

THE BIBLE, BACONIANISM, AND MASTERY OVER NATURE

THE BIBLE, BACONIANISM, AND MASTERY OVER NATURE:  
THE OLD TESTAMENT AND ITS MODERN MISREADING

By

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### Abstract of Dissertation

A common twentieth-century hypothesis, found in various forms in the work of Berdyaev, Toynbee, Foster, Jaki, Cox, White, and many others, is that the Bible taught the West to regard nature as inanimate, raw material, operating according to mechanical laws, and hence subject to rational understanding and ultimately to human dominion. According to this hypothesis, it was the Biblical attack upon 'pagan' doctrines of animate nature, combined with the Biblical injunction to rule over the earth, which created the modern Western consciousness of nature and hence paved the way for modern industrial civilization. This hypothesis is used by some of its proponents to blame the Bible and by others to praise it, according to their evaluation of modern technological mastery.

This dissertation establishes that the hypothesis is untenable. It shows: (a) that ancient Western 'paganism' was neither in theory nor in practice identifiable with 'nature-worship', and did not restrain human aggression toward nature nearly as much as is often



supposed; (b) that the Bible, in particular the Old Testament, appears to teach restraint, not unlimited mastery, regarding nature; (c) that the 'Biblical understanding of nature' discussed by these modern writers is actually a re-statement of the pro-technological Biblical apologetics of Francis Bacon and his seventeenth-century followers, and, like that earlier interpretation of the Bible, is selective and misleading. Therefore, it is the Baconian reading of the Bible, not the Bible itself, which is to be praised or blamed for the consequences of modern technological mastery over nature. The Bible itself, like the ancient paganism to which it is often opposed, favoured a limited technical mastery over nature, whereas the modern West, following Bacon, has committed itself to unlimited mastery.

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## Key to Hebrew Transliterations

<u>Consonants</u>	<u>Vowels</u>
'āleph ( א ) = '	As per Holladay; note:
bêth ( ב ) = b or bh	long vowel = -
gîmel ( ג ) = g or gh	<u>plēnē</u> vowel = ^
dāleth ( ד ) = d or dh	and note modification:
hē ( ה ) = h	<u>any</u> sh <sup>e</sup> wā' = e
wāw ( ו ) = w	
zayin ( ז ) = z	
hêth ( ח ) = ḥ	
ṭêth ( ט ) = ṭ	
yōdh ( י ) = y	
kaph ( כ ) = k or kh	
lāmedh ( ל ) = l	
mēm ( מ ) = m	
nûn ( נ ) = n	
sāmekh ( ס ) = s	
<ayin ( ע ) = <	
pēh ( פ ) = p or ph	
tsādhēh ( צ ) = ts or tz	
qōph ( ק ) = q	
rēsh ( ר ) = r	
sîn ( ש ) = s	
shîn ( שׁ ) = sh	
tāw ( ת ) = t or th	

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## Introduction: The Mastery Hypothesis

It has been a frequent contention of modern scholarship that the notion of 'mastering' or 'conquering' nature, a notion central to the expansive, energetic civilization of the modern West, has deep roots in the Biblical foundations of Western religion. Such a contention may at first sight appear surprising, in light of the widespread opinion that the official religion of the West, Christianity, was for centuries anti-scientific, anti-technological, and eager to belittle human achievements in the temporal sphere. Nevertheless, in the literature of a wide range of disciplines (philosophy, history, theology, and sociology), and in the writings of a number of scholars respected in those disciplines (including Pierre Duhem, Stanley Jaki, Nicolas Berdyaev, R. G. Collingwood, M. B. Foster, Peter Berger, Lynn White, Harvey Cox, Theodore Roszak, Arnold Toynbee, and George Grant), one can find forceful arguments connecting the Christian worldview with the rise of the modern attempt to subdue non-human nature to human purposes.

The line of reasoning by which the writers named above have sought to connect modern technological mastery to the Bible can be stated briefly, in an oversimplified but essentially accurate summary, as follows. First, they say, one can observe that the notion that man could or should 'conquer' nature in a thoroughgoing manner is a peculiarity of the West, in fact of the modern West. The 'conquest' of nature is not a major theme in the uncivilized tribal cultures, in the high civilizations of the ancient West, or in the great civilizations of the East. Why, it must be asked? The other peoples in question surely had some of the same motives for mastering nature (eliminating hunger and disease, for example). Further, many pre-modern civilizations, both Eastern and Western, achieved sophistication in both the practical arts and in subjects such as mathematics and astronomy, all of which later proved relevant to the modern Western project of mastery. It seems, then, that what differentiated early modern Europe from contemporary and previous non-mastering cultures must have been the presence of some factor other than brute need or intellectual and technical background. Could that factor have been one of attitude? Was there some unique element in the early modern European mind that enabled it to investigate, assault, and conquer nature?

According to the account of these authors, there was such an element: Christianity. Christianity, they assert, psychically distinguished the peoples of Western Europe from their pre-Christian ancestors, their Greek and Roman intellectual heritage, and all other peoples and civilizations. Christianity, in contrast with ancient Mediterranean religion, Classical philosophy, and Eastern thought, contained a 'Biblical' understanding of nature and man's relation to it.

To understand the importance which this account gives to Christianity (or, more broadly, to the Judaeo-Christian tradition) in this connection, one has to grasp the contrast between two views of nature: the one held by peoples informed by the Bible, and the other held by peoples, generally called 'pagans', who were uninformed by it. These authors affirm that for 'pagans', whether they were Taoists, Stoic philosophers, worshippers of the Great Mother, or something else, nature was in some sense divine. It pulsed with mysterious life and was worthy of reverence. Because of this, it could never be treated contemptuously, or as merely an object for human use. It could never be scrutinized or manipulated in the manner required by modern science and technology. For Christians



and Jews, on the other hand, insist these authors, nature contained no such mysterious life. For the Judaeo-Christian doctrine of Creation required that nature be understood as a collection of non-divine artifacts, made by God but not in any way worthy of reverence. Biblical religion, therefore, undercut that pious attitude toward nature which held back the pagans from manipulating it at will, paving the way for the modern technological attitude. Further, these writers add, specific passages of the Old Testament, authoritative for Christians and Jews, elevated mankind to a new and divine stature; they taught that man was in the image of God, and consequently given dominion over all of the lesser creatures. Europeans understood such passages as a God-given licence to exploit, manipulate, suppress, and domineer over nature. In sum, the triumph of Judaeo-Christian over pagan religious teaching in Europe guaranteed that the West would become the bearer of the uniquely Biblical view of nature and human mastery.

The historical consequences of this Bible-based shift in world view were, according to this argument, the following. Initially, Christian missionaries destroyed the pagan religious awe for natural objects and phenomena, rendering it possible for the aggressive European peasants

of the Middle Ages to transform their wild continent into the home of a marvellous civilization. Next, the Judaeo-Christian understanding of Creation as a non-divine artifact prompted seventeenth-century thinkers to seek for the contrivances which drove the non-divine heavens, which quest produced the general laws of modern physics. Finally, Judaeo-Christian anthropocentrism urged post-Enlightenment Europe to apply the newly discovered laws of physics and chemistry to constrain nature and make it serve their needs and desires; such applications were manifest in the Industrial Revolution. The crucial events in the development of modern Western mastery, then, depended fundamentally upon the Biblical worldview implicit in Western Christianity and Judaism. Such is the essence of the scholarly argument under consideration.

Now it is significant that this argument, if valid, can be turned to two opposed ends, the glorification of Judaeo-Christian thinking or the humiliation of the same. For if the modern mastery of nature is understood to be a good thing, then a proof that it depended upon a Biblical worldview seems to be a proof that Biblical religion has been a blessing for mankind, whereas if the modern mastery of nature is understood as a disaster, any proof that the Biblical worldview is

responsible for that mastery amounts to a proof that Biblical religion has been a terrible curse. And it turns out in fact that the scholarly writers mentioned above, even as they present a common account of the connection between Christianity and the conquest of nature, are divided on this very point, whether the connection entails praise or blame for the triumph of the 'Biblical' over the 'pagan' worldview. One group of them (including, among others, Duhem, Jaki, Foster, Collingwood, Berdyaev, and Cox) tends to feature the bright side of human mastery: the discoveries of modern science, the advances of medicine, and the increased ability of mankind to control its own historical development. Another group of them (including, among others, White, Roszak, Toynbee, and Grant) tends to dwell on the dark side: the nuclear threat, environmental damage, and the forgetfulness of human values beyond manipulation and control. The former group likes to attribute modern enlightenment, comfort, health, and freedom to Christianity, and the darkness, suffering and slavery of ancient cultures to paganism; the latter group tends to blame the devastation, the violence, and the spiritual emptiness of the modern world upon the Bible's man-centred callousness toward nature, and alleges that our ancestors were less environmentally destructive and spiritually more balanced precisely

because their paganism contained a more organic, harmonious relation with the natural world.

Now it is the contention of this work that these attempts-- to elevate or denigrate either Judaeo-Christian or pagan religion because of its alleged connection or lack of connection with the modern conquest of nature-- are fundamentally flawed, because the account upon which they rest-- the one outlined above-- is untenable. As will be demonstrated below, the attempt to fit modern technological mastery over nature into a scheme of attitudes polarized as 'pagan' and 'Biblical' is seriously inadequate; it distorts the character of both pagan and Biblical thought about nature, and it overlooks the essential characteristics by which both pagan and Biblical attitudes concerning mastery differ from modern ones. It thus leads to misplaced praise and misplaced blame of the religious traditions involved, and to a faulty analysis of the character of contemporary technological mastery. And, in the present state of the world, when the problems posed by our technological prowess loom so large, and when the relevance of the great religious traditions to this situation is so earnestly inquired after, it is important not to accept faulty analyses and misplaced criticism.

The task of this work, then, is to refute the account above, to expose the roots of its errors, and to offer an alternative account of the relation of pagan, Biblical and modern thought on the mastery of nature which does more justice to the evidence and shows the modern predicament in a clearer light.

Of course, one does not refute a scholarly argument by refuting a summary of it, and the above description of the scholarly argument in question is only a summary. The hypothesis advanced by Foster, Jaki, Cox, White, and the others needs to be presented in its fullest and most articulate form before it can become a target for proper criticism. It also needs to be presented in its authors' own voices and accents. Therefore, the first task of this dissertation is to set forth the hypothesis concerning pagan, Biblical and modern thought on nature in full dress, quoting and explicating the individual authors with scholarly exactness.

