

ENVIRONMENTAL PHILOSOPHY AND ITS ONTO-ETHICAL PROBLEMS: ANCIENT, MEDIEVAL AND CONTEMPORARY WORLD-VIEWS

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Summary

The chapter traces the evolution of environmental philosophy from Pre-Socratic Greek Thought to the present. Its focus is on the underlying conceptual structures of the different worldviews through which human beings understand nature, their actual relationship to it, and what it is permissible for them to do in/to nature given their understanding of it and their relationship to it. The contradictions which each successive environmental worldview suffers serve as the through-line of analysis, enabling the reader to see the ways in which the problems of preceding worldviews form the basis for successor worldviews. All worldviews enable some range of possibilities and disable opposed ranges. The problem, progressively explored throughout the argument, concerns the distinct ways in which succeeding world views are inadequately anchored in the onto-ethical primacy of life-support systems.

1. Introduction

Environmental philosophy is the attempt to outline the fundamental assumptions, basic principles and normative ideals that characterize and shape a society's conception of itself

in relation to its fellow life and the natural life-supporting environment. This includes the interpretation and evaluation of the kinds of practices and ways of life that may be licensed, cultivated or encouraged by that society's general conception of itself in relation to its environment. In its critical aspect, environmental philosophy attempts to highlight the pathogenic tension that arises when a society's assumptions, principles and ideals unwittingly engender life-destructive effects on its environment. One of the central tenets of the environmental philosophy outlined here is that humanity's relation to nature is shaped in varying degrees by the general conception of nature and human nature that is shared among its members. At the same time, it will argue that these conceptions of nature and human nature are not free floating abstractions, but are themselves generated by the practical relationships that humanity establishes with nature in each social epoch. Included in any general conception of nature is a shared sense of what nature is, what value or values it may have, what purpose or purposes it may possess, and the kinds of practical relations that human beings do in fact have, as well as those which they may be encouraged, or even obligated, to develop with their environment. General conceptions of nature, it is important to note at the outset, are not iron cages. While shared amongst a society's members, those same members, because they are themselves thinking agents within that society, may themselves detect the sort of life-threatening tensions that interest environmental philosophy. In response, they may express different kinds of beliefs that better serve the common basis underlying and shaping those differences.

The focus on a society's conception of nature does not privilege the ideal in abstraction over the complex of material, physical, biological and other non-conceptual causes (making it important that we examine, understand and evaluate these as well). Nevertheless, human beings are conscious beings whose active capacities include efficacious determinations by consciousness or mind. However much we may be determined by physical, biological or other material conditions, as conscious beings our actions are ultimately decided by what we think we can do, are encouraged to do, or may feel obligated to do. This includes our actions as they relate to the natural world, for they are shaped to some degree by the general conception of nature that is part and parcel of that relation.

The relationship between conscious valuation and the conditions of social practice is no doubt quite complex. As far as humanity's relation to nature is concerned, it is likely that mentality and practice either stand in some kind of mutual, two-way relation (with mentality conditioning practice and practice conditioning mentality to varying degrees), or they are interwoven so intimately as to make the distinction more theoretical than real. Whether one has priority over the other probably depends upon context, but it is highly unlikely that humanity's relation to nature is reducible to any purely asymmetrical, one-sided relation. Thus, to properly understand, assess and, if appropriate, reform the relation that exists between a people or society and its environment it is essential that our conception of nature and the relation between that conception and practice in general be systematically outlined, rendered explicit and made better understood.

This chapter will outline the general conception of nature and human nature that is currently dominant within the techno-scientific world view. It will trace some of the key historical developments that helped give rise to the current conception of nature and human nature, and make explicit certain key ingredients within that framework that are essential to understanding its character. It will end by suggesting alternative ways of thinking about

nature that, if developed and adopted, enable a richer, healthier, more ethically sensitive sense of place within the natural world. Rethinking our relation to nature is crucial at this point in history when both human and ecological life-systems are being threatened on multiple planes.

2. Vital Historical Background

It is commonplace to think of our modern conception of nature as the progressive rejection and subsequent overturning of classical and medieval ideas in favor of a more enlightened, rational, scientific point of view. Typically, the modern view of nature is said to emerge from a great philosophical and scientific revolution initiated by Bacon (1561-1626, CE), Descartes (1596-1650 CE), Galileo, (1569-1642, CE), Newton (1643-1727, CE) and others. This revolution supposedly involved the dispelling and overcoming of traditional, dogmatic authority and superstition through the proper exercise of reason grounded in the empirically based methods of scientific discovery. For many this is when the true character of nature was first objectively revealed, discovered through the hard, factual, concrete exercise of reason adopting the methods of modern science. Reality, however, is more complex and subtle. Key elements, for example, in the development of the modern conception of nature and human nature actually have their origins deep within classical and medieval thought. To fully appreciate the importance of these trans-epochal developments for the health of global life support systems, however, we need to first contrast classical and medieval conceptions of nature as a means of identifying how key elements of classical and medieval thought became essential ingredients within the modern, techno-scientific enterprise.

3. Classical Views of Nature and Human Nature: A Hierarchy of Limits

There is no single, universally shared conception of Nature that is characteristic of classical thought as a whole. In fact, there have been many competing views. We can nevertheless identify a number of general characteristics that are fundamental to most if not all classical conceptions of nature. These include (but are not necessarily exhausted by) the following presuppositions or general principles: 1) that the basic constituents of the universe are fixed, immutable, eternal, 2) that there are necessary, pre-determined limits on what is possible, and 3) that natural beings have their own pre-designated end or good that defines their proper place within the general scheme of things (as a function of their essence or 'nature'). As Hans Joan argues in "Technology and Responsibility," these three notions help to distinguish classical from medieval and modern world views. (pp.231-235)

The nature and importance of these notions or principles is perhaps most clearly seen in their place within the ancient world of myth. For despite attempts by early thinkers to set themselves apart from mythical modes of thought (as a more philosophical, more rational alternative), they still borrow from the general mode of orientation or deep perspective that is characteristic of the epoch viewed as a whole, as Blumenberg argues in *Work on Myth* (p. 26f). The first and second principles underlying classical conceptions of nature have their correlative in the mythical idea of the fates. The fates represent the idea that there are certain pre-established, fixed limits or boundaries governing all events and actions within the world, boundaries that no power, not even that of the gods, may violate or transgress. The basic idea is that all power, without exception, has its proper, pre-ordained place within the general scheme of things. Attempts to transgress or violate these circumscribed

limits will be met by the fates, whose own power is directed exclusively toward guarding and enforcing those limits. The fates own defensive powers serve to restore justice to the world by bringing things back into their proper balance and so relegating things to their proper place (themes that we see later revived in Renaissance figures such as Shakespeare). From a practical point of view, this ancient idea can be seen as an implicit acknowledgement of the presence of an ultimate order beyond human right to alter to which we must properly conform, thereby serving to limit humanity's radical intervention in nature and the world in general.

At the same time, the idea of the fates as supernatural regulatory powers expressed the real inability of human beings in the ancient world to intervene in decisive ways in natural processes. An irony is introduced here to which the argument will return below. On the one hand, the idea that the fates limited that which it was legitimate for human brings to change in nature was an implicit acknowledgement that nature is a life-support system that provided by its own abundance for human life-requirements. On the other hand, it was also an acknowledgement that humanity could do little to alter nature when the latter's forces (disease, drought, and so on) turned against the conditions required for human life. As social changes created new conditions for science, technology, and the forces of production to develop, humanity has become less directly hostage to the life-destructive implications of natural forces. However, as will become clear below, humanity has not governed these forces and powers in a life-grounded way. "Life-grounded" as first systematically elaborated by McMurtry in *Unequal Freedoms*, means the development and use of only those productive powers and forces which enhance the human ability to satisfy our natural and social life-requirements without exhausting, permanently damaging, or destroying the natural and social life-support systems (p. 23). Because current systems of thought and production are not life-grounded, human understanding has been determined in its development by life-blind economic and social forces which have become the major threat to life. By "life-blind" is meant any system of thought or practice that cannot recognize the foundational role that life-support systems (the life-ground of value) play in the maintenance even of its own recommended practices and policies.

Before this irony can be fully understood a more complete understanding of ancient environmental philosophy is necessary. Where principles one and two above are expressed in the role of the fates as limiting conditions, the third principle listed has its correlative in the mythical idea of fate or destiny, some pre-apportioned role or purpose that all beings either have to or ought to play out. As both MacIntyre, in *Whose Justice?* and Sambursky, in *The Physical World of the Greeks* explain, the basic idea is that all things have a pre-determined function or part within the general scheme of things, and the highest good for all things is to play out their assigned role in the pre-determined manner (p.14; p.159). To attempt to resist or bypass one's pre-apportioned purpose or goal is to risk a life of disaster, unhappiness and general ruin (with the end result that one ends up playing one's role anyway, but through a more severe, more circumnavigated route). Theoretically, this idea of destiny or fate is expressed as the best or proper end that is apportioned to individuals based on their given 'nature.' Thus, to use an example from Wright in *Cosmology in Antiquity*, the kind of life that is best suited to a living thing (whether it is a rose or a tree, a bird or a human) will depend upon the essence, kind, or nature of the thing in question (pp.56-74). To live contrary to one's given nature will be to live a life of trouble, hardship, tragedy and ruin.

