⁹: "This likewise I humbly pray, that things human may not interfere with things divine, and that from the opening of the ways of sense and the increase of natural light there may arise in our minds no incredulity or darkness with regard to the divine mysteries...ⁿ²⁰ Indeed, Bacon considered that natural philosophy was, after the word of God, the surest medicine against superstition and the "most approved nourishment for faith.ⁿ²¹ Whereas natural philosophy consisted of knowledge about God's power, faith was grounded in knowledge

¹⁹ The Great Instauration, p. 14.

²⁰ Ibid., pp. 14-15.

²¹ Aphorisms LXXXIX, Book One, p. 88.

about God's wisdom. Bacon also drew an analogy between the work of science, of establishing true axioms in the light of experience, with the first day of Creation, during which God created light only.²² Bacon cautioned however that a system of natural philosophy could not be based on the first *Book of Genesis*, since from this "unwholesome mixture of things human and divine there arises not only a fantastic philosophy but also a

heretical religion. Very meet it is therefore that we be sober-minded, and give to faith that only which is faith's."²³

Galileo Galilei (1564-1642) was the first to apply mathematics to an analysis of mechanics, proposed the law of uniform acceleration for falling bodies and developed the astronomical telescope, with which he explored the Universe. Galileo's work has sometimes been presented as a passionate fight against dogma, for example by Albert Einstein in his twentieth-century foreword to Galileo's *Dialogue Concerning the Two Chief World Systems*. There is certainly something extraordinarily moving in the struggle of this latter-day Socrates, who fought the geocentric dogma of the Catholic Church in the name of intellectual freedom, and who suffered the consequences of his defiance of authority, through eight long years of house arrest. But the way in which Galileo defended the Copernican theory that the planets revolve around the Sun, was part of the problem. His insistence that a scientific hypothesis, once it was empirically verified, was absolutely true, amounted to erecting a naïve counter-dogma to match the dogma he was so assiduously attacking. Unlike Bacon, Galileo implicitly presented the space between reason and faith as a stark chasm.

For his part, René Descartes (1596-1650), developed a mechanistic view of nature, and proposed a four-part approach to knowledge: to accept as true only what is clearly recognized as such; to analyze problems systematically in order to solve them; to move from simple to ever more complex considerations; and to pass over everything again to ensure that nothing has been left out. This painstaking application of doubt as the foundation of knowledge, whether divine or human, consisted in suspending beliefs long enough to test them in the light of reason: "For all the principles which I had integrated

²² Axiom LXX - Book One, in The New Organon, p. 68.

²³ Aphorism LXV - Book One, p. 62.

through my beliefs, I could do nothing better than to undertake once and for all to rid myself of them, in order to put them back afterwards, or other still better ones, or the same ones, once I had adjusted them at the level of my reason. And I strongly believed that by this means I would succeed in living my life far better, than if I built on older foundations, or if I relied on the principles I had submitted to in my youth without ever examining whether they were true..^{#24} It is worth noting that Descartes' leisurely and ultimately psychological account of knowledge, which was slowly built up by means of systematic doubt and self-questioning, would not only result in truer principles, but also in a better life.

Blaise Pascal (1623-1662), another important figure in seventeenth-century science, developed a model of knowledge human and divine quite different from Bacon. Pascal, inventor of the digital calculator and the syringe, and discoverer of Pascal's law of pressure and the principle of the hydraulic press, proposed to defuse the conflict between faith and reason by explicitly setting out the limits of reason, of what was knowable. "The ultimate working of reason is to acknowledge that there is a multitude of things which surpass it: unless reason grasps this, then it is weakness itself Our whole reasoning consists in yielding to emotion. We know the truth, not only through reason, but also through the heart: it is in this latter way that we know principles, and the struggles of our reasoning with these principles is vanity, since our reasoning has no part in them.."²⁵ That reason had its limits did not just affect nature or science, however; the limits of reason also affected faith, which for Pascal consisted of an inner religion, which had to be lived out, by means of a passionate love of God and an uncompromising evangelical morality. It should be noted that Pascal had a far greater faith in God than he had in the institution of the Catholic Church: he drew a clear distinction between his personal faith in a hidden God, and the authority of the Pope and the Inquisition which was often directed against the pursuit of scientific knowledge in the seventeenth century: "The Pope abhors and fears those scholars who do not owe him obedience," he wrote in Sur l'Obéissance due à l'Église et au Pape.²⁶

²⁴ Discours de la méthode, p. 86 (author's translation).

²⁵ Pensées, pp. 1219 and 1221 (author's translation).

²⁶ Sur l'Obéissance due à l'Église et au Pape p. 1072 (author's translation).

We have examined four alternative seventeenth-century perspectives on the contradictions and complementarities of science and religion. These perspectives were indicative of a slow shift in gravity from religion over to science, at a time as we have said when Europe as a whole still believed in God; this shift in turn was part of the gradual secularization of modern Western civilization. An uninterrupted succession of scientific discoveries starting with the Renaissance had inexorably thrown back the frontiers of knowledge. By the early nineteenth century, it mattered little that these discoveries had frequently been made possible by the mind-set, using (or reacting to) the terms of reference of Western Christianity; many of these discoveries now challenged and even refuted age-old Christian doctrines (based on a literal reading of the *Bible*) concerning the Creation of life on Earth, the origins of Man, the objective existence and duration of time, the interplay of life, disease and death, the place of our planet in the universe, the ultimate and one might almost say cosmic destiny of humanity, and the likelihood that divine Providence could be evoked to explain much of anything in human affairs.

At the same time, the succession of scientific discoveries had set up a new standard of intellectual authority: not faith, the revelation of the canonical Scriptures, or accepted practice within the Church, whether Catholic or Protestant, but the systematic exploration and justification of scientific hypotheses, their elevation into natural laws and their application by means of technology. Whereas previously it seemed the heart had embraced the tenets of transcendent faith at an intuitive level, sometimes consciously suspending reason altogether in order to embrace the spiritual account of the world (the way Pascal had done), now the scientific mind assented rationally to demonstrable and justifiable truth, and often responded with enthusiasm to the latest mechanical inventions.

If science had only challenged religion in the nineteenth century, then the philosophy of Lucretius might have made something of a comeback. After all, there was a certain elegance in the way that Lucretius, an atheist, had relegated the gods to a remote, ethereal role, never actually denying their existence, while boldly investigating nature in and of itself. Instead, some nineteenth century scientific thinkers used the intellectual structures of religion to overthrow the "old" religion and attempt to create a new religion of reason in its place. This was an extremely important development, because, to

reintroduce Origen's distinction, it meant that scientific thinkers were now prepared to go beyond the literal interpretation of science, to interpret its moral and allegorical meaning instead. It is important to examine the interplay of myth and modern science, since scientism re-interpreted science not just on a literal basis (what does science tell us?) but also on a moral basis (how does science dictate what we should do?) and an allegorical basis (what powerful symbols can be developed through science to address the fundamental questions of existence?)

In the mid-nineteenth century, for example, the social positivism of Auguste Comte (1798-1857) posited a law of three phases of intellectual development, the first stage of which was theological, the second metaphysical, and the third scientific or "positive". According to Comte, mankind attained to fullness only by abandoning the first two phases and replacing them with a third: a rigorous commitment to the scientific method. In this three-phase image of historical development, one detects a movement of progress: from worse to better, from disappointment to promise, from ignorance to knowledge, from obscurantism to enlightenment, from bestiality to civilization, from chaos to industry, from the past to the future; and also a religious faith in the enabling power of science. "Positivists then may, more truly than theological believers of whatever creed, regard life as a continuous and earnest act of worship; worship which will elevate and purify our feelings, enlarge and enlighten our thoughts, ennoble and invigorate our actions.... Thus Positivism becomes, in the true sense of the word, a Religion; the only religion which is real and complete; destined therefore to replace all imperfect and provisional systems resting on the primitive basis of theology."²⁷

In Comte's view, the positivist scientist was a high priest of order and progress ("Ordem e Progresso" is actually inscribed on the flag of Brazil, a country where Comte had a huge following), and this high priest was hard at work bringing about an industrial society organized on the rational principles of the new religion of humanity: "All the points, then, in which the morality of Positive science excels the morality of revealed religion are summed up in the substitution of Love of Humanity for Love of God.... Science, therefore, Poetry, and Morality, will alike be regenerated by the new religion, and

²⁷ A General View of Positivism, p. 365.

will ultimately form one harmonious whole, on which the destinies of Man will henceforth rest."²⁸

A second attempt to turn science into a rational religion was made by Comte's student Ernest Renan (1823-1892), author of L'avenir de la science. This latter book is a monument of nineteenth-century scientism. Renan, a distinguished historian and philologist, wrote it in the late 1840s, only to fling it into the drawer, submitting it for publication in 1890, shortly before his death. The book bears signs of youthful self-indulgence and gushing optimism. Perhaps more importantly, it was written at the time of the February revolution of 1848, which built up huge expectations in France about science, reason and the future. Renan was an ambiguous person who brought together two very different natures: on the one hand, a cool intellectual taste for critical rationalism, and on the other, messianic expectations and passionate apocalyptic visions.

In L'avenir de la science, Renan made enormous claims for science: "For heaven's sake, grant me that science alone can provide man with vital truths, without which life would be intolerable and society impossible. If we imagined that these truths were derived from the patient study of things, then the higher form of science would no longer have any meaning; there would be erudition, vain curiosity, but not science in the noblest sense of the word...."²⁹ But it was not enough for Renan to consider science as the noble pursuit of vital truths. Science aimed at the scientific organization of humanity, and was about to embark on a new mission: "I will go still further. The universal mission of every living being is to make God perfect, that is to bring about the definitive resolution which will unify and close the circle of things. Up till now, reason doubtless had no part in this mission, which was instead fulfilled in a blind and unknowing way by everything that is. But I say that reason will one day take on this mission and, having organized humanity, WILL THEN ORGANIZE GOD."³⁰

It is interesting to note, in Renan's case, that this millenarian shift from faith to reason was not all lightness and joy: like a huge shock wave it had been building up for some time, at least since the Reformation, and arguably since the time of Lucretius; like a

²⁸ Ibid., p. 394-5.

²⁹ L'avenir de la science, p. 107 (author's translation).

³⁰ Ibid., p. 106.

wave it hammered Renan, rocking his old certainties to their foundations, washing away conventions of times past, raising countless unanswerable and often disturbing questions. Renan accepted that the "answers" provided by reason were in some ways unsatisfying: for one thing, they seemed ephemeral since they were likely to be replaced by yet other "answers". A certain ambivalence can be detected in *L'avenir de la science*, since Renan now publicly assented to rationality, while longing secretly for the impossible return of the older sense of wonder: "Who has not cursed the day he was born and regretted the loss of illusions, once he had given himself up to science? For my part, I admit I have had a lot of regrets; yes, some days I would have preferred a state of blissful innocence, I would have been annoyed by criticism and rationalism.... What science offers me is not enough - I am still hungry. I admit that if I believed religion, my faith would provide me with more sustenance. But it is better to have a little good science than lots of shaky science."³¹

A third scientific thinker who treated science as a kind of new religion was H.G. Wells (1866-1946). He was well aware that science could be horribly abused (one has only to think of the dreadful transgenic experiments crudely envisioned in that work of science fiction, The Island of Dr. Moreau), but he also saw science and technology as invaluable tools. In spite of this persistent ambivalence, which sometimes veered off into naive optimism and at other times into dark pessimism, Wells saw science as somehow superior to humanity itself. In A Modern Utopia, Wells articulated his idea of the welfare state, and indeed of the World State. He identified man's panic-stricken, violent, base, cowardly and bestial struggle for existence with a pre-scientific age in the past. And he contrasted this with science, ambition and energetic imagination, which taken together would usher in a better, more rational, technological society of well-ordered great arches and domes of glass. While Wells gloried in dreams of a perfect society, he also expressed pessimism about man's ability to rise to the intellectual and moral challenge of science: "The plain message physical science has for the world at large is this, that were our political and social and moral devices only as well contrived to their ends as the linotype machine, an antiseptic operating plant, or an electric tram-car, there need now at the present moment be no appreciable toil in the world, and only the smallest fraction of the pain, the fear, and

³¹ Ibid., pp. 152-3.

the anxiety that now makes human life so doubtful in its value. There is more than enough for everyone alive. Science stands, a too competent servant, behind her wrangling underbred masters, holding out resources, devices, and remedies they are too stupid to use."³² Servant, perhaps; but a servant whose intelligence far outclassed the stupidity of her masters.

For Wells, science and technology were emancipating forces, freeing the individual from the narrow constraints of Christian morality as much as his own grasping, pathetic nature; on the societal level, science and technology could be used to organize humanity properly, promote social equality, ensure world peace and bring about the future happiness of the planet. It will be seen that Wells' vision of well-ordered great arches and domes of glass concentrated huge power in the hands of supposedly benevolent technocrats, working for the greater good of humanity.

Science was thus identified with the future and technique: not with some future constantly hovering before us - and moving away from us; not with the future as something yet to come, but which is currently nowhere and never actually arrives; but, rather, as Christopher Canto and Odile Faliu say in *The History of the Future*, with future "visions ... looking forward to an age of perfection, blossoming in their thousands during the period when Western civilization was in its years of glory, basking in the rays of progress and surfing on growth.... Among the mythologies of happiness, the prospect of a technological Eden, while it was unable to dissipate the more deeply-rooted doubts, nevertheless appeared credible and acceptable. It was an idealized instant, and people thought it might finally be achieved....⁸³

- ³² A Modern Utopia, p. 102.
- ³³ The History of the Future, p. 8.

Ic. The interplay of myth and modern science

As we stated earlier, we aim to understand the origins and development of a modern myth: that a technological Eden will come into being through the concerted efforts of a community of technocrats, whose rigorous application of scientific knowledge will definitively resolve the problems of humanity in the future. We will here examine three ways in which myth serves as a vehicle for scientific expression.

- First, in developing conceptual frameworks in order to evoke and allude to processes which people do not consciously experience;
- second, in modeling constantly recurring literary archetypes of the scientist himself, which provide a historical context for understanding the singularly exalted role given to the scientist by scientism;
- and third, as intuitive springboards to original scientific discoveries.

Since the nineteenth century, there has been a huge amount of discussion about the role of myth. In Edward Burnett Tylor's landmark 1871 work The Origins of Culture, for example, we read of the stark difference between science and myth. "Science, investigating nature, discusses its facts and announces its laws in technical language which is clear and accurate to trained students, but which falls only as a mystic jargon on the ears of barbarians, or peasants, or children. It is to the comprehension of just these simple unschooled minds that the language of poetic myth is spoken.... The poet contemplates the same natural world as the man of science, but in his so different craft strives to render difficult thought easy by making it visible and tangible, above all by referring the being and movement of the world to such personal life as his hearers feel within themselves...."³⁴ Tylor's articulation of the role of myth should be placed in the setting of his new theory of the progressive development of cultures past and present, which traced the continuity and fundamental unity of humanity's experience, and the many survivals of primitive customs and beliefs up to modern times. While we share with this giant of cultural anthropology a belief in such survivals (which is after all the theme of this essay), we cannot agree with his understanding of myth.

³⁴ The Origins of Culture, p. 316.

The Second World War was the gloomy setting for another expression of the role of myth. During his wartime American exile, in 1943-4, the neo-Kantian Ernst Cassirer thought deeply about the ways concepts structure the natural world. He brooded about the way that an irrational belief in myths had opened the way to modern dictatorship: "As these beliefs are in open contradiction to our sense-experience and as there exist no physical objects that correspond to the mythical representations, it follows that myth is a mere phantasmagoria. The question necessarily arises why men cling so obstinately and forcibly to such phantasmagoria. Why do they not directly approach the reality of things, and see it face to face; why do they prefer to live in a world of illusions, of hallucinations and dreams?"35

In the late nineteenth century when Tylor was building up the new discipline of cultural anthropology, and evidently in the mid-1940s when Cassirer was writing his last book, "myth" seemed to be virtually synonymous with "fable"; it was seen as a superstitious, spontaneous, popular and even threatening hand-me-down from primitive societies; it was imaginative certainly and poetic, which explains its tremendous appeal to the Romantics, but myth ultimately lacked any basis in fact. Science, meanwhile, was the systematic rational exploration of reality, the painstaking construction of knowledge by means of irreducible and stubborn facts.

There is a certain ambiguity in the views of Tylor and Cassirer, however. In modern usage, myth has two quite distinct meanings. The word "mythos" in Latin referred to fables and fabulous accounts, but in the original Greek "mythos" referred to "a series of words which have a meaning", and was gradually applied to "fiction, myth and the subject of a tragedy". By 1840, "myth" had two distinct meanings in the Western world: that of the "fable or imaginary account of mythology" and that of "the expression of an idea or teaching in an allegorical form". ³⁶ Scientism often reserved the first of the two distinct meanings of myth - "fable or imaginary account" - for religion (sometimes with a tactful exception made for Christianity), but reserved the second - the expression of an idea or teaching in an allegorical form - for the scientific enterprise. Yet scientism took myth

³⁵ The Myth of the State, p. 27.
³⁶ Le Robert: Dictionnaire Historique de la Langue Française.

literally and found it wanting, while studiously ignoring the moral and allegorical dimensions of science itself.

A more recent and altogether different articulation of the role of myth, and one that allows for the use of myth in the scientific enterprise, is provided by the historian of religion Mircea Eliade in *Aspects du mythe* (1963): "The unconscious presents the structure of a private mythology. We can go still further and assert not only that the unconscious is mythological but also that some of its contents support cosmic values; in other words, they reflect the modalities, the processes and the destinies of life and living matter. We can even say that the only real contact modern man has with the cosmic sense of the sacred takes place in the unconscious....³⁷ According to Eliade's view, myth is not just found among primitive and traditional societies. As a comparative historian of religion, Eliade sought to define the primordial myths common to various religious traditions and at the basis of spiritual experience. According to Eliade, some of these religious myths had survived in new secular forms in the modern world as well, for example in the ideologies of Marxism and Nazism.³⁸

A summary of late-twentieth-century views of myth is given by Pope John Paul II (1981), who reminds us that "H. Schlier emphasizes that the myth does not know historical facts and has no need of them, inasmuch as it describes man's cosmic destiny which is always identical. In short the myth tends to know what is unknowable. According to P. Ricoeur: 'The myth is something other than an explanation of the world, of its history and its destiny. It expresses in terms of the world, indeed of what is beyond the world, or of a second world, the understanding that man has of himself through relation with the fundamental and the limit of his existence.... It expresses in an objective language the understanding that man has of his dependence in regard to what lies at the limit and the origin of his world."³⁹

³⁷ Aspects du mythe, p. 100 n. 1 (author's translation).

³⁸ Mythes, reves et mystères, pp. 24-5.

³⁹ Original Unity of Man and Woman: Catchesis on the Book of Genesis, p. 32.

When viewed from this perspective, it is obvious that myth is not foreign to the scientific enterprise. Several examples can be given to demonstrate that myth not only serves scientific purposes, but is even an indispensable part of the scientific enterprise. Myth and metaphor are frequently used to develop conceptual frameworks in order to evoke and allude to processes which people do not consciously experience. William Rawley, in his seventeenth-century preface to the original edition of Francis Bacon's *The New Atlantis*, alluded to the value of myth: "This fable my Lord [Bacon] devised, to the end that he might exhibit therein a model or description of a college instituted for the interpreting of nature and the producing of great and marvellous works for the benefits of men.... His Lordship thought also in this present fable to have composed a frame of Laws, or of the best state or mould of a commonwealth..." ⁴⁰ We might add that the tremendous imaginative power of *The New Atlantis* is derived precisely from Bacon's conscious fabrication of a new myth. We have already mentioned Bacon's use of the metaphor of the tree; he explained the three-part classification of knowledge by means of this powerful metaphor.

Myth has also proven extremely useful to scientists since it provides graphic metaphors for things which cannot be described by direct appeals to "facts." In the twentieth century, we have grown accustomed to such mythical constructs in astrophysics as the Big Bang or "singularity" at the beginning of the universe; the Big Crunch or "singularity" at the end of the universe; the idea that the universe has a beginning and an end; the black hole or "region of space-time from which nothing, not even light, can escape, because gravity is so strong¹⁴¹; a "white dwarf" or "stable cold star, supported by the exclusion principle repulsion of electrons⁴²; the psychological arrow of time, our subjective sense of the direction of time, which is "determined within our brain by the thermodynamic arrow of time⁴³; George Smoot's riddles in time; Schrödinger's kitten - a mythical creature that Erwin Schrödinger invented to cast light on quantum mechanics and the nature of reality; and the Gaia principle. Naturally, none of these examples are myths in

⁴⁰ Francis Bacon: A Selection of His Works, p. 418.