The most convenient way of presenting the hypothesis is as a composite, that is, as a synthesis of the most convincing arguments of the various authors who affirm the significant components of the hypothesis. This is an idealizing procedure, it is true, since no single

author sets forth every possible link in the hypothesis, and since some of the authors establish some of the links in a rather unconvincing fashion. But idealizing the hypothesis has several advantages, both for the authors being criticized and for the critic. For the authors, it does the favour of displaying their strongest passages and omitting their weakest ones; it also builds their arguments into an structure which is more coherent theoretically than the one which many of them articulate. For the critic, it makes it possible to omit those peculiarities of each author which are not relevant to the understanding of the hypothesis as a whole, and it presents a clearer object for historical and philosophical analysis. Of course, important differences between the authors should not be swept under the rug, but they can be dealt with in qualifying statements and footnotes; the unity toward which all the authors manifestly tend can be shown without seriously distorting the intentions of any one author.

Since the authors themselves have not given their account a name, and since a name will be convenient for repeated references, it seems permissible to invent one. Because the account concerns the mastery of nature, it will hereafter be referred to as 'the mastery hypothesis'.

The mastery hypothesis, presented as a running commentary upon the words of its authors, the 'mastery writers', is set out in full in the following pages; after it, the plan of the present work will be explained.

### Barriers to Mastery in the 'Pagan' Conception of Nature

A fundamental distinction must be made, it is said, between 'pagan' and 'Biblical' conceptions of nature. The 'pagan' conception prevailed in the West (and in the rest of the world) throughout antiquity and well into the Middle Ages. It was only decisively broken during the upheavals of the Renaissance and Reformation. The 'Biblical' conception was found only among the Jews in antiquity, and, though formally transmitted to all of the Christian and Islamic peoples, did not begin to show its power until the later Middle Ages, and only fully manifested itself in the natural science of the seventeenth century and the industrial revolution of the eighteenth.

In the 'pagan' (or 'animist' or 'polytheist' or 'pantheist' or 'magical') view, nature is 'alive', 'divine', or 'sacred'. Natural things, like trees, rivers, and stars, are regarded as living, quasi-personal,

semi-divine or divine beings. 'Pagan' men therefore treated natural objects as they would treat gods, spirits or human beings, that is, as personalities capable of being persuaded or commanded, honoured or dishonoured, placated or outraged. Their intercourse with nature was thus always accompanied by words, gestures, or rituals indicating due attention to the spiritual status of the natural objects involved. A prayer of apology might be offered to the spirit of a tree about to be felled; a magical incantation might be hurled at a stubborn patch of unyielding soil; a ritual of thanksgiving might be performed for the obliging rain-clouds. In the words of American theologian Harvey Cox:<sup>1</sup>

Presecular man lives in an enchanted forest. Its glens and groves swarm with spirits. Its rocks and streams are alive with friendly or fiendish demons. Reality is charged with a magical power that erupts here and there to threaten or benefit man. Properly managed and utilized, this invisible energy can be supplicated, warded off, or channeled.

A similar account is found in the writings of Mediaeval historian Lynn White, jr.:<sup>2</sup>

Popular religion in antiquity was animistic. Every stream, every tree, every mountain contained a guardian spirit who had to be carefully propitiated before one put a mill in the stream, or cut the tree, or mined the mountain.

This 'pagan' view of nature, it is argued, was



bound to inhibit, and did in fact inhibit, the development of the mental attitude necessary for the understanding of the world through natural science and the manipulation of it through a subtle and penetrating technology. For natural science, as conceived today, requires gazing upon nature with an impersonal, detached eye. It requires men to look upon natural things-- the glorious heavenly bodies, the graceful sacred streams, the revered ancient oaks, the angry lightning, the treacherous sea, the merciless desert-- as merely 'objects'. And technology-- which coerces natural objects into human service by a mastery of the secret powers hidden within those objects and within nature generally-- involves an even greater expression of 'objectification'. It involves not merely the cold gaze of the analyst, which sees nature as a mere object, but the self-assertive will of the engineer, which works nature as if it were a machine. 'Paganism', which understood nature as teeming with wills and purposes different from, and often contrary to, those of human beings, could not tolerate the impudence implied in either science or technology. The 'pagan' resistance to the idea of mastering nature in thought and deed is well-expressed in the writing of the Russian philosopher Berdyaev:<sup>3</sup>

As long as man had found himself in communion with nature and had based his life upon mythology he could not raise himself above nature through an act

of apprehension by means of the natural sciences or technique. It is impossible to build railways, invent the telegraph or telephone, while living in fear of the demons. Thus, for man to be able to treat nature like a mechanism, it is necessary for the daemonic inspiration of nature and man's communion with it to have died out in the human consciousness.

### 'Animism' and the Failure of Greek Natural Science

Mindful of the scientific and philosophical achievement of the Greeks, one might think that the previous account of 'pagan' inhibitions regarding the scrutiny of nature would not apply to classical thought at its height. According to the mastery hypothesis, however, the Greek thinkers (in this context, primarily Socrates, Plato, Aristotle, and the Stoics), were little better off than their uneducated, nature-worshipping contemporaries. For, if they managed to rise above the cruder forms of 'animism', yet they retained a large part of the spirit of 'animism' in their contention that natural things had ends or purposes. They thought that all beings in nature, whether organic or inorganic, 'strove' toward their 'natural ends' as if they were alive. This view is articulated by M. B. Foster:<sup>4</sup>

It is the principle of Aristotle's philosophy of nature that natural objects are to be classed . . . with the animal and not with the artefact. Consequently the motion proper to a natural object will be determined by the kind

of object it is, and a knowledge of its specific nature will make possible the prediction of its movement. We have only to know the nature of fire in order to understand why the natural movement of fire is upwards, and the nature of earth in order to see that it must move downwards; an understanding of the nature of the celestial will explain why the celestial spheres exhibit a circular motion.

But this view of nature was antithetical to the view which grounded modern natural science, that is, the view that natural things are more like man-made objects, and that the principles of motion cannot be derived from the nature of the objects themselves, but only from more general and universal mechanical laws. This is again clearly expressed by Foster:<sup>5</sup>

But the fundamental principle of the modern science of mechanics, that the laws of motion are the same for all material objects, involves the denial that the motion of an object can be affected by the kind of object it is. This science again is possible only upon the assumption that the quantity of motion of a natural object is precisely commensurate with the force communicated to it. That is to say, its possibility presupposes that natural objects are in these respects to be classed with the artefact and not with the animal.

An equivalent statement regarding the tension between the 'pagan' and modern scientific worldviews is made by Theodore Roszak:<sup>6</sup>

What was most revolutionary about the [scientific] revolution was not the struggle with Christian religious psychology, but with its overlay of inherited Aristotelian concepts.

And what was the great obstacle that the pagan Aristotle posed? Simply that his study of nature preserved, if only as a weak residue, too much of the Old Gnosis, too much of the sense of nature alive and infused with purpose, nature aglow with seductively sensuous qualities. This was nature as it had been known in pagan worship-- philosophically intellectualized by Aristotle, yet nonetheless a nature that concealed divinity never far below the surface of appearances.

The 'pagan' view of nature did not end, as one might expect, with Christianity, for the great Christian theologians of the Middle Ages, such as Thomas Aquinas, received their understanding of nature from the Greeks, especially Aristotle. Thus, Mediaeval natural science remained stuck in the vocabulary of 'strivings' and 'natural ends', and was unable to arrive at a grasp of nature as a mechanism. An important particular example of this is the Mediaeval understanding of the heavens. Since Mediaeval natural science could not clearly shake off the ancient Greek notion that the heavens were 'divine'-- composed of a non-corruptible substance different from that of the earth, and hence bound by different laws of motion, that is, pure circular motion-- it could not arrive at the notion of a 'universe' in which Newton's laws held sway over earth and planets alike. The French physicist and historian of science Pierre Duhem described the obstacles to modern mechanical physics which kept

Mediaeval science in a 'pagan' state in the following way:<sup>7</sup>

Modern science, one may say, will be born the day when one will dare to proclaim the truth: the same mechanics, the same laws govern the celestial motions and the sublunary motions, the motion of the sun, the ebb and flow of the sea, the fall of bodies. That such an idea may possibly be conceived it was necessary that the stars should be removed from the divine rank where Antiquity had put them.

#### Heavenly Influences, Fatalism, and Circular Time

While all of the mastery writers assert that natural beings in general are conceived in 'pagan' thought to be alive, sacred, or divine, some of them single out the heavenly bodies in particular for special attention. The heavenly bodies, they say, were in most ancient cultures divine in a pre-eminent sense. The sun, the moon, the other planets, and the stars, by virtue of their brightness, their loftiness, their changelessness, their wondrous regularity, and their dominant position in the arrangement of the world, were conceived to be especially powerful and influential divinities, exerting themselves upon the atmospheric elements, the earth and seas, and the fortunes of nations and individuals. Further, since the movements of the heavenly bodies are more or less circular, and since the conjunctions of planets occur

according to predictable cycles, it was commonly believed, say these writers, that events in the lower world, including the course of human civilization, occurred in cycles. The course of time, then, was conceived as cyclical and repetitive rather than linear and progressive; civilizations did not believe that they could accomplish anything very new because the range of freedom of human beings was drastically limited by the cyclical regularity of the heavens. Nations rose to prominence and fell from prominence with their stars; superhuman celestial powers guaranteed that all 'progress' would be ephemeral and unreliable.

The notion of the influence of the heavenly bodies reached its zenith in ancient astrology, which, these writers seem to say, asserted not merely that the stars influenced the lower world, but that they completely determined it. Ancient astrology, then, was fatalistic, and generated the ultimate in passive, anti-historical attitudes. If the future of a culture, or of human civilization in general, was determined by superhuman astral forces, then no action by man could alter it. No moral decision, no political innovation, no new technical foray against nature could preserve an ancient nation for even one minute beyond its allotted span. Such a belief,

directly antithetical to the modern history-making spirit, was bound to dull the human sense of freedom and initiative, and to dull the appetite of ancient cultures for scientific discovery, innovation in the arts, and novel forms of social co-operation-- all of which are essential components in the corporate conquest of mankind over nature. Therefore, in civilizations such as Babylon, in which astrology held sway, human beings adopted the attitude of conformity, attempting to live within the natural and political patterns dictated by the heavens rather than to overrule or alter them. They accepted the given social order as ordained by heaven, and they tried to harmonize with the natural order rather than to master it.