4. Divine Rationality and Man in Medieval Thought: The Re-Maker Turn

In many ways, medieval conceptions of nature and human nature share many characteristics in common with the classical world. In fact, most medieval scholars accepted some variation on Plato's or Aristotle's general system of philosophy (and the conception of nature that went with them) as the basic groundwork for understanding the world. The crucial difference, of course, is the addition of the religious idea of the Monotheistic God as the personal, creative ground or cause of all being. Once nature and existence are defined as God's creation, the classical belief that existence is eternal in some primordial sense, that possibility is limited or bounded in some inviolable sense, and that human beings have a pre-apportioned and bounded place in the general scheme of things are all radically called into question.

To understand medieval conceptions of nature it is absolutely imperative that they be understood in dynamic tension with the newly emerged religious faith in the Monotheistic God and the social power of the Church hierarchy. Essential to this newly emerging world view is the belief that God's power, wisdom, goodness, etc. are infinite or absolute but expressed with definite intentions regarding the organization of social life. As infinite or absolute, God stands as the final authority upon which all other conditions rest, including nature and the hierarchical structure of society themselves. On the one hand this means that the world or the primordial 'stuff' of which it is comprised and ordered (such as in Plato's (427-347, BCE) *Timaeus*) can no longer be held to be eternal as many classical thinkers assumed or claimed, for it must now be redefined as God's creation. This has a number of important implications. Firstly, it means that the world was created *ex nihilo* or out of nothing. For medieval thinkers, the world had to be created out of nothing because if it was created out of something (that God did not create), then this would undermine the idea of God's infinity and absolute authority. If God is to be truly infinite and God's authority absolute, then there can be nothing, absolutely nothing that does not owe its existence to God. Thus one of the fundamental claims or presuppositions of medieval conceptions of nature is that nothing can exist independent of God. As Gilson in *The Spirit of Mediaeval Philosophy* explains, this means that everything that is, was, or will be (from the ordering principle of nature to the very 'stuff' or *being* of nature itself) stands in some kind of dependent relation to God, absolutely and unconditionally. (pp.70, 90) It also meant that the structures of authority as one finds them in social life are also the products of God's will and authority. As embodiments of divine reason, human beings thus find themselves in a contradictory situation. As will become clear, medieval philosophies of nature give voice to this tension. From one perspective, the nominalist, human reason is liberated from the older idea of a fixed nature ruled by the fates in so far as the nominalists maintained that universal ideas were essentially names that human reason imposed on the world. From the contrary perspective, however, human reason finds itself trapped and limited within structures of power which are assumed legitimate because intended by God. It is this fundamental tension that modern thought tries to resolve.

The idea that both nature and social hierarchy is dependent on God as creator is very different from the idea of emanation espoused within classical thought. Theories of emanation typically claim that everything stands in some kind of asymmetrical relation to an originating ground or source. This originating 'principle' may be the source or ground of the order, the intelligibility, or even the existence of the world as a whole (and all the things

in it), which are said to emanate from that source. What makes the idea of God as creator importantly different from the classical idea of emanation is that God is usually thought to be much more than a mere principle or ontological ground. Unlike a mere principle, which may be thought to function automatically, almost mechanically or algorithmically, God is said to be personal in some important sense that is often characterized as a kind of concern, care or love that is directed towards the world and its creatures. As Gilson again explains, the medievals' regarded God's power as something more than a mere efficient or final cause (with final cause functioning as a target or a lure towards which change is directed or drawn as its proper end or goal), but is better expressed as the idea of an intentional, unconditioned will. (p.71) Since God is infinite and has absolute authority, then God's will is held to be unbounded and so radically autonomous or free. In its most radical expression, to say that the world was created by God, means that the world was freely willed by God as an act of love. It is this idea that the world depends upon the free, creative will of God that most clearly distinguishes the Monotheistic idea of creation from the classical idea of emanation, for where emanation proceeds automatically and necessarily, creation proceeds willfully, freely and lovingly. Under this new ontotheological scheme, the classical idea of justice as an eternal and necessary metaphysical principle is undermined by the absolute authority of God's will. Hall, in *The Revolution in Science* argues that as a result, the order of nature can no longer be grounded in metaphysical principles that are fixed, permanent, and eternal. Instead, as God's creation, the order of nature becomes an *act of legislation*, a created order governed by *natural laws* legislated by God. (p.180)

There is a continuous tension in medieval thought between the classical emphasis upon the primacy of order (and reason) and the monotheistic idea of God as creator. Attempts to preserve the metaphysical spirit of classical thought, but with a monotheistic spin, are typically expressed in the idea of God as the God of reason. This idea is persistently challenged, however, on the grounds that it places a limit upon God's power, namely, the limit of reason. In time, a more voluntarist conception of God, as the God of Will, emerges as a dominant idea that finds its most powerful expression in the nominalism of William of Ockham (1288-1348, CE). According to Funkenstein in *Theology and the Scientific Imagination*, Ockham's denial of the reality of universals in favor of a pluralistic ontology of radically unique singulars is a direct expression of the voluntarist conception of God from which he departs. (pp.129-145) The rise of this voluntarist conception of God gave rise to a number of key questions within the Medieval period. Central among these were questions about the nature and freedom of the will (both in humans and in God) and related questions concerning the necessity or contingency of Nature in general. For if God's will is indeed absolute as Ockham and others suggest (having primacy even over the demands of reason), then the classical belief in the necessity and eternity of the world and its constituents (including the role and place of human beings within the general scale of beings) is suddenly called into question. For under this voluntarist conception of God, not only does all of creation stand in a relation of dependency to God (as its author) but this relation itself has to be reinterpreted as a relation of *radical contingency*, that is, a relation of dependence, not to God's reason, but to the infinite freedom of God's will. With the rise of this voluntarist conception of God, the primacy of God's infinite freedom demands that the necessitarian, rationalist presuppositions inherited from the classical world regarding the general of order things (including the natural epistemic accord between mind and world) no longer hold. As a result, 1) the classical sense of trust in the world as an eternal, fixed order becomes deeply undermined, 2) the classical belief that there are fixed

metaphysical limits on what is possible vis-a-vis the natural world or general environment is called into question (giving rise to the new metaphysics of ‘possible worlds’ that we develops from Aquinas (1227-1274, CE) through to Bruno (1548-1600, CE), and Leibniz, (1646-1716, CE) as Funkenstein again points out), (pp.140-150), 3) there is an increased emphasis on the idea of humanity’s free, creative will (as made in God’s image) as the primary means of human redemption and salvation, 4) humanity’s place in the world is reinterpreted as in an eschatologically privileged way that assigns primacy to human ends and purposes, and 5) a tension arises between humanity’s newly established sense of place and power and the traditional idea of a naturally fixed hierarchy of social/political life that eventually gives rise to the revolutionary developments that characterize so much of modern political life. The socio-political opposition between a new conception of radically free humanity trapped within a fixed and inegalitarian social order was resolved (at least temporarily) by unhinging the idea of human purposes from the larger world of objective values and purposes (to which human action must conform on pain of undermining its life conditions). This unhinging, according to Blumenburg in *The Contingency of the Modern Age*, fully opened the door for a radically new, creative self-conception in which humanity sees itself, not as part of a fixed order to which it must conform, but as possessing the means of creatively transcending any given set of limits with the aim at advancing a narrowly conceived idea of human-centered progress. (pp. 214-221) The stage for this newly emerging modern self-conception was set by the nominalistic turn that characterizes so much of late medieval thought.

5. Nominalism and the Transition to a Modern Conception of Nature

The rise of nominalism during the late scholastic period marks a crucial period in the transition from classical and medieval into modern forms of life. Of particular importance is the nominalist denial of the reality of universals (as a framework of shared essences) in favor of a purely pluralist ontology of unique singulars. Under Ockham’s scheme, individuals are no longer conceived as instantiations or imitations of some metaphysically pre-existing form or essence (i.e., universal), but are conceived instead as radically singular realities or ‘singular substances’ (i.e., that whose ontological domain extends only to itself and never to many), each of which stands in a radically unique relation of dependence to God’s will (pp. 18-37) Under this scheme, universals exist, not as shared elements or substances in any ontological sense, but as nominalist abstractions (or constructions) of mind. This nominalist ontology helped lay the groundwork for two key elements of the modern conception of nature: 1) the cosmological idea that nature or the world as a whole is nothing more than an aggregate of radically discrete entities standing in external, naturally efficient relations, and 2) the concurrently developing political idea that human beings are autonomous, rationally self-interested individuals standing in external, contractually determined, and socially efficient relations. As noted by Wallance and reported by Blumenburg, the key ideas developed within scholastic nominalism thus helped set the stage for the newly emerging ‘Copernican’ world view because they weakened the link between divine reality and the scientific exercise of human rationality. (p. xxi-xxviii) This helped to fuel the newly developing liberalist view of socio-political life (as exemplified in Hobbes (1588-1679, CE) and Locke (1632-1704, CE)), extending it an air of theological, philosophical and scientific plausibility essential to its eventual emergence as a dominant form of social, political and economic life.