⁴¹ Stephen Hawking, A Brief History of Time, p. 194.

⁴² Ibid., p. 200.

⁴³ Ibid. p. 156.

the rationalistic sense of the word; yet, as Hubert Reeves has written, "black holes are more extravagant than the most delirious fantasies of science fiction authors. On approaching black holes, matter is engulfed. Matter literally disappears, projected outside of time and space. And like pulsars, this object turns on itself; these atoms, once snatched up, could then escape. But where to? Nobody knows!"⁴⁴ It would be hard to find a better expression of the value of myth to scientists as a way of evoking the unknowable.

At a second level, myth is a useful archetypal vehicle in articulating a role for the scientist himself. From the vantage-point of the late nineteenth century, the technocratic scientist stood as one of the most influential figures in the history of Western civilization. The scientist was an adventurer of the intellect, boldly going where ordinary men normally did not dare to go. Part of his boldness lay in embracing uncertainty, part lay in the prestige associated with discovery itself, part yet again lay in the beneficial role he presumably played, by working for the greater good of humanity. Through the steady application of the scientific method, the scientist built up truths based on stubborn and irreducible facts. And through the steady application of science in the form of technology, the scientist built up a world of new possibilities.

Throughout the history of Western civilization are to be found cultural archetypes, which although not all strictly scientists in our current-day understanding of the term, have had a profound influence on the social responses to scientific work and intellectual freedom. Several of these cultural archetypes are cited here as examples of the interaction of myth and modern science, since their courage and ambivalence help to explain how scientistic thinkers such as Comte, Renan and Wells could have developed such an exaggerated view of the scientist. We have presented them in chronological order.

• A first archetype is that of *Socrates* (c. 470-399 BC), a moral philosopher who pursued knowledge by means of inductive arguments and universal definitions, and whose practice of holding "dialectics" or conversations ensured that an ever-greater number of young Athenians doubted and even ridiculed the conventional wisdom of the time. Socrates serves as an archetype of the scholar whose single-minded pursuit of truth

⁴⁴ Poussières d'étoiles, p. 139 (author's translation).

provokes the wrath of state authorities, and who calmly accepts the supreme sacrifice as a way of better defending that truth. It is worth remembering that Jean-Jacques Rousseau (1712-1778), in Discours sur les sciences et les arts, took precisely the same view as we do.⁴⁵ For Rousseau. Socrates symbolized the defiance of knowledge, in the face of unbending orthodoxy. In the Apology, Plato stated that Socrates' ultimate motivation was to persuade every man to look within himself, to seek virtue and wisdom before he looked to his private interests, and to consider the nature of the State before he looked to the interests of the State. According to Plato, Socrates was thus concerned with grounding life in virtue and wisdom, and with establishing the principles of knowledge and continuous discovery by means of self-questioning. A cutting, satirical view of Socrates the fraudulent free thinker was however taken by Aristophanes.⁴⁶ Before the court of King Archon, Socrates was deemed guilty because the state worshipped, but introduced new and unfamiliar he did not worship the gods religious practices; and further corrupted the young. His struggle was thus the struggle of religion vs. the pursuit of knowledge. With considerable pathos, Plato told the tale of his mentor's imprisonment and self-poisoning, of the wisest and the most just and the best man "of all whom we met at that time." ⁴⁷ As if to heighten the pathos, Socrates' jailor denounced the injustice of the philosopher's forced suicide, praised the nobility and gentleness of Socrates, and sought the latter's forgiveness.

• A second archetype is that of the *philosopher-king*, which Plato developed in *The Republic*. The philosopher-king, it should be noted, is at the summit of the natural aristocracy whose wisdom makes the ideal State possible. "Until philosophers are kings in their cities," Plato wrote, "or the kings and princes of this world have the spirit and power of philosophy, and political greatness and wisdom meet in one, and those commoner natures who pursue either to the exclusion of the other are compelled to stand aside, cities will never have rest from their evils - no, nor the human race, as I believe, - and then only will this our ideal State have a possibility of life and behold the light of day." A second archetype is that of the *philosopher-king*, which Plato

⁴⁵ Discours sur les sciences et les arts, pp. 100-101.

⁴⁶ The Clouds.

⁴⁷ Phaedo, 116c.

developed in *The Republic.*⁴⁸ Like the example previously given of Socrates, the philosopher-king may seem far-removed from the modern scientist; except that Plato intended him to be the aristocratic leader of an intellectual élite, a lover of knowledge, wisdom and visions of truth, whose mastery of and taste for knowledge made him worthy to command; whose power over the sight-loving, art-loving, practical class was derived from his study both of nature and ideas. In certain respects, the philosopher-king is a precursor to the technocrat of modern times. He leads directly to Francis Bacon and *The New Atlantis*.

- A third archetype is the figure of Ulysses in Dante's The Divine Comedy, whose domineering personality, arrogance and relentless struggle to push back the frontiers of knowledge earned him a place in the Eighth Pouch of the Eighth Circle of Hell, among the Fraudulent Counsellors. In The Divine Comedy, Dante (1265-1321) recounted an idealized, mythical passage through the torments of Hell (presumably his own), then spiritual rehabilitation in Purgatory, and finally the fulfillment of spiritual completion, the healing of the rift of exile and eternal union with God in Paradise. In Dante's view, the pride and paganism of Ulysses assured him of a lasting place in Hell. Rousing all his eloquence and resourcefulness, Ulysses spoke to his fellow sailors as follows: "Brothers,' I said, 'O you, who having crossed a hundred thousand dangers, reach the west, to this brief waking-time that still is left unto your senses, you must not deny experience of that which lies beyond the sun, and of the world that is unpeopled. Consider well the seed that gave us birth: you were not made to live your lives as brutes, but to be followers of worth and knowledge."⁴⁹ Dante's Ulysses suggests that the free pursuit of knowledge was a kind of hubris which carried an implied threat in medieval times: it was like a seductively fatal invitation to embrace falsehood. But in our modern-day context, his speech actually sounds like lyrical praise of the adventure of science!
- A fourth archetype is King Solamona in Bacon's *The New Atlantis*, a king "with a large heart, inscrutable for good, and ... wholly bent to make his kingdom and people
- ⁴⁸ The Republic, Book V, 473d.

⁴⁹ Inferno XXVI, 112-120.

happy,"⁵⁰ whose benevolent dictatorship consisted in keeping his subjects in blissful isolation from the rest of the world, instituting a House "for the finding out of the true nature of things (whereby God might have the more glory in the workmanship of them, and men the fruit in the use of them)." ⁵¹ Bacon took Plato's aristocratic archetype of the philosopher-king a step further, by having him promote knowledge and the application of new mechanical devices for the benefit of humanity. We have here in embryonic form the technocrat of modern times.

A fifth archetype is the disturbing personage of Faust, a necromancer and alchemist well-known in Western European folklore from medieval times, who "goes too far", rejects tradition and the authority of the Bible, and by means of trickery and selfbetrayal acquires the knowledge and power of the gods. According to the natural philosopher and Classic-Romantic author Goethe (1749-1832), Faust's grasping character leads him to bargain with and ultimately sell his soul to the Devil, in exchange for power over a woman which proves to be both illusory and fleeting. In Part One of Goethe's ironic play Faust, the hero decries how, thanks to Mephistopheles, "Now do I see, no perfect thing is given to poor mankind. The bliss you have bestowed to bear me ever nearer to the gods binds this companion to me: doomed I am to need the help of him whose impudence ensures the cheap abasement of myself in my own sight, so much his subtle word can sour and stifle all your gift of joy." ⁵² Not only has Faust's proud quest of knowledge and absolute power, his arrogant defiance of the gods, embittered and defeated him; not only has he lost his identity; but Faust, like Adam and Ulysses before him, has leapt across the barriers of what should be known, he has transgressed the divine order, he is cursed by the fact that he has two warring natures: a capacity for love and a restless inquiring mind. Because he ultimately yields to the snares of the Devil he thus serves as a warning of how the pursuit of knowledge can become a form of moral slavery, leading to personal destruction. Unlike previous interpreters of the Faust myth, Goethe ended up purifying and redeeming him in Part Two of the play.

⁵⁰ The New Atlantis, in Francis Bacon: A Selection of His Works, p. 434.

⁵¹ Ibid., p. 436.

⁵² Faust, Part One, p. 145.

- A sixth archetype which develops this theme of the moral slavery of the scientist in quest of absolute power is that of Mary Shelley's fictional character Victor Frankenstein - the modern Prometheus. Mary Shelley (1797-1851) should be seen in the context of a Romantic revolt against rationality and a no less Romantic fascination with myths and the occult. In the 1818 novel, Frankenstein's inner being is in a state of insurrection and turmoil as he begins to understand that occult scientists "penetrate into the recesses of nature, and show how she works in her hiding places. They ascend into the heavens: they have discovered how the blood circulates, and the nature of the air we breathe. They have acquired new and almost unlimited powers; they can command the thunders of heaven, mimic the earthquake, and even mock the invisible world with its own shadows." ⁵³ Armed with this occult knowledge, Dr. Frankenstein contrives to sew together the lifeless, shriveled limbs and organs of various yellowing cadavers, and infuses the electric spark of life into his appalling creation. But he recoils at the ugliness and evil of the daemon he has brought into being. The monstrous creation comes to haunt its creator, destroying and enslaving his life by turns. "Yet you, my creator," says the monster to his maker, "detest and spurn me, thy creature, to whom thou art bound by ties only dissoluble by the annihilation of one of us. You purpose to kill me. How dare you sport thus with life?" And again the monster cries out in despair: "Accursed creator! Why did you form a monster so hideous that even you turned from me in disgust? God, in pity, made man beautiful and alluring, after his own image; but my form is a filthy type of yours, more horrid even from the very resemblance." ⁵⁴ The Frankenstein myth is a powerful statement of the dangers man runs, when he seeks the god-like stature of total knowledge and power, when the application of forbidden knowledge creates an out-of-control technology which returns to annihilate its creator.
- A seventh archetype is provided by Renan, who was riding the very crest of the wave of scientism in 1848, when he wrote the following glowing if not religious passage about the role of the scientist in L'Avenir de la science: "What could happen in a more advanced phase of intellectual culture is that the emotion which gives rise to artistic and
- ⁵³ Frankenstein, p. 30. ⁵⁴ Ibid., pp. 69 & 92.

poetic composition, the penetration of the scholar and philosopher, the moral sensitivity of the great human being, come together to form one and the same soul, open to everything that is beautiful, good and true." Moreover, this new personality was "a Christ who would not represent solely the moral dimension to the highest degree, but also the esthetic and scientific dimensions of humanity."55 Thus, the ultimate model for the scientist was Christ, who, in Renan's analysis, could be seen as an incomparable man, supremely enlightened, undogmatic, rational, without any prejudice or superstition, devoted to the free pursuit of knowledge. For a nineteenth-century religious sceptic bordering on messianism and atheism like Renan, this was quite an admission. It meant that man, through the cultivation of science, could aspire to a godlike status. The ancient theme of god-like knowledge that had been developed in the Book of Genesis now returned, in the startling guise of critical rationalism. Renan sought to establish science on an altogether new basis: science would be free of what he considered to be the hindering influences of revealed religion; it would be built up into a secular faith (which we call scientism); and it would be bolstered by new myths like that of Christ the scientist.

When compared to earlier archetypes of the scientist, Renan's model of the scientist offers certain novel features: the rationalistic Christ does not glory in the pathetic triumph of virtue, like Socrates; he does not dispense fraudulent counsel like Ulysses; he does not flirt with the moral slavery and self-destruction of Faust and Victor Frankenstein. Instead, the science-minded Christ of Renan has some of the benevolent power of Plato's philosopher-king and Bacon's King Solamona. He has overcome humanity's lingering doubts and ambivalence about knowledge for knowledge's sake; he has closed the rift between religion and science by making reason a religion in its own right; he has redirected the religious impulse to the rational purposes of science.

Finally, we may expose the way in which myth and metaphor have sometimes led scientists to original discoveries. Stories are rife throughout the history of science of discoveries made on the intuitive basis of analogy. Did Archimedes not cry "Eurêka!" -

⁵⁵ L'avenir de la science, p. 86.

"I've found it!" on stepping into his bath and so forming the theory of specific gravity? Could Isaac Newton have come upon the theory of gravitation when he saw an apple drop out of a tree? Beyond such discoveries by intuitive means of analogy, there is also the fact that many visionary dreams have had a significant impact on the formation of new scientific theories. Examples are a dream which led to Descartes' theory of dualism; another which helped Descartes reconcile Euclidean geometry with algebra; and Dmitri Mendeleyev's discovery of the periodic table of elements on the basis of a dream. Two particularly striking scientific dreams are those of Friedrich A. von Kekule and Albert Einstein.

"Kekule had been attempting for some time to solve the structural riddle of the benzene molecule," writes Robert L. van der Castle in *Our Dreaming Mind.* ⁵⁶ "He fell asleep in a chair and began to dream of atoms flitting before his eyes, forming various structures and patterns. Eventually some long rows of atoms formed and began to twist in a snakelike fashion. Suddenly one of the snakes seized hold of its own tail and began to whirl in a circle." On the basis of the intuitions arising during this dream, Kekule developed a model of a closed ring with an atom of carbon and hydrogen at each point of a hexagon, and thus ascertained how the benzene molecule was structured.

Another example of a visionary dream helping to resolve a complex scientific problem is provided by Albert Einstein. In *Creativity, the Magic Synthesis*,⁵⁷ Silvano Arieti described how Einstein's fantasies helped him discover the theory of relativity. "Einstein visualized himself as a passenger who rode on a ray of light and held a mirror in front of him. Since the light and the mirror were traveling at the same velocity in the same direction and since the mirror was a little ahead, the light could never catch up to the mirror and reflect any image."

Evidently, a non-scientist, an uninitiated person, who had never spent years of study investigating such theoretical problems, could never have solved the benzene riddle or pictured the theory of relativity; but it is worth noting that dreams, the unconscious, metaphors have played a significant role in modern science.

⁵⁶ Our Dreaming Mind, p. 35.

⁵⁷ quoted in The Ethical Dimensions of the Biological Sciences, p. 25.

It was tempting for scientism to take modern achievements in science and technology at face value, and assume that humanity had somehow made a shift towards more rational purposes and plans, or at least was capable of doing so. Yet beyond this overt rationality, many of the same deep-set attitudes, motivations and concerns have survived from Biblical times. As if to support this view, Einstein wrote to his friend Janos Plesch, "When I examine myself and my methods of thought, I come to the conclusion that the gift of fantasy has meant more to me than my talent of absorbing knowledge."⁵⁸

⁵⁸ R.W. Clark, Einstein: The Life and Times, New York, World, 1971, p. 87, quoted in The Ethical Dimensions of the Biological Sciences, p. 25.
IIa. Pre-biblical models of time

Today we take for granted the existence of a time continuum including a unique past, a unique present and a unique future, which is a legacy of the *Bible*. As we stated at the outset of this essay, one of the three Judeo-Christian myths at the root of visions of a technological Eden is the myth of Biblical time moving forward from the past through the present to a culminating point in the future. To better understand the originality of this myth, however, we will first examine two alternative views of time that were developed outside of the context of Jewish monotheism: we will call them the "regressive" and "circular" views of time (in the latter case, "cyclical", although commonly used, does not seem as accurate a description of time moving around like a giant wheel and repeating itself periodically).

The "regressive" view of time is to be found throughout the ancient world, prior to the emergence of Judaism. The fact that *Genesis* gave an account of the primordial Fall from Paradise at the beginnings of time should not be confused with the regressive view of time, however. The *Bible* clearly projected the future dimensions of the original Fall: man, having once become a captive of sin, now had to ransom himself through obedience in the present to gain future redemption. In fact, the entire *Bible*, Jewish and Christian alike, is focused on the future redemption of fallen humanity, on recovering the initial state of grace. Otherwise, why should Jesus Christ be presented as a second Adam?

It is striking that Sumer, the earliest known civilization, left no trace of myths pertaining to the future. According to Samuel Noah Kramer, the Sumerians took a pessimistic view of man and his future. They felt nostalgia for the secure old world they had known and whose traces were everywhere to be seen around them; they wanted to live a life free of fear, poverty and war. But whereas they believed that long ago men had lived in a state of happiness, they could not believe in a better future. They considered it was impossible to see beyond the present into the future, since only the gods themselves could ever contemplate destiny. Time thus ended abruptly in the present.⁵⁹

⁵⁹ This idea has been developed throughout Samuel Noah Kramer's landmark work, History Begins at Sumer.

A similarly pessimistic view was held by the Egyptians, for whom the heroic achievements of the past were everywhere in evidence, but the future was a time of narrowing possibilities. As Henri Frankfort has written, "For the Jews, the future is normative. For the Egyptians, on the other hand, the past was normative; and no pharaoh could hope to achieve more than the establishment of the conditions 'as they were in the time of Re, in the beginning.¹ⁿ⁶⁰

In the Greek poet Hesiod's Works and Days (fl. c. 700 BC), we find expressed the powerful myth of the Golden Age, according to which five races have appeared on the face of the Earth. With this poem, Hesiod sought to change the ways of his mean-spirited and selfish brother Perses, by conjuring up the image of a happier society where justice was its own reward. The myth of the Golden Age symbolizes the gradual decay and fall of man from his godlike status in the beginning, and thus resembles the regressive view of time developed by other ancient peoples.

The five races are as follows: first the Golden Race lived like gods and felt no sorrow, did not toil, but rather feasted gaily all the day long; the greatly decayed Silver Race, whose idleness, sin and folly earned the scorn of the gods; the Bronze Race, lovers of battle and horror; a fourth race of demigods, righteous and heroic; and Hesiod's own Fifth Race: "Dark is their plight. Till and sorrow by day are theirs, and by night the anguish of death; and the gods afflict them and kill... And Zeus will smash them in turn on his chosen day..."⁶¹ Although Lucretius in the second century BC did not believe in the gods, he nevertheless adhered to the myth of the Golden Age.

In the account the highly inventive Latin poet Ovid (43 BC - AD 17) gave of the creation of the world in the epic poem Metamorphoses, there is a similar rendering of the Golden Age. Like Hesiod, Ovid had difficult personal circumstances: he had to complete Metamorphoses in exile on the Black Sea, after committing an unknown indiscretion during the reign of the emperor Augustus. "In the beginning was the Golden Age," wrote Ovid, "when men of their own accord, without threat of punishment, without laws, maintained good faith and did what was right. There were no penalties to be afraid of, no

⁶⁰ Before Philosophy, p.35. ⁶¹ Oxford Book of Greek Verse in Translation, p. 135.

bronze tablets were erected, carrying threats of legal action, no crowd of wrong-doers, anxious for mercy, trembled before the face of their judge; indeed, there were no judges, men lived securely without them.... Last of all arose the age of hard iron: immediately, in this period which took its name from a baser ore, all manner of crime broke out; modesty, truth, and loyalty fled. Treachery and trickery took their place, deceit and violence and criminal greed." ⁶² The myth of the Golden Age still had a large following during the Renaissance, largely by means of Ovid, who succeeded in giving it new vigour. As we shall see when we deal later on with secular apocalypses, the myth of the Golden Age reappeared in the nineteenth century, when some millenarian writers "reversed" the ordering of time, placing the Golden Age in the future instead.

Another example of the regressive view of time is furnished by the myth of Atlantis, which Plato developed in the *Timaeus* and the *Critias*. Plato here wrote of an ideal commonwealth, the island of Atlantis, situated 9,000 years before the birth of Solon: Poseidon wisely inaugurated peace, prosperity and a spirit of sharing on the island; under his benevolent reign the Atlantean people enjoyed considerable wealth, because of mines located on their island as well as regular sea-borne commerce; they had an abundance of wood, elephants, race horses, pastures, grasses and fruit-bearing trees; they built a beautiful city of palaces and temples, golden statues, canals, aqueducts and every refinement known to man. But Plato developed this compelling vision of a long-lost wonderland in the perspective of the regressive view of time: the wonderland existed no longer. "By such reflections and the continuance in them of a divine nature, the qualities which we have described grew and increased among them; but when the divine portion began to fade away, and became diluted too often and too much with the mortal admixture, and the human nature got the upper hand, they then, being unable to bear their fortune, behaved unseemly."63 After this, Zeus, the god of gods, perceived that an honourable race was in a woeful plight; and although the dialogue ends abruptly, we are left to understand that Zeus inflicted severe punishment on the Atlanteans; other traditions maintain that the fabled city of 9,000 years beforehand was engulfed by the sea.

⁶² Metamorphoses, pp. 31-2.

⁶³ The Dialogues of Plato, vol. III, p. 804.