The Benedictine historian of science Stanley Jaki affirms the ancient connection between the heavens and human life in this way:<sup>8</sup>

Changes in human life, in society, and in the immediate physical surroundings of man were naturally pictured as the effects of the periodic clashes of large-scale forces and phenomena in nature. Most of these, the wind, the rain, the clouds, the daylight, and the night were readily connected with the heavens. The observation of the heavens seemed, therefore, to be the logical clue for learning something about the course of events on earth.

Jaki continues with the argument that, since the motions

of the heavenly bodies are endlessly cyclic, and since human fortunes are governed by these cycles, human 'history' is swallowed up in the eternally recurring cycles of the cosmos; 'pagan' man can never make a genuine beginning and build upon that beginning to establish an open-ended progression of science, technology, and human freedom:<sup>9</sup>

The ultimate motivation of their [Babylonian] preoccupation with the phenomena of the heavens came from that animistic, cyclic conception of the world in the same way as the observation of eclipses and the investigation of the entrails of animals were as many methods for them to divine ways and means for assimilating themselves with the cosmic life repeating itself for eternity.

Similarly, Harvey Cox argues that any notion of historical progress was bound to be overwhelmed by the sense that civilization was constrained by the heavenly influence:<sup>10</sup>

The Sumerian, Egyptian, and Babylonian religious systems . . . [relied] for their cohesion on the integral relation between man and the cosmos. . . . the predictable revolution of the stars and the commanding presence of the sun and moon provided the framework by which the society was held together. . . . History was subsumed under cosmology . . .

And he refers specifically to the dampening effects of astrological determinism upon the scientific scrutiny of the stars and planets:<sup>11</sup>

However highly developed a culture's powers of observation, however refined its equipment for



measuring, no real scientific breakthrough is possible until man can face the natural world unafraid. Wherever nature is perceived . . . as an embodiment of the divine, science as we know it is precluded. This is evident in Assyrian culture, where an uncanny accuracy in astronomical observation developed, but in which the heavenly bodies were still experienced as the determinants of human destiny; hence no real scientific astronomy emerged.

According to what has been said so far, the mastery writers affirm that the 'pagans' were: first, extremely deferent toward nature and inhibited from fully scrutinizing or manipulating it for human purposes; second, unable to develop a proper science of physics due to their understanding of nature as 'living'; third, without a sense of human freedom from natural forces and determinisms which is necessary for scientific, technical, and social progress, without a sense that the world is open for human history-making.

How was it that 'pagan' attitudes toward nature disappeared, to be replaced by modern ones? What generated such a revolutionary change? According to the mastery hypothesis, it was a set of ideas derived from Judaic and Christian sources, especially the Old Testament. The way in which these Judaeo-Christian notions altered man's fundamental stance toward nature is explained by the mastery writers in the following manner.

### Biblical 'Desacralization' of Nature

In contrast with the 'pagan' view of nature is the 'Biblical' (or 'Hebraic' or 'Judaic' or 'Judaeo-Christian' or 'Christian') view. In the 'Biblical' account of nature, says the mastery hypothesis, the world is not 'sacred' or 'divine' or 'alive'. The 'Biblical' doctrine of Creation, articulated in the Old Testament (that is, the Hebrew Bible), teaches that nothing is divine except God, and that all other things are non-divine products of his creative activity, unworthy of worship or reverence. The non-divinity of nature was an essential part of Judaic monotheism, which above all opposed idolatry, the worship of anything other than the one God (Exodus 20; Deuteronomy 4). Further, the 'Biblical' notion of nature is that nature is, on the whole, 'inanimate'. Only man and the animals are alive; everything else must be regarded as inert matter. There are no daimones or genii dwelling in the bushes, shrubs, and streams. Natural things have no inner life. They are simply objects. Lynn White, taking a tree as a typical natural object, and referring to the 'Biblical' rejection of the notion of 'sacred groves', and says bluntly: "To a Christian a tree can be no more than a physical fact".<sup>12</sup>

The objectification of nature which for the mastery writers follows from the 'Biblical' teaching is called by them the 'desacralization' (or 'de-divinization' or 'de-animation' or 'disenchantment') of nature. 'Desacralization', say the mastery writers, laid the basis for both the scientific understanding of nature and the technological manipulation of nature.

#### 'Desacralization' and Modern Physics

According to the mastery hypothesis, the modern, scientific understanding of nature was made possible by 'de-sacralization' for two reasons. First, a 'desacralized' world no longer contains gods or spirits which might be offended by the scientist's cold gaze or by his analytical, experimental forays into the inner workings of things. Second, and more important, 'desacralization' implied or at least made possible a mechanical understanding of nature and its workings. For natural objects, not being 'alive' as the 'pagans' thought, were reduced in stature to become mere artifacts. And if there is an apparent order in the behaviour of

these artifacts, it cannot come from their lifeless, spiritless, interiors; it must be imposed upon them by outside forces. Those forces, Western thinkers came to see, were the laws of nature established by God.

The first of the above two points is made well by Collingwood. In his Essay on Metaphysics and his Idea of Nature, Collingwood expresses his conviction that "the new physics of the seventeenth century" was derived from "the body of Christian theology";<sup>13</sup> in An Autobiography he makes explicit the Baconian attitude of this new 'Christian' physics, an attitude which enabled early modern man to move from being a mere spectator of nature (which is the appropriate stance if nature is filled with gods worthy of reverence) to becoming its interrogator:<sup>14</sup>

Soon after the beginning of that [seventeenth] century, a number of intelligent people in western Europe began to see in a settled and steady manner . . . that the problems which ever since the time of early Greek philosophy had gone by the collective name of 'physics' were capable of being restated in a shape in which, with the double weapon of experiment and mathematics, once could now solve them. What was called Nature, they saw, had henceforth no secrets from man; only riddles which he had learnt the trick of answering. Or, more accurately, Nature was no longer a Sphinx asking man riddles; it was man that did the asking, and Nature, now, that he put to the torture until she gave him the answer to his questions.

The second of the above points involves the mastery writers in a discussion of the motion of the planets. According to the hypothesis, whereas for 'pagan' man the planets were divine, intelligent beings following their circular paths out of their inward striving for perfect motion, for 'Biblical' man the planets had to be interpreted as non-living, non-divine masses, moving in their circular paths (elliptical, as it proved) as a result of the will of God. And, because the planets, like everything upon earth, were non-divine, there was no reason to suppose that their motions were governed by laws any different from those that governed earthly motions. Thus, the laws which governed the operation of a clock, the path of a projectile, and the motion of the planets could all be interpreted in a 'Christian' way as expressions of the order imposed upon the universe by the will of the Creator. The mastery writers therefore claim that modern (i.e., seventeenth-century) physics and astronomy were built upon a 'Biblical' insight.<sup>15</sup>

According to the mastery writers, this 'Biblical' understanding of nature as 'law-bound' did not fully triumph over the 'pagan' idea of nature as 'alive' until the time of Newton, but it had begun to make headway once certain later Mediaeval thinkers realized the scientific

implications of Creation doctrine. Jaki, following Duhem, locates the crucial shift of theological opinion-- away from Greek ideas and toward 'Biblical' ones-- in the thirteenth-century attack upon certain Scholastic doctrines:<sup>16</sup> (emphasis added)

The dramatic event took place on March 7, 1277, when a list of 219 propositions was condemned by Etienne Tempier, bishop of Paris. . . . What ultimately was at stake was man's rather newly acquired awareness of the contingency of the world with respect to a transcendental Creator, source of all rationality and lawfulness in the macrocosmos [heavens] as well as in the microcosmos [earth]. . . .

The vindication of the Creator's attributes opened up far reaching possibilities for the interpretation of the cosmos. . . . the rejection of the superlunary material [the matter of the heavenly bodies] as animated, incorruptible, and eternal (Prop. 31-32); the admission of the possibility of a rectilinear motion for celestial bodies (Prop. 66); the rejection of their actual motion as if sparked by animal desire (Prop. 73); the rejection of the celestial orbs as organs equivalent to the eyes and ears of the human body though not as parts of a celestial machinery (Prop. 75); . . . all these decisions followed intimately from the effort to safeguard the abilities and exclusive rights of the Creator [from the consequences of pagan theology].

The mastery writers concede, of course, that the revolt of Bishop Tempier against the 'pagan' understanding of nature was to take four centuries to bear fruit; but when it did, they say, it produced the mathematically ordered mechanical universe of Galileo, Kepler, and Newton. Thus, the 'Christian' doctrine of Creation,

rooted in the 'Judaic' teaching of the Old Testament, yielded modern physics; and modern physics, while being itself a mastery over nature of an intellectual kind, was of course eventually to be the basis of a vast extension of mastery over nature in a more practical sense, since it (along with its sister science, chemistry) laid the theoretical groundwork for modern technology.

### 'Desacralization' and the Rise of Exploitative Attitudes

According to the hypothesis, if 'desacralization' led to the modern science of nature, it by the same path had to lead to the modern technological manipulation of nature; for, as it removed the inhibitions from scrutinizing and prying into the causes of natural things, it eliminated the barriers to making those things serve human interests. Once the 'holiness' or 'divinity' or 'life' was removed from trees, rivers, mountains, the skies, plants, animals, and all other things, there was no longer any natural sentiment to prevent men from attempting to manipulate, dominate, and subjugate the universe in every imaginable way. In the words of Arnold Toynbee:<sup>17</sup>

Man was divorced from his natural environment, which was divested of its former aura of divinity. Man was licensed to exploit an environment that was no longer sacrosanct. The

salutary respect and awe with which man had originally regarded his environment was thus dispelled by Judaic monotheism in the versions of its Israelite originators and of Christians and Muslims.

This radical diminishment of esteem for nature was an essential part of all the Biblically-based religions, but most markedly displayed in Christianity. Christians enjoyed expressing their contempt quite dramatically, according to Lynn White:<sup>18</sup>

To a Christian a tree can be no more than a physical fact. The whole concept of the sacred grove is alien to Christianity and to the ethos of the West. For nearly two millennia Christian missionaries have been chopping down sacred groves which are idolatrous because they assume spirit in nature.