Linking the seemingly abstruse metaphysical critique of the reality of universal essences and the fundamental re-ordering of the relationship between human beings and their natural world is the disconnection which nominalism ushered in between human thought and its ability to recognize any objective limitation on the way things ought to be understood or utilized. If the essence of a thing is just the idea that a human mind forms of it, then the nature of things is reduced to the way human beings construct that nature. Thus, nominalism opens the door to (but does not itself cause) forms of understanding and utilizing the natural world in ways which damage its life-supportive integrity. If ‘the nature of things’ is just an abstraction in the human mind, then it can appear that human interests are free to utilize this nature in anyway that can be conceived by a human. If human thought operates within a social field which is (as will be explained below) systematically life-blind because it is steered by values like money-creation as the sole good, it can undermine the life-supportive integrity of the natural life-support system without knowing that it is doing so. As will become clear below, this form of life-blind thought becomes dominant once the so-called “laws” of the capitalist market—laws which, not coincidentally, appear as divine commands ruling over human thought and practice—have secured their rule over the social life-support system. These so called laws thus become one of the key proximate causes of the life-crisis that besets the contemporary world.

From this perspective, as Blumenberg notes, the most important consequence of the shift from classical and medieval to a modern conception of nature was increasing doubt and gradual loss of trust in the presumed reliability of the relation between mind and nature. (pp.160-165) In the classical world, it was assumed that there was an inherent accord between mind and world, for each was taken to be the proportionate expression of the eternally fixed order that governed the universe as a whole. Plato, in *The Republic* for example, does not doubt that the rational part of the soul is capable of grasping the truth, but instead argues that, properly cultivated, the mind turns towards and necessarily knows the good as “the cause of all that is correct and beautiful in anything.” (p. 189). Since the proper place or function of mind included the pursuit of knowledge, then it could be assumed that the relation between mind and world was pre-apportioned or pre-established towards that end (as exemplified in the classical idea that nature does nothing in vain). This implies a life-grounded connection between human activity and world, since if mind is understood as the expression in humanity of divine intelligence, and divine intelligence understood essentially as a meaningful moral order in nature, then learning itself should be oriented around what is essential to life, and to the good life in particular (i.e., finding one’s proper place in the world). Of course, this purported moral order also included invidious hierarchies of man over woman and citizen over slave. Despite this real contradiction at the level of social and political organization, at a metaphysical level there does operate a life-grounded understanding of nature as more than simple mechanical interactions, as a world that was meaningful and valuable in-itself to which the mind had to respond.

Once mind and world are understood to be the radically contingent creations of a personal God, however, the classical belief in an ontologically pre-established harmony between mind and world is suddenly called into question. “Radically contingent” does not mean that nature is not law-governed, but rather that it is impossible to read back from the mechanical laws of nature to the divine purpose the creator-God had in mind when it brought the universe into being. Thus In his *Meditations* Descartes can at one and the same time call God the creator of the Universe and banish final causes from the object of science, thus

leaving it up to human beings to decide what purposes to pursue. (p. 53). The general result, as both Leff and Blumenburg emphasize, is a standpoint of radical uncertainty and doubt, for the presumed eternality of the world order has been replaced by a relation of dependence to a cause or ground whose infinite freedom is now rendered to be rationally inscrutable. (pp. 8, 132-135, 256-258; pp.152-162,181-190) Under these metaphysical conditions of uncertainty and doubt, it was as Blumenberg says, “left to man to resolutely turn his gaze to the scope of what was not pre-given in the factual world but could be realized by his own power.... Man discovered that he could be something other than an imitator of nature.” (p.532) Thus begins the modern turn away from the traditional metaphysics of completeness and towards a new, epochal emphasis on the promise of “human self-assertion,” a turn that is grounded upon humanity’s newly emerging creative self-conception and its theologically privileged place in an otherwise thoroughly contingent world. (Blumenberg 1983, p.138-139). Unfortunately, the turn towards “human self-assertion” as the origin of value in a natural universe now assumed to have been created by God for human purposes, found its earliest expression in the destructive and self-destructive form of a free market libertarianism that is aimed at the transformation and ‘perfection’ of a nature according to narrowly conceived understanding of human purposes as reducible to self-maximizing gain. This point will be further developed in the next section.

6. Nature and Human Nature in Early Modern Thought

It is not exaggerating too much to say that the modern era is defined by the manner in which it responded to the general atmosphere of uncertainty and doubt that followed the late scholastic period. The spirit of human self-assertion that emerges, from, for example, Descartes’ re-grounding of philosophy, can be characterized broadly as a general attitude that aims to secure humanity’s place in nature by making nature conform to human ends. Where classical social life was aimed primarily at occupying the natural place assigned to humanity in the general scheme of things, the modern spirit of self-assertion is aimed at transforming or recreating nature in humanity’s image. The earliest form of this new spirit of self-assertion was the rise of Renaissance humanism as exemplified in the works of Petrarca (1304-1374, CE), Ficino (1433-1494, CE), and Zarabella (1534-1596, CE). This new spirit is aptly expressed epistemically in Vico’s (1668-1744, CE) claim, reported by Funkenstein, that “we know for certain only those things that we have constructed ourselves. (p.299) As we shall see, this creative approach to knowledge, as grounded in a certainty that we ourselves construct, is part of a general emphasis on making and re-making that helps define the modern era (and modern attitudes towards nature). Two key developments aid in better understanding this shift in modern attitudes towards nature and humanity’s place within it: 1) the development of the idea that humans are essentially creative, productive or constructive beings with a theologically and axiologically privileged place in nature, which licenses humans to do what they want with nature without regard to any inherent values or goodness it might possess and 2) the development of a new, mathematical conception of nature now reduced from an organic system of formally organized and teleologically elaborated life-order to a quantitative framework of lifeless, valueless material conditions related under lawfully efficient relations. The former idea helped give rise to a general attitude that viewed nature solely as an instrument of humanity’s desires and privileged purposes, while the latter provided humanity with a conception of nature as mechanism of efficient causes laying ready-to-hand for whatever

transformations human beings decided to pursue.

7. Humanity's Modern, Creative Self-Conception

The modern conception of nature did not emerge full blown as a single, clear, systematic statement, but developed gradually, as both Grant and Hall argue, through the melding and blending of different material, social and intellectual ingredients.(pp.171-203; pp.73-91). One of the more important of these ingredients was a new, culturally secure, theologically inspired vision of human nature whose essence included the God-like power of creative freedom, a power to re-make the world both politically and technologically according to humanly conceived ends. The idea that human creativity is unbounded by the limits of natural life-support systems was inherited from medieval times, emerging full blown as one of the defining beliefs and epistemic pre-conditions of the modern world view. Central to this belief are two key notions: 1) that human beings (as made in God's image) are fundamentally creative beings whose power to transform matter and bring humanly made, non-natural forms into the world is analogous to the creative power of God (and so is good without question), and 2) that human beings have also been granted a special, privileged place in the general scheme of things that encourages the exercise of their God-like, creative capacities. This dual, distinctly modern vision of human nature imbued the age with a powerful sense of God-given purpose and God-like freedom, and in so doing helped fuel the spirit of discovery, invention and hope that are so typical of the modern spirit of human self-assertion. As Koyre, in *from Closed World to the Infinite Universe* makes explicit, the sense of purpose and power associated with this new self-conception supplied modern thinkers such as Descartes, Galileo and others with sufficient intellectual latitude to entertain alternatives to the traditional, dominant conceptions of nature, allowing them to eventually reject and overthrow the Aristotelian scheme in favor of a new, modernized world composed solely of efficient, material relations. (p.2). This theologically inspired vision of creative human nature, modified and transformed in subtle ways, also lay much of the groundwork for the modern, money-value steered, techno-scientific world view. For the privileged sense of place and purpose associated with this period spawned the general belief that humanity has both the capacity and the license to transform nature into a place of its own making, an attitude that lies at the heart of the current money-steered techno-scientific world view and the life-destructive consequences that its unreflective, narrowly conceived operation has engendered.

8. Nature as Instrument, Knowledge as Power

As already noted, the elimination of the idea of final causes undermined the classical view of nature as an intrinsically valuable moral hierarchy. This had two important consequences. First, it prompted an inward turning examining of the self-assertive subject either as containing the grounds for the possibility of knowledge within itself (and its own divine-like creativity), or as a means of discovering humanity's epistemic limits (and thereby helping redirect our efforts toward their most fruitful ends). This 'subjective turn' is exemplified in the work of Descartes and the Rationalist on the one side, and by Locke and the Empiricists on the other (culminating ultimately in the unifying efforts of Kant (1724-1804, CE)). This general state of epistemic uncertainty also prompted, secondly, a more rigorous and intense investigation of nature as a means of discovering, of the many possible worlds that could have been, the factual character of what had actually been

ordained. This second ‘objective turn’ is exemplified in the work of such natural philosophers as Kepler (1571-1630, CE), Galileo, and Newton, and helped give rise to what we now understand as the institutional program of modern science. This program combined the rationalist concern with certainty, as expressed in the mathematical modeling of efficient causes, with the empiricist demand for concrete study of phenomena. Linking both was the idea explained above, namely, that nature obeyed no final causes but was identical with its mechanistic dynamics. As with most such changes, these two distinct but related lines of investigation did not emerge all at once, but started out tentatively and developed gradually. As soon as they became linked to the socio-economic changes through which the capitalist market system developed, however, they were quickly and enthusiastically accepted and embraced as the defining concerns of the early modern world, laying the groundwork for what would eventually become a new ‘common sense.’ The connection between the growth of modern science and the value-program of the capitalist market will be examined in the next section. First, a further spelling out of the new instrumental understanding of nature is required.