It may seem peculiar to compare the Golden Age of Hesiod and Ovid to the Atlantean myth of Plato: the Golden Age pictures the slow degeneration of humanity by means of a depressing succession of ever-weaker races, whereas the myth of Atlantis situates a single primordial paradise in a remote past. What these various myths share, however, is the way they move in a backward direction, and locate a blissful life free of want and suffering in a past which can be neither revisited nor recreated.

Another view of time held in Antiquity was the "circular" view. We will not comment on cosmic cycles, the Great Year or periodicity. Nor is this essay the place to explore the repetitive pattern of the growth and decay of societies as identified by Polybius in *The Histories*, which is closer to a purely cyclical view (variations on a theme) than a circular view (the same theme repeated periodically). We will instead comment on Aristotle's idea of the eternal universe.

Aristotle (384-322 BC) was opposed to Plato's view that there had been a beginning of all things, a moment of time when Creation occurred. Time itself could not have come into being at a given time, as Plato had theorized. On the contrary, the universe was eternal, and if it was subject to periods of change, that movement of change came around full circle once every thousand years, when the Sun, Moon and planets returned to the same positions of a millennium beforehand. Future events were not just located in the future; nor were past events just located in the past. According to this circular view of time, moving along like a huge cosmic wheel, events could return after one thousand years to be re-enacted once again. A person could thus live both one hundred years after and nine hundred years before the same historical event: "How are the concepts of priority and posteriority to be taken? Are we to take it that the generation of the Trojan War is prior to ours, and that their predecessors are prior to them, and that those who are previous are prior ad infinitum? Or, if the Universe has a beginning and a middle and an end, and if, when anybody is brought by old age to the terminus, he comes right back again to the starting-point, then what stands in the way of our being nearer to the starting-point than the generations of the Trojan War were? And, if in virtue of this, we might possess priority, which stands in the way of a correspondence between the process of the genesis and disintegration of things subject to decay and the circular motion that is characteristic

of all the heavenly bodies? Why should not their genesis and decay be repetitive, in the sense of the proverb that 'Human life is a vicious circle'? It would be silly, of course, to suppose that the same state of human society was reproduced statistically, but a morphological reproduction would not be so difficult to demonstrate. On this showing, we might actually possess priority, and one might conceive the structure of the series as a continuous and uniform process of coming round again full circle to the starting-point. According to Alcmaeon, human beings are subject to death because they do not possess the art of joining their beginning to their end; and it is a brilliant observation if one takes the aphorism symbolically without attempting a literal interpretation. Well, if human history is a circle, and if a circle has no starting-point and no terminus, it follows that the priority which consists in being nearer to the starting-point cannot be possessed either by us over the generation of the Trojan War or by that generation over us.⁶⁴

It is not clear whether Aristotle took this idea seriously, or whether he was merely "toying" with it, as Stephen Toulmin and June Goodfield have suggested in *The Discovery* of *Time*.⁶⁵ What is clear is that this circular view of history depreciated the unique character of events, since they were inevitably bound to recur every thousand years, in a repetitive pattern on the analogy of the circular movement of celestial bodies.

⁶⁴ Problemata, xviii.3, quoted in Arnold Toynbee, A Study of History, v. 4, p. 30-31.

⁶⁵ The Discovery of Time, p. 45.

IIb. Biblical time

The *Bible* is a very difficult book to interpret, since it has for so long been considered the "Word of God" and has been defended at times with fire and sword as the literal truth. In addition, the precise authorship of individual books, and even of sections within those books, is not known for certain. Thus, to speak of "Biblical time", as if it were one unified model which can somehow be applied equally to many unknown authors throughout a two-thousand-year period, may seem precarious.

However, if the models of time prevalent in the ancient world are considered, such as the regressive and circular models already discussed, it becomes readily apparent that the *Bible* took a very original approach to time, which was now moving forward from a past through a present to a culminating point in the future. Moreover, this "arrow" of time traveled within the framework of a cosmic beginning and ending of time, an opening and closing of the phrase of life on Earth.

The beginning was described in the very first words of the first book, *Genesis*: "In the beginning, God created the heavens and the earth; The earth was without form and void, and darkness was upon the face of the deep; and the Spirit of God was moving over the face of the waters."⁶⁶ No other beginning was proposed in the *Bible*, although the cosmic ending was evoked hundreds of times. A passage towards the end of the *Revelation to John*, which also happens to be the "end" of the Christian *Bible*, can be quoted: "Then I saw a new heaven and a new earth; for the first heaven and the first earth had passed away, and the sea was no more..... And [the angel] said to me Too not seal up the words of the prophecy of this book, for the time is near. Let the evildoer still do evil, and the filthy still be filthy, and the righteous still do right, and the holy still be holy. Behold, I am coming soon, bringing my recompense, to repay every one for what he has done. I am the Alpha and Omega, the first and the last, the beginning and the end."⁶⁷

The Bible thus established the forward movement of time, within the framework of a cosmic beginning and ending. Moreover, as Augustine wrote in The City of God, the

⁶⁶ Genesis 1:1-2.

⁶⁷ Revelation 21:1-2 & 22:10-12.

Biblical model of time left no room for belief in the circular model of time, or the existence of multiple worlds: "There are some, again, who, though they do not suppose that this world is eternal, are of opinion either that this is not the only world, but there are numberless worlds, or that indeed it is the only one, but that it dies, and is born again at fixed intervals, and this times without number; but they must acknowledge that the human race existed before there were other men to beget them. For they cannot suppose that, if the whole world perish, some men would be left alive in the world....ⁿ⁶⁸

Early on in Genesis, several important ideas were expressed: that there was a unique character to events any of which only occurred once, that man had fallen from a state of blessedness, and that man could only be delivered from his state of sin by God, who would ransom the chosen people for himself. This quest for redemption added a significant new element to Biblical time: the forward thrust to a future brimming with promise and fulfilment, when the suffering and mistakes and sins of the past would be erased and all but forgotten. In the Pentateuch, this new quest was eventually identified with a place: the Promised Land. One of the most beautiful images in the Old Testament is that of Moses, who led the chosen people from captivity to the plains of Moab in presentday Jordan overlooking the Promised Land: "And Moses went up from the plains of Moab to Mount Nebo, to the top of Pisgah, which is opposite Jericho. And the Lord showed him all the land, Gilead as far as Dan, all Naphtali, the land of Ephraim and Manasseh, all the land of Judah as far as the Western Sea, the Negeb, and the Plain, that is, the valley of Jericho the city of palm trees, as far as Zoar. And the Lord said to him, 'This is the land of which I swore to Abraham, to Isaac, and to Jacob, "I will give it to your descendants." I have let you see it with your eyes, but you shall not go over there.' So Moses the servant of the Lord died there in the land of Moab...."⁶⁹ Moses was in fact confronting a future consisting of unique events ordained by God which were - alas - not for him to experience: and after peering into this future, there was nothing left for the prophet Moses to do but die.

⁶⁸ The City of God, pp. 391-2.

⁶⁹ Deuteronomy 34:1-5.

We have noted already that a crucial element of Biblical time is the belief in the existence of a "future", which acts as the culmination of time moving forward from the past and the present. It will be seen how original this Biblical future is, if it is compared to intuitions about the future found in the regressive and circular models of time prevalent in Antiquity. Everywhere in the *Bible*, the human impulse to want to know the future was acknowledged. One has only to think of the Psalmist, who pleaded: "Lord, let me know my end, and what is the measure of my days; let me know how fleeting my life is! Behold, thou hast made my days a few handbreadths, and my lifetime is as nothing in thy sight. Surely every man stands as a mere breath! Surely man goes about as a shadow! Surely for nought are they in turmoil; man heaps up, and know not who will gather! And now, Lord, for what do I wait? My hope is in thee."⁷⁰

In the *Bible* are to be found many different attempts to unlock the secrets of time and thus to model the future:

- First, premonitory dreams could contain genuine communications from God about the future, but some dreams were false and some dreamers deceitful. Joseph, for example, "had a dream, and when he told it to his brothers they only hated him the more. He said to them, 'Hear this dream which I have dreamed: behold, we were binding sheaves in the field, and lo, my sheaf arose and stood upright; and behold, your sheathes gathered around it, and bowed down to my sheaf.' His brothers said to him, 'Are you indeed to reign over us? Or are you indeed to have dominion over us?' so they hated him more for his dreams than for his words."⁷¹ Job also spoke of genuine communications: "Now a word was brought to me stealthily, my ear received the whisper of it. Amid thoughts from visions of the night, when deep sleep falls on men, dread came upon me, and trembling, which made all my bones shake. A spirit glided past my face; the hair of my flesh stood up. It stood still, but I could not discern its appearance."⁷² Other Biblical writers such as Jeremiah spoke of false dreams: "Let the prophet who has a dream tell the dream, but let him who has my word speak my word faithfully."⁷³
- ⁷⁰ Psalm 39.

⁷² Job 4:12-16.

⁷¹ Genesis 37:5-8.

⁷³ Jeremiah 23.28.

- Second, the *Bible* recounted the conflict between state power on the one hand and magic, divination, sorcery and prophecy on the other, as for example when Ahab, king of Israel sought politically useful prophecy which would foretell his own glorious future: "There is yet one man by whom we may inquire of the Lord, Micaiah the son of Imlah; but I hate him, for he never prophesies good concerning me, but always evil."⁷⁴
- Third, a distinction was drawn between the "real" knowable future intuitively apprehended by the God-fearing prophets and the "illusory" imagined future conjured up by godless soothsayers: "For thou hast rejected thy people, the house of Jacob, because they are full of diviners from the east and of soothsayers like the Philistines, and they strike hands with foreigners."⁷⁵ In other words the quality of the prophet determined the quality of the prophecy.
- Fourth, events which interrupted man's understanding of God's plans for his covenant • (with Israel and then with the Church) had the effect of challenging previous prophecies and frustrating expectations, thereby upsetting the human ordering of time. As we will examine later when we speak of religious apocalypses, frustrated expectations were often accompanied by impassioned end-of-the-world visions. The best example of this interruption was the Babylonian captivity, which prophets then had to rationalize and justify in terms of Israel's sin and disobedience, giving enormous power to their new visions (in order to displace the old visions) by using fiery, apocalyptic imagery. The chosen people, having received from God the Promised Land, "deserved" to be led off to Babylon. But the covenant with the Christians was also challenged when the Thessalonians demanded that Paul write to say when Christ would appear at the end of the world. Paul's reply was simply "timeless": "But as to the times and the seasons, brethren, you have no need to have anything written to you. For you yourselves know that the day of the Lord will come like a thief in the night."⁷⁶ A certain wasting ambivalence about the still much-prophesied Last Things can be detected here.
- ⁷⁴ 2 Chronicles 18.7
- ¹⁵ Isaiah 2:6.
- ¹⁶ 1 Thessalonians 5:1-2.

In the Biblical context, the future is not directly "knowable"; God alone determines in advance what will happen, and understands what He has done: God has preknowledge of each man from his conception onward: "Thy eyes beheld my unformed substance, in thy book were written, every one of them, the days that were formed for me, when as yet there was none of them."⁷⁷ This intuition is expressed somewhat differently in *Ecclesiastes*: "And I thought the dead who are already dead more fortunate than the living who are still alive; but better than both is he who has not yet been born, and has not seen the evil deeds that are done under the sun."⁷⁸ Likewise, God has preknowledge of events: "Have you not heard that I determined it long ago? I planned from days of old what now I bring to pass, that you should turn fortified cities into heaps of ruins, while their inhabitants, shorn of strength, are dismayed and confounded..."⁷⁹

If the future is not directly "knowable" by man, then it is at the very least accessible, in varying degrees, to the faithful, depending on the purity of their faith and the extent of their trust in God. Without faith and trust there is simply no future whatever. "Surely there is a future, and your hope will not be cut off."⁸⁰ "Know that your wisdom is such to your soul; if you find it, there will be a future, and your hope will not be cut off."⁸¹ "Fret not yourself because of evildoers, and be not envious of the wicked; for the evil man has no future; the lamp of the wicked will be put out."⁸²

Some Biblical references to the duration of time are downright quirky, such as the passage in the *Revelation to John* where eternity is merged with earthly time: "When the Lamb opened the seventh seal, there was silence in heaven for about half an hour."⁸³ This reference is a little like the idea in *Genesis* that after creating the universe, God rested a seventh day! Moreover, in John, the beast "was allowed to exercise authority for forty-two months; it opened its mouth to utter blasphemies against God..."⁸⁴

⁷⁷ Psalm 139.16.

⁷⁸ Ecclesiastes 4.2-3.

⁷⁹ 2 Kings 19.25-6.

⁸⁰ Proverbs 23.18.

⁸¹ Ibid., 24.14.

⁸² Ibid., 24.19.

⁸³ Revelation to John 8.1.

⁸⁴ Ibid. 13.5.

Ultimately, Biblical time is constructed around the future, which serves as a focus for promise, hope, and deliverance from current suffering. The future is thus apprehended in a moral and allegorical way more than a literal way, and the prophet's message itself is a fiercely moral message, which does not necessarily have a strictly literal meaning: "Thus says the Lord: 'A voice is heard in Ramah, lamentation and bitter weeping. Rachel is weeping for her children; she refuses to be comforted for her children, because they are not.' Thus says the Lord: 'Keep your voice from weeping an, and your eyes from tears; for your work shall be rewarded, says the Lord, and shall come back from the land of the enemy. There is hope for your future, says the Lord, and they shall come back to their own country."⁸⁵

⁸⁵ Jeremiah 31.16-17.

IIc. Post-Biblical chronologies

We have suggested that the Biblical model of time was a radical departure from other models of time in Antiquity, since it was constructed around a future which served as a focus for promise, hope, and deliverance from current suffering. Indeed, this myth of Biblical time, ever pointing its arrow to the future, had such staying-power, that it survived the process of secularization in the eighteenth and nineteenth centuries, and has become integrated into the modern consciousness. However, we have not yet mentioned an important aspect of Biblical time which, if taken at a "literal" level, did not survive the process of secularization, and that is chronology. Some "literal" examples of Biblical chronology are now given:

- First, Genesis established the time-span of primordial Creation at six days. On the first day, God created light and separated it from darkness; on the second, God created a firmament called Heaven in the midst of the waters; on the third, he caused dry land which he called Earth to appear separate from the waters which he called the Seas, and he filled both with vegetation; on the fourth, God created the stars and lights in the heavens; on the fifth, he created swarms of living creatures on land and in the waters; and on the sixth, he created man in his own image. This dating was variously interpreted as literal days, or again as ages, or as periods of 1000 years each. Augustine admitted that "it is a laborious and difficult task for the powers of our human understanding to see clearly the meaning of the sacred writer in the matter of these six days."⁸⁶
- Second, some passages of the *Bible* implied the scope and nature of future events in enough detail that dates could be extrapolated. In his interpretation of Nebuchadnezzar's dream, for instance, the prophet Daniel predicted the reign of five successive kingdoms: "And in the days of those kings the God of heaven will set up a kingdom which shall never be destroyed, nor shall its sovereignty be left to another people. It shall break in pieces all these kingdoms and bring them to an end, and it shall

⁸⁶ The Literal Meaning of Genesis, v. 1, pp. 103-4.

stand for ever."⁸⁷ Then again. Daniel predicted that the fourth beast "shall speak words against the Most High, and shall think to change the times and the law; and they shall be given into his hand for a time, two times, and half a time."³⁸ Daniel heard a holy one asking another holy one: "For how long is the vision concerning the continual burnt offering, the transgression that makes desolate, and the giving over of the sanctuary and host to be trampled under foot?' And he said to him, 'For two thousand and three hundred evenings and mornings, then the sanctuary shall be restored to its rightful state."⁸⁹ The last words of the Book of Daniel give us vet more time references: "Blessed is he who waits and comes to the thousand three hundred and thirty-five days. But go your way till the end; and you shall rest, and shall stand in your allotted place at the end of the days." ⁹⁰ Other passages of the Bible pointed to future events one thousand years hence: the Psalmist wrote of the Lord that "a thousand years in thy sight are but as yesterday when it is past, or as a watch in the night."⁹¹ And the *Revelation to* John reads: "Also I saw the souls of those who had been beheaded for their testimony to Jesus and for the word of God, and who had not worshipped the beast or its image and had not received the mark on their foreheads or their hands. They came to life, and reigned with Christ a thousand years. The rest did not come to life until the thousand years were ended.... And when the thousand years are ended, Satan will be loosed from his prison and will come out to deceive the nations which are at the four corners of the earth "92

• And third, since Biblical time was set in the context of a cosmic beginning and ending, authors could estimate the ultimate beginning and ending of the world, by means of compilation and analogy. *Genesis* reported the considerable age to which people lived in the beginning: Adam became a father at 130 and died 800 years later; Methusaleh lived to be 969; Lamech lived after the birth of Noah 595 years; Noah himself was 600 years old at the time of the Flood, etc. These chronological references in the *Bible* from

⁸⁷ Daniel 4:44.

⁸⁸ Ibid. 7:25.

⁸⁹ Ibid., 8:13-15.

⁹⁰ Ibid., 12:12-13.

⁹¹ Psalm 90:4.

⁹² Revelation to John 20:4 & 20:7

Genesis onwards could be taken literally by post-Biblical authors, compiled, crossreferenced and merged, to give an estimated date for the Creation of the world, as well as any other important dates. Apocalyptic passages about the future end of the world could be reinterpreted in the light of "historical" passages about the past, to provide an approximate date for the end of the world. Justin, for example, merged the thousand days of the Lord and the seventh day during which he rested after the Creation, to assert that the world from the Creation to the Apocalypse, would last 7,000 years.⁹³

The idea of chronologies proceeding from a single all-important event was not new: whereas the Greeks had never really tried to date important events in the past such as the Trojan War, Roman chronologies were based on the Foundation of the City. Given that early Church fathers were working in the context of the Roman Empire, it was natural and even necessary for them to use a similar device in their new chronologies. Dating was extremely important from the point of view of historical legitimacy. Just as Rome's legitimacy was partially derived from the beginning of the City, so the Christian Church needed to derive legitimacy from the beginning of time as recounted in the *Bible*.

In two works, the *Chronography* and the *Canon*, Eusebius of Caesarea (fl. 4th century AD) sought to establish that Christianity was not a new religion, as some opponents objected, but was in a direct line of succession from Abraham. Eusebius reckoned 5611 years between the Creation and the taking of Rome by the Goths, and asserted that Abraham's birth took place 810 years before the fall of Troy. Eusebius was however, "sceptical as to the immense antiquity of Egypt and Babylonia, and gives as his opinion that the sari of the Chaldees, which were supposed to be periods of 3600 years, were in reality much shorter, and that the Egyptian years may be no more than months."⁹⁴ In other words, Biblical dates should be taken more seriously than rival dates in other traditions.

Augustine was also keenly aware of the legitimacy to be derived from a chronology which gave a central role to the *Bible*. In *The City of God*, he attacked the opinion of those who do not believe that in antediluvian times men lived as long as had

⁹³ Jean Delumeau, Une histoire du paradis: Mille ans de bonheur, p. 24.

⁹⁴ F.J. Foakes-Jackson, Eusebius Pamphili, p. 144.

been stated. He acknowledged that some people discounted the possibility that antediluvians could have lived hundreds of years: "By these plausible arguments certain persons, with no desire to weaken the credit of this sacred history, but rather to facilitate belief in it by removing the difficulty of such incredible longevity, have been themselves persuaded, and think they act wisely in persuading others, that in these days the year was so brief that ten of their years equal but one of ours, while ten of ours equal 100 of theirs."⁹⁵ Augustine's argument was based on acknowledging the doubts of others, after which he made a literal reading of the *Bible*, and finally focused on textual differences between the Hebrew and Greek *Bibles*. This allowed him to conclude that there was the plainest evidence to show that such questioning of the dates of the *Bible* was misguided and that the arguments advanced were "quite false."

The date of God's Creation of the world proved to be a rich subject for theological speculation from Eusebius right up to the eighteenth century. Jean Delumeau, in *Une histoire du paradis: le jardin des délices*, provides a convenient table of speculative dates for God's Creation: in the sixteenth century, Cardinal Bellarmine thought it had occurred in 3984 BC, Johannes Kepler in 3992, and Martin Luther and Francisco Suarez in 4000 BC. In the seventeenth century, the Anglican archbishop James Ussher calculated that God's Creation had come about in 4004,⁹⁶ a view shared by Jacques-Bénigne Bossuet (1627-1704).