#### 'Dominion' in the 'Image of God' and Human Mastery

If the 'Biblical' idea of 'desacralization' paved the way for modern natural science and a manipulative, utilitarian view toward nature, another 'Biblical' idea, that of 'dominion', pushed the West fully onto the path. For, say the mastery writers, several Biblical passages preach 'dominion' in no uncertain terms: in Genesis 1 man is told that he is "in the image of God", and that he is to "rule" over all the living creatures and "subdue" the earth; in Genesis 2 he is given the power to name all the animals; in Genesis 9 he is given the right to kill and



eat the animals; in Psalm 8 he is described as but "a little lower than the angels" (KJV), and monarch over all living things. The Bible thus, in very clear statements, widens the gap between man and nature, exalting man and emphasizing his sovereign freedom to use nature as he sees fit. The Bible, then, according to the hypothesis, taught Western civilization its attitude of godlike superiority over everything natural, and justified even the harshest methods of control and manipulation. Thus, the Japanese Buddhist scholar D. T. Suzuki understood the Western tendency to set mankind over and against nature as rooted in the Biblical teaching expounded in Genesis 1:<sup>19</sup>

The Nature-Man dichotomy issues, as I think, from the Biblical account in which the creator is said to have given mankind the power to dominate over all creation. It is fundamentally due to this story that the Western people talk so much about conquering Nature. When they invent a flying machine, they say they have conquered the air; when they climb up to the top of Mt. Everest, they make the loud announcement that they have succeeded in conquering the mountain.

Arguing in a similar manner from Genesis 1 and 2, Lynn White writes:<sup>20</sup>

. . . Christianity inherited from Judaism . . . a striking story of creation. By gradual stages a loving and all-powerful God had created light and darkness, the heavenly bodies, the earth and all its plants, animals, birds, and fishes. Finally, God had created Adam . . . Man named all the animals, thus establishing his dominion over them. God planned all of this explicitly for man's benefit and rule: no item in the physical

creation had any purpose save to serve man's purposes. And, though man's body is made of clay, he is not simply part of nature: he is made in God's image.

Especially in its Western form, Christianity is the most anthropocentric religion the world has seen. . . . Man shares, in great measure, God's transcendence of nature. Christianity, in absolute contrast to ancient paganism and Asia's religions . . . not only established a dualism of man and nature but also insisted that it is God's will that man exploit nature for his proper ends.

Michael Foster, whose view on desacralization and mechanistic physics has already been quoted, sees also a direct connection between the modern Western attitude of 'dominion' and specific texts of the Old Testament:<sup>21</sup>

There is a difference between ancient and modern attitudes to nature. On the ancient view, man is a part of nature, and his true destiny is to conform himself to it, "to live according to nature". Such a life was the end to be achieved by philosophy, and in a broad sense by science; the two were not very sharply distinguished. . . .

In modern times science has acquired a different aim, that of mastery over nature. This new aim is expressed by the prophets of the new era, Bacon and Descartes. Bacon in his Novum Organum speaks of "the interpretation of nature and the dominion of man" (De Interpretatione Naturae et Regno Hominis). Descartes claims that it is possible to introduce a new physics which would make men "lords and possessors of nature" (Discourse on Method, part VI). This practical direction of modern science is connected with the fact that it gave birth to a technology and hence to the scientific transformation of the world. . . .

This attitude of man to nature, characteristic of modern science and characteristically un-Greek, has a Biblical source. In Genesis 1.28 man is commanded "replenish the earth and subdue it". In

Psalm 8 the psalmist says "Thou madest him [man] to have dominion over the works of thy hands, thou hast put all things under his feet".

The Reformation: 'Biblical' Liberation Toward Mastery

After reading the account above, one might well ask why, if 'Biblical' teaching about 'desacralizing' and 'dominating' nature was inherent in Christianity from the beginning, did modern science and technology not make their appearance shortly after Constantine, rather than between the late Middle Ages and the seventeenth century. The mastery hypothesis has two ready answers. The first is that the 'Biblical' teaching had a delayed influence-- on the popular level, because despite the official status of Christian theology, missionaries needed several centuries to extirpate the folk 'animism' of the pagani; on the intellectual level, because Western theologians rather unwittingly attempted to formulate Biblical ideas about man and nature in terms of Greek philosophy, which contained equivalent 'animist' notions.<sup>22</sup> The second answer, common especially among the Protestant mastery writers, is that the full impact of 'Biblical' thought could never be expressed in Catholic Christianity, which was inherently half-pagan, and so science and technology had to await the arrival of Protestantism. The first

answer is almost implied in the hypothesis itself, and so is readily understandable; the second answer, however, requires some elucidation.

The role of Protestantism in generating modern mastering attitudes is central to the account of Canadian philosopher George Grant. For Grant, Protestant theology was the link between the Biblical understanding of nature and the new Baconian science. It turned the English-speaking peoples away from Catholic and classical traditions of understanding the natural and the social order. Drawing upon "the hidden depths of Biblical religion",<sup>23</sup> Protestantism swept aside the great Greek-Christian synthesis of the Middle Ages and inaugurated a new, dynamic technological civilization. That civilization was most fully realized, not in England itself, in which traces of the old civilization could not be completely erased, but in North America, which lay as a virgin continent waiting to be subdued by English-speakers of the new spirit, and once mastered became the incarnation of that spirit:<sup>24</sup>

Greece lay behind Europeans as a first presence; it has not so lain for us. It was for them primal in the sense that in its perfected statements educated Europeans found the way that things are. The Greek writings bared a knowledge of the human and non-human things which could be grasped as firmness by the Europeans for the making of their own lives

and cities. Most important, Plato and Aristotle presented contemplation as the height for man. . . .

To say this does not deny that there was for Europeans another primal-- Christianity. Indeed, the meeting of these two in men's lives, the manifold attempts to see them as one, to bring together contemplation and charity . . . formed the chief tension out of which Europe was shaped . . .

For us [in North America] the primal . . . was the meeting of the alien and yet conquerable land with English-speaking Protestants . . . the Europeanness which remained for us was of a special kind because Calvinist Protestantism was itself a break in Europe-- a turning away from the Greeks in the name of what was found in the Bible. . . .

To understand North America it is necessary to understand those Protestants and to understand particularly their connection to the new physical and moral science which were coming into being in Europe. Why was it that the new physical and moral sciences, although not initiated by Calvinists, found a particularly ready acceptance among them, especially among the Dutch and the English?

. . . neither Weber nor the Marxists were concerned with the deeper level of the matter, which is the connection between Protestant theology and the new sciences. For example, more fundamental than the practical connections between capitalism, the parliamentary party and Protestantism, lies the fact that the refugee Protestant theologians from the continent espoused so immediately the Baconian account of science and worked to make it influential in England.

Now when Calvinism and the pioneering moment have both gone, that primal still shapes us. It shapes us above all as the omnipresence of that practicality which trusts in technology to create the rationalised kingdom of man. . . . Those unreflective, and unflinching wills, without which technological society cannot exist, were shaped from the crucible of pioneering Protestant liberalism. . . .

Concurring with Grant's account in essentials is that of American sociologist Peter Berger:<sup>25</sup>

If compared with the "fullness" of the Catholic universe, Protestantism appears as a radical truncation, a reduction to "essentials" at the expense of a vast wealth of religious contents. This is especially true of the Calvinist version of Protestantism, but to a considerable degree the same may be said of the Lutheran and even the Anglican Reformations. . . . If we look at these two religious constellations more carefully . . . Protestantism may be described in terms of an immense shrinkage in the scope of the sacred in reality, as compared with its Catholic adversary. The sacramental apparatus is reduced to a minimum and, even there, divested of its more numinous qualities. . . . The Protestant believer no longer lives in a world ongoingly penetrated by sacred beings and forces. Reality is polarized between a radically transcendent divinity and a radically "fallen" humanity . . . Between them lies an altogether "natural" universe, God's creation to be sure, but in itself bereft of numinosity. . . .

The Catholic lives in a world in which the sacred is mediated to him through a variety of channels . . . Protestantism abolished most of these mediations. It broke the continuity, cut the umbilical cord between heaven and earth, and thereby threw man back upon himself in a historically unprecedented manner. . . . In doing this . . . it narrowed man's relationship to the sacred to the one exceedingly narrow channel that it called God's word . . . It needed only the cutting of this one narrow channel of mediation, though to open the floodgates of secularization. . . . reality then became amenable to the systematic, rational penetration, both in thought and in activity, which we associate with modern science and technology. A sky empty of angels becomes open to the intervention of the astronomer and, eventually, of the astronaut.

. . . the question inevitably suggests itself as to whether the secularizing potency of Protestantism was a novum or whether it rather had its roots in earlier elements of the Biblical tradition. We

would contend that the latter answer is the correct one . . . we would maintain that the "disenchantment of the world" begins in the Old Testament.

The last two paragraphs quoted from Berger, which lead back from the contemporary conquest of space, through the secularizing potential inherent in Protestantism, to the thought of the Old Testament, seem to supply a suitable ending to the detailed exposition of the mastery hypothesis.

In sum, this is the essence of the mastery hypothesis: Christian civilization, pregnant with the Old Testament notion of an inanimate nature and man's power over it, swept away pagan thought and produced, possibly as early as the later Middle Ages and certainly after the Protestant Reformation, the modern understanding of nature as neutral matter awaiting the command of man.

#### The Moral of the Hypothesis for the Mastery Writers

In the above articulation of the mastery hypothesis, the historical connections alleged by the mastery writers were deliberately distilled, in the interests of clear historical analysis, from their evaluative contexts. It must not be forgotten, however,

that almost all of the mastery writers have quite pronounced opinions on the goodness or badness of the historical development they have outlined. Indeed, for many of the mastery writers, the desire to make public these pronounced opinions seems to be of greater concern than the presentation of a detailed and coherent historical hypothesis. Be that as it may, it is necessary to consider the mastery writers' evaluative statements. As stated earlier (see p. 6 above), these evaluations vary widely. The variations are for the most part correlated with two factors: the writer's religious tradition, and the writer's critical response to modernity in general, including both its interior aspect of human freedom and its exterior aspect of mastery over nature.