The modern spirit of self-assertion at the root of this conception of nature is exemplified in the life and work of Francis Bacon. Like so many of the thinkers of this period, Bacon’s project was twofold. It was aimed firstly at defending and affirming the very possibility of knowledge against the general atmosphere of skepticism and doubt. Secondly, Bacon focused on redirecting our efforts away from the traditional Aristotelian emphasis on deductive reasoning and the associated ideals of contemplation of an order of final causes in which human thought was situated and limited, towards a newly inspired reinterpretation of inductive reasoning as a divinely ordained method that is perfectly adapted to investigating a world without final causes in which the ideal of human self-perfection could be realized through a scientifically-enabled remaking of nature. In answer to the first condition, Bacon offered a detailed and rigorous defense of the dignity and the possibility of knowledge as an essential feature of humanity’s ordained purpose or place in the world. In response to the second condition, Bacon provided a detailed analysis and outline of the various powers, limits and functions of the human mind, showing how the mind’s epistemic function can be distorted or led astray by natural and historical connections to non-epistemic interests, and constructing a method of inductive invention and discovery that is able both to counteract those non-epistemic influences, and to provide us with a secure and fruitful knowledge of what is now accepted to be a radically contingent world.

Bacon’s defense and affirmation of the dignity and possibility of knowledge in *The New Organon* are part of what he calls his *great renewal*. As part of this great renewal, Bacon defended and reaffirmed both the dignity and promise of learning by arguing that humanity’s desire for and aim at knowledge was an essential ingredient in God’s revealed purpose for the creation of the world as outlined in Scripture. Specifically, Bacon held that the promise of knowledge was part of God’s gift to human beings, granted as a means of raising humanity up from its original, Biblically ‘fallen’ state. The various obstacles and difficulties encountered in the pursuit of knowledge should be viewed, claimed Bacon, as parts of a game or contest set by God through which we are challenged to perfect ourselves materially, morally and spiritually as part of our divinely established purpose in the world. As he argues in *The New Organon*, God created an epistemic accord between mind and world, but it is one that is deliberately set with challenges and hurdles of various kinds

designed to make us earn our divinely ordained, privileged place in creation. (pp.12-13) Included in these hurdles are various innate, natural and acquired tendencies of the mind that can serve to distract, delay and even delude it in its attempt to understand and know the order of the world. Bacon calls these mental tendencies the ‘distempers’ or ‘Idols’ of the mind. Bacon’s Idols represent one of the first explicit, systematic attempts to show not only that many of the mind’s operations and tendencies have a history, but that those histories are often grounded in non-epistemic interests.

Bacon claimed that the mind had deep-seated tendencies whose primary function is not to know as such (as an end in itself), but to advance other non-epistemic aims (e.g., to preserve the coherence of an accepted theory, to serve the social requirements of effective communication, and to maintain the integrity of an individual’s beliefs). To combat these various mental tendencies, Bacon claimed that God has provided us with capacities and powers to overcome these obstacles and to discover the hidden operations of the mechanical, non-purposive world. These powers and capacities include not only the ability to understand and to contemplate (which was the primary focus of classical and medieval thought) but, more importantly: 1) the freedom to neutralize (and in some cases to purge) the various non-epistemic interests that impede the pursuit of knowledge, and 2) the capacity to transform through the creative process of *invention* both ourselves and the world within which we live. Of central importance in helping to neutralize (and where possible purge) the mind’s non-epistemic operations is the use of what Bacon calls ‘helps’ for the understanding. These include the use of disciplined, highly methodical procedures or *techniques* for objectively accumulating, arranging and interpreting the totality of observations and experiments, and the use of humanly constructed instruments or *technologies* to enhance our observations, experiments and interpretations and, where applicable, to improve the material conditions of life in nature. Techniques and technologies stand in a mutual feedback relation, for as technologies are developed and improved through the application of investigative techniques, so too new techniques for observation, experimentation and interpretation will themselves be developed and refined using those technologies, enabling the development of higher order axioms and principles in a progressive pyramid of intellectual and material advance. The more our knowledge advances the more powerful our technologies will become, and the more powerful our technologies, the more advanced our investigations of nature will become, for “we who look at the mind not only in its own native ability, but also in its union with things, must take the position that the art of discovery may improve with discoveries.” (p. 101)

Importantly, contrary to classical and medieval world views, Bacon boldly proclaimed that it is not the capacities to understand and contemplate that are most important in the pursuit of knowledge (and the fulfillment of our God-given purpose), but the God-like capacity to create or *invent* non-natural forms and from these inventions to then *transform* both ourselves and the natural world within which we live. The creative capacity or power to invent is the key to understanding Bacon’s work as a whole. It is the one (often overlooked) element upon which his proposal for a new science of nature and a new purpose for humanity ultimately rests. For invention, as Bacon characterizes it, represents the God-like power to create novel forms of existence, both cognitively and materially. To invent is to bring new, previously non-existing forms into existence, to add genuine novelty to the world, for all such “discoveries are like new creations, and imitations of divine works. (p.99). Applied to cognitive life, invention represents the power to construct mental truths

whose forms are not otherwise found in the singularities given to us in sensual experience. Applied to material life, on the other hand, invention represents the power to construct physical artifacts and technologies whose forms are not otherwise found in nature. This is why Bacon asserts emphatically that the most important technologies are not those that imitate or build upon the free operations of nature, but those that stand as novel inventions formed by pushing the material of nature beyond its otherwise freely formed, natural conditions. To invent meant to push the material of nature beyond its normal, free operating conditions towards possibilities that can only be made actual or real through the creative intervention of human beings. Importantly then, for Bacon, the pursuit of knowledge is more art or *techne* than theory or *episteme*. It is part of what Perez-Ramos has called the *maker's* tradition of knowledge. (p.149). For Bacon, inquiry is a process whereby the formal nature of cognitive truths must be constructed or made from empirical observations (as a kind of mental artifact) just as the formal transformation of material nature (in the production of technologies) must be constructed or made from found or given in the physical world.(pp.15-16)

Bacon's emphasis upon the interdependence between techniques and technologies as necessary ingredients in the pursuit of knowledge helped bring about a major transformation in the conception of knowledge, namely, the shift from the classical and medieval emphasis upon knowledge as understanding and contemplation to the highly modern conception of *knowledge as power*. And with this shift came an important change in the modern world's relation to nature. For nature was no longer conceived as an organically ordered framework within which human beings occupied a specific rung in the great chain of being. Instead, nature now came to be viewed less as a place and more as raw material to be stripped and processed as a means of proving humanity's privileged place in creation. In his revolutionary portrayal of humanity as creator and inventor, Bacon helped articulate the new, modern vision of human beings as a God-like presence whose creative, speculative power sets us apart from the natural world, not just morally (as many medieval thinkers believed), but epistemically and technologically as well.

As it turned out, Bacon's vision of human nature turned out to be the perfect fit for the new efficient, mathematical conception of nature that was also being developed during his day. But while Bacon's proposal was revolutionary, it also turned out to be a double-edged sword, for as Carolyn Merchant in *The Death of Nature* has noted, when disconnected from any grounded consideration of the necessity of nature as life-support system, such a program can become pathological both for humanity in general and for the broader world that we inhabit. (pp.164-190). That is, since the idea of nature has been stripped of any intrinsic value and purpose, and human purposes identified simply with whatever purposes happen to exist and operate in the given society, the potential life-value of scientific knowledge and technology cannot operate coherently in Bacon's system. Since there is no basis in his thought for establishing a life-ground of value beyond the actual purposes that circulate in a given social system, the links that he established between the new methods of knowledge-acquisition, transformation of the natural world, and service to bettering human life were all too easily absorbed by the existing value system of Tudor England as service to itself and its own political and economic ends and those of the newly powerful agricultural and industrial bourgeoisie with whom it was allied in its military expansion and trade. Thus, concealed within Bacon's revolution is a deep-seated contradiction between the potential life-value of scientific understanding and technology (realizable if and only if

service to life-requirements is understood as both purpose and limit of knowledge) and the actual life-destructiveness of science and technology when their development is programmed by life-blind goals. This contradiction is fully realized in the modern understanding of nature as resource for economic exploitation.