Bossuet accepted Ussher's chronology, maintaining in the Discours sur l'histoire universelle that God had created the world in 4004 BC, Cain had killed Abel in 3975 BC, the Flood had occurred in 2348 BC, Moses had begun to write down the laws of God in 1491 BC, and so forth.⁹⁷ Bossuet harmonized these Biblical dates with dates such as the siege of Troy in 1184 BC, which he extrapolated from Homer and other classical authors. Bossuet's example is interesting, in that it shows how Biblical chronology had become the focal point, the foundation even, of an extremely developed and all-embracing philosophy of history: "What a convincing testimony it is of the truth of our religion to find that, in times when secular histories have nothing to tell us but fables or, at most confused and

⁹⁵ The City of God, p. 493.

⁹⁶ Une histoire du paradis: le jardin des délices p. 244.

⁹⁷ Discourse on Universal History, pp. 9-16.

half-forgotten facts, the Scriptures - indisputably the most ancient book in the world - carry us back, by so many precise events and by the very succession of things, to the true principle, that is to say, to God, the author of everything!"⁹⁸

In Chronology of the Ancient Kingdoms Amended, Isaac Newton (1643-1727) did not directly examine the question of the Creation of the world, drawing dates out of the Bible as a way of testing his chronologies for the Greeks, Egyptians, Assyrians, Babylonians and Medes, and Persians. He clearly stated his purpose: "I have drawn up the following chronological table, so as to make chronology suit with the course of nature, with astronomy, with sacred history, with Herodotus the father of history, and with itself; without many of the repugnancies complained of by Plutarch."99 Newton noted that Egyptian dating went very far back into the past: "The Egyptians had, before the days of Solon, made their monarchy 9,000 years old; and now they reckoned to Herodotus a succession of 330 kings reigning so many generations, that is about 11,000 years before Sesostris."¹⁰⁰ Likewise. Newton reminded the reader that "Diodorus tells us, that when Alexander the Great was in Asia, the Chaldeans reckoned 473,000 years since they first began to observe the stars, and the ancient Greek and Latin writers who copy from him, have made the Assyrian empire as old as Noah's flood within 60 or 70 years..."¹⁰¹ It is amusing to note that Newton sought to harmonize his chronology even with Homer, asserting that Ulysses had been born in the ninth century BC!

That an idea developed by Eusebius in the fourth century AD could still serve as a serious chronological basis for some of Europe's greatest minds in the seventeenth and eighteenth centuries, is a testimony to the tremendous authority of Biblical time. But this post-Biblical chronology was simply swept aside by Buffon, Hutton and other eighteenthand nineteenth-century scientists, who greatly extended geological time on Earth and even contemplated the age of the Universe. As Stephen Toulmin and Jane Goodfield have written, "The end-result was inevitable. Bit by bit, a picture of the Earth's history was constructed which owed everything to 'the testimony of things', and nothing to the five

⁹⁸ Ibid., p. 114.

⁹⁹ Chronology of the Ancient Kingdoms Amended, in Isaaci Newtoni Opera quae exstant omnia, v. 5, p. 7. ¹⁰⁰ Ibid., p. 179.

¹⁰¹ Ibid., p. 193.

books of Moses. Before 1780, scientific excursions into the past had been isolated, and open to attack piecemeal; but after 1800 they reinforced one another, so that a cumulative pressure built up. Like plants trapped beneath a layer of asphalt, the new geological discoveries pressed more and more forcibly against the restraints of the Old Testament chronology, feeling out its weak points and destroying its consistency."¹⁰²

The new theory about the origin of species and the descent of man developed by Charles Darwin (1809-1882) had the effect of a coup de grâce. He summarized his investigation into the principles of variation in domestic organisms as follows: the possible and probable application of these same principles to wild animals and consequently the possible and probable production of wild races, analogous to the domestic ones of plants and animals; the reasons for and against believing that such races have really been produced, forming what are called species.

Darwin's work demolished in one fell swoop the old literal reading of the Biblical account of Creation, and of the five first books attributed to Moses, although that was not really his intention. The Pentateuch definitively lost its authority as a body of work giving a factual account of history, and now seemed to be a purely moral and allegorical account, full of inaccuracies and internal contradictions. Darwin was keenly aware that his work would be attacked as irreligious. "The idea of a universal and beneficent Creator does not seem to arise in the mind of man, until he has been elevated by long-continued culture.... Few persons feel any anxiety from the impossibility of determining at what precise period in the development of the individual, from the first trace of a minute germinal vesicle, man becomes an immortal being ... "103

For this reason, Darwin was extremely sensitive about the effect his theory would have on revealed religion. "It accords with what we know of the law impressed on matter by the Creator," Darwin wrote in 1842 in his first private abstract, "that the creation and extinction of forms, like the birth and death of individuals, should be the effect of secondary means. It is derogatory that the Creator of countiess systems of worlds should have created each of the myriads of creeping parasites and worms which have swarmed

¹⁰² The Discovery of Time, pp. 163-4.
¹⁰³ The Descent of Man, p. 914.

each day of life on land and water on the globe."¹⁰⁴ And in *The Descent of Man*, Darwin wrote that he was fully aware his work would be considered irreligious by some; but "why is it more irreligious to explain the origin of man as a distinct species by descent from some lower form, through the laws of variation and natural selection, than to explain the birth of the individual through the laws of ordinary reproduction." ¹⁰⁵ Once Darwin had established the new perspective of evolutionary creation, the model of Biblical time lost all resonance: in *The Origin of Species*, he suggested, without really committing himself, that a planetary history lasting millions of years could be inferred from the rates of geological denudation and deposition.

Anyone picking up Augustine's *The Literal Meaning of Genesis*, written around 391 AD in Tagaste, North Africa, will see that the dilemma faced by Darwin, concerning the literal interpretation of the *Bible*, had been tacitly acknowledged by the greatest of Church fathers, some 1,450 years beforehand: how could the *Bible* be understood in a way consistent with everything else that was known about the world? Origen, with his three methods of interpretation, had offered a way out. But for about 1,600 years altogether, the Church had invested huge resources in buttressing the literal meaning of the *Pentateuch*. During the nineteenth century, the Church, Catholic and Protestant alike, lost enormous prestige and authority as a result. And in so doing, it opened up an intellectual vacuum which may account for some of the exaltation and naïve excesses of scientism, of the idea that "science, natural science, is much the most valuable part of human learning - much the most valuable part because it is much the most authoritative, or serious, or beneficial."¹⁰⁶

¹⁰⁴ quoted in The Discovery of Time, p. 225.

¹⁰⁵ The Descent of Man, p. 915.

¹⁰⁶ Scientism: Philosophy and the Infatuation with Science, p. 1.

IIIa. The religious search for Earthly Paradise

Secularization can be understood as a gradual process of historical change in which the mythical content and indeed the intellectual and emotional structures central to a religion are slowly drained of their other-worldly power, and are transformed into worldly values. Secularization consists of more than merely removing God from the horizon of consciousness. It operates on a deep unconscious level, responding to the profound mythical needs of society, some of which lie submerged and out of view. It is not a oneway process, nor does it happen all of a sudden. Instead, secularization follows an incremental movement, full of twists, turns and reversals.

A too rapid or too total process of secularization can open up yawning emotional chasms, can create an indefinable ache and even a nostalgic longing for more secure times past, something to which Renan alluded in *L'avenir de la science*. And this ache and longing may be heart-wrenching, even when people ostensibly or consciously reject the "missing" contents of religion: faith, a sense of the sacred, a set of clear obligations, the support of an empowering community, the extraordinary pageant of the sacraments and a complete cosmology.

At the same time, new transcendental values, whether Nature, Reason, Science, Democracy, Class Struggle or some other value, come to be invested with the emotional force of religion. The new transcendental values operate at a submerged level, like deepwater currents in the ocean. As a result, secular myths, now loosened from the secure structures of religious faith, are surprisingly tenacious and can take bewildering directions; they have some of the staying-power of the old, and all the freshness of the new. Secular myths are submerged, but they are also, at an instinctive level, very much a part of a culture's surface vocabulary. They "come to mind" spontaneously, to inspire and justify actions.

We have made this digression into secularization, as a way of introducing the religious search for Earthly Paradise, one of the founding-myths of the Judeo-Christian tradition. This myth eventually came to be transformed into a secular search for a technological Eden of the future.

The Biblical image of Eden has had an extraordinary power throughout the ages, well beyond the barren confines of the desert: it became the founding myth of the Judeo-Christian world. So powerful was this founding myth of the loss of innocence, that the whole Bible can be seen as an account of man's sometimes desparate attempts to repair the damage done when, in Eden, he tried to be like God, and failed.

The image of Eden is everywhere in the Western world, half-submerged in the consciousness even of people who believe neither in God nor in any particular "beginning" of time. "Most cultures regard certain stories with more reverence than others," Northrop Frye wrote, "either because they are thought of as historically true or because they have come to bear a heavier weight of conceptual meaning. The story of Adam and Eve has thus a canonical position for poets in our tradition whether they believe in its historicity or not."¹⁰⁷

Moreover, Eden was indispensable from another point of view: it introduced into the Bible, for the first time, the human dimensions of time, of birth and dying, of destructive human choices from which there was no turning back. The rest of the Bible's thrust into the future always pointed to an apocalyptic recovery of the lost delights of Eden, the restoration of grace and reunion with God through the Messiah, who would come as a second Adam to cleanse the sins of the first. Paul implied that Jesus Christ both resembled, and was different from, the first Adam: "Have this mind among yourselves, which is yours in Christ Jesus, who, though he was in the form of God, did not count equality with God a thing to be grasped." ¹⁰⁸ And while Christ did not yearn for a godlike stature, the Cross on which he died was frequently likened to the sacred tree of Genesis.

Our purpose is not so much to explore the theological ramifications of the garden of Eden as to assemble a concrete idea of Earthly Paradise from the few references to be found here and there in the Bible.

¹⁰⁷ Anatomy of Criticism, p. 188.
¹⁰⁸ Philippians 2:5-6.

"And the Lord God planted a garden in Eden, in the east; and there he put the man he had formed. And out of the ground the Lord God made to grow every tree that is pleasant to the sight and good for food, the tree also of life in the midst of the garden, and the tree of the knowledge of good and evil."¹⁰⁹

So began the Biblical account of Eden, a delight, a garden of God, the Earthly Paradise, the primordial place where eternal life and wisdom could be conferred on man. A river flowed out of Eden, dividing into four rivers: the Pishon, Gihon, Tigris and Euphrates. Here Adam lived at first; he was meant to till and keep the garden, and was warned by God not to eat of the tree of the knowledge of good and evil; all the beasts of the field and birds of the air were brought to him, that he might name them and have dominion over them; Eve was formed as a fit helper out of one of Adam's ribs during a deep sleep; the serpent urged Eve to eat the fruit of the tree of knowledge, saying "You will not die, for God knows that when you eat of it your eves will be opened, and you will be like God, knowing good and evil."¹¹⁰ After yielding to this temptation, Adam and Eve heard the sound of the Lord God walking in the garden in the cool of the day, and, feeling shame and guilt, they hid from his sight. But God in anger expelled Adam and Eve from Eden because of their wickedness, saying to Adam: "Because you have listened to the voice of your wife, and have eaten of the tree of which I have commanded you, 'You shall not eat of it,' cursed is the ground because of you; in toil you shall eat of it all the days of your life; thorns and thistles it shall bring forth to you; and you shall eat of the plants of the field. In the sweat of your face you shall eat bread till you return to the ground, for out of it you were taken; you are dust, and to dust you shall return."¹¹¹ After which God sent Adam and Eve out of the garden of Eden, setting up the cherubim with a flaming sword which turned every way, to guard the way to the tree of life.

Eden was hardly described in *Genesis* at all: we are presented in a few lines with the image of a charmed, well-watered garden, of a lush, pastoral haven in the burning Mesopotamian wilderness, where death, evil, sin, toil and suffering did not yet exist,

¹⁰⁹ Genesis 2:8-9.

¹¹⁰ Ibid., 3:4.

¹¹¹ Ibid., 17-19

because here God and man lived in harmony. Like a perfect dream, few words were needed.

Earthly Paradise was conveyed by means of contrasted images. Insofar as it could be considered a place in the world rather than a mystical vision, we should not set Eden in the context of verdant countries with temperate climates. A garden in Italy or in France would have nowhere near the same evocative power, since it would seem like any other "normal" garden. Eden should be placed back in the scorched setting of the desert. We are reminded for example of the dusty palms of the oasis town of Al Azraq, shimmering in the Syrian desert of eastern Jordan, close to Iraq, which T.E. Lawrence described in The Seven Pillars of Wisdom in these words: "Azrak's unfathomable silence was steeped in knowledge of wandering poets, champions, lost kingdoms, all the crime and chivalry and dead magnificence of Hira and Ghassan. Each stone or blade of it was radiant with halfmemory of the luminous silky Eden, which had passed so long ago."¹¹² For desert peoples. the oasis was a life-sustaining miracle of geography, where once-a-year floods could be contained and measured out rather than wasted, and mysterious cool aquifers could be tapped, and camels could fatten up and provide milk, and there was shelter from the searing, swelling dunes of sand blown about by the wind. Forced departure from the oasis could very well mean sudden death.

In the *Pentateuch*, the myth of Eden is all the more powerful in that it lies in the vertical either/or world of the desert; it is implicitly contrasted with mortal man's relentless struggle to survive the arbitrary hammer-blows of Nature's plagues, famine and flooding, the arbitrary rule of bondage, imprisonment, slavery and murder, and the no less arbitrary tug and pull of man's own uncertainty, self-doubt and fears.

The earth was conceived by the Hebrews as a vast flat surface, lying between a huge pit below, a place of unquenchable fire, smoke and torments inhabited by shades of the dead, and God's heavens above, which stretched to the horizon and were supported by foundations which trembled and quaked when God was angry.¹¹³ There were seven heavens, of which the third, we are told, was Paradise: in 2 Corinthians, Paul wrote "I

¹¹² The Seven Pillars of Wisdom, p. 423.

¹¹³ 2 Samuel 22:8.

know a man in Christ [probably Paul himself] who fourteen years ago was caught up to the third heaven - whether in the body or out of the body I do not know, God knows.... And he heard things which man may not utter."

There is no explicit parallel in the Bible between this third heaven and the primordial garden, although Eden evidently served as a conceptual foundation for Paradise. In apocalyptic books of the *Bible*, Paradise loomed large; it was thus the ultimate focal point of eschatological expectations. Eden provided a tangible symbolic vehicle for Paradise. For example, God said to Ezekiel: "You were the signet of perfection, full of wisdom and perfect in beauty. You were in Eden, the garden of God; every precious stone was your covering, carnelian, topaz, and jasper, chrysolite, beryl and onyx, sapphire, carbuncle, and emerald; and wrought in gold were your settings and your engravings. On the day you were on the holy mountain of God...." ¹¹⁴ And God said to Esdras: "because it is for you that paradise is opened, the tree of life is planted, the age to come is prepared, plenty is provided, a city is built, rest is appointed, goodness is established and wisdom perfected beforehand."¹¹⁵

We may at this point mention several alternate views of Eden which the Church ultimately rejected as uncanonical: Eden as a symbol of fertility and spiritual power; Eden as an ethereal place in whose streams flowed milk and honey; and Eden as a place of despair and self-destruction.

First, according to the Gnostic book *Baruch*, by Justin, Eden was an esoteric symbol of female fertility corresponding to the spiritual side of humanity, rather than a distinct place. Gnosticism was prominent in the Greco-Roman world in the 2nd century AD, and posited that the Elect would be redeemed by means of esoteric knowledge which would be revealed to them. In *Baruch*, Justin wrote that paradise was the fruit of the mutual satisfaction of Elohim and Eden, after which the angels of Elohim took some of the most excellent earth of Eden to make man. From the bestial parts came wild beasts and the other animals. Elohim and Eden fashioned man as a symbol of their unity and love, they

¹¹⁴ Ezekiel 28:12-14.

¹¹⁵ 2 Esdras 8:52.

each gave him a share of their powers. "Eden provided the soul and Elohim the spirit. And man, the Adam, became a kind of seal and memorial of their love and an eternal symbol of the marriage of Eden and Elohim." ¹¹⁶ Second, in the apocryphal *Secrets of Enoch*, we read that Enoch was taken up into the first and second heavens, before being assumed into the third, where the root of the tree of knowledge was in the garden at the earth's end. Yet there is something distinctly intangible and otherworldly about this paradise: "Two springs come out which send forth honey and milk, and their springs send forth oil and wine, and they go separate into four parts, and go round the quiet course, and go down into the paradise of Eden, between corruptibility and incorruptibility." ¹¹⁷ And third, the apocryphal *First Book of Adam and Eve* stated that the two inhabitants of Eden were so desolated by their own wickedness that they tried to drown themselves in the waters flowing from the garden past the Tree of Knowledge. None of these three books ever found a place in the Biblical canon.

We have reviewed several Biblical and esoteric references to Paradise and the garden of Eden. Those references are taken from the creative phase of the Judeo-Christian tradition, when myths surged forth in a spontaneous fashion. There came afterwards a more analytical phase, during which theologians broke Eden down systematically into various components or essential features, in order to answer objections, chase away their own lingering doubts, and when necessary, merge the myth of Eden with other cherished beliefs.

Augustine (354-439), who brought about a fusion of the New Testament with Platonism, sought to defend the literal meaning of the Bible from its most determined heretic and pagan adversaries. He noted that there were three possible theories of Paradise: "There is, first, the opinion of those who interpret the word 'paradise' in an exclusively corporeal sense. Then there are those who prefer to give an exclusively spiritual meaning to the word. Finally, there are those who accept the word 'paradise' in both senses, sometimes corporeally and at other times spiritually." ¹¹⁸ Augustine favoured the latter theory. No better demonstration could be found of the cultivated ambiguity of

¹¹⁶ Robert M. Grant, ed. Gnosticism: an Anthology, p. 95.

¹¹⁷ The Lost Books of the Bible and the Forgotten Books of Eden, p. 84.

¹¹⁸ The Literal Meaning of Genesis, v. 2, p. 32.

the Church, always shifting between various interpretations of Scripture until it found the most convenient one!

We are interested most of all in the literal interpretation of *Genesis*, since it provides clues about the religious search for Earthly Paradise, which as we shall see was eventually superseded by speculative and scientific searches for a perfect world.

It was important for Jews and Christians alike to determine the exact location of Eden, since this knowledge would give legitimacy to a myth which was quite hard to take literally. Augustine accepted accounts of Paradise as fact: "no good reason prohibits us from understanding things first in the literal sense. We can, therefore, follow with simplicity the authority of Scripture in the narration of these historical realities, taking them first as true historical realities and then searching for any further meaning they may have." ¹¹⁹

Jean Delumeau has shown in *Une histoire du paradis: le jardin des délices* how the systematic search for Earthly Paradise mobilized legions of theologians, poets, geographers, explorers from the Maccabean revolt of the first century up to the Renaissance, some concentrating on the four rivers flowing out of Paradise, others on the holy mountain of God, still others on the third heaven of Paul....

In the first century AD, Flavius Josephus identified the four rivers: the Gihon was the Nile of Egypt, the Phison was the Ganges of India, and the Tigris and Euphrates were the contemporary rivers of the same name. In the fourth century, Ephrem the Syriac concluded that the Phison was actually the Danube. In the early fifth century, the Cappadocian Philostrogios placed Eden at the Equator. Around the same time, it should be noted, Augustine agreed with Flavius Josephus on the identification of the four rivers flowing out of Paradise.

A very novel idea was developed in the sixth century by Cosmas Indicopleustes. As Delumeau puts it: "According to Cosmas, the habitable Earth is surrounded on all sides by an ocean, and beyond this ocean is an external world which contains a paradise where God has put Adam. After the original sin, Adam and his first descendents went to live in the same part of the world, but it was hard to till and infested with beasts. They lived there

¹¹⁹ Ibid., p. 43.

until the Flood, the time when God saved Noah thanks to the Ark, which took 150 days to cross the ocean and reach our world."¹²⁰

In Delumeau's view, the long and short of these various speculations about Eden, was that Paradise now lay beyond the reach of humanity, whether because of the gulf of original sin, or because an immense uncrossable ocean separated Eden from humanity. One can appreciate how the discovery of the New World in the fifteenth century fit snugly into the interpretation of Cosmas, the Atlantic being the uncrossable ocean.

Starting in the eleventh century the focus of speculation shifted: rather than try to determine the location of Eden, authors now wrote imaginary accounts of journeys there. The most famous of these journeys is Dante's Divine Comedy, to which we have already referred.