For most of the Christian writers, the connection is seen as in the main laudable, because it shows that Christianity hardly hindered, but in fact originated, the Western tradition of natural science and the utilization of nature for the relief of the human estate. For most of the Christian writers, also, scientific and technical progress are connected with the modern notion that man is a 'history-making' or 'dynamic' being, moving forward upon a time-line which is both 'linear' and 'progressive'. The scientific mastery of nature, then, is a manifestation of



human freedom, is proof that man is not bound by 'cyclical' concepts of time or 'pagan' notions of fate, is evidence of a hopeful rather than a despairing stance toward worldly existence. Christianity permitted, in fact encouraged, man to hope that he could remake his own environment, natural and social, for the better. This positive evaluation of human mastery is expressed by Berdyaev, Cox, Foster, Collingwood, Duhem, Jaki, Baillie and many others. Of the state of 'pagan' man, Berdyaev writes:<sup>26</sup>

. . . The fallen human spirit had ceased to dominate nature and had of its own free will become the slave and indivisible part of nature in a prehistorical world. Man's dependence on nature was synonymous with his union with it. The pagan world was peopled with demons and man was powerless to dominate either them or the natural cycle. Man's image therefore corresponded not with the highest divine but the base nature peopled with elemental spirits. Man adapted himself to the forms of this base nature, which had enslaved him and whose chains he could not break of his own free will.

Berdyaev's dark picture of paganism is echoed, as it were, by Jaki, who argues that not even the greatest ancient civilizations could achieve true science, true mastery of nature, true human freedom or dignity. One by one, Jaki denigrates Babylon, India, and China:<sup>27</sup>

(A) . . . The promising creativity of Hammurabi's age was not followed up in later times either in literature, or in arts, or in legislation, let alone in matters of scientific learning. . . . The

basic reason for this failure [is that] . . . the educated and literate classes in ancient Mesopotamia . . . remained trapped in the disabling sterility of a world view in which not reason ruled, but hostile wilfulness . . . Believing as they did that they were part of a huge, animistic, cosmic struggle between chaos and order, the final outcome appeared to them unpredictable and basically dubious. . . . Not that they did not wish to influence nature, or rather its personalized forces, the gods. The animistic, cyclic world view made it, however, impossible for them to realize that to influence or to control nature one had to be able to predict accurately its future course. They lacked faith in the possibility of such a prediction as it implied the notion of an order free from the whims of animistic forces . . .

(B) . . . The case of India shows that infatuation with a cyclo-animistic and pantheistic concept of the world put a strait jacket on thought and will alike. Contentions about the psychological and instructional benefits of the Indian preoccupation with the wheel of cycles can hardly conceal the fact that the wheel kept in rotation an ominous and debilitating treadmill. Escape from it was well-nigh impossible either emotionally or conceptually. . . .

(C) It should not be difficult to see the striking similarity between the mental lull generated by a belief in a universe revolving for ever in cycles, and the passivity of mind, pleasant as it may be, induced by the organismic conception of the universe. The fusion of these two can only undermine any budding intellectual enterprise along scientific lines. The organismic concept of the world . . . invariably fosters a state of mind dominated by a nostalgic longing for the primitive golden age, with its idyllic settings in which everything takes place in an effortless way. In that dreamlike condition of spontaneousness men live off nature without disturbing it, and carry out their social propensities without the sense of constraint due to authorities and laws.

A classic description of . . . that idyllic, organismic order of things, persons, and events is given in the writings of Pao Ching-Yen . . . he

evokes the perfect conditions of old, where everybody enjoyed a carefree existence. It was a golden age undisturbed by cultural efforts. The face of nature was not ruined by channels, roads, and bridges. There was universal peace as people were uninhibited, uncompetitive, and unconcerned about either honour or shame. Their life was pleasant but certainly uneventful, unfettered by ambitions . . . In other words, they forgot themselves in the enjoyment of the moment eschewing . . . [any] cultural or intellectual pursuit.

Jaki concludes from all of this that scientific, rational culture is a blessing of Christianity:<sup>28</sup>

All great cultures that witnessed a stillbirth of science within their ambience have one major feature in common. They all were dominated by a pantheistic concept of the universe going through eternal cycles. By contrast, the only viable birth of science took place in a culture for which the world was a created, contingent entity. . . . The present and past of scientific history tell the very same lesson. It is the indispensability of a firm faith in the only lasting source of rationality and confidence, the Maker of heaven and earth, of all things visible and invisible.

In this judgment he is confirmed by Berdyaev:<sup>29</sup>

The greatest contribution of Christianity, although it is not fully recognized by the Christian world, consisted in that it liberated man from the power of the baser elemental nature and demons. . . . Christianity alone restored the spiritual freedom of which man had been deprived by the power of the demons, the natural spirits and elemental forces in the pre-Christian world . . .

. . . . .

. . . The struggle against the natural elements therefore became an essential part of Christianity. It gave rise to the Christian dualism of spirit and nature. . . . The dynamism of history would be impossible without the opposition between the

active subject and the objective natural environment against which he struggles. Accordingly, those periods of history in which the subject is entirely dominated by the environment do not favour historical dynamism.

In direct opposition to Berdyaev and Jaki are the non-Christian and anti-Christian proponents of the mastery hypothesis. They regard the 'Biblical' teaching about human mastery over nature as a terrible error which has caused untold sufferings for both human and non-human beings, and they look upon the Judaeo-Christian tradition with suspicion or outright hostility. Some of these critics are from non-Western cultures. Two Japanese thinkers, D. T. Suzuki and Daisaku Ikeda, understand the peculiar character of the Western teaching about nature from the point of view of their Oriental religious traditions, primarily Buddhist, which regard nature in a much less aggressive way. Also, perhaps, their understanding of the modern West's mastery over nature is coloured (not unreasonably) by the terrifying demonstration of that mastery made to the civilian inhabitants of Hiroshima and Nagasaki in 1945. Suzuki says:<sup>30</sup>

But as far as the biblical account is concerned, Man was made in God's image and Nature to be dominated over by Man. And this idea is the real beginning of human tragedy. I wish to ask if it is

the right way of thinking-- this idea of domination. For when the idea of power which is domination comes in, all kinds of struggle are bound to take place, and as this struggle is always ego-centered, its outcome is inevitably tragic and horrifying . . .

It is not only Buddhists victimized by the technological mastery of the West, however, who condemn 'Biblical' religion because of its technological connections. In the very heart of the modern West, in dynamic, progressive, North America, there are equally outspoken critics. Landscape architect Ian McHarg writes:<sup>31</sup>

. . . the Biblical creation story of the first chapter of Genesis, the source of the most generally accepted description of man's role and powers . . . in its insistence upon dominion and subjugation of nature, encourages the most exploitative and destructive instincts in man rather than those that are deferential and creative. Indeed, if one seeks license for those who would increase radioactivity, create canals and harbors with atomic bombs, employ poisons without constraint, or give consent to the bulldozer mentality, there could be no better injunction than this text. Here can be found the sanction and injunction to conquer nature-- the enemy, the threat to Jehovah. . . .

In times long past, when man represented no significant power to change nature, it mattered little to the world what view he held. Today, when he has emerged as potentially the most destructive force in nature and its greatest exploiter, it matters very much indeed. One looks to see whether with the acquisition of knowledge and powers the western attitudes to nature and to man in nature have changed. But for all of modern science it is still pre-Copernican man whom we confront. He retains the same implicit view of exclusive

divinity, man apart from nature, dominant, exhorted to subdue the earth-- be he Jew, Christian, or agnostic.

Yet surely this is an ancient deformity, an old bile of vengeance that we can no longer tolerate.

McHarg's criticism of the conquest of nature, motivated primarily by ecological and aesthetic concerns, is supplemented by the arguments of Theodore Roszak, an intellectual historian who brings to the case an anti-Christian, neo-pagan conception of religious and social life. Roszak's project has been to restore what he calls the "sacramental consciousness": the capacity of the human mind to perceive divinity through nature. Opposed to the sacramental consciousness is "single vision", which for Roszak is the world-view animating most of the projects and activities of modern Western man. Single vision is the kind of seeing which turns everything into dead matter in motion, which analyzes everything that happens, whether in nature or culture, into mechanistic elements and principles. Single vision is the modern disease; it blights both our environment and our political life; it is the sworn enemy of the sacramental consciousness and hence of all true religiosity.

For Roszak, as for many of the Christian mastery writers, the peculiar mastering and history-making

attitudes of Western culture can be traced back to Baconianism, which in turn is a product of a Protestant animus against paganism, which in turn is rooted in Christian Creation doctrine and ultimately in the Hebraic thought of the Old Testament. But whereas for Foster, Cox, and others this history is to the credit of Christianity, for Roszak it is both necessary and sufficient reason for rejecting Christianity:<sup>32</sup>

. . . As a category of religious thought, idolatry unfolds peculiarly out of the Jewish religious sensibility. In no respect is Judaism more unique than in its uncompromising insistence on God's unity, invisibility, and transcendence. It is the first commandment imposed upon the nation: that God should not be idolized, nor any idol (whether man-made or natural object) be deified. Christianity carries forward the same hot intolerance for nature worship and the pagan use of imagery. In Protestantism especially, hostility toward the slightest idolatrous inclination becomes obsessive. . . .

It remained for the Protestant Reformation to bring iconoclast Christianity to its fever pitch of intensity. So zealous has been the Protestant crusade to purify itself of what it took to be "accursed idolatry" that one feels impelled to conclude that we are dealing here not simply with a divergent interpretation of Christian doctrine but with a strange new stage in the history of human consciousness. Protestantism revised Christian orthodoxy because the experience of its founders and followers had shifted into a radically different key from that of their Catholic rivals. Their sensibility harked back to the desert prophets of Israel. In them we find the same intolerance for sensuous imagery and magic, the same fanatical determination to segregate the sacred from the profane that the two might at no point touch. It is an event of unparalleled importance that this old prophetic animus against

magic should be reborn in a society as expansively energetic and as technologically proficient as Western Europe in the age of discoveries. For now, in its search for a purified Christianity, Protestantism carried the desacralization of nature to its annihilating extreme, and so conceived a world into which the extraordinary dynamism of the west could flow freely and aggressively to work its will.

But what becomes of a world purged of its sacramental capacities? It dies the death of the spirit. It may retain for some its pleasing aesthetic surface, but that is of little significance. Beauty cut loose of its sacramental base is a decadent pleasure, and a vulnerable one. For most, the desacralized world is doomed to become an obstacle inviting conquest, a mere object. Like the animal or the slave who is understood to have no soul, it becomes a thing of subhuman status to be worked, used up, exploited. . . .

. . . And has this not become our predominant way of viewing the world: as so much raw material there but to manure the growth of economies? Today, when "realistic" people look at nature around them-- mountains, forests, lakes, rivers-- what is it they see? Not divine epiphanies, but cash values, investments, potential contributions to the GNP, great glowing heaps of money . . .