9. The Modern, Efficient Conception of Nature

The importance of empirical observation and experimentation as a way of understanding nature was not a modern discovery. Aquinas, for example, building upon the work of Aristotle, had also espoused the then widely held view that the road to knowledge had to begin with sensible experience and the study of nature (commonly known as natural philosophy). (p.52) The main difference between the modern and medieval or classical approaches to the investigation of nature was thus not one of kind, but of emphasis. As already noted, the conception of the origins of the world as a function of God's absolute power implied by the work of scholastics such as Ockham cast serious doubt upon the soundness of the links in the great chain of being (as a proportionate accord or hierarchical order ranging from the inanimate to the divine). As Funkenstein argues, this included the general exchanging, methodologically, of "the physical necessity of orders and structures for the physical necessity of efficient causality" (p.144) As Funkenstein as well as Lindberg explain, for thinkers such as Galileo, Descartes, Newton and Hobbes, this general exchange of explanatory, causal conditions was extended to a wholesale questioning of physics (and metaphysics) of the Aristotelian tradition. Since it was widely acknowledged that the study of sensible experience must begin with the examination of material and efficient causes (with both the formal and final causes being revealed after the fact through reflection), many of these thinkers began to experiment with the idea that the operations of nature might be reducible to material and efficient causation alone (with the place of formal and final causes being either rejected entirely as merely subjective, anthropocentric projections, or redefined as having a purely metaphysical or theological function). (pp.317-327; pp.361-362)

The rejection of formal and final causes in favor of an increased emphasis on efficient and material causation was a distinguishing moment in the development of the modern philosophy of nature for a number of reasons. Firstly, the devaluation of formal and final causation placed greater normative importance upon empirical observation, experimentation and induction as the primary means to knowledge instead of the more traditional emphasis on deduction, logical reflection and rational speculation. This methodological turn has become one of the hallmarks of the modern scientific world view and a defining feature of our current scientific conception of knowledge. Secondly, the reduction to material efficient causes opened the door to the pivotal shift from the heterogeneous world view of qualitatively different entities standing in normative hierarchical relations of the classical tradition to the modern homogeneous conception of nature. Funkenstein explains this shift as a consequence of the fact that from a mechanical perspective, what counts is just that matter moves, not what *kind* of thing the matters forms. (pp.63-70) Rejecting the explanatory role of formal and final causes says in effect (or is at least compatible with saying) that all things in the universe are only matter in different efficient relations as determined by a God who created the universe *ex nihilo* for purposes that finite minds cannot understand. If this claim is true, then there is no longer any basis for recognizing any normatively significant qualitative difference in the universe (save for

the human mind now entitled to impose whatever purposes it ‘chooses’ on nature). Collingwood explains how this pivotal move allowed Newton to develop his revolutionary theory which claimed that the forces and laws that govern motion locally here on earth are the very same as those that govern the motions of heavenly bodies (a claim which was ruled out by the Aristotelean tradition’s heterogeneous division between the transitory character of natural motion and the eternal character of the heavenly sphere) (pp.111-112). The increased explanatory power afforded by this revolutionary move would help reinforce the view that the modern mechanistic view of nature was a progressive alternative to the more traditional organic world view. Funkenstein, Hall and Collingwood all emphasize how the reduction of nature to efficient material relations also enabled the mathematization of nature, i.e., the belief that essential relations within nature can be expressed and described in mathematical terms. (pp. 299-317; pp.285-290; pp.93-112) Mathematics proved so suitable to explaining nature as matter in motion because its terms are qualityless, uniform, and thus the basis of universal comparability. The seemingly providential accord between a world reduced to efficient material relations and the law-like certainty of mathematical descriptions lent still further support to the mechanistic conception that was being developed during this period. So important was the ability to map mathematical formulas onto the regularities of nature that it prompted Galileo to declare mathematics to be the universal language of the great book of nature. By marrying the more uncertain, traditionally less reliable inductive methods of empirical investigation to the certainties of mathematical expression (which had long been held up as the model of genuine knowledge), modern thinkers were able to reinforce the belief that knowledge should be reduced to that which can be mathematically modeled and predicted. The success of this method in predicting those behaviors that could be modeled in this way helped secure the normative authority of the modern scientific point of view, both as the final measure of what is to count as knowledge, and as the final word on what is to count as nature or world or reality as such. All of this was further supported by the conviction that the modern mechanistic world view, with its reduction of nature to efficient material relations, also satisfied the newly expressed principle of Ockham’s Razor, namely, that entities not be multiplied beyond the minimum needed to explain the phenomena.

While the conception of nature as a material system of efficient relations allowed the new science of nature to draw upon the power and prestige of mathematics, it also drained the world, scientifically conceived, of all life and purpose. The mathematization of nature did indeed increase drastically the predictive power of natural science, but at the cost, of course, of thereby excluding that which could not be mathematized from the scientific understanding of nature. Within the traditional, organic world view life was typically characterized as the unfolding of an immanent formal cause as governed by the purpose encoded in the final cause, that is, as an essential developmental activity that distinguished living from non-living things and grounded their unique value. As the mechanistic picture of nature that emerged was seemingly proven by increased instrumental control over natural processes that predictive natural science enabled, formal or final causes were rejected as realities and reinterpreted as projections of human desire.

Hobbes most clearly manifests the consequences of this shift. If nature is nothing but a system of interacting material causes, then it follows that nothing in the natural world has any intrinsic claim to goodness or badness. Hobbes thus re-defines good and bad in terms of what people desire, and desire in terms of a mechanical response in the human organism

to the objects which it happens to experience in its environment. “Whatsoever is the object of any man’s appetite,” Hobbes writes, “is that which for his part he calleth good ... there being ... no common rule of good.. to be taken from the objects.”(pp. 28-29).

In this new constellation what counts as valuable is only what atomic human individuals assert as valuable on the basis of their desires. Reason is redefined as the servant of desire, as in Hume’s famous quip that “’tis no more rational to prefer the destruction of the whole world to the scratching of my finger.” (p. 416) Hume (1711-1776, CE) makes clear the essential life-blindness of the basic principles of the early modern reconstruction of the philosophy of nature. “Life-blind,” a concept introduced by McMurtry, means in this context that the early modern understanding of the nature of desire and the relationship between desire, reason, and human purposes fails to recognize that desire, reason, and purpose all presuppose an on-going essential connection between the life-bearer which has desires and reasons about how to pursue them, and the natural and social fields of life-support. This life-blindness alone, however, cannot explain how such a subtle thinker as Hume can assert what is materially self-contradictory. Hume assumes that our desires are always self-interested, and argues from that principle to the conclusion that if it is only the abstract ego that can judge the goodness or badness of his desires, there is no basis whatsoever outside of the ego to criticize choices. Yet, if it really is rational to prefer the destruction of the whole world, then it is rational to prefer one’s own destruction, since one is in truth a moment of the world of life. In that case, it would follow that it is in the interests of the rational individual to destroy himself in the service of his own interests, since there is no baseline of rational judgment outside of the self against which its decisions can be evaluated.

The only way that it is possible to understand such material contradictions in early modern philosophy is to understand these developments in the social context of the ruling value system then in the process of consolidating itself. That which allowed the modern conception of nature and human nature to ultimately succeed, therefore, was not simply its scientific explanatory and predictive power, but the service it provided to the newly emergent money-value system. Take again the example of Hobbes. Hobbes argues that “the value of a man is his price,” which means that “it is not absolute, but relative to the needs of another.” (p.51). In other words, he who can afford another’s price annexes that person’s power to his own, and if no one wants to pay a price for someone, then it follows that that person lacks all value. This is not philosophical innovation on Hobbes’ part, however, so much as it is an actual description of social relations in the emerging capitalist market society of revolutionary England.

In capitalism the abstractions of early modern philosophy become real as the rule of money-value over life-value. The actual leveling of qualitatively distinct things and individuals to their price is the socially concrete outcome of the spread of capitalist market relations. Under a capitalist market society value is reduced to money-value (price) and economic “reason” means, essentially, serving the growth of money-value. Once “reason” has been redefined as economic reason it becomes clear how Hobbes and Hume can assert, without consciousness, the contradictions described above. Since money is not alive, and thus does not require constant connection with life-sustaining nature, but is socially necessary as the means of procuring what one desires, the most rational pursuit under a capitalist market economy is pursuit of money as the socially instituted condition of desire-

satisfaction. Hence whatever conditions best enable money-value to grow appears rational as a goal for individuals to serve. The instrumental link between money-demand and desire satisfaction is what produces the life-blindness described above. People pursuing money-value as their sole end confuse it with the basis of life itself, i.e., they forget that while money as such is not dependent upon the natural field of life-support, they, as embodied beings are. Thus it is the spread of the money-value system that ultimately explains the all-pervasive contradiction between the development of science, human understanding, and productive power with the degradation, rather than improvement, of life-conditions with which the contemporary world is still grappling.