Dante situated Earthly Paradise just above the Seventh Terrace on the very summit of Purgatory, of that holy purifying mountain which the soul had to ascend on its pilgrimage to the infinite heaven beyond the spheres. It contained a sacred wood - "dense, alive with green, divine,"¹²¹ washed by the sublime stream of Lethe, the stream of forgetfulness. Dante likened the state of bliss in Eden to the Golden Age of Ovid. Dante and Virgil walked upstream where they beheld a pageant of elders and mythical animals, taken from John and linking this vision of Eden with the millenarian expectation of a perfect future world. After a succession of powerful allegorical images, Dante said farewell to Virgil, who was not a Christian and could not be admitted to heaven, joining Beatrice instead, who would be his guide in Paradiso. Suffice it to say that in Dante's person was operated a hot fusion of all of the myths that interest us: of the Golden Age, Biblical time pointing to the future, Eden and the Apocalypse. From the present-day point of view, however, the least interesting part of the Divine Comedy is the poetic evocation of Earthly Paradise, which seems such a stagnant, dull, unlikely place!

In the sixteenth century, Walter Raleigh (1554?-1618), the English navigator and author, devoted many pages in The Historie of the World to the precise location of Eden. There is something extraordinarily touching in the circumstances of this work, which was

¹²⁰ Le jardin des délices, p. 62 (author's translation).
¹²¹ Purgatory, Canto XXVII:2.

penned in the Tower, while Raleigh was awaiting execution. This was scientific scholarship of a kind, testing and verifying each mythical theory by turns. Raleigh held that the Flood had not utterly defaced the marks of Paradise, nor caused hills in the earth; he denied that Paradise was the whole earth, as if the ocean were the fountain of the four rivers; he attacked the view that Paradise was as high as the moon or higher than the middle region of the air; he settled ultimately on Babylonia and Mesopotamia as the most likely location: "out of Eden came a river, or rivers, to water the garden, both which rivers, viz. Tigris and Euphrates, come out of Armenia, and both of them traverse Mesopotamia, regions first of all known by the name of Eden, for their beauty and fertility. And it is very probable, that Eden contained also some part of Armenia; and the excellent fertility thereof in divers places is not unworthy of the name of Eden."¹²²

As Delumeau has shown, myths about Prester John became incorporated into the late medieval myth of Eden, which was variously said to be situated in Central Asia and Ethiopia; according to another view, Paradise was located in blessed isles to the West of Europe, which resembled the isles of Avalon of Celtic tradition, and even the Atlantis myth of Plato.

By the time of the voyages of discovery of Christopher Columbus (1451-1506) at the close of the fifteenth and the opening of the sixteenth centuries, the Biblical myth of Earthly Paradise had greatly changed shape. Such writers as Dante had imperceptibly merged it with other classical myths, such as the Golden Age. The apocalyptic dimensions of Eden, always latent, had risen once more to the surface. And at a time of expanding knowledge and greater confidence about navigation, an idealized Eden across the seas finally seemed within the reach of humanity. Columbus himself was no stranger to the Jewish and Catholic millenarianism of the Iberian sub-continent; he set off on his first voyage in the same year as the Moslems were expelled from Spain.

In the narrative made by Columbus of his third voyage, he discussed learned theories about the location of Paradise, whether in the East, Ethiopia or in the Canaries. Describing to his sovereigns the Golfo de las Perlas at the mouth of the Orinoco River in current-day Venezuela, this first important European discoverer of the Americas wrote

¹²² The Historie of the World, v. 1, p. 112.

bluntly: "For I believe that the earthly Paradise lies here, which no one can enter except by God's leave. I believe that this land which your Highnesses have commanded me to discover is very great, and that there are many other lands in the south of which there have never been reports. I do not hold that the earthly Paradise has the form of a rugged mountain, as it is shown in pictures, but that it lies at the summit of what I have described as a stalk of a pear, and that by gradually approaching it one begins, while still at a great distance, to climb towards it."¹²³ Yet it was still inaccessible, since no man could ascend to the top.

The bold assertion made by Columbus was believed by some: Raleigh, for example, led an expedition up the Orinoco in 1595, on the assumption that the fabled Eldorado lay in Guiana, in the interior of South America. Eldorado was a tantalizing, shimmering mirage of bountiful wealth, lying at the juncture of Hesiod's Golden Age, the Biblical myth of Paradise and the alchemical dream of the Philosopher's Stone. It was nonetheless clearly a mirage, as can be attested by anyone who has actually been to Guiana! But the view of Columbus was also contested on many sides. Some attacked his lack of learning. Certainly his financial motives could be questioned. Didn't this belated discovery of Paradise assure the discoverer of gold for future voyages? If so, it could have been an early modern example of marketing. Columbus took an apocalyptic end-of-theworld tone in the narration of his fourth voyage, when he brooked the subject of future funding! The claims of Columbus were taken seriously, however. Why else would Jacques Cartier bitterly dismiss the barren coast of south Labrador as "the land which God gave to Cain"?

It was understandable that Columbus should take America for Earthly Paradise, since its lush vegetation, abundant water and boundless mineral resources seemed without precedent. Its native peoples, in their naked innocence, in their placid, unsophisticated harmony with the Creator, seemed to hearken back to the very beginnings of time. This huge discovery rolled over Europe like a tidal wave. The sciences of navigation and geography were now directly involved in the quest of Earthly Paradise. The discovery

¹²³ The Four Voyages of Christopher Columbus, pp. 221-2.

excited the imagination of many creative people, who began to develop idealized Edens of the imagination, existing outside of time.

Except that the newly-discovered Earthly Paradise of America was not for long an object of veneration; it was quickly conquered, enslaved, humiliated, depopulated, pillaged, despoiled and exploited.

IIb. The secular search for Earthly Paradise

The previous section of this essay closed with the claim by Christopher Columbus to have discovered Eden. "Paradise" was the only word Columbus could find for the mouth of the Orinoco; this profoundly religious, simple and unlettered adventurer spontaneously described his personal financial troubles, persecution at the hands of others, and failing health in terms of the Apocalypse. He identified completely with these religious myths, instinctively making them his own; but he would not likely have been aware that he was secularizing anything, or casting himself as a new Adam or secular prophet.

As we shall see, the myth of Earthly Paradise was taken up by a succession of individuals, many of whom were, like Columbus, profoundly religious, but who now interpreted the myth, played with it, laughed about it and even merged it with other myths, while minimizing and even removing explicit references to God and the Church.

It was soon obvious that Columbus had *not* found Paradise, but that only served to stimulate the creative imagination of Europe. The search for Earthly Paradise might be all but over; but wouldn't it be intriguing if Paradise had existed somewhere on Earth after all? Why not satisfy humanity's age-old longing for peace and fulfillment by imagining the perfect society? Such light-hearted imagining could even inspire some positive changes in society.

A more uncompromisingly spiritual person could hardly be imagined than Thomas More (1477-1535), who was beheaded and eventually canonized for refusing to acknowledge Henry VIII as head of the Church of England. Yet More was a leading figure in the secular search for Earthly Paradise: from his pen flowed the ideal commonwealth of *Utopia*, a pagan communitarian city-state governed by reason, located on an imaginary blessed isle in the Atlantic. Utopia's ancestry could be traced to Plato's myths of the philosopher-king and to Atlantis. In other ways it resembled the charmed world of Eden, free of sin and suffering. As if to accentuate the secular nature of this new Edenic myth of Utopia, More wrote that divorce and euthanasia were practiced in some circumstances, priests could marry and indeed women could become priests. Close to five centuries later, Roman Catholics are still struggling with these issues! Utopia had many unique features, some of which were to be taken up by later writers. It was:

- a closed insular system, remote from and in marked contrast to contemporary Europe, with its selfish greed and power struggles;
- an idealized state, existing outside of time and in no particular place ("Utopia" means no place), where serious political projects could be envisioned without being too offensive to the powers that be;
- a place knowing neither the bitter ashes of war nor the extravagance of superfluous, unshared wealth;
- a state governed by reason in which the causes of social conflict (private property, vice, disorder, self-interest etc.) were systematically isolated and removed so that collective life was marvelously well-regulated;
- an island republic which severely limited individual liberties in the name of collective cohesion and prosperity;
- the subject of an entertaining imaginary travelogue, in which it is never quite clear what should be taken seriously and what lightly.

We have mentioned that the discovery of the New World greatly stimulated the imagination of Europeans in search of the perfect society. Marxist writers have tended to see *Utopia* as the precursor of communism, as a form of prophecy. But Utopias were clearly intended to amuse, as is made clear in the case of a Utopian spoof by William Shakespeare (1564-1616). *The Tempest* is the only Shakespearean play set in the Americas (somewhere like Bermuda); it also pokes fun at Utopias, in Gonzalo's silly speech in Act II, Scene I: "I' the commonwealth I would by contraries execute all things; for no kind of traffic would I admit; no name of magistrate; letters should not be known; riches, poverty, and use of service, none; contract, succession, bourn, bound of land, tilth, vineyard, none; no use of metal, corn, or wine, or oil; no occupation; all men, idle, all; and women too, but innocent and pure; no sovereignty All things in common nature should produce without sweat or endeavour; treason, felony, sword, pike, knife, gun, or need of any engine, would I not have; but nature should bring forth, of its own kind, all foison, all

abundance, to feed my innocent people.... I would with such perfection govern, sir, to excel the golden age."

Like More's Utopia, Bacon's The New Atlantis was also a closed system, an idealized utopian state governed by reason. But whereas More used the device of an imaginary travelogue to attack social injustices in his day, Bacon used a teasing combination of Edenic, Atlantean, philosopher-king and Golden Age myths, to develop the ideal of a scientific community set on an island in the South Pacific.

Since for Bacon the knowledge of nature was derived first from observation and experience and then from inductive reasoning, it was understandable that his perfect state should organize a living laboratory to assist the scientific community in developing a body of general propositions about nature. And so were provided every imaginable kind of artificial wells and fountains, great and spacious houses, orchards and gardens, parks, enclosures and pools, places for the breeding of useful worms and flies, brewhouses, dispensatories, furnaces. perspective-houses, sound-houses, perfume-houses. a mathematical house, and even houses of deceit of the senses. All of these establishments were to be a living laboratory for a model closed community, mobilized around a twin goal: the development of knowledge through the methodical testing of new observations and experiences, and the practical application of that knowledge in the form of profitable new techniques.

In *The New Atlantis*, Bacon made several veiled references to *Genesis*. Atlantis was of a paradisiac character, since one had to ascend a "scala coeli" or ladder to heaven in order to get there.¹²⁴ The Order or Society of King Solamona was sometimes called "the College of the Six Days Works; by which I am satisfied that our excellent king had learned from the Hebrews that God had created the world and all that therein is within six days; and therefore he, instituting that House for the finding out of the true nature of things (whereby God might have the more glory in the workmanship of them, and men the more fruit in the use of them), did give it also that second name.¹²⁵ Likewise, before

¹²⁴ cf. Genesis 28:12.

¹²⁵ The New Atlantis, in Francis Bacon: A Selection of His Works, p. 436.

marrying, friends of the prospective bride and groom could examine them bathing naked in "Adam and Eve's Pools".¹²⁶

More telling than these fleeting references to *Genesis*, however, was the general thrust of the short book. Whereas work came as a never-ending torment for Adam and Eve after the expulsion from Paradise, the State in New Atlantis placed a very high value on the development of new technical inventions. Future problems ("diseases, plagues, swarms of hurtful creatures, scarcity, tempests, earthquakes, great inundations, comets...") could be anticipated by natural divinations and prevented.¹²⁷ And finally, science and technology could be used to realize a more permanent kind of Paradise than Eden, a state of enduring collective happiness.

An indication that secularization does not proceed in a linear fashion, nor in any single direction, is offered by the irrepressible Romantic, Rousseau. It is important to consider him in our examination of the secular search for Earthly Paradise, since, unlike More and Bacon, Rousseau detested the sciences and particularly the idea of progress, while praising a secularized Eden of his imagination, an idealized, pre-agricultural society at once vigorous, unselfconscious and virtuous.

In two works, Discours sur les sciences et les arts and Discours sur l'origine et les fondements de l'inégalité parmi les hommes, Rousseau combined in a fresh whole a number of age-old ideas about good, evil and the pursuit of knowledge. One finds in Rousseau shades of *Genesis*, of Ovid, of Paul warning the Colossians about vain philosophy, of Thomas More. He defied the Christian doctrine that man was inherently flawed; he likewise rose against the Enlightenment idea that increased knowledge would bring about greater happiness; he reworked several elements of Utopia, and added the enchanting Liberty of the forest.

In fact, Rousseau preferred the noble unawareness of the New World savage to the self-seeking pretensions of the Old World scholar. He imagined man in a Utopian state of nature, in the sacred (Caribbean) groves at the beginning of time. It is hard not to see this imagining as a secular restatement of Paradise before the Fall, when man was unstained:

¹²⁶ Ibid., p. 445.

¹²⁷ Ibid., p. 457.

"The spectacle of nature becomes a matter of indifference to him by dint of becoming familiar to him. It is always the same order, always the same succession of changes. He does not have a mind for marveling at the greatest wonders; and we must not seek in him the philosophy that a man needs in order to know how to observe once what he has seen everyday. His soul, agitated by nothing, is given over to the single feeling of his own present existence, without any idea of the future, however near it may be, and his projects, as limited as his views, hardly extend to the end of the day."¹²⁸

Such lyrical passages had a definite appeal in the mannered aristocratic salons of the mid-eighteenth century, where rich word-pictures and sweeping references to classical authors were greatly appreciated. Perhaps most appealing of all were the clearly Utopian elements Rousseau borrowed from More: the state of nature was a closed, insular system, existing outside of time and in no particular place, free of war and economic inequality, and in that state of nature collective life was regulated spontaneously, without constraint, because man was inherently good. One important difference should be noted, however: unlike More, Rousseau was a passionate partisan of Liberty.

If Rousseau can be said to have developed in these two works a coherent view of *the sciences* (although not of *science* in the our contemporary sense of the word), such a view contained the following points:

- the direction of time is regressive, leading from Nature to Civilization, from purity to corruption, from better to worse;
- natural man is born virtuous and loses his wild innocence, the more he is exposed to arts and sciences;
- most so-called "learning" of any sort is vain, error-ridden, dangerous, frivolous, a waste of time, and encourages the vices of luxury and idleness;
- true enough, the sciences are the masterwork of human genius, fine arts owe much to the spirit of imitation and the mechanical arts have developed useful inventions which have greatly added to the charms and conveniences of life;

¹²⁸ Discourse on the origins of inequality, p. 27.

- yet ultimately the sciences are to be held in contempt, since they are largely useless, a drain on the State's resources, an exercise in futility and in no way draw man closer to his Creator;
- moreover, in civilized man's struggle with natural man, technique would give an unfair advantage to civilized man, although natural man is naturally the more alert and resourceful of the two.

The ambivalent Romanticism of Rousseau had great resonance at a time when in Europe the city was encroaching on the country, and the Industrial Revolution was quickly increasing the potential of technology to change the environment and reorganize work. At the same time, pioneering authors were methodically investigating the exotic customs of New World natives. Rousseau's vision of the primordial state of nature drew attention away from the fact that he had no real understanding of the scientific enterprise, which he associated solely with the corruption and vices which had developed in society. He believed man would have been happier without any science at all, a belief which pointed directly back to the bitter consequences for Adam and Eve of tasting the forbidden fruit in the Garden of Eden.

Rousseau's Romantic vision of the primordial paradise was comforting for those who felt threatened by radical new changes in Europe. In England, the Industrial Revolution transformed the nature of work and the organization of society. Iron, steel and coal became the pillars of the new economy; new machines were invented to greatly increase the mass production of goods; science was loosened from the realm of observation and experiment, and came to be systematically applied to industry. At the same time, a too-rapid and too-concentrated urbanization turned the grimy and gritty city into the breeding ground of crime, vice and demoralization.

Bacon's *The New Atlantis* had pictured a tranquil pastoral haven devoted to the pursuit of scientific knowledge. But when the Industrial Revolution got underway, the darker side of *applied* science was revealed: unlike the older speculations of natural philosophy, applied science could pollute, destroy, violate; it could reinforce inequality, bring about misery and justify repression. Rousseau retreated into the sacred groves of the beginning, where he found the natural man flourishing and unaware. But that was a

retreat. Some way had to be found to adapt the age-old longing for Earthly Paradise, for a closed society outside of time and beyond sin and suffering, to new conditions. The secular myth of Earthly Paradise was surprisingly tenacious. This submerged myth was very much a part of Europe's surface vocabulary. It "came to mind" spontaneously and was now channeled in a new direction: Utopian socialism.

In the early nineteenth century, a series of Utopian socialists confronted the crime, vice, demoralization and inequality of industrial communities head-on, offering new visions of the model community, which became an impetus for social reform. The new model communities had in common with More's *Utopia* that they were insular and planned and sought to remove the causes of social conflict, often severely restricting individual liberties. But in this new space of compelling visions, the secular search for Earthly Paradise was almost imperceptibly joined by the millenarian belief in a new post-revolutionary world of justice and order, pushed forward past the end of time.

Among these utopian socialists, Étienne Cabet (1788-1856) stood out as an Old World theoretician caught up in the revolutionary fever of the 1840s who later put his ideas into practice in the New World settlement of Nauvoo, Illinois. His novel *Voyage en Icarie* described the social and political revolutions which would, he believed, accompany the Industrial Revolution. Cabet's ideal communitarian society of Icarie was based on several founding principles: the sovereignty of the people, universal suffrage, equality, brotherhood and collective happiness. But there was an inherent contradiction in Cabet's dream. On the one hand, there was no need in Icarie for central authority, since individual liberties were tightly prescribed and each individual disciplined himself. On the other hand, Icarie was a dictatorship where everyone was expected to act in unison, under the benevolent gaze of the Dictator: "anarchy would be your fiercest enemy: our common interest demands that we act together, if possible, like a single man."¹²⁹

The Icarians understood that a successful social and political revolution required a gradual transition from a society based on private property, money and unequal opportunity to one in which goods were equitably shared. Icarie was Cabet's Utopian device for demonstrating how the extraordinary developments in science and technique of

¹²⁹ quoted in Denis Fernandez-Récatala (ed.), Mémoires du futur, p. 189 (author's translation)
the preceding three hundred fifty years, the steamships and railways and printing presses, could now be redirected to the communitarian goal of equality: "Finally I wanted to prove not only that the productions of Industry are more powerful today than ever, but that Industry is strong enough to bring about Equality of abundance and of happiness."¹³⁰ In his vision of a model community, Cabet even went so far as to say that the machine itself would be the catalyst, bringing about social justice: "Yes, the machine makes us tremble as we hear its distant roar or when we see it draw near and pass us, with all force and speed, carrying in its womb one thousand little revolutions and the great social and political Revolution! And you could have believed that the Assembly heard or saw an enormous steam engine hauling a long train of wagons, one thousand Reforms leading along Equality!"¹³¹

What is interesting about Cabet's vision is that the machine, far from being a threat to the individual as it had been for Rousseau, had now become a sublime instrument of social and political emancipation. Paradise itself was full of machines, which had an enormous allegorical power, shuddering through history, carrying humanity forward to a future world of uninterrupted Progress. The Icarians responded with a generous, self-regulating conformism, exploiting the possibilities offered by technology, applying science to govern social relations, and concentrating power in the hands of a single technocratic Dictator. In *The Pentagon of Power*, Lewis Mumford rightly considered Cabet "disarmingly naïve". According to Mumford, "what the main utopias disclosed as an image of perfection was a totalitarian community, so organized that its rulers would, with the aid of the machine, assume control over all human activities, translating a large part of its functions into a mechanical or electronic form, and holding the workers themselves under the strictest possible discipline 'for their own good'".¹³²

Cabet developed a vision of a technological Eden, which will come into being through the concerted efforts of a community of technocrats, whose rigorous application of scientific knowledge will definitively resolve the problems of humanity in the future.

¹³⁰ Ibid., p. 198.

¹³¹ Ibid., p. 200.

¹³² The Pentagon of Power, p. 213.

This naïve vision combined revolutionary zeal with millenarian longing, memories of the Golden Age and Eden with apocalyptic prophecy.

In the nineteenth century, scientistic dreams did not appeal to everyone. In Erewhon, Samuel Butler (1835-1902), the rebellious grandson of an Anglican bishop, took up the myth of Utopia, and developed a wonderful satirical account of a horseman accidentally coming across a lost world in the Rangitoto mountains of New Zealand, from which he could not easily return to normal life. The most interesting part of Butler's novel for our purposes is that his quasi-utopian lost world had come to realize the dangers of technology. Some four hundred years previously, they had discovered that machines were ultimately destined to supplant man, by developing a superior sort of vitality. The entire country "made a clean sweep of all machinery that had not been in use for more than two hundred seventy-one years (which period was arrived at after a series of compromises), and strictly forebade all further improvements and inventions under pain of being considered in the eye of the law to be labouring under typhus fever, which they regard as one of the worst of all crimes."¹³³ The rusting wreckage of some centuries-old instruments was stored in the museum of old machines, as a reminder of human folly.