The negative evaluation of Suzuki, McHarg and Roszak is shared, for the most part, by Arnold Toynbee and Lynn White. Though the latter writers argue for a 'minority tradition' within Christianity of a more harmonious, quasi-personal relation of man to nature (e.g., in the teaching and life of Francis of Assisi),<sup>33</sup> they contend, with the writers above, that Judaism and Christianity as these have commonly been understood by



their adherents are fundamentally unsuited to the proper appreciation and preservation of nature. Therefore, Judaism and Christianity as traditions remain blameworthy. White is himself not hostile to Christianity per se, since he declares himself "a churchman",<sup>34</sup> but according to his position he can retain loyalty for Christianity only by jettisoning what he himself considers to be central parts of the tradition, such as a 'de-animated' nature and the story of 'dominion' in Genesis 1.

There are still other stances. Peter Berger remains officially neutral; he refuses, as a sociologist, to evaluate the 'Biblical' roots of the modern attitude to nature; he is content merely to affirm them:<sup>35</sup>

The term "secularization" refers to empirically available processes of great importance in modern Western history. Whether these processes are to be deplored or welcomed is, of course, irrelevant within the universe of discourse of the historian or the sociologist. It is possible, actually without too great an effort, to describe the empirical phenomenon without taking up an evaluative stance. It is also possible to inquire into its historical origins, including its historical connection with Christianity, without asserting that this represents either a fulfillment or a degeneration of the latter. This point should be particularly stressed in view of the current discussion among theologians.

In a unique evaluation which combines elements of all the above assessments, George Grant writes simultaneously as a

Christian, a critic of technological mastery, and as a non-apologetic expositor of the history of ideas. For him, as for Berger, it is important to treat the relation between the Bible and modern mastering attitudes with a certain degree of scholarly detachment, in order to fathom that relation correctly and see the modern world exactly as it is. Yet, he also feels compelled to grope toward an evaluation of the relation. This is difficult for him, however, because he fits into neither 'camp' of evaluation. He is like Foster, Jaki, and others in affirming the truth of Christianity, but he rejects their nearly unqualified praise of modern mastery and freedom; on the other hand, he is like Roszak, Suzuki, and others in his criticism of the West, but cannot join them insofar as they attack the West's loyalty to Christianity. Grant's recognition of his own perplexity, and of the difficulty of coming to grips with technological mastery for any Christian, can be seen in this passage:<sup>36</sup>

. . . our need is to think through modernity to its very foundations . . . to what extent is modern technological society connected to, and a product of, the western interpretation of Christianity? This is very hard for Christians to ask, because it may seem to bring into question our fundamental loyalty to Christianity itself. It was an easy question to face when western society appeared an unequivocal triumph. Then one could simply say: look at what Christianity is responsible for. But now that modernity appears, not only the greatness of its achievements but in its ambiguities, it is a more difficult question to face. We may easily

refuse to try to fathom the relation between modernity and western Christianity, because we may think such a fathoming may put in question what is most dear. But that is not the point. What we are called to do is to think through how the western interpretation of the Bible was responsible not only for the greatness of modernity, but also for what is frightening in it.

As a summary of the foregoing discussion, one can say the following. The mastery hypothesis comprises two distinct elements, the first a historical argument connecting modern technological mastery with Biblical thought, and the second a widely varied set of responses to this fact. A simplified version of these responses can be used to group the mastery writers, thus: pro-Christian and pro-mastery (Berdyayev, Duhem, Jaki, Collingwood); pro-Protestant and pro-mastery (Cox, Foster, Baillie, Hooykaas, and others); anti-Christian and anti-mastery (Roszak, Suzuki, Ikeda); anti-mainstream Christian and partly anti-mastery (White, presumably Toynbee and McHarg); apparently neutral (Berger, Forbes); and pro-Christian and considerably anti-technological (Grant).

The fact that the same historical analysis should be compatible with several different personal attitudes is not, in the light of the previous discussion, surprising. The authors have differing evaluations of the impact of

science, technology, and the mastery of nature upon the modern world, and also differing religious loyalties, both within and without the Christian tradition. One thing is clear, however: a hypothesis which can be found in the works of agnostic, Buddhist, Orthodox, Catholic, and Protestant writers, who come from French, Hungarian, Russian, American, British, and Canadian backgrounds, and whose fields of expertise include theology, philosophy, history, and sociology, has some kind of universal appeal. This suggests that all the expositors of the hypothesis have hit upon some fundamental truth, or that all of them have been making some kind of fundamental error.

#### Argument and Plan of This Work

The suggestion of this essay is that all of these authors have been making a fundamental error. It appears, upon examination, that the contrast between 'pagan' and 'Biblical' thought upon which the mastery hypothesis is built is too glib and simplifying, and that the modern idea of mastery over nature cannot be especially connected to Biblical as opposed to pagan thought. In fact, it appears that the modern idea of mastery over nature, insofar as it differs from the notions of mastery over nature prevalent in the ancient world, is rooted in

notions which appear to be far from Biblical: a deeply penetrating natural science; an extraordinarily manipulative role for art; an understanding of human freedom as limitless or nearly so; and an emphasis on creativity, novelty, and history-making.

It follows, then, that the attempts by various of the mastery writers to praise or blame Biblical thought for the conquest of nature are off the mark. If the mastery over nature which characterizes the modern world is as alien to Biblical as to pagan ideas, then the evaluation of that mastery as either beneficent or demonic does not imply any parallel evaluation of the Bible. The acceptance of mastery as the greatest good mankind has received adds nothing to the case of the Christian or Jewish apologist; the condemnation of mastery as Faustian, or as a collective act of hubris on the part of the modern world, gives no ground for anti-Biblical polemics from the side of Buddhists or Western neo-pagans.

There does appear, however, to be a sense in which the mastery writers are correct. It can be said that there arose in the West a particular interpretation of Biblical teaching which placed great emphasis upon man's mastery, and that this interpretation, which found such

champions as Francis Bacon, did indeed have a profound influence. For through it the Bible was made to justify a newer, more penetrating science of nature, the doctrine of technological progress, and the appearance of modern technical civilization. Because the early modern prophets of science chose to appeal, arguably for reasons of convenience, to the Bible rather than to pagan antiquity, it can therefore be said that the Bible had a special influence upon the modern project of mastering nature-- as long as it is not implied that the Biblical authors intended to promote that project or would have approved of it.

These conclusions will be established in the following manner. In Part One it will be shown, first, that 'paganism' is inaccurately understood by the mastery writers, and second, that, particularly regarding the high civilizations of the Ancient West, neither in theory nor in practice was there an aversion to the human utilization of nature so strong as that supposed by the mastery writers. In Part Two it will be shown that the Biblical notions of 'desacralization' and 'dominion' are not dealt with by the mastery writers in a careful way; a closer reading of the Old Testament text shows that 'desacralization' does not necessarily imply a mechanistic

or lifeless view of nature, and that 'dominion' does not imply either a limitless or harsh rule. The first two parts of this work, then, are devoted to destroying the stereotyped representations of pagan helplessness before nature and Biblical aggressiveness against it. Part Three attempts to show that the understanding of 'Biblical' thought which underlies the mastery hypothesis can be traced back to the re-interpretation of the 'image of God' by Italian Renaissance thinkers and to the re-interpretation of 'dominion' by Bacon and his followers; this re-interpretation, which was simultaneously an apologetic effort on behalf of technological mastery, has been successful enough to cause many modern Western thinkers, including the mastery writers, to accept an aggressive form of humanism as the teaching of the Bible.

In the execution of the argument of this thesis the aid of other scholars who have written against the mastery hypothesis has been indispensable. Because of this, the works of Rolf Gruner, F. B. Welbourn, John Passmore, James Barr, B. W. Anderson, Jacques Ellul, Paul Santmire and others will be drawn upon with grateful acknowledgment. Their contributions to the discussion will be made clear in the appropriate places in the

argument.

The useful conclusions of this essay will be the following: first, the mastery hypothesis is, on the whole, an inaccurate account of the historical and intellectual relations of pagan, Biblical, and modern thought; second, that the inaccuracies are grounded to a large extent in the distressing and recurrent tendency of scholars, especially theologically-oriented ones, to interpret cultures and systems of thought in terms of oversimplified dualisms such as 'pagan' and 'Biblical', a tendency which needs to be eliminated from academic thinking; and third, that both Biblical and pagan thought, properly understood, in different ways appear to teach a balance between human mastery and human restraint regarding nature, and therefore both have some possibility of relevance to the modern situation, which requires mastery and restraint in tandem.



PART ONE:

Attitudes to Nature in Pagan Western Antiquity

### Introductory Remarks

The mastery hypothesis rests upon the contention that pagan thought, as opposed to that rooted in the Bible, was particularly unsuited to promote the rational understanding and physical conquest of the natural world. It asserts that the pagan arts and sciences never rose to the level of achievement characteristic of modern science and technology because of the inhibiting influence of the pagan worldview. The pagan mind and the pagan heart alike, the hypothesis affirms, were enslaved by a false perception of nature and man's place in it. Pagan man was allegedly too afraid of the mysterious life which seemed to dwell within nature, too impressed by the divine wisdom which ordered all things, to imagine that he could, or should, assert his intelligence and will to control or even fully comprehend the world around him. Pagan man was, therefore, in comparison with Biblical and modern man, relatively helpless before his environment; he was driven always toward adapting his needs and desires to the order of nature rather than toward modifying the processes of nature to suit his needs and desires.

This above characterization of pagan attitudes to nature is essential to the formulation of the mastery

hypothesis from any point of view; it matters not whether the sentiment of given writer is pro-Biblical, anti-Biblical, or neutral. For if the intent of the writer is to vindicate Biblical thought by connecting the great triumphs of science and technology with it, then he must show that ignoble pagan passivity before nature was the source of pre-modern ignorance and suffering; if his intent is to denigrate Biblical thought by connecting it with the modern exhaustion and pollution of nature and the modern misuse of nature's hidden powers, then he must portray pagan times as Eden-like states of human existence, when the race lived humbly and in perfect harmony with its environment; if his intent is simply to establish that Biblical thought rather than pagan thought is the true source of modern mastery, he still must rest everything upon the alleged contrast between pagan passivity and Biblical activism.

Because the notion of 'paganism' is central to the hypothesis, it is vital to ascertain whether 'paganism' had the character ascribed to it. It must be determined whether the pagan conception of nature and man's place in it did in fact place restrictions upon human mastery, and if so, whether such restrictions were of the character and scope supposed by the mastery writers. This task is

undertaken in the next two chapters, to which the following remarks stand as preliminary reflections.