The complex web of relationships and mutually reinforcing interconnections that exist between the ruling value-system, socio-economic and political institutions, and scientific understanding thus serve as the basic fabric behind the present money-value steered *techno-scientific enterprise*. The combination of liberal capitalism and techno-science generated an entirely new conception of progress as unlimited accumulation of power and wealth for atomic selves. It is here that the contradiction referred to above becomes most evident. On the one hand, the increased knowledge of nature that modern science makes possible generates new potentials for life-requirement satisfaction and life-value development. On the other hand, the understanding of “productivity,” “efficiency,” and “progress” in terms of the more pervasive spread of market forces and the rule of money-value over life-requirements that drives the techno-scientific project is increasingly generating life-crises on all planes of being alive. For example, there is now no scientific debate about the reality of global warming or its potentially catastrophic impacts for most life on earth. Yet, despite numerous conferences, communiqués, and pledges, governments around the world not only fail to act, they are encouraged by corporations to turn pollution itself into a priced commodity to be traded on a carbon market. This plan is put forward as “innovative thinking” and “progress in the solution of our environmental problems.” As Kovel, for example, reveals, commodifying pollution cannot by solve the problem, however, because it does not reduce or stop pollution and is, in fact, a new source of money-value creation and it is precisely the idea of progress as the ungoverned creation of money-value enterprise that drives the environmental crisis in the first place.(pp. 47-50)

Thus, the potential life-value of the overturning of ancient hierarchies which the new conception of human nature as creative makes possible is submerged in the abstractions of the mathematical science of nature made real as the rule of money-value over life-requirements and life-value development. As the example of emissions trading shows, once a scientific consensus can no longer be denied by the corporate agents that exercise preponderant social power, the potential life-value of the scientific insight which they acknowledge in the abstract is immediately absorbed by the money-value system and turned into its concrete opposite— yet another justification for the growth of money-value. Even when, therefore, science does not explicitly subserve commerce and industry, the rule of the money-value system is proven by its power to subvert potentially life-valuable science by promoting policies as solutions which are, when judged from their real effects on the natural life-support system, the very essence of the problem.

Therefore, it is not the mathematized reduction of nature to a lifeless, valueless world of mechanical-causal relations in itself that generates the contemporary life-crisis, but the steering of the techno-scientific enterprise by the money-value system. Modern science, in

contrast, can be a force for understanding the real complexity and beauty of nature, and in this regard it can be an ally in the global effort to restore the natural life-support system. In so far as it serves, intentionally or not, the market values of property, ownership, and money-value as final, however, the techno-scientific enterprise becomes a life-destructive force.

10. Nature, Human Nature and the Techno-Scientific Enterprise

While scientific theories, technological developments and liberal capitalism have undergone many changes since their mutual emergence in the early modern period, the universal steering power of money-value as the essential motivating force of the techno-scientific enterprise has not. Current theories may have greater predictive and explanatory power, technologies may be more powerful and complex, and liberal politics and capitalist economics may have been modified significantly, but the underlying conception of nature as valueless mechanism until priced by human beings pursuing their desires has remained the same at its core. Thus, for example, while Newtonian mechanics may have been displaced by relativity theory and quantum mechanics, the underlying view that nature is a framework of lifeless, intrinsically valueless material conditions in efficient relations remains much the same. In the words of physicist Stephen Weinberg as cited by Pagels, “the more we have learned about the universe, the more we know it is meaningless.” (p. 307) Similarly, while there may currently be increased skepticism about the traditional religious claim that humanity’s power, purpose and place in the world has been ordained directly by God, two key religiously inspired beliefs are not. These two beliefs are that human interests and purposes are privileged in some fundamental sense (trumping all others), and that humanity possesses the creative, God-like capacity to determine what the value of nature. These two beliefs underwrite the project of trying to control nature through engineered projects in the service of ruling value systems. Given the underlying project of money-value control, problems this form of activity causes are never traced back to their underlying socio-philosophical conditions. As Blumenberg argues, these core beliefs function as a kind of common, ‘subsisting’ thread from medieval and early modern times, undergoing a kind of *reoccupation* whereby the formal, intuitive power of those traditional ideas is preserved and sustained, but within a very different context. (pp. 137-143).

These are the same basic beliefs and practices that helped to distinguish and define the modern period, but they are now realized in a much more elaborated and highly developed economic and scientific system. However, despite the fact that these beliefs now appear objectified as sophisticated technology and a global money-value economy, they have not freed themselves from the theological-moral origins described in the previous section, and they continue to function as a ‘common sense’, a deeply ingrained attitude or existential disposition that serves as the constitutive, evaluative ground for deciding what it means for something to be real, true, valuable, and good. This means that for a belief, theory or practice to be taken seriously, it must be capable of being translated into or mapped onto the assumptions, principles and ideals characteristic of the techno-scientific enterprise steered by money-value accumulation. Any idea or theory that exposes this money-driven system of technologically mediated production as itself the fundamental cause of the crisis of natural and social life-support systems is perceived as a failure to accord with ‘reality’ as now prescribed.

A crucial and often overlooked feature of the money-value steered techno-scientific enterprise is the emergence of technology itself as a fundamental framing element of modern life. The constitutive role of technology in helping to shape modern life is so ubiquitous that it may without exaggeration be said to constitute our very *form of life* in the sense that it is now the built social environment and the ruling value system that organizes it that appears to be the fundamental basis of human life-support. Nature as the underlying sustaining life-ground disappears behind the social-technological forms of life built up out of it, such that people appeal to “technology” to rescue them from the problems the money-steered development of “technology” has produced in the first place. As Winner, Jonas, and Heidegger in their several ways all argue, ruling values and norms, our anticipations and expectations, our very manner of thinking, judging and evaluating are so technologically oriented, both formally and materially, that we are often unable to recognize just how dominant technology is in modern social life. (pp.103-113; pp.17-33; pp.26-28) So pervasive is our technological mind set that we have a difficult time conceiving how things could be otherwise, or even understanding what that might mean. Technological life, for example, is no longer seen as contingent or questionable, but as *inevitable* both materially and normatively. It is true that one may question the desirability of certain particular technological developments, but to question the desirability of technological development per se, as an end in-itself, would be seen as ‘unrealistic’, unintelligible, and perhaps even akin to madness, as Marcuse suggests in his essay “The Social Implications of technology. (pp. 65-70) The very forms of contemporary politics, for example, i.e., the emphasis on the image and the soundbite, the process of governing by polls, the marketing of policies, etc., each express or instantiate the real valences and real possibilities that are inherent within and enabled by technological modes of production and technological forms of life. So too the very manner in which we conduct our daily activities: the kinds of food we eat, the ways we spend our leisure time, the ways we work, the kinds of associations we form, the ways we communicate, our patterns of consumption, the economic and political emphasis that is placed on freedom of choice, etc., are all shaped in vital ways by the money-value driven technological environment in which we are embedded. And make no mistake, the world in which we are embedded and within which we live most immediately and most proximately is not the so-called ‘natural’ environment (which most of us know and encounter only mediately), but a technological or *constructed* environment selected, as McMurtry argues, at every step by money-value adding.

In being a constructed environment, however, the immediate reality of human life is society. All particular factors within society, science and technology included, thus must obey the ruling value system of that society. The ruling value system at present is, as has already been argued, the money-value system. “Technology” because it is not self-moving or alive, must itself be developed according to deeper principles of social value and choice. The form the technological world has taken is not an automatic function of the development of the modern view of nature and human nature, but is itself steered by the master-goal of the modern world, the commodification of all that is in the service of producing ever more money-value. The vast majority of our waking and sleeping lives—our home life, work life, transportation, communication, entertainment, even the very food we eat and the water we drink—are concretizations of consumer technologies whose primary purpose is not to alleviate the so-called “burdens” of life, but to realize profits for the corporations that produced them, artificially created the demand for them, and in the next iteration subtly altered them in order to produce new demand and new profits. For

those who can afford to participate, this world of gadgetry has become our immediate, ‘real’ environment, the ‘real’ locus of our everyday attention, our everyday efforts, and our everyday concerns. Even science itself, which most people mistakenly see as the theoretical engine of modern technology, is now seen to be so deeply inseparable from technology as to be an expression of a deeper value program ruling both.

To fully understand the essence of technology it is essential to not lose sight of the way in which the development of technology is itself driven by the value-imperatives of the capitalist market. That which is considered feasible and good technology is restricted to those technologies that are more profitable, regardless of whether they serve the deeper imperative of life-value protection and promotion that any life-grounded science ought to serve. Life-valuable uses of technology are limited to those technologies which better enable human beings to produce with minimal damage to the natural environment that which they really require to live, and to live well. Efficiency in this use, as McMurtry argues, means maximal production of life-requirement satisfiers with minimal disruption and harm to other life and the natural life-support system. Compare this meaning with the meaning of “efficiency” in the capitalist world. As it is utilized under contemporary social and political conditions, efficiency is re-defined as essentially “profitability.” If a practice is profitable but inefficient as regards its actual use of resources, it will nevertheless be pursued and defended as “technology in the service of our way of life.” Consider for example the separation of useable crude oil from the so-called “oil sands” in Northern Alberta. The higher the price of oil, the more profitable this development becomes and thus the more time and money is invested in it. The oil sands, however, actually produce no new energy. It takes as much energy in the form of natural gas which is burned in the process of separating the oil from the oil sand as is produced in the form of usable crude oil, not to mention the four to five gallons of water made toxic sludge for every gallon of oil produced. The process is thus not at all efficient by the metric of life-value explained above, but it is presented as a great technological breakthrough, because of and to the extent that it is profitable. Yet, the links between technology, profitability, and efficiency have become so ingrained into our thinking as to become part of the fabric of normative ‘common sense’. Hence, absurdities like the oil sands proceed without official challenge or critique. The absurdity, of course, lies in the waste of energy to produce energy affirmed as a great economic good.