In Erewhon, Butler explored the interaction of man and machine, maintaining that machines had a sort of consciousness, human faculties could be understood in mechanistic terms and found wanting, and man was now quietly becoming the servant of the machine. If all machines were annihilated, and if all knowledge of mechanical inventions were taken from man, Butler did not see how humanity could survive more than a few weeks. "The servant glides imperceptibly into the master, and we have come to such a pass that, even now, man must suffer terribly on ceasing to benefit the machines... Even now machines will only serve on condition of being served, and that too upon their own terms; the moment their terms are not complied with, they jib, and either smash both themselves and all whom they can reach, or turn churlish and refuse to work at all."¹³⁴

Like More, Butler set his narrative in a closed system, a lost world, an ideal republic outside of time and in no particular place. Unlike More's Utopia, however,

¹³³ Erewhon, p. 87.
¹³⁴ Ibid., pp. 246 & 248.

Erewhon was governed by unreason, which Butler used as a satirical device to draw attention to the destructive and self-limiting dimensions of reason, science and technology. He hearkened back to the primeval times of man's innocence, before the slave-master of the machine had set up its empire over humanity. As such, Butler's *Erewhon* shared with Rousseau's *Discours sur l'origine et les fondements de l'inégalité parmi les hommes* the suspicion that science and technology were out of whack with man's true nature: Rousseau and Butler alike were animated by the impossible dream of returning to the paradisiacal beginnings of time.

In the context of the secular search for the Earthly Paradise, we may come at last to H.G. Wells, who pushed the doctrine of social progress supported by science to "utopian" limits. Once more, in *A Modern Utopia*, an inventive and entertaining travelogue led the reader to a closed world, this time "out beyond Sirius, far in the deeps of space, beyond the flight of a cannon-ball flying for a billion years, beyond the range of our vision." ¹³⁵ This other world was the double of Earth, the mirror-image of our planet, which gave Wells the opportunity to poke fun at certain cherished Earthly institutions, such as courtship, love-making, and class prejudice. The *Utopia* of Wells was the meetingground, the point of convergence, of many myths: Earthly Paradise, the Golden Age, Atlantis, the philosopher-king, the New Atlantis, which Wells picked up one after the another to analyze and incorporate into the land of his imagining.

In his *Utopia*, for example, the desire for privacy was not suppressed, but was rather diminished through the "broadening of public charity and the general amelioration of mind and matters." ¹³⁶ The World State had chipped away unnecessary liberties in order to build up the greatest general happiness. Methodical organization was very much a part of this Utopia, since the World State maintained detailed files on each citizen, including their fingerprints, marital status and criminal convictions. This latter bank of individual files was significant, in that it showed that Wells saw benevolent technocratic experts exercising power over the individual: "Our thumb-marks have been taken, they have traveled by pneumatic tube to the central office of the municipality hard by Lucerne, and

¹³⁵ A Modern Utopia, p. 12.

¹³⁶ Ibid., p. 38.

have gone on thence to the headquarters of the index at Paris. There, after a rough preliminary classification, I imagine them photographed on glass, and flung by means of a lantern in colossal images upon a screen, all finely squared, and the careful experts marking and measuring their several convolutions. And then off goes a brisk clerk to the long galleries of the index building."137

At the same time, machines had dispensed with servants, creating a new emotional and social landscape, as new and liberating as the arches and domes of glass Wells imagined above London. He certainly expressed more forcefully than any of his contemporaries the view that science and technology greatly extended human possibilities and made possible the rational organization of life.

Wells picked up and enlarged upon Bacon's idea of the House of Solamona: "Reports of experiments, as full and as prompt as the telegraphic reports of cricket in our more sportive atmosphere, will go about the world.... The literature of the subject will be growing and developing with the easy swiftness of an eagle's swoop as we come down the hillside; unseen in that twilight, unthought of by us until this moment, a thousand men at a thousand glowing desks, a busy specialist press, will be perpetually sifting, criticising, condensing and clearing the ground for further speculation."¹³⁸

We have already seen, at the beginning of this essay, how Wells wished that "the political and social and moral devices" of society were as well-contrived as a linotype machine, an antiseptic operating plant or a tram car. This wish seemed to confirm Butler's lurking fear that people would be interpreted in mechanistic terms, and found wanting. The "glowing desks" may well have been a prophetic intuition that digital electronic computers were on their way, and would hold experts in thrall.

But we have suggested that Wells raised science to the level of a new quasireligion, filling the emotional void that opened up when the new authority of science seemed to have dethroned the old authority of religion. His modern technocratic Utopia became a powerful secular version of the Biblical myth of Earthly Paradise: of a charmed, closed society, outside of time and in no particular place, where people regulated

¹³⁷ Ibid., p. 167. ¹³⁸ Ibid., pp. 60-1.

themselves so that vice and social conflict were kept to a strict minimum. With the difference that God was now nowhere to be seen: the "glowing desks" of technological expertise were set to the task of resolving humanity's problems. Later dystopias, such as Aldous Huxley's *Brave New World* and George Orwell's *Nineteen Eighty-Four*, tore into Wells' vision.

IVa. Religious apocalypses

Let us consider for a moment the *Revelation to John*: "Then I looked, and lo, on Mount Zion stood the Lamb, and with him a hundred and forty-four thousand who had his name and his Father's name written on their foreheads. And I heard a voice from heaven like the sound of many waters and like the sound of loud thunder; the voice I heard was like the sound of harpers playing on their harps, and they sing a new song before the throne and before the four living creatures and before the elders. No one could learn that song except the hundred and forty-four thousand who had been redeemed from the earth. It is these who have not defiled themselves with women, for they are chaste...."

This passage,¹³⁹ gives a good indication of how fascinating, strange, encoded, hermetic, fiery and fearful the apocalyptic genre is. This is an inspired picture-book, containing revelations communicated by God through an angel to a long-suffering Greek saint in exile, in an island cave in the Aegean Sea just off the coast of present-day Turkey. John left the realm of conventional narration to evoke the mystical destiny of the seven churches (Ephesus, Smyrna, Pergamum, Thyatire, Sardis, Philadelphia and Laodicea). He then described visions of the glory of God and the Lamb and opened a series of seven seals of the sacred scroll. War, bloodshed, pestilence, death, a great earthquake, plagues and divine judgments led up to lurid battles with horrid beasts and a dragon. He viewed the crumbling ruins of fallen Babylon and Rome, and foresaw the victory of Christ and his armies. He witnessed the binding and loosing of Satan, and had a final supremely liberating vision of a New Jerusalem.

At first glance, we simply do not know how to react. How do we know the author is inspired? How should we respond to the graphic symbols? How does the author "know" the Elect number one hundred forty-four thousand? Can anyone else recognize who belong to the Elect? Is their promised redemption imminent? Should they wait, continuing to be chaste, for the return of the Messiah? Or is their redemption something which may or may not happen in some distant future? And is that future a completely new and unknowable dimension of their existence, with no tangible link to our known world? Then

¹³⁹ Revelation to John 14:1-4.

again, are war, bloodshed, pestilence, death, a great earthquake and plagues to be accompanied by divine judgments? And if so, when? And what are we to make of the fallen cities of Babylon and Rome, the victory of Christ and his armies, and the binding and loosing of Satan? Augustine asked some of these questions in *The City of God*, without, it is true, providing satisfactory answers.

Inevitably, these questions bring us back to Origen's three-part interpretation of the Scriptures. Except that in the case of apocalyptic, the difficulties even of allegorical interpretation are greater than for the rest of Scripture. The apocalyptic genre can be understood in several different ways:

- as a literal statement of what is yet to come;
- as disguised commentary on one's own times, using particularly hermetic symbolism to get around state censorship;
- as a dramatized projection of anxieties and the fear of death;
- as a mythical framework setting a beginning and ending which serve as limits to time;
- as a search for meaning in the moving incoherent jumble of events;
- as a longing for future release from present suffering;
- as a final resolution of the world's problems;
- as a mythical reversal of the injustices of today's world, by conjuring up a vision of the justice-to-come, which will comfort the Elect;
- as a justification for bludgeoning all those who do not fit the inspired description of the Elect;
- as several of the above simultaneously.

Where did the apocalyptic genre come from? In Cosmos, Chaos and the World to Come, Norman Cohn suggests that "some time between 1500 and 1200 BC Zoroaster broke out of (the previous) static but anxious world-view. He did so by reinterpreting, radically, the Iranian version of the combat myth. In Zoroaster's view the world was not static, nor would it always be troubled. Even now the world was moving, through incessant conflict, towards a conflictless state. The time would come when, in a prodigious

final battle, the supreme god and his supernatural allies would defeat the forces of chaos and their human allies and eliminate them once and for all."¹⁴⁰

In *Cosmos and History*, Eliade agrees that the myth of the end of the world by fire, from which the good will escape unharmed, originated in Zoroastrianism. He adds that this myth eventually spread throughout the Greco-Roman world, becoming the foundation of Judeo-Christian eschatology, because of its special appeal. "Strange as it may seem, the myth was consoling. In fact, fire renews the world; through it will come the restoration of a new world, free from old age, death, decomposition and corruption, living eternal, increasing eternally, when the dead shall rise, when immortality shall come to the living, when the world shall be perfectly renewed. This, then, is an *apokatastasis* from which the good have nothing to fear. The final catastrophe will put an end to history, hence will return man to eternity and beatitude."¹⁴¹

But in one sense at least, Judeo-Christian apocalyptic represented a departure from the earlier Zoroastrian myth of universal conflagration. In *Aspects du mythe*, Eliade writes that "Judeo-Christianty introduces an extraordinary innovation. The End of the World will be unique, it will be the same Cosmos created by God at the beginning of Time, but will be purified, regenerated and restored in its primordial glory. This Earthly Paradise will neither be destroyed nor have an end. Time is no longer the circular Time of the Eternal Return, but a linear and irreversible Time. Because the End of the World will reveal the religious value of human acts, and men will be judged@according to their acts."¹⁴²

It should be noted here that an indispensable element of religious apocalyptic is the existence of a prophet responsive enough to God to be singled out for, and to receive, divine revelation. The prophet embraced the message of God, at the same time interpreting and presenting it to the Elect in such a way as to command their attention and redirect their behaviour. Without a prophet, there could be no apocalyptic vision; the prophet was not only the leader and guide of the Elect, he was God's personal choice to prepare the Elect for the harrowing experience of the "final things" which opened the way to a privileged new existence in the future.

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¹⁴⁰ Cosmos, Chaos and the World to Come, p. 227.

¹⁴¹ Cosmos and History, pp. 123-4.

¹⁴² Aspects du mythe, pp. 86-7.

André Neher has identified four kinds of prophets in the ancient Near East: the first and lowest kind of prophet dwelled in the realm of magic; the second was more concerned with social ideals, and used prophecy to make his claims for justice better known; then there was the mystical prophet; and finally the apocalyptic prophet: "The apocalypse is also a total and definitive revelation, but unlike the mystery, the apocalypse does not stand being recreated by means of ritual, by a discipline. It is not necessary to induce the birth of the apocalypse, which ripens through a process of maturation, the length of which sometimes gives rise to impatience, but which does eventually reach completion."¹⁴³

For Neher, the prophet concentrates in his person all the intensity of the fiery struggle between light and darkness, between good and evil. As a result, to be a prophet means to be weighed down, deprived of freedom, martyred, to have experiences which free the prophet of the human illusions of liberty and autonomy and make of him a more complete man. Neher is particularly eloquent in writing of Jeremiah's captivity. Indeed, exile, the rift between the self and its native place, is common to much apocalyptic prophecy, whether it be Jeremiah himself in Babylon, John in exile on the isle of Patmos or even Dante, disconsolate after being expelled from his beloved Florence. The tension of forced separation only heightens apocalyptic consciousness.

There have been many kinds of apocalyptic in religious and secular traditions: for example, the Old Testament apocalypses of Isaiah, Jeremiah, Ezekiel, Daniel and Joel; the extra-biblical apocalypses of Enoch and Ezra; the Revelation to John; subsequent post-Biblical and Gnostic apocalyptic; Shiite Islam's feverish visions of the end of the world; the apocalyptic illumination of Joachim de Fiore; the apparitions surrounding the Peasant's Revolt in the fourteenth century; the seventeenth-century visions of English revolutionaries; Marxism from the mid-nineteenth-century to just recently; and scientistic visions of the role of science in definitively emancipating and transforming the world.

We will for the moment examine Isaiah in particular, and some elements of John, as they pertain to the structure of apocalyptic, the quest of a new Eden, and the problem of when the apocalypse is expected to come. Our intention is not to analyze these books in

¹⁴³ The four kinds of prophets are described in Prophètes et prophéties, pp. 48-59.

detail, but rather to draw out of them such themes as serve our purpose in this essay, which is to understand the influence exerted by religious apocalypses on the modern myth of a technological Eden.

While Isaiah lived in the eighth century BC, the version of the Book of Isaiah which we today possess was probably compiled after the Babylonian captivity (586-538 BC).

The Book of Isaiah denounced the wickedness of Judah and Jerusalem, of this "sinful nation, a people laden with iniquity, offspring of evildoers, sons who deal corruptly!"¹⁴⁴ The author admonished the godlessness and disobedience of Israel, particularly on account of the social injustice then prevalent in her midst, and her lack of righteousness. Isaiah denounced the people of Judah and Jerusalem for having strayed far from God and for allowing themselves to be engulfed by the sin and luxury of Babylon.

At the same time, Isaiah longed for the restoration of Jerusalem: "How the faithful city has become a harlot, she that was full of justice! Righteousness lodged in her, but now murderers. Your silver has become dross, your wine mixed with water." ¹⁴⁵Isaiah predicted that God's wrath would come hammering down, purifying the city of Jerusalem: "And I will restore your judges as at the first, and your counsellors as at the beginning. Afterward you shall be called the city of righteousness, the faithful city."¹⁴⁶

The incessant alternation between doom and boundless happiness grips the reader. But Isaiah held out a fixed hope: the people of Judah and Jerusalem would be saved if only they turned resolutely to God. The rule of the Messiah would bring about an ideal reign of peace: "The wolf shall dwell with the lamb, and the leopard shall lie down with the kid, and the calf and the lion and the fatling together, and a little child shall lead them." ¹⁴⁷ The Messiah in turn would restore the Lord's people, and, once reunited, Israel would take vengeance on her oppressors.

Within Isaiah is a long passage which Biblical scholars call the "Isaiah Apocalypse". It does not fit easily into the rest of the book; it is impossible to say who wrote it or when. The apocalyptic passage presents a spectacle of total destruction, of waste and desolation, of an Earth mourning, withering, languishing and lying polluted; and

144 Isaiah 1:4. 145 Ibid., 1:21-22. 146 Ibid., 1:26. 147 Ibid., 11:6. in the midst of this spectacle arises an overpowering image of the abasement of the proud and the exaltation of the humble. Indeed, in the day of judgment "from the river Euphrates to the Brook of Egypt the Lord will thresh out the grain, and you will be gathered one by one, O people of Israel."¹⁴⁸ This eschatological harvest would separate the wheat from the chaff, renewing the covenant with Israel, saving Abraham's children, ushering the Elect into a state of bliss: "For the Lord will comfort Zion; he will comfort all her waste places, and will make her wilderness like Eden, her desert like the garden of the Lord; joy and gladness will be found in her, thanksgiving and the voice of song."¹⁴⁹

In this book are to be found several elements of religious apocalyptic:

- a gloomy catalogue of suffering, destruction and despair;
- intense longing for the restoration of Jerusalem, which would be a new Eden;
- the precondition of obedience to God for this new Eden to come into existence;
- the joy of God in singling out the Elect for salvation;
- the wrath of God in laying waste to the sinful world;
- the participation of the Elect in helping to chastize that sinful world;
- the inauguration of an ideal reign of peace, after harmony had been definitively restored between God and his people in a new Eden.

It is interesting to note that references to the new Eden are found in several other apocalyptic writings as well. In *Ezekiel*, we read: "And they will say, 'This land that was desolate has become like the garden of Eden; and the waste and desolate and ruined cities are now inhabited and fortified."¹⁵⁰ In *Joel*: "Fire devours before them [the locusts], and behind them a flame burns. The land is like the garden of Eden before them, but after them a desolate wilderness, and nothing escapes them." ¹⁵¹ And in the *Revelation to John*, the angel of the church of Ephesus promised an extraordinary reward to those continuously vigilant people who managed to conquer their own sins: "To him who conquers I will grant to eat of the tree of life, which is in the paradise of God."¹¹⁵²

Like the Books of Daniel and Ezekiel, the Revelation to John is full of obscure numerical references, the true import of which may never be known. These numerical references, even when not clearly understood, were significant however because they gave

148 Ibid., 27:12.
149 Ibid., 51:3.
150 Ezekiel, 36:35
151 Joel 2:3.
152 Revelation to John 2:7.

a certain material, tangible quality to the fierce prophetic symbolism of the book; they were a puzzle which fascinated even seventeenth-century scientists such as Thomas Napier, who invented logarithms as a way of penetrating the mystery of John's apocalyptic calculations.

There were seven representative churches; seven spirits spoke to John; the letters were opened and read one by one; four living creatures were angelic beings representing man and all the beasts; the scroll's seven seals were opened; between the sixth and seventh seals came two visions; the redeemed numbered 144,000; seven trumpets sounded; two beasts appeared, one from the sea, the other from the earth; the human number of the latter beast was 666; there were seven bowls of the wrath of God.

But perhaps most importantly, John, having produced his burning vision in continuity with Isaiah, Jeremiah, Ezekiel and Daniel, now hinted at the time when the Apocalypse would come about. The Christian martyrs "came to life, and reigned with Christ a thousand years. The rest did not come to life until the thousand years were ended.... And when the thousand years are ended, Satan will be loosed from his prison and will come out to deceive the nations which are at the four corners of the earth....^{*153}

The mention of a thousand years was to have extraordinary resonance throughout the next two thousand years, and even up to our own day. In *Prophecy in the Later Middle Ages: A Study in Joachimism*, Marjorie Reeves succinctly restated the apocalyptic view of time: "The Millennium, as described in the Apocalypse, has the following characteristics: it will be ushered in by direct divine intervention in history; it will be a definite limited period of time, that is within history and distinct from eternity; during it Satan will be bound, but not finally; it will be enjoyed by a privileged and elect group, not by a whole generation of the human race; it will end in a further and final struggle with evil, further divine intervention, and the winding-up of history. Only after this will the Holy Jerusalem descend: the new heaven and earth will be beyond history, not its fruition."¹⁵⁴

In the interests of orthodoxy, John's text on the Millennium was painstakingly downplayed and dedramatized by Augustine in *The City of God*. The text has nevertheless

153 Ibid., 20:4 & 20:7.

154 The Influence of Prophecy in the Later Middle Ages: A Study in Joachimism, p. 296.

had a huge effect on millenarian movements ever since it was first written. J.-P. Charlier notes that since the time of Origen there have been three main interpretations of the thousand years: "The first is chronological and takes this period of ten centuries at face value, even if it is approximate; the second is ecclesiological and considers this millennium to be coextensive with the life of the Church that is from the Pentecost up to the end of time; finally the third is futuristic and pictures a lapse of time - 1,000 symbolic years between the Coming and judgment of Christ and the definitive establishment of the kingdom of God."¹⁵⁵

There is little point in using John in order to anticipate the date of the Apocalypse with any precision; what is more important is to understand why anyone would have taken such a hermetic work, rife with allusions to mythical beasts and spirits, at face value. An answer to this question is provided by the Gnostics, whose esoteric movement gained strength when the eschatological expectations raised by Paul were shattered. Apocalyptic visions haunted the Gnostics because the reality they were living, the destruction of Jerusalem and the shattering of previous prophecies, was simply unbearable.

According to Robert Grant, Gnosticism started out as a kind of reinsurance contract, as a way of reinventing the past, of compensating for the fact that the end of the world never did arrive. In other words, Gnosticism was a post-apocalyptic belief, which filled the voids left by a prophetic vision of the future which turned out to be false. And Gnosticism cultivated a belief in the redemptive power of esoteric knowledge which was revealed only to the *gnostikos* (one who has "secret knowledge").

Grant attempts to explain how Gnosticism arose "out of the debris of apocalypticeschatological hopes which resulted from the fall or falls of Jerusalem. It must be admitted that other disappointments are found in the first century of our era; the followers of the 'false prophets' described by Josephus must have suffered in this way. But the most crushing blow of all must have come when God failed to save his city of Jerusalem. Only after this disaster do we encounter Gnosticism in all its various systematic forms."¹⁵⁶

Having reviewed Isaiah, John and their references to an apocalyptic return to Eden, as well as the views of Cohn, Eliade, Neher and Grant, we can now identify several

¹⁵⁵ Comprendre l'Apocalypse v.2, p. 170.