In the mastery hypothesis, 'paganism' is one of many terms used almost interchangeably to denote the religious outlook of pre-modern, non-Biblical man. These other terms include 'animism', 'pantheism', 'fatalism', 'polytheism', 'totemism', 'magical thought', 'astrological determinism', 'cyclical, ahistorical thought', 'primitive belief', 'Greek (or Hellenic) thought', 'Platonism', 'Aristotelianism', 'Stoicism', and 'pre-secular thinking'. In any given mastery writer, several of these terms may appear without any caution about possible distinctions between them. Since these terms are not, prima facie, synonymous, the careful reader of the mastery hypothesis is left with a certain uneasy feeling that the notion of 'paganism' underlying the theory is too undifferentiated to be relied upon.

This lack of differentiation has been with the notion of 'paganism' for a long time. The word 'pagan' comes to us from the Latin paganus, meaning 'country person' or 'villager', in contradistinction to 'city dweller'. Originally, then, it had no reference to religion, views of the world, or attitudes to nature.

However, this changed after the rise of Christianity. According to one widely held etymology, the word was pressed into the service of the early Church to designate non-Christian Greeks and Romans because the pagani or rural folk were much slower to convert to Christianity than the city-dwellers.<sup>1</sup> The new religious usage stuck, and 'pagan' eventually became the word commonly used by Christians, Jews, and Moslems to describe all their non-monotheistic, non-Bible-acknowledging contemporaries, including those living outside of the Mediterranean basin. In modern times, historians of religion have completed the linguistic development begun by the early Church, classing as 'pagan' all newly-discovered 'primitive' peoples and all cultures, whether mentioned in the Bible or not, which existed prior to Mosaic monotheism. 'Pagan' is thus negative rather than positive in meaning. It identifies an individual or civilization not by indicating what the individual or civilization does believe or practice, but by indicating that the individual or civilization does not believe or practice Judaism, Christianity, or Islam.

'Paganism', then, does not specify any particular belief or system of beliefs. In fact it embraces, both geographically and chronologically, a wide range of peoples, belief systems, and attitudes. Cannibalistic

tribes are pagan, but so are tribes which pronounce cannibalism to be the greatest of sins. Aboriginal peoples who go about unselfconsciously naked are pagan, but so are those who clothe themselves out of a sense of shame. The Hindu ascetic who denies all value to carnal pleasures is pagan, but so is the Hindu artist who carves shockingly erotic sculptures. Homer was pagan, but Plato's Socrates, who criticized Homer's notions of the gods, was so as well. Romans who tried to win the favour of the gods through sacrifice and ritual were pagan, yet so was the atomist Lucretius, who denied that gods cared for men and thought religion a great evil.

A moment's reflection on these facts will suffice to raise the question whether all these different 'pagans', who held not incidentally but fundamentally opposed views on virtually every question of significance to human life, can be grouped together under a common religious outlook, labelled 'paganism', 'animism', 'pantheism', or anything else. This reflection is especially important for the present topic, since the general assumption made by the mastery writers is that 'pagan' religion was intimately bound up with 'harmony with nature', 'submission to nature', or 'nature worship'. It is far from being obvious that all non-Biblical

cultures can be understood primarily in terms of human subordination to the natural. The French classical scholar Fustel de Coulanges argued that the earlier Greeks and Romans found the centre of meaning of human existence not in nature, but in the ancestral; their family, tribal, and civic hearths originally burnt not for nature-gods such as Zeus, but for the spirits of their dead progenitors.<sup>2</sup> The German scholar Walter Otto, believed that even the cult of Zeus and the other Olympian gods served primarily to dignify not the powers of nature but the divine element in the human spirit.<sup>3</sup> To move further East, it can be argued that the 'pagan' system of theology known as 'Hinduism' is, in its highest form, not nature-worship, but in fact a highly anti-natural affirmation of anthropocentric attitudes; the Upanishads teach that man is ultimately divine and utterly beyond nature in dignity, and that the natural order, as the source of passion and suffering, is something to be despised, not worshipped. In all of these interpretations of ancient cultures, the human rather than the natural is the focus.

It seems possible, then, that the mastery hypothesis, resting as it does upon the assumption that non-Biblical cultures can be understood primarily in terms

of something like 'nature-worship', may be based upon an insufficiently discriminating understanding of classical, Oriental and primitive culture.

The above caution, of course, does not make it necessary to go to extremes and deny that 'nature-worship' has ever existed or that it has been an important part of human religion and human culture. It is probably true that a significant number of ancient and modern cultures have subscribed to something approximating 'nature-worship'. Let it be granted, then, that some of the Amerindian or Siberian or Polynesian or Amazonian or African tribes did, or still do, worship nature in some way; let it be granted that such nature-worship may also have been prevalent in the pre-historic phases of many of the high cultures of antiquity (e.g., pre-Aryan India, pre-Etruscan Italy, pre-Israelite Canaan). Let it be granted further that such worship may have inhibited the rise of technological attitudes in these times and places.

All of this, however, would not be enough to establish the validity of the mastery hypothesis. For the mastery hypothesis has to explain not only why the Seneca Indians or the Watusi did not generate a mastering science and technology; it has to show why the Egyptians,



Babylonians, Greeks, Romans, and other civilizations of the ancient West did not do so. It therefore has to assert that the attitude of submission to nature prevailed in historic times in the Mediterranean and Near Eastern world, and that this attitude had a verifiable hindering effect upon human inclinations to understand and know the world. It has to assert that the arts and sciences of Western antiquity, advanced though they were in some respects, were cut off from developing into modern tools of mastery by their insistence upon the sacredness of 'nature' and their lack of a firm sense that man was meant to have dominion over it.

In this respect there is a shortage of content in the mastery hypothesis. One would expect the mastery writers to describe in some detail the religious beliefs of the Greeks, Romans, Babylonians, and so on, and to show the significance of those religious beliefs for ancient thought and practice regarding nature. Indeed, Foster, Collingwood and Jaki do some detailed work in this regard when they compare the natural science of the Greek philosophers with that of Galileo and Newton. Yet in most of the mastery writers, the accounts of ancient religion, science and technical achievement are very brief and general, appearing to rest upon isolated points of fact or

broad impressions picked up from secondary reading (including the reading of other mastery writers), rather than from detailed studies of ancient texts. Cox, for example, seems to rest his understanding of pagan antiquity on notions picked up from anthropologist Radcliffe-Brown, sociologist Max Weber, and theologian Friedrich Gogarten.<sup>4</sup> White seems to lean on ancient historians Sambursky and Forbes.<sup>5</sup> Berdyaev cites no ancient authorities at all, but takes his general philosophy of historical progress from Hegel and Schelling.<sup>6</sup> Foster, when he refers to Greek religion (rather than to Greek philosophy, in which he knows the sources) cites neither primary nor secondary sources for his statements.<sup>7</sup> Berger relies upon Voegelin, Eliade and Frankfort.<sup>8</sup> Baillie relies on other mastery writers Foster and Berdyaev.<sup>9</sup> Grant has in mind the picture of antiquity painted by Eliade and others, but is also influenced by mastery writers Foster and White.<sup>10</sup>

Now the fact that these writers rely largely upon second-hand knowledge of antiquity does not make their arguments false. Some of the people they rely upon are excellent scholars. It seems dangerous, however, to accept generalizations about ancient cultures, even from excellent scholars, without examining at least a few

relevant primary ancient texts and consulting certain other excellent scholars of antiquity who offer differing interpretations.

There are two possible reasons why the mastery writers have not presented much concrete discussion of ancient Western antiquity. First, it may seem to them that the identification of paganism with nature-worship and technological passivity is so intuitively obvious, or else so well-established by other scholars, that it does not require demonstration. Second, and less pleasant to contemplate, it may be that their particular biases make a certain simplified picture of paganism very convenient. For Toynbee and Roszak, who are critics of modern ravages of the environment, an idealized antiquity representing harmony with nature can be a useful symbol for the reproof of the excesses of our 'Biblical' culture. For Foster, Baillie, Cox, Jaki, Berdyaev, and others, that same simplified picture of paganism serves well not only both the traditional anti-pagan animus present in their Christian (often Protestant) apologetics, but also their efforts to justify modern Christianity's embracing of 'Biblical' mastery. In other words, pagan antiquity may be handier as a weapon for both polemicists and apologists if it is romanticized, idealized, or otherwise

superficially considered.

Whatever the reason for the incomplete discussion of pagan antiquity in the mastery hypothesis, it cannot be accepted as adequate. It must be determined whether the mastery writers, in imputing an all-pervasive 'submission to nature' to the great civilizations of the ancient West, are accurately representing the beliefs and practices of antiquity. If these writers are correct, it should not be hard to find, both in significant primary texts, and in secondary literature written by expert classicists and Near Eastern scholars, considerable support for the depiction of ancient high cultures as civilizations submerged in reverence for nature and retarded in scientific and technical activity. If, on the other hand, such a search shows the mastery writers' depiction of antiquity to be false, or seriously unbalanced, the mastery hypothesis will appear as untenable, or at best open to question.

The purpose of the next two chapters, then, is to present the findings of a search through some important ancient texts and some important secondary scholarship on pagan antiquity, findings which appear to demonstrate that ancient pagan beliefs and attitudes were less uniform than

the mastery writers suppose. In particular, these chapters attempt to establish that one can find in the pagan civilizations of the West various attitudes and ideas attributed by the mastery writers to the Bible, including the idea that nature is 'desacralized', that violence toward some of its parts is quite permissible, that a mechanistic science of nature is possible, that man is a unique, godlike being fit to rule over nature, and that many or most of the other creatures exist primarily to serve human ends. The existence of such notions in ancient thought and practice implies that Biblical thought, even if it contains the same notions, was not unique, and cannot be cited as the only, or even the necessary, source for the modern idea of mastery.

## Chapter One

### Practical Attitudes Toward Nature in Western Antiquity

The aim of this chapter is to show, both from primary texts and from authoritative secondary literature, that the everyday practices of the ancient Near Eastern and Mediterranean civilizations-- in industry, in engineering, in agriculture, and other areas-- reveal an attitude toward nature, owing nothing to the Bible, which implied both a considerable degree of 'desacralization' of nature and a clear affirmation of human 'dominion' over it. Certain notions of sacredness, divinity, or animation in natural things did persist in these cultures, but such beliefs appear to have posed only incidental, not fundamental, obstacles for a wide range of human operations. The pagans of the ancient West considered themselves free to modify and control nature, and did so with as much energy as would be expected from peoples taught by the Old Testament.

When speaking of the reticence of ancient civilizations to manipulate the natural environment, the mastery writers invoke two arguments, which often overlap. First, they say that there was a general hesitation to tamper with nature as given, because nature as a whole was

'divine' and hence already ordered for the best. Human interference in the natural scheme of things was, according to this reasoning, both foolish and impious. This is the main drift of the argument of Foster, Jaki, and Grant. Second, they say that there were many specific restraints upon the use of nature, because natural objects were believed to be inhabited and endowed with personality by a host of living spirits which were respected as minor deities. This is the main drift of the argument of Cox, McHarg, Forbes, Toynbee, and White.

Now both of these arguments seem intuitively plausible. There is no obvious reason why they should be wrong. What is significant, however, is that the mastery writers give almost no documentation for them. When White claims that due to popular "animistic" beliefs of antiquity, "every" tree, stream, or mountain had to be carefully placated before any woodcutting, dam-building or mining could take place,<sup>1</sup> he does not cite even a single ancient example of a placating ritual. When Toynbee argues that the Japanese doctrine of Esho Funi-- man in harmony with nature-- had Western parallels which prevented ancient Mediterranean civilizations from devastating the environment, he does not recount even one incident in the history of Greece or Rome in which such a

teaching was actually applied.<sup>2</sup>

This failure to provide documentation appears to spring from one of two convictions. First, many mastery writers seem to presume that the inhibitions of the ancients regarding nature are so well-known that it is unnecessary to offer proof of them. And in fact there is some evidence (though one has to hunt outside the mastery writers for it) that ancient religion did contain certain inhibitions. Whether such inhibitions were very effective in the everyday life of the ancient West will be considered later, in the body of this chapter.

Second, the mastery writers seem to think it unnecessary to present documentation of what, according to them, must have been the case. Their reasoning appears to run something like the following: since the ancient world held that nature was 'sacred' or 'divine' or 'alive', therefore ancient men must, out of piety, have been restrained in their attitudes toward it. There is no need to prove such restraints existed; their existence follows from the internal logic of ancient beliefs. Here, the assumption of the mastery writers' reasoning is that the practical life of a culture is largely derived from, and always consistent with, a theoretical scheme of reality.<sup>3</sup>



Members of an 'animist' culture, it is presumed, always ask themselves, before fishing, cooking or stone-cutting, how their activity may be performed without offending the natural objects utilized; members of a culture which have an 'organic' view of the cosmos, it is presumed, always ask themselves how a particular activity, such as damming a stream, will affect the life of that giant divine organism which contains them all; and so on.

Now, logical though this second line of reasoning seems, it cannot be taken as reliable. Without denying that the religion of a culture may have a great effect upon its practical activities, one may argue that it need not have such an effect. We know that the 'official' opinions of a civilization are often not a reliable index of the way its people will behave, for several reasons. First, official views often enshrine token remnants of no longer effective principles. The Queen, for example, still rules Canada in name, and still retains a subtle presence in the emotions of many Canadians, but she exercises no substantial influence upon Canadian affairs. Second, the official views are also often the views of a relatively inconsequential intellectual elite rather than those of the masses. For example, university professors, editors, government environmentalists and political party

leaders may all insist upon a need for smaller automobiles, even as large-car sales are booming. Third, official views are often, even when acknowledged by both the elite and the masses, not very influential. One would not expect that Christian Europe, steeped in the teaching that the Kingdom is not of this world, would have engaged in the Crusades or sea-going imperialism. One would not have expected that Mediaeval Italian merchants, taught that lending money at interest is forbidden to Christians, would have gone to such great lengths to develop a system of 'gifts' to nullify the effect of the restriction. Thus, if someone today were to say that Mediaeval Italian merchants must not have lent money at interest because they were shaped by a 'Christian' as opposed to a 'pagan' worldview, he would be laughed at by any competent Mediaevalist. If a future historian were to say that, because the Queen's face appeared on Canadian bills and stamps produced in 1989, Canada must have been ruled directly by the English Crown, he would seriously misunderstand twentieth-century Canadian politics. In sum, then, one cannot safely reason from the abstract principles or even everyday religious beliefs of a culture to an accurate description of that culture's activities. One must have empirical knowledge.

In order, then, to establish that Babylonian 'astral fatalism' or Roman 'polytheism' inhibited the ancients from manipulating nature, it is not enough to argue that such views in logic implied a passive relation to nature; it must be shown that such views did in fact yield that relation. The mastery hypothesis is thus responsible for providing an account of Western antiquity which is not only theoretically coherent but also empirically plausible. The rest of this chapter makes the case that mastery writers' picture of antiquity is not empirically plausible, that the pagan civilizations mastered nature in ways that, according to the mastery theory, they should not have dared to try.

An investigation of pagan practices and attitudes can be subdivided according to any number of schemes. The one chosen here is developed from the question: over what kind of things in the world is it said that Biblical man had mastery, but pagan man did not? Keeping in mind Lynn White's examples of trees, streams, and mountains, and keeping in mind that eventually the discussion must turn to the Biblical statements about subduing the earth (Genesis 1.28) and ruling over the animals (Genesis 1.26,28), the following topics suggest themselves: (i) tree-worship and ancient lumbering; (ii) animal life and

ancient domestication; (iii) water-gods and ancient engineering; (iv) the divine earth and ancient agriculture, mining, and quarrying.

### Tree Worship, Sacred Groves, and the Lumber Industry

One of the leading mastery writers, Lynn White, speaking of modern contempt for nature and in particular for trees, says: "The whole concept of the sacred grove is alien to Christianity and to the ethos of the [post-pagan] West. For nearly two millennia Christian missionaries have been chopping down sacred groves which are idolatrous because they assume spirit in nature."<sup>4</sup> In this statement White affirms that there was a 'pagan' limitation upon the appropriation of trees guided by the notion that groves of trees were deemed 'sacred' because trees, like other natural things, possessed 'spirit' and were 'animate'. He assumes that the fact of the sacredness or animation of trees in classical antiquity is well-established. From what source is he drawing his conception of ancient beliefs?

It is impossible to ascertain the particular authors upon whom White leans at this point, but it is easy enough to find a significant author who could easily

have been one of his sources, and who in certain respects lends support to his case: Sir J. G. Frazer, the great English pioneer in the study of religion, myth, and folklore. In one section of his great work, The Golden Bough, Frazer tries to show the universality of 'tree worship', and gives a horde of examples of it from a variety of times and places (modern Africa, mediaeval Lithuania, ancient Greece, and so on).<sup>5</sup> According to him, tree-worship was sometimes focused on a 'sacred grove', other times on particular trees or types of trees which were believed to house a spirit or divinity. This reverence placed restrictions upon the use of trees for timber. To cut down a tree from a sacred grove could mean a penalty of death, or at least a very stiff fine (the cutting of a cypress in the grove of Aesculapius at Cos was punishable by a fine of a thousand drachmas).<sup>6</sup> Even where it was permissible to cut an 'ensouled' tree down, certain observations were necessary. The Ilocanes of Luzon still beg the trees' forgiveness before cutting them down,<sup>7</sup> and so on. Evidence such as this, supplied by Frazer and scholars of a similar bent, seems to be the unstated basis of White's argument that ancient men were hindered by the holiness or divinity of trees.

But, to turn to the relevant case of Greece,

Frazer in the same place gives evidence that flies in the face of White's contention. He quotes Porphyry: "They say that primitive men led an unhappy life, for their superstition did not stop at animals but extended even to plants. For why should the slaughter of an ox or a sheep be a greater wrong than the felling of a fir or an oak, seeing that a soul is implanted in these trees also?"<sup>8</sup>

The words "they say" and "primitive men" indicate that Porphyry was thinking of times ancient and obscure to him, and about a belief system no longer in force. In fact, he was thinking of beliefs which survived only in fragments of Empedocles and Pythagoras, and which were opposed by both Aristotelian and Stoic philosophers.<sup>9</sup> Thus, well before Porphyry's time (mid-third century A. D.), and hence long before Christianity had any influence on Greek beliefs, men had ceased to think of trees as 'alive' in a sense which would make the cutting of them a form of murder. If Porphyry's remark is reliable, then the death of 'animism' was an internal development within paganism, not something brought on by Christianity.

How, though, can this conclusion be compatible with the sense of other ancient passages quoted by Frazer, especially the one about the grove of Aesculapius, which implies that into classical times trees remained 'sacred'

enough to protect? The answer is, that there is an important theoretical difference between 'sacred' trees and 'animate' ones, a difference somewhat confused by the treatment of White (and perhaps also of Frazer). White writes as if 'animism' is always the religious notion behind the existence of 'sacred groves', and assumes that the Christian missionaries, in cutting down the sacred groves, were always up against 'animist' views. This may have been true in their conflicts with, say, Lithuanian peasants; it was not so of their conflict with the later classical world. For there is a fundamental difference between not cutting down a tree because it is 'animate' and not cutting it down because it is 'sacred'. In the former case the tree itself, or the spirit within it, is respected; in the latter case not the tree itself, but the god or goddess to whom the entire grove is dedicated, is respected. The god or goddess to whom a sacred grove in Greece was dedicated was usually an Olympian god, such as Zeus, Hera, Athena, or Apollo. These Olympian gods were not primarily nature gods;<sup>10</sup> the religion of sacred groves was not, then, nature-worship. In fact, in the example given above, the god involved was Aesculapius, the god of medicine; medicine is the conquest of 'natural' maladies through human science and art. Perhaps in pre-Olympian religion the trees in the groves were worshipped as

spirits or gods; that was not the understanding of later antiquity. The trees in the grove were sacred because they were Zeus's or Athena's, not because they were 'ensouled'.

This distinction between 'animate' and 'sacred' can be worked out more fully in regards to the ancient use of trees, as follows. If every tree in the world is 'animate', then no tree can be cut down, at least, not without a ritual of expiation for the sin of murder. However, if trees are not 'animate', then only the trees in 'sacred' groves (or single trees consciously designated as 'sacred') are off-limits. It follows that all trees outside of those groves-- all 'profane' trees- are permissible victims of the axe. What is not specially dedicated to a god (or God) is of everyday use, is profane. Trees not so dedicated have no right to be preserved-- and this leaves vast tracts of forest open for human exploitation.