11. The Plasticity of Nature and Necessity of Culture: The New Ironic ‘Reality’

As already noted, traditional conceptions of nature and humanity’s place within it typically maintain that the world and all that is in it is ordered according to fixed principles, conditions or necessities that set pre-determined limits on what is possible. Such limits typically functioned as combinations of physical, aesthetic and moral prohibitions against certain kinds of actions and goals, serving as the pre-established grounds for a universal system of justice where everything has its proper purpose and place. This idea persisted well into early modern thought, as illustrated in Francis Bacon’s famous dictum that to command nature one must first obey it. But the world view of the money-value steered techno-scientific enterprise marks an important turn away from that traditional scheme. The world in which idea of nature as a framework of fixed limits made sense has been replaced by the world of money-value driven ‘progress’ whose consequences are the multiple forms of life-crises observable across the globe. The limits abstracted out by market ideology still

exist in material reality. The problem, however, is that science in the service of money-value can not understand that natural limits are fixed, underlying, objective life-support systems upon which all life depends. In other words, there is no technological fix to environmental problems caused by the hypertrophied growth of productivity as measured by money-value alone.

The point may be further developed through a reflection on the meaning of “growth” in the contemporary world. The traditional, organic idea of growth (as the actualization or completion of a finite process of development aimed at a final cause which expresses the good of that which is developing) has been replaced ideologically by a money-value based notion that valorizes *technological growth* in the service of the production of ever more consumer commodities. In the money-value driven techno-scientific rendering of the idea, growth is no longer conceived organically as an immanent process of finite actualization that includes a process of degradation and decay. Instead, the growth of consumer commodities through the application of technology to natural “raw materials” is assumed to be able to go on endlessly precisely because the technological fetish obscures the reality of natural limitations. (Georgescu-Roegen, 1071, p. 18) The economy appears to issue from the unending process of discovery, invention, refinement, and construction (e.g., of speed, power, knowledge, wealth, etc.) *rather than* natural resources contained within the finite natural life-support system. Hence the money-value system goal of expansion of money-value for the sake of expansion of money value appears to be able to proceed without natural limit, when in fact, because economic systems depend upon human life and activity, and human life and activity are ultimately grounded in the natural life-support system, what is in reality occurring is the hollowing out of the ability of nature to support life, and therefore any economic activity whatsoever. Thus, the traditional, organic ideal of *developmental perfectibility* (understood as the actualization or completion of a final cause immanent to and expressive of the good of the living thing in question) has been replaced by the contrary ideal of *perfectibility of process* where the end or goal is the *actualization or perfection of the process of technological development in the service of the non-living system goal of money-value creation for private money managers and possessors*. The highest value in such a world lies not in what is actually produced or made (for such products are viewed as contingent, temporary, disposable, and soon to be obsolete; their consumption does not signify that any immanent good has been realized, but only that the price has been paid), but the money-value embodied in the technology as “research and development” and realized as profit at the end of the cycle.

A fundamental correlate of this modern conception of money-driven technological growth is the deep-seated belief that humanity has both the creative capacity and the moral license to ‘play God,’ that is, to re-make the world according to whatever system-goal happens to rule. To re-make the world according to ruling system-goals, without any critical reflection upon how that system-goal serves or does not serve the satisfaction of human life-requirements and the preservation of the natural life-support system, is the deepest form of irrationality that marks contemporary society. Within the current money-value steered techno-scientific world, nature and natural living things (i.e., those beings and processes whose characters and purposes have not been deliberately shaped or directed by human activity) are not presented or defined as things to be admired, respected, appreciated and loved for their own sake and for the sake of the other life they support. Instead, they are reduced to instruments or means for the satisfaction of human purposes, human desires,

human intentions, which are in turn themselves reduced to consumer demand for more money or its equivalents. In other words, under the current money-value steered techno-scientific worldview the life-sustaining essence of nature is obscured. Natural limits as life-enabling boundaries against which we should voluntarily and respectfully restrain our power to act are instead presented as obstacles to money-value growth that must be overcome. Thus, ironically, the natural order that was once perceived in fatalistic terms as a pre-ordained necessity which constrained humanity by the iron-determinism of ‘natural place’ has been turned completely on its head. Under the rule of the modern money-value system, nature is now conceived as an essentially plastic, value-neutral fabric that is subject to our value-endowing labor, while our own creative, cultural environment, which before was seen as our primary hope and refuge from the iron-determinism of nature, has itself come to be seen as an inevitable, necessary reality which we must fatefully accept and to which we must adapt as our Providence.

12. The Three Dogmas and the Problem of Environmental Reform

The failure to recognize, critically, that the techno-scientific enterprise is embedded in the emergence of the money-value system, that it is thus itself the expression of historically situated conditions and interests of both an epistemic and socio-economic and political character, stands as one of the greatest impediments to rethinking and reforming our understanding of, relation to and place within the broader world environment. The general failure to acknowledge the intimate interconnection and interdependence between the historically concurrent fields of science, technology and politics has made the task of reforming our relation to nature and the broader environment more difficult still. These failures have helped give rise to what John McMurtry, in “The Planetary Life-Crisis,” has identified as three modern *dogmas* that stand as serious impediments to significant environmental understanding and reform: 1) the belief that ecological processes and environments can be understood independently of the causal structures of political, economic systems (which, in truth, daily alter the reproduction and the distribution of the world’s species by destruction, depletion and pollution of habitats), 2) the belief that environmental, biological and related sciences are or can in principle be ‘value neutral’ (when, in truth, the increasing preponderance of the research problems, programs and results of these sciences are selected and funded to serve the interests of for-profit corporations), and 3) the belief that humans are somehow separate or distinct from the natural environment in some fundamental way, and so are free to use it as they will (or any other metaphysical division that dichotomizes or polarizes the otherwise interrelated process or planetary life organization, when in truth both nature and society are fundamental life-support systems). (p. 183). The widespread acceptance of these three dogmas serves as one of the major roadblocks to genuine social and environmental reform.

The dogma that it is possible to understand ecological processes and environments independently of the causal structures of economic and political systems is arguably the most important and most stubborn roadblock to genuine environmental reform. For associated with this dogma is the sincere belief that environmental reform can be accomplished from within our current economic and political structures through simple refinements of those systems, for example, pollution reduction (following the model of technological innovation and substitution). As the historical study of the techno-scientific enterprise clearly shows, however, ecological processes and environments cannot be

understood independently of the political, socio-economic, and normative systems that help shape our relations to those processes and environments. Not only are those processes and environments altered and shaped by the activities, practices, and lifestyles preserved and promoted within them, but the very status and shared meaning of those processes and environments are themselves constituted by the interpretive framework supplied by the ruling value system and its institutions. Uncritical adherence to this dogma merely preserves the status quo by compelling those who seek environmental reform to view the broader environment and our relation to it as a problem to be solved from within the very political and economic system that causes the problem in the first place, as explained above. Thus, rather than viewing the call of environmental reform as a chance to critically rethink and reassess the dominant conceptions of nature and human nature (including the structures and operating principles of the political economy, the role of technology in shaping social life, and the authoritative role of modern science in determining what is to count as knowledge), the prevailing dogma encourages us to view the task of environmental reform as merely another managerial problem which can be corrected if market forces are allowed to “freely” steer the vectors of technological change. Viewed through this normative, managerial lens, the task of environmental reform ends up being understood and presented as but another problem to which we can and should find a techno-scientific solution. Thus our environmental situation is approached and framed, not as an opportunity to reflect critically upon the health, richness and viability of the techno-scientific lifestyle and general world view, but as a series of problems easily solved by such things as: 1) better understanding and managing the processes and environments we utilize (as a framework of valueless, efficient, material relations), 2) reducing the harmful effects of waste by creating more efficient technologies that would allow us to get maximum utility from the world’s resources, or 3) refining and perfecting the political and economic marketplace so that they apply to all domains of nature now in crisis. The fact that these and similar proposals appear so reasonable to most people is a testament to how strong a grip this dogma, and the historical threads that underlie it, has upon the contemporary mind, so much so in fact that the money-value steered techno-scientific enterprise is our current *form of life*.