¹⁵⁶ Gnosticism and Early Christianity, p. viii.

elements which are common to all of the variations of religious apocalyptic so far mentioned:

- First, particular individuals prophets assert that God has revealed to them personal, transcendent knowledge about the cosmos and the destiny of man. God has forced his way into the life of the prophet who receives instantaneous, blinding, disturbing flashes of revelation, hears voices, winds, music, the terrifying roar of monsters, whose senses are quickened and literally transformed by these visions.
- Second, the prophet is particularly receptive to the blinding flashes of revelation, since he is living the torment of exile, which already represents an intensely emotional break with his own previous understanding of God's plans for the Elect.
- Third, the prophet is compelled to communicate a fervent sense of the absolute to the Elect, "the hundred and forty-four thousand who had been redeemed from the earth" according to John's vision. The prophet impresses on the Elect a sense of their own involvement in the prophecy, to propel them towards future redemption and security. For their part, the Elect have ever to keep in mind the "last things", and participate in the fulfillment of prophecy by remaining faithful to the laws and traditions laid down by God. By remaining faithful, the Elect ensure that they survive the fiery cataclysms which are coming and are made necessary by God's plan.
- Fourth, the apocalyptic account, by means of its incredible fire and passion and ultimately its ambiguity, supersedes previous prophecies, and above all the future envisioned in those prophecies. This is crucial since unfulfilled prophecies have a tendency to frustrate eschatological expectations, which can then lead to further apocalyptic visions.
- Fifth, once a group considering themselves the Elect are drawn into the passionate world of apocalyptic consciousness, huge reversals of fortune may paradoxically make that consciousness yet more intense.
- Sixth, the apocalypse announces that a perfect new world is about to come into being, either imminently, or at a fixed time in the future, such as one thousand years hence.
- And seventh, the apocalyptic vision organizes history into distinct periods, clearly drawing a dividing line between suffering and salvation, between the wicked and the

Elect, at the same time merging the Biblical continuum of past-present-future with visions of a fiery cleansing cataclysm. This has the effect of projecting hopes of redemption into an idealized future time when the present is reconciled with the past and when time simply ceases to be.

In a way, the apocalypse is a nostalgic hearkening back to "those days", when the world was created, when man was unaware of his imperfections, errors and historical experience, and when suffering and death did not yet exist. Gilgamesh cherished a desire for immortality free of sin and suffering; so did Adam and Eve. This human longing for the immortality of the gods can be found in several founding myths. The apocalypse offers a return to the primordial state of bliss; God can no longer accept the existence of Evil, and returns to scorch the Earth and separate good from bad. With the difference that Gilgamesh dwelled in a static world where the past loomed large and there was no awareness of any future. Judeo-Christian apocalyptic, on the other hand, pointed to the future, as a dimension of time when the conflicts of the world will be resolved once and for all.

IVb. Secular apocalypses

We have somewhat arbitrarily drawn a line between the secular search for Earthly Paradise, and secular apocalypses, in order to retrace the development of the modern myth of an imminent technological Eden. In the preceding section, however, we showed that there was no clear line to be drawn between Eden and the Final Things in apocalyptic books of the *Bible*, since Paradise (rather than Jerusalem) served as the ultimate focal point of eschatological expectations. In addition, we have limited discussion of the millennium and of Jerusalem, since they did not seem to suit the objective of this essay. At the same time, we have already described how particular individuals such as Dante, Columbus, Bacon and Wells joined together various myths to form a new coherent whole. Some other individuals, Comte and Renan among them, should be considered to have developed a millenarian rather than a paradisiac view of science. But we already discussed them in the section on the secular search for Earthly Paradise, since we were then busy explaining how science came to be interwoven with the idea of a perfect future society, of a new Eden. Secular myths are sometimes a surprising fusion of disparate and even contradictory elements in any case.

In *The Pursuit of the Millennium*, Norman Cohn settled on the late fourteenth century as the ultimate birthdate of the secular apocalypse, which he studied in relation to revolutionary millenarianism: "When did people cease to think of a society without distinctions of status or wealth simply as a Golden Age irrecoverably lost in the distant part, and begin to think of it instead as preordained for the immediate future? So far as can be judged from the available sources, this new social myth came into being in the turbulent years around 1380."¹⁵⁷

Cohn examined millenarian aspects of the last medieval crusade of the poor, the belief that Emperor Frederick II was the Messiah returned, peasants' revolts in England and Germany, as well as the end-of-the-world beliefs of early modern Anabaptists and Ranters. He explained the nature of revolutionary millenarianism in these terms: "A social struggle is seen not as a struggle for specific, limited objectives, but as an event of unique

157 The Pursuit of the Millennium, p. 198.

importance, different in kind from all other struggles known to history, a cataclysm from which the world is to emerge totally transformed and redeemed."¹⁵⁸ But where Cohn restricted his interpretation to the "Judeo-Christian" world-view, Shiite Islam could just as well be included on account of its the end-of-the-world imagery, egalitarian rhetoric and radical violence. Over the years, many revolutionary millenarian movements around the world have had the five characteristics identified by Cohn, namely that they have been: "(a) collective, in the sense that it is to be enjoyed by the faithful as a collectivity; (b) terrestrial, in the sense that it is to be realized on this earth and not in some other-worldly heaven; (c) imminent, in the sense that it is to come both soon and suddenly; (d) total, in the sense that it is to utterly transform life on earth, so that the new dispensation will be no mere improvement on the present but perfection itself; (e) miraculous, in the sense that it is to be accomplished by, or, with the help of, supernatural agencies."¹⁵⁹

Secular apocalypses have found their way into interpretations of the role of science in transforming humanity. They have done so in two distinct ways:

- a first knowledge-based model of secular apocalypse took inspiration from the Elect of John's Revelation, implicitly identifying their spiritual knowledge with enlightenment or even with esoteric scientific expertise, as knowledge gradually came to be secularized in the West;
- a second technology-based model concentrated instead on the explosive cataclysm of the Last Things, particularly after the Second World War, implying that only the elect group who had mastered technology would have the means to survive, or on the implosive cataclysm, in which case humanity would be totally depersonalized from within or even wiped out by technology.

The knowledge-based model of the secular apocalypse could be traced to the religious apocalypse of Joachim de Fiore (1130-1201). Joachim was the first great European prophet of the future, and developed a Trinitarian philosophy of history, according to which the world was passing through three successive ages: the Age of the Father, corresponding to the Old Testament, the Age of the Son, corresponding to the

¹⁵⁸ Ibid., p. 281. ¹⁵⁹ Ibid., p. 15.

New Testament, and the future Age of the Spirit. Within each of these three ages, Joachim detected a beginning, a coming-to-fruition and a consummation. In so doing, he made explicit the link between the apocalyptic vision of a cosmic beginning and end of time, and the Biblical time continuum of past-present-future: history pointed towards progress, completion, transcendence.

Joachim summoned spiritual men to the Third Age of perfect knowledge and transcendence with the following words: "Clear the eyes of the mind from all dusts of earth; leave the tumults of crowds and the clamour of words; follow the angel in spirit into the desert; ascend with the same angel into the great and high mountain; there you will behold high truths hidden from the beginning of time and from all generations.... For we, called in these latest times to follow the spirit rather than the letter, ought to obey, going from illumination to illumination, from the first heaven to the second, and from the second to the third, from the place of darkness into the light of the moon, that at last we may come out of the moonlight into the glory of the full Sun."¹⁶⁰

From the point of view of Church authority, the first threat posed by Joachim lay in the fact that his prophecy envisaged a future which actually surpassed in perfection the Age of Christ; a second lay in his basing this future age on the illumination of spiritual men who were not apostles. The struggle between divine and human knowledge was thus relaunched.

Joachim eventually was rehabilitated in the late eighteenth and early nineteenth centuries, when he was identified with the secular myth of progress, which Comte and Renan took to heart. If Joachim is considered to be at the religious end-point of this transition, and the nineteenth-century believers in scientism at the secular end-point, then Bacon and Newton may have been somewhere in the middle, only just emerging from the medieval world of magical prophecy, astrology and Paracelsian medicine. These two giants of early modern science were deeply interested in the Apocalypse, but they still couched that concern in religious, rather than purely secular, terms.

In The Great Instauration, Bacon hinted that scientific knowledge had an apocalyptic quality, insofar as it helped to understand the hidden ways of God: "And all

¹⁶⁰ quoted in Prophecy in the Later Middle Ages: a Study in Joachimism, p. 292.

depends on keeping the eye steadily fixed upon the facts of nature and so receiving their images simply as they are. For God forbid that we should give out a dream of our own imagination for a pattern of the world; rather may he graciously grant us to write an apocalypse or true vision of the footsteps of the Creator imprinted on his creatures.^{*161} This view was fully consistent with Bacon's metaphor of the great tree of Philosophy, whose three branches were the knowledge of God, of Nature and of Humanity.

For his part, Newton wrote extensively about the language of prophecy as well as about the Apocalypse itself, like many of his contemporaries, he sought to determine the place of his age in the course of events preordained by God, and thus to evaluate when the Last Things would come upon the world. Newton was living at a time of intense eschatological anxiety and expectation, when prophecies were rife, and the apocalyptic calculations made by mathematicians and astronomers laid the groundwork for the emergence of experimental science. As Charles Webster has pointed out, there was something unnerving about the new discoveries: "knowledge enhanced the sense of trial and impermanence. God's retribution seemed more imminent to the contemporaries of Paracelsus and Newton than the possibility of nuclear holocaust seems to us. Accordingly questions relating to the more permanent features of world systems or planetary mechanisms arguably took second place, among the educated public, to cosmological considerations bearing on the immediate future of Europe. Experts were accordingly faced with the delicate problem of bringing their cosmology in line with eschatology."¹⁶²

The knowledge-based model of the secular apocalypse would not have been possible without *the secularization of knowledge*. The transition was made, largely in the eighteenth and nineteenth centuries, when science held out the promise of serving as the basis for the rational reorganization of every aspect of human existence: nature, reason, the imagination, feeling, human relations, economic relations, morality, God. Millenarians and positivists alike redirected the mindset and the tremendous emotional force of religion to secular undertakings such as the pursuit of scientific knowledge. Secular knowledge seemed to guarantee that humanity would be swept along the thrilling course of progress

¹⁶¹ in Francis Bacon: A Selection of His Works, p. 323-324.

¹⁶² From Paracelsus to Newton, p. 16.

towards a radiant future, when everything would be possible, everything within reach. Given the transcendent character of this future, ways had to be found to express such an extraordinary change in human destinies. Spontaneously the various founding-myths of the Western world surged forth: the Golden Age, the forward thrust of Biblical time, Earthly Paradise and indeed the Apocalypse. These founding-myths were merged into new coherent wholes which formed the foundation of the optimistic ideology of material progress. Secular knowledge provided a convenient focus, since the emancipation of knowledge from the constraints of religious orthodoxy had opened up so many possibilities. Knowledge had a personal dimension since it was acquired by means of education; it also had an industrial dimension since it was the key to material progress.

For Hesiod and Ovid, the myth of the Golden Age had occurred in a remote and inaccessible past. The positivist prophet of social reorganization Henri de Saint-Simon (1760-1825) changed all that by reversing the order of time and placing the Golden Age in the future: "Poetic imagination placed the golden age in the cradle of humankind, amidst the ignorance and crudity of earliest times; but the iron age should have been placed there. The golden age of humanity is not at all behind us, but rather still ahead of us; it is in the perfection of the social order; our forefathers did not see it, our children will get there one day, and our role is to open the way for them."¹⁶³ Indeed, Saint-Simon expounded a view in *Mémoire sur la science de l'homme* which Renan later picked up, to the effect that the new scientific system would reorganize the religious, political, ethical and educational system and consequently the Church itself.

The knowledge-based model of the secular apocalypse came into fashion at the end of the eighteenth century, by which time the Enlightenment had come to invest science with much of the emotional force of religion. In *Esquisse d'un tableau historique des progrès de l'esprit humain*, which he wrote in detention during the Terror, Condorcet (1743-1794) developed a view of the progress of humanity on its irresistible push towards perfection. According to Condorcet, the history of humanity was not made up of three epochs, as Joachim had suggested, but rather of ten:

¹⁶³ De la réorganisation de la société européenne, quoted in Mille ans de bonheur, p. 354 (author's translation).

- humans gathered together to form peoples;
- the passage was made from pastoral to agricultural life;
- agricultural peoples continued to progress up to the invention of the alphabet;
- the mind continued to progress among the Greeks, up to the time of Alexander, when the scientific specialties came into being;
- knowledge continued to progress until decadence set in;
- this decadence continued until the time of the Crusades;
- knowledge continued to progress from the reintroduction of the sciences in Europe until the invention of the printing press;
- knowledge continued to expand to the point where it shook religious authority;
- the progress of the human mind continued from Descartes to the French Revolution;
- and this progress will continue into a future of unlimited promise and fulfillment.

In Condorcet's millenarian vision of the future, the inequalities between nations would be leveled and the inequality between classes destroyed. Science would play an important part in assuring the indefinite perfectibility of man for two reasons. First, the best chance to reduce natural human inequality lay in offering people equal opportunities for public instruction, much of which was scientific. Second, science consisted in the discovery of truths, which opened up endless possibilities: "It is thus in examining the advance and laws of perfection that we will be able to appreciate the extent and term of our possibilities."¹⁶⁴ Condorcet scoffed at the idea that man would eventually have discovered so much scientific truth, that he would finally reach the outer limits of understanding, where the number and complication of objects would make the further absorption of knowledge impossible. It is worthwhile noting that Condorcet's work Fragment sur l'Atlantide transformed the objective of Bacon's New Atlantis ("The End of our Foundation is the knowledge of Causes and secret motions of things, and the enlarging of the bounds of Human Empire, to the affecting of all things possible") to "a society of men solely devoted to the pursuit of truth."¹⁶⁵ In Condorcet's millenarian view, the limitless potential of science would be within the reach of each citizen, in a nation

¹⁶⁴ Esquisse d'un tableau historique des progrès de l'esprit humain, p. 277 (author's translation).

¹⁶⁵ Fragment sur l'Atlantide, p. 299 (author's translation).

where the people's sovereignty was firmly established and their political rights protected, and public instruction was so well-organized that it made knowledge equally accessible to one and all. Science was the foundation of progress; it established not facts but truth itself.

For some authors, knowledge came to be unconsciously identified with the spiritual illumination of the Elect of Biblical apocalypses, as the prophetic intuition of Joachim de Fiore was adapted to modern times. This conferred on scientifically-minded social thinkers "ahead-of-their-time" the gratifying status of secular prophets, every bit as powerful and controversial as Joachim himself. Comte openly claimed that those who pursued scientific knowledge constituted a new secular priesthood; Renan likened the contemporary scientist to a rational Christ. Comte and Renan considered themselves secular prophets, and in this way they resembled apocalyptic prophets of Biblical times: they both felt strongly that their intellectual researches had given them personal, transcendent knowledge about the cosmos and the destiny of man; they had also both gone through the wrenching break of exchanging the God of religion for a rational God, in whom they piled up their frustrated love, longing and pain; they felt compelled to communicate the exalted message of science as well as a fervent sense of the absolute; they were utterly convinced that those accepting this message would be emancipated. Like apocalyptic prophets before him, Comte organized history into distinct periods, projecting his confident hopes of redemption into an idealized future time when the present is reconciled with the past and when time simply ceases to be. Comte believed he had uncovered the hidden law of the progressive course of the human mind, according to which humanity had entered the final, positive state of its development. Indeed, Comte's law of three phases of intellectual development, the first theological, the second metaphysical, and the third scientific or positive, can be compared to Joachim.¹⁶⁶

Joachim's Trinitarian philosophy of history suited the purposes of several early nineteenth-century philosophers who believed that progress was derived from the secularization and systematization of knowledge. Towards the end of *The Philosophy of History* by Georg Wilhelm Friedrich Hegel (1770-1831), there is a tantalizing reference to the three epochs, which has a Joachimite ring to it: "We may distinguish these three

¹⁶⁶ as Jean Delumeau has done in Mille ans de bonheur, p. 347.

periods as Kingdoms of the Father, the Son and the Spirit. The Kingdom of the Father is the consolidated, undistinguished mass, presenting a self-repeating cycle, mere change like that sovereignty of Chronos engulfing his offspring. The Kingdom of the Son is the manifestation of God merely in a relation to secular existence - shining upon it as upon an alien object. The Kingdom of the Spirit is the harmonizing of the antithesis.¹⁶⁷ But the passage remains somewhat obscure, and not too much should be read into it.

A more explicit reference to Joachim was made by the historian Jules Michelet, who drew a link between spiritual election and secular knowledge in *Histoire de France au seizième siècle: Renaissance*. Michelet noted that Tertullian had commented on the fear of God in the cradle of humanity, the law of the prophets in man's childhood, the Gospel in his youth, and the Holy Spirit in his adulthood. But for Michelet, the Calabrian friar Joachim had discerned a more significant pattern in the succession of epochs: "The first age is that of slavery; the second of free men; the third of friends. The first age is that of the elders, the second of men; the third of children...." In Michelet's vision of Joachim, the future was ever unfolding before humanity; this future involved both the recovery of innocence and the illumination of new knowledge; Joachim was opening the way to the Renaissance: "The reign of the Holy Spirit is the age of science and of childhood at one and the same time! What a heart-warming doctrine, which sets humankind in the very ship of friends in which Dante would have wanted to sail forever, and where we ourselves ask of God that we may navigate from world to world!"¹⁶⁸

We have earlier discussed Auguste Comte's comprehensive system of Positivism, as an example of how science was sometimes taken for a new religion in the nineteenth century. Comte was clearly scientistic but he was also profoundly ambivalent about modern technology.

According to Comte, the model to which humanity should conform was science, which should be considered on an allegorical level as an emancipating force, sweeping Humanity in its noble arms and rising to contemplate Reason, Imagination and Feeling. "Science acquires a position of unique importance," he wrote in *A General View of*

¹⁶⁷ The Philosophy of History, p. 345.

¹⁶⁸ Histoire de France au seixième siècle: Renaissance, p. lxiii-lxiv (author's translation).

Positivism, ¹⁶⁹ "as the sole means through which we come to know the nature and conditions of this Great Being, the worship of whom should be the distinctive feature of our whole life." One can't help associating this ethereal vision of knowledge with Dante's equally disembodied vision of love, at the border between Earthly and Celestial Paradise.

Comte synthesized and catalogued scientific knowledge over the centuries, and detected an intellectual movement towards Positivism, whose primary object was "to generalize our scientific conceptions and to systematize the art of social life." ¹⁷⁰ Positivism had originated in mathematics and astronomy; it had always shown "its tendency to systematize the whole of our conceptions in every new subject which had been brought within the scope of its fundamental principle." ¹⁷¹ Since the time of Descartes and Bacon, it was clear that Positivism was destined to supersede theological and metaphysical principles. "Positivism has gradually taken possession of the preliminary sciences of Physics and Biology, and in these the old system no longer prevails. All that remained was to complete the range of its influence by including the study of social phenomena."¹⁷²

Comte claimed he had mastered the science of society itself, uncovering the scientific laws which dictated social organization and interactions. "The study of Humanity therefore, directly or indirectly, is for the future the permanent aim of Science; and Science is now in a true sense consecrated, as the source from which the universal religion receives its principles." ¹⁷³ Comte also claimed that society would be governed by a secular priesthood of supremely enlightened men - men of unparalleled dignity (like himself) who had renounced wealth and worldly position. They would coordinate the progress of humanity. "All functions, then, that co-operate in the elevation of man will be regenerated by the Positive priesthood."¹⁷⁴

It is important to understand the role of technology in Comte's vision of future progress. While developing his view that science was the progressive foundation for the

¹⁷² Ibid., p. 12.

¹⁶⁹ A General View of Positivism, p. 368.

¹⁷⁰ Ibid., p. 3.

¹⁷¹ Ibid., pp. 11-12.

¹⁷³ Ibid., p. 374.

¹⁷⁴ Ibid., p. 368.

new religion of humanity, he was interested in science as knowledge, he embraced scientific ideas as parts of an intellectual system; he did not see technology as the fulfillment of science. A society's ability to develop required some technological sophistication. But technology was a lower kind of progress: "The nation that has made no efforts to improve itself materially, will take but little interest in moral or mental improvement. This is the only ground on which enlightened man can feel much pleasure in the material progress of our time. It stirs up influences that tend to the nobler kinds of Progress; influences which would meet with even greater opposition than they do, were not the temptations presented to the coarser natures by material prosperity so irresistible."¹⁷⁵ Comte felt that material progress was given too much importance simply because of the mental and moral anarchy of his times, and the consequent inability of society to gain the higher degrees of Progress in any systematic fashion. The universal Priesthood of Positivism organized science; it uplifted and directed humanity in the pursuit of scientific knowledge. Technology would be part of the future Eden, but it remained a base by-product of science, not an end in itself. We may note once again, in Comte's case as in that of Cabet, that this shimmering vision of Paradise had a definite apocalyptic quality: it was the focal point of Comte's eschatological expectations, it was an idealized place in a future time where the fundamental problems of humanity would be resolved.

Ernest Renan followed Comte closely in this respect. In L'avenir de la science he made only fleeting mention of technology. But science was opening up vast new horizons of understanding, inaugurating a revolutionary new era: science was the exalted new religion of modernity! "May it please God that I have managed to get some great souls to understand that there is in the pure faith of human faculties and the divine objects which they reach a religion just as wonderful and rich in textures as the most ancient faiths."¹⁷⁶ This new religion had procured Renan far greater joys than the Catholicism of his youth; and he wished on those who had held fast to orthodoxy a peace comparable to his own: "a peace which can be compared to that which I have known since my struggle ended and the becalmed storm has left me in the midst of an immense, peaceful ocean, a sea with neither

¹⁷⁵ Ibid., p. 117.

¹⁷⁶ L'avenir de la science, p. 343.

waves nor shorelines, where there are no stars other than reason, and no compass other than one's own heart." ¹⁷⁷ Naturally, the contemplation of absolute Truth and Beauty was not for the common people; the secular religion of science took on an esoteric quality in Renan's view. Science would be used to resolve the problems of humanity. But in his ecstasy, Renan failed to describe the power scientists would have in the new utopian Paradise of his imagining. He lacked the perspicacity to see that technology would be concentrated in the hands of these same scientists, who would wield it over the uncomprehending "vulgar" masses.

At the beginning of the twentieth century, H.G. Wells still maintained, like the positivists over the previous hundred years, that science had rendered social organizations of the past utterly obsolete. But by his time, the many practical applications of science had made it totally indissociable from its handmaiden, technology. In the view of Wells, the forces of mechanical and scientific development fought against all the old antagonisms between nations, the obsolete particularisms, and were driving humanity towards the final attainment of the larger synthesis of a world state. A new republic would arise by the year AD 2000 from the clear ideas of science, and would rely on the collective knowledge and energies of technical experts: "It seems reasonable to anticipate, replacing and enormously larger and more important than the classes of common workmen and mechanics of to-day. a large, fairly homogenous body - big men and little men, indeed, but with no dividing lines - of more or less expert mechanics and engineers, with a certain common minimum of education and intelligence, and probably a common class consciousness - a new body, a new force, in the world's history."¹⁷⁸ What was more, Wells foresaw that this "final" world (a word immediately recognizable as apocalyptic in portent) would be totally secular. Men would have no positive definition of God at all: "they will content themselves with denying the self-contradictory absurdities of an obstinately anthropomorphic theology, they will regard the whole of being, within themselves and without, as the sufficient revelation of God to their souls, and they will set themselves simply to that

¹⁷⁷ Ibid., p. 344.

¹⁷⁸ Anticipations of the Reaction of Mechanical and Scientific Progress upon Human Life and Thought, p. 102.

revelation, seeking its meaning towards themselves faithfully and courageously."¹⁷⁹ According to this knowledge-based secular apocalypse, a new ethical system would be constructed "in the light of modern science and to meet the needs of such temperaments and characters as the evolution of mechanism will draw together and develop."¹⁸⁰ In other words, to reintroduce the age-old distinction of Origen, science had, in addition to its literal meaning, now taken on an allegorical meaning: it was used to provide colourful word-pictures in order to evoke by indirect means certain fundamental experiences and cosmic dimensions of life which could not be described by a dry recitation of "fact". And science had taken on a moral or normative aspect: it would become clear how individuals should act "in the light of modern science". Whereas rational science had once sought to dethrone religion because of its literal implausibility, its allegorical whimsy and its shrill moral demands on individuals, now the naïve scientism of Wells proposed a seemingly virtuous science based on precisely the same vices as the old religion he detested.

As we have seen, secular apocalypses have some of the same features as religious apocalypses: prophets announce and interpret revelations to the Elect; in their prophecy, myth plays a pre-eminent role; human acts will be judged at the End of the World, which may not be the End of existence *per se* as much as the End of history or of human struggles. But there are crucial differences between religious and secular apocalypses. God has been replaced by some other transcendent value, whether the pursuit of revolutionary justice or scientific knowledge; the "horizon" remains largely in the future, but is here on Earth rather than in a cosmic "out there"; the content of human acts will be judged at the appropriate time; and the hidden meaning of History has been revealed to secular prophets, who generally have two of the four characteristics of prophecy identified above by Neher - they are determined social critics and they authentically believe in their prophecy.

Cohn clearly established the relationship between secular apocalypses and revolutionary violence: the transcendent belief in a radiant future here on Earth created enormous eschatological expectations which, when frustrated, led to revolutionary

¹⁷⁹ Ibid., pp. 306-7.

¹⁸⁰ Ibid., p. 322.

violence. As Camus pointed out, that future, since it never actually came to pass, was rhetorically used to justify violent excesses. Marx claimed to be scientific. The exalted, the highly exaggerated view of science of the nineteenth century prophets of progress bore in it the seeds of disappointment. Another compelling statement of the relationship between secular apocalypses and revolutionary violence has been made by the comparative historian of religion, Mircea Eliade. According to Eliade, Marx's view that a classless society would put an end to historic tensions was paralleled by the myth of the Golden Age at the cosmic beginning and ending of History. "Marx enriched this age-old myth with a whole Judeo-Christian messianic ideology; on the one hand, the prophetic role and soteriological function it conferred on the proletariat; on the other the final struggle between Good and Evil, which can easily be likened to the apocalyptic conflict between Christ and the Antechrist, leading to the definitive victory of Christ.,"¹⁸¹ Eliade maintained that Nazism had developed a much weaker eschatological myth, since it had could offer only the pagan Germanic gods of ancient times, an apocalyptic struggle of Good and Evil, and the ultimate destruction even of the Just, after which a new world might spring up later.

It will be seen from these examples of secular apocalypses that they invested social and political events with the emotional force of religion. The secular myth of the apocalypse, now loosened from the secure structures of religious faith, was diverted to serve the cause of revolutionary violence, which spontaneously and inevitably piled up eschatalogical expectations into a radiant future.

But events in the mid-twentieth century challenged the radiant dreams of scientism: the power of science was redirected to the task of enslavement and mass destruction. Scientism died in the smouldering ashes of Auschwitz, the Gulag and Hiroshima. There was the peculiar way in which Marxism brought together a secular apocalypse with the myth of a Golden Age. How many people in the twentieth century were butchered because of this bewildering secular myth? How many Marxists steadfastly denied there was ever anything wrong? In fact, the myth continued inspiring and justifying Marxism's destructive excesses, all of which were committed in the name of the supposed "science" of dialectical

¹⁸¹ Mythes, rêves et mystères, p. 24.

materialism. In the 1970s and 1980s, there was something grotesque in the sight of an increasingly impoverished and dysfunctional Soviet Union, which the leadership insisted was still on the "right" course. Albert Camus wrote in *Le révolté*, "The golden age, postponed until the end of history and coincident, to add to its attractions, with an apocalypse, therefore justifies everything. The prodigious ambitions of Marxism must be considered and its inordinate doctrines evaluated, in order to understand that hope on such a scale leads to the inevitable neglect of problems that therefore appear to be secondary."¹⁸²

Once the Puritans of New England determined that they were a righteous people, a city set on a hill, its light shining before men,¹⁸³ a religious myth held fast. Through the process of secularization in the late eighteenth century, this myth was eventually drained of religious content, becoming moralistic instead. Yet in the latter half of the twentieth century there was no dissuading the American government from using this secular myth and its mastery of military science, to justify sending millions of American troops into every theatre of war around the world, there to kill other millions. America was simply "right" because it was American, and was still set on a hill in full view of an admiring humanity.

For a while the world was trapped between the secular apocalypse of Marxism and the secular myth of America set on a hill, its light shining before men; the world was trapped and fearful that nuclear holocaust would simply snuff out the planet, because these secular myths were served by the scorching fire of military science.

The secular apocalypse of science didn't quite die - not yet. It lived on in a new form: the technology-based model of the secular apocalypse. This is quite different from the knowledge-based one, since it consists in a series of worrisome observations usually about some technology out of control; the observations are then pulled together in a plausible but unprovable theory, leading to a dramatic end-of-the-world scenario, forcing humanity to choose between Nothingness and Survival. The impulse at the outset is a deep-seated anxiety about the continuity and survival of humanity in the face of

¹⁸² The Rebel, p. 207.

¹⁸³ Matthew 5:14-16

unpredictable and total change. The hoped-for parousia is freedom from fear, death and destruction - much like apocalypses from thousands of years ago. Our age is rife with such anxiety.

Carl Sagan's neo-Positivist book of the early 1990s Pale Blue Dot: a Vision of the Human Future in Space is an example of the rationally-constructed technological apocalypse. Here we see humanity torn between two forces: Darkness - the failure of technique on Earth (environmental destruction, nuclear war, social and economic inequality) pressuring us to leave the planet - and Light - the triumph of technique in outer space, meaning there are faraway places (an asteroid, planet, moon or far-distant constellation) where humanity may start out all over again.

Sagan, an astronomer, was fascinated by the discoveries of the space probe Voyager, exploring the outer limits of the solar system. He also had a truly apocalyptic despair about the gradual environmental destruction of our planet, and the lack of a sustainable future: "The visions we offer our children shape the future. It matters what those visions are. Often they become self-fulfilling prophecies. Dreams are maps. I do not think it irresponsible to portray even the direct futures; if we are to avoid them, we must understand that they are possible. But where are the alternatives? Where are the dreams that motivate and inspire? We long for realistic maps of a world we can be proud to give to our children. Where are the cartographers of human purpose? Where are the visions of hopeful futures, of technology as a tool for human betterment and not a gun on hair trigger pointed at our heads?"¹⁸⁴

Working with NASA to study other planets, Sagan played a key role in uncovering three potential environmental catastrophes on Earth: ozone layer depletion, greenhouse warming and nuclear winter. Ozone layer depletion was first understood using theoretical work on chlorine and fluorine molecules in the atmosphere of Venus. In addition, the deficiency of simple organic molecules on Mars was widely attributed to the lack of ozone on that planet. Global warming was first conceptualized using the example of Venus. "The climatological history of our planetary neighbor, an otherwise Earthlike planet on which the surface became hot enough to melt tin or lead, is worth considering - especially by

¹⁸⁴ Pale Blue Dot: a Vision of the Human Future in Space, p. 81.

those who say that the increasing greenhouse effect on Earth will be self-correcting.^{*185} Finally, "nuclear winter was first calculated and named in 1982/83 by a group of five scientists to which I'm proud to belong.... The earliest intimation of nuclear winter came during (the) Mariner 9 mission to Mars, when there was a global dust storm and we were unable to see the surface of the planet; the infrared spectrometer on the spacecraft found the high atmosphere to be warmer and the surface colder than they ought to have been....^{*186}

Because of these imminent disasters, Sagan proposes moving out to new horizons. "Even when our descendants are established on near-Earth asteroids and Mars and the moons of the outer Solar System and the Kuiper Comet Belt, it still won't be entirely safe.... For safety, some communities may wish to sever their ties with the rest of humanity - uninfluenced by other societies, other ethical codes, other technological imperatives. In a time when comets and asteroids are being routinely repositioned, we will be able to populate a small world and cut it loose."

Sagan believed humanity had evolved beyond belief in God; instead, he proposes a rather vague cosmic consciousness based on rational speculation about the universe, freedom for every community to choose its own orientations, and advanced technology to provide support systems for life in even the harshest planetary climates. Anyone involved in the space enterprise knows what "harsh" means, since astronauts extend humanity's reach beyond Earth, in order to confront extremes of radiation, temperature and weightlessness. The Elect in Sagan's worldview are those (Americans) best able to respond to the challenges of environment and technology, those willing to make the break with their current existence to start up a new human community. His vision certainly gives a whole new meaning to the utopian concept of a closed, insular world, outside of time and in no particular place, where the problems of survival could be resolved.

The paradox is that if technology is advanced enough to support life on airless asteroids and frozen moons, why not use this same technology to fix environmental problems on Earth? It seems pointless to fantasize about life hundreds of generations from

¹⁸⁵ Ibid., p. 227.

¹⁸⁶ Ibid., pp. 227-8.

now in other constellations, in conditions far worse than anything global warming could ever bring about on Earth.

A very different kind of technological apocalypse is presented by the French author Pierre Lévy in *La Machine Univers*. Lévy says the computer fulfills man's age-old dream of having a universal machine able to calculate everything. In this pessimistic view, one finds echoes of Mary Shelley and Samuel Butler, of the tragic enslavement of man to the machine, one hears a despairing appeal to "turn back" before it is too late.

Lévy notes how the computer has opened up a utopian space of networks, where unimaginable quantities of information surge daily, and neither experience nor sensibility have any place. This is a very interesting restatement of the myth of Utopia, of an idealized place outside of time and nowhere in particular: using the techniques of computerized simulation, cyber-Utopia has now entered the electronic netherworld of the computer, which is not physically attainable. Cyber-Utopia has finally become a simulated no-place, an infinitely changeable, highly subjective, individual paradise. Moreover, by reducing everything to calculations, the computer is bringing about profound changes in the nature of belief: "The West calculates the myths of other cultures and its own. But when you begin to calculate your own myths, they are no longer the great organizing narratives of the collective imagination. Calculations now organize life itself. When traditions and religions become optional, the very notion of culture changes meaning."¹⁸⁷

Unable to believe in this cyber-Utopia, Lévy regrets that "computerization is accompanied by the dissolution of the globally and intuitively perceptible object. Likewise, the subject, that maintained relations of knowledge and action with things, now gives way to a series of basic operations codified by algorithms."¹⁸⁸ Lévy notes that this habit of codifying creations can be traced back to the way each performance of music was an original work until the 16th century, when precise musical notations came into favour. He foresees, however, that attempts will be made to codify the very essence of a person by means of artificial intelligence: "It is by means of communications and logical theory that

¹⁸⁸ Ibid., pp. 87-8.

¹⁸⁷ La Machine Univers, p. 219 (author's translation).

cybernetics will undertake scientifically to take account of the soul, the spirit, or to use a more neutral expression, the observer.¹¹¹⁹⁹

Lévy's remedy seems inadequate: that nations withdraw from international competition, and resist the temptation of believing the false theories of "algorithmic intelligence", the man-machine and mechanical nature.

¹⁸⁹ Ibid., p. 117.

V. Conclusion

In this essay we have explored the origins and development of a powerful modern myth: that a technological Eden will come into being through the concerted efforts of a community of technocrats, whose rigorous application of scientific knowledge will definitively resolve the problems of humanity in the future, which will be a sort of Golden Age. This myth has had a major impact on the development of the twentieth century.

The myth of a technological Eden is supported by the idea of a benevolent, technically-minded intellectual élite, embodying some of the same values as the philosopher-king of Plato's *Republic*, or again of King Solamona of Francis Bacon's *The New Atlantis*. Unlike Adam and Eve in the original Eden, who were punished by God for seeking to know too much, this technically-minded élite is solely occupied with boldly pushing back the frontiers of knowledge. In fact, this expert élite directs its systematic knowledge of techniques for making and doing things to the scientific reorganization of society and the resolution of the fundamental problems of survival which have long faced the planet. In so doing, this élite gains a huge power over society - but our scientistic authors don't really worry about that, because the expert élite always acts in the better interests of humanity!

We are speaking of a modern myth which developed since Francis Bacon's time, and which I am not sure Bacon would have recognized. Technical knowledge and natural philosophy are no longer as separate as they were in Antiquity, when the privileged few speculated about science at their leisure. On the contrary, at least since the time of H.G. Wells, technique is now harmonized with and even wedded to science.

Believers in this modern myth consciously turned away from the old certainties and security of revealed religion, but the very way in which they exalted science and technology suggests that they had elevated science to the status of a new religion. And since the religious impulse was involved, it is hardly surprising that several great myths of the Judeo-Christian religion, even though secularized, were integrated into the myth of a technological Eden. The myth of Biblical time, moving forward from a past through a present to a culminating point in the future; the myth of Earthly Paradise, in that the new technological Eden constitutes a haven of luxury and comfort, free from want and fear; and third, the myth of the Apocalypse, not so much from the perspective of the fiery destruction of the planet as from the knowledge-based perspective of the covenants, the ages which succeed one another throughout history, ever pointing to a better future in which the blessed (the technically-minded élite) recover some of the innocence of Paradise, managing at the same time to bring about, by means of systems engineering, operations research, mathematical modeling and technology assessment, the greatest good for the greatest number. Yet once, in the mid-twentieth century, humanity saw that knowledge could destroy as well as create, could enslave as well as emancipate, a technology-based model of the secular apocalypse emerged. From this perspective the knowledge of the Elect mattered less than the fiery cataclysm of the Last Things, from which there was almost definitely no escape.

Many modern observers see religion and science in stark contrast. Some two thousand years ago, Lucretius separated the material universe from the gods, although he did not deny the existence of the latter. In hindsight this distinction makes sense, now that the Western scientific revolution has transformed the face of the Earth. But it is doubtful whether the somewhat stagnant ideas of Lucretius, his indifference to the gods and his acceptance of the regressive view of time bound up in the myth of the golden age, could have brought about that scientific revolution. It is likely that the scientific revolution was made possible by the mindset of Judeo-Christianity and of monotheism, the dynamic marriage of analytical thinking and spiritual values, the forward thrust of Biblical time, the restless ideal of human perfectibility, and the struggle for intellectual liberty in the face of orthodoxy.

In investigating this myth of a technological Eden, we have also shown the limits of the scientistic interpretation of science. Origen's distinctions between the literal and moral and allegorical meanings of Scripture can just as easily be applied to the various meanings of science. Indeed, many of the most interesting nineteenth- and twentiethcentury writings about science have not been the work of scientists at all; they have been produced by pamphleteers, science-fantasy writers, people like Ernest Renan or H.G. Wells who had some knowledge of science but whose main professional preoccupation was not the production of scientific research. Some of these writers have concentrated on what we may call the moral and allegorical dimensions of science, by constructing scientistic utopias, and insisting that science "finally" - in the apocalyptic time piled up in the future - should be the model for social organization and even for individual behaviour.

Whereas late-nineteenth-century scientism saw science and technology as beneficial forces which should be applied to resolve every type of human problem, our understanding on the eve of a new millennium has greatly changed: solving the collective problem of survival can snuff out the individual survival instinct; the machine can save lives, just as it can depersonalize individual and social life, attacking collective values and customs built up over the centuries; it is now in the interests of the hugely powerful state, whether democratic or dictatorial (and at a certain point there is not much difference), to neutralize individual initiative and keep the citizen under close surveillance; technology can be used by the state to invade a person's privacy and individuality just as much as it can extend the individual's potential; in the space of a few minutes, nuclear technology can annihilate the spark of life on the planet, as well as the millennial accumulation of creativity, effort and passion which we call Civilization; the world's quickly growing population may reach a level which the planet's resources can no longer sustain; the creation and exploitation of wealth by means of technology has institutionalized intolerable disparities which could never have been imagined by the naïve nineteenth-century believers in a technological Eden; nature has been conquered in a short-term way, with little regard for the ecological consequences of prodigious waste, pollution and disturbances to the fragile balance of the ecosystem.

What makes the fundamental ambiguity of science and technology all the more troubling is that scientism elevated science to the exalted status of a religion, situating its apocalyptic promise in the future, and in so doing it blinded an important portion of humanity. Science from their perspective took on a transcendent, religious quality. Ardent believers in any religion are unfortunately the last ones to question their own assumptions. There may be few conscious believers in the scientistic creed today. But at a submerged level, the technological Eden still has the prestige and staying power of a quasi-religious myth promising to launch humanity into a glorious future of fulfilment and emancipation
from false gods. The moral and allegorical aspects of the myth, and the uses to which it has been and is still put today, go largely unnoticed. The glorious, golden future, if it has not yet arrived, will one day arrive. Perhaps that explains why, in the interim, so many concrete problems and consequences in our world are being ignored, and why the stubborn believers in a technological Eden still long for their redemption.

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