The dogma that we can undertake the task of environmental reform from within the political and economic structures of the techno-scientific enterprise is supported and maintained both by the two other dogmas mentioned, as well as by a number of other historical, material and conceptual conditions. Thus, the dogma that the environmental, biological and related sciences are value neutral, for example, allows researches to believe, again sincerely, that their work is untainted by the financial support that makes that research possible. This perceived separation between research and interests allows both researchers and the interest groups that support them to claim that the information and knowledge produced has the authority of real, objective facts (resulting from a process of inquiry aimed primarily at the discovery of the ‘truth’). The authority granted to such work has at least three important effects: 1) Because the subject matter of research is often selected on the basis of its marketability and appeal to various funding sources, the content of that research will usually end up serving the interests of those funding groups. But while the research itself will be interest-laden (by highlighting specifically selected perspectives that preserve and advance the interests of the funding sources), it is usually presented and received as an authoritative, truthful assessment of that phenomena. 2) Because other forms of inquiry, knowledge and wisdom are not perceived to be value neutral (but as

subjectively or culturally relative), these alternative perspectives will rarely serve as serious challenges to the higher authority of science, and are actually designated as mere ‘mythology,’ ‘mysticism,’ or ‘superstition’ as a means of preserving the normative authority of science, and 3) The process of inquiry eventually can thus devolve into a battle between market-funded techno-scientific experts, bringing their own interest-laden research perspectives to the table. The result will not likely be the advancement of the truth or conditions that are good for all, but a competition between researchers to attract selection by the funding sources, and thus position scientific research to serve best the agendas of those who are able to pay for it.

Other material and conceptual conditions that support the current dogmas include: 1) the emergence of the now commonly accepted belief that money-value growth can be and ought to be endless; 2) that whatever environmental problems this growth might cause can endlessly be solved by technological development without natural limit; 3) the materially conditioned and conceptually reinforced exploitation of women and other social groups by a cultural elite schooled in this system; 4) the materially conditioned and conceptually reinforced perpetual exploitation of non-human organisms, processes and environments by 1 to 4; and 5) the merchandising of all these processes by a market based political system validated by a rhetoric of freedom.

13. Ecological, Biological, Cultural and Social Time

The optimistic attitude that humanity can transcend the limits of nature by always choosing for the production of more money value is fueled and maintained in large part by the exploitative social structures and relationships that help insulate privileged groups from important natural realities that are part and parcel of the broader, lived environment. As Mellor argues in “Ecofeminism and Environmental Ethics,” the natural realities against which these privileged groups are insulated include natural processes and environments that operate at the levels of ecological and biological time. (pp.111-114). *Ecological time* may be broadly defined as the time required for the development, maintenance and repair of processes and environments that operate at a *macro-environmental* level and scale (from the perspective of human beings). This would include such things as the natural cycles of localized ecosystems, climate, the long term ebb and flow of large scale population cycles, the natural processes and environments required for the development and maintenance of species, and other kinds of processes and environments that operate on a similar macro-environmental level and scale. *Biological time*, on the other hand, may be broadly defined as the time required for the development, maintenance and repair of processes and environments that operate on a *micro-environmental* level and scale (again from a human perspective). This would include such things as the time it takes for the development, maintenance and repair of individual organisms, including the immediate processes and environments needed by those organisms to survive, grow and flourish.

As natural organisms, human beings are continually and factually subject to the realities of biological and ecological time: we eat, we drink, we urinate, we defecate, we sleep, we need rest, we require love and care and compassion, we must face the realities of weather, climate, the cycles of the earth’s spin, the cycles of its revolutions around the sun, the limited rates at which wastes are naturally processed and recycled, and so on. But while all human beings must inevitably encounter these realities at some level or other, not everyone

experiences them to the same extent. For while everyone must eat, not everyone needs to take the time needed to grow, gather, prepare and cook the food from which they obtain their nourishment, and while everyone must sleep and live in clean, healthy accommodations, not everyone needs to put the same time and effort into the care and maintenance of such needs. The exploitative character of our social structures and relationships allows certain privileged groups to be free riders on these unacknowledged life-conditions by shifting the responsibility for such tasks to marginalized individuals and groups categorized as fit only to be the servants of the monetarily privileged groups.

Basic life-supportive work is thus done by people with less power and advantage, or as their natural responsibility (for example, as “women’s work”). By declaring the many tasks required or demanded by the realities of biological and ecological time to be part of the naturalized labor of ‘being a woman’, or ‘being a servant’, or ‘being poor,’ privileged individuals and groups gain an artificially maintained level of freedom from these realities, allowing them to pursue other, “more important” cultural projects of their choice. Because they live in a more culturally and socially defined world (with its own peculiar cultural and political realities and time frames), the free riders typically see themselves as on the cutting edge of a project that will allow humanity to transcend the demands of biological and ecological time and their natural limits and dependencies, (e.g., on a clean atmosphere, potable water, nutritious food, energy supplies, and so on). Such delusions (e.g., the belief that the exhaustion of one natural resource can always be compensated by a technological substitute) are nourished and encouraged by the social structures and relationships characteristic of the money-valued steered techno-scientific enterprise, which express a peculiar normative system of values and rankings which is a priori blind to all the natural and social life-support systems that it presupposes.

14. Rethinking the Techno-Scientific Enterprise

The historical pattern of environmental philosophy outlined here is described by a single, continuous line of development, but is itself comprised of fibrous parts that have themselves become twisted and interwoven, sometimes necessarily and sometimes contingently, to form a connected whole. This philosophical thread, while on the one hand but one of many historical threads (political, economic, cultural) that together help form the overall fabric of our current environmental situation, on the other may claim explanatory primacy in so far as the overall understanding of the human relationship to nature, the respective values of the relata, and thus what every age thinks it is permissible to do to the natural life-support system, are problems that are fundamentally philosophical in nature. That is not to say that the philosophical conception of nature that rules in every age is alone the cause of either life-affirmative or life-destructive relationships between human beings and nature. The complete causal story involves all the threads that make up the fabric of the human theoretical and practical relationship to nature. Nevertheless, since when human beings act they do so on the basis of values, and it is the province of philosophy to study the consistency, cogency, and goodness or badness of those values, the emphasis placed here on environmental philosophy is warranted. As the argument has made clear, the present money-value steered techno-scientific enterprise requires rethinking and critical re-evaluation, if humanity is to intelligently confront the present crisis of life-support systems. That re-thinking, in turn, requires an understanding of the deeper philosophical sources out of which the ruling value-regime has been constructed. By revealing the philosophical

presuppositions of the real social, material and conceptual conditions out of which the money-value steered techno-scientific world view has developed, it becomes possible to better understand why the exploitative and life-undermining character of this particular form of social life can go unrecognized by those in positions of power today. It becomes possible to see not only that the view of nature and human nature upon which the value-system that drives the techno-scientific form of life rests is distorted and dangerously disproportionate to lived realities, but is in fact life-blind in the sense defined in the introduction, that is, incapable of valuing life as such because all that is recognized as of value in this world is the growth of money-value or what serves the growth of money-value. Becoming critically aware of the operation and consequences of this value-system can aid the world in better understanding the limitations of human action that the health of the natural life-support system imposes; but also enable recognition and respect for these limits as not a diminution of human and terrestrial life-value, but the essential conditions for its development. A concrete example of such a life-coherent and life-grounded alternative to the money-value steered techno-scientific world is outlined in the related chapters in the Encyclopedia of Life Support Systems (EOLSS). This rigorous and highly comprehensive body of work is sufficient proof that we can indeed rethink and re-evaluate our views of nature and human nature in connected and life-grounded ways that are ethically and aesthetically life-coherent in contrast to the ruling mechanisms of the money-value steered techno-scientific market system's reductionist thought regime.

Glossary

- Aesthetic:** In general, aesthetic refers to the human capacity to sense and intuit the world around it. The aesthetic is thus the domain of affective response to, as opposed to active cognition of, the surrounding world. As used here, the aesthetic relationship to nature is opposed to the instrumental control over nature; aesthetically conceived, the human relationship to nature is one of response to what our experience of it creatively discloses.
- Biological Time:** The time required for the development, maintenance and repair of processes and environments that operate on a *micro-environmental* level and scale.
- Cause (Efficient):** The motive or mechanical force that initiates a material process or impels a change of position in an object.
- Cause (Final):** The goal or end, assumed to be good, which governs the development of a natural substance in Aristotle's philosophy.
- Cause (Formal):** In Aristotle, the pattern immanent to natural substances which organizes and structures their development.
- Ecological time:** The time required for the development, maintenance and repair of processes and environments that operate at a *macro-environmental* level and scale.
- Epistemic:** Broadly construed, 'epistemic' means the cognitive relationship between human minds and the world, the general sphere of conceptual relationship and the higher order logical rules that are thought to govern that relationship in a given epoch of knowledge.
- Ethics:** Broadly construed, ethics is the study of the good life, including both problems of universal (transhistorical and cross-cultural) value

as well as the particular structures of value that rule in any given social epoch, as well as the natural, social, and cultural systems that underlie and condition ruling value-regimes.

Life-Ground of Value:

A concept introduced by McMurtry (1998) which signifies the totality of conditions, natural and/or social, upon which any living thing or collection of living things depends for its existence.

Nature:

In the broadest terms, the totality of what exists at all levels in the universe. In its narrower signification, nature refers to the non-humanly constructed environment of life and life-support systems. In the history of speculative metaphysics, nature also refers to the essence of things, or that defining feature which distinguishes kinds of things from other kinds of things.

Science:

In its original signification as the Latin translation of the Greek term *theoria*, science referred to the contemplation of the universal principles of order assumed to rule the universe, principles which were treated as superior to and unchangeable by human beings. In its modern signification science refers to the systematic mathematical modeling, for the sake of prediction and control, of both natural and social systems.

Technology:

Technology is any humanly built tool which extends the organic capabilities of human beings.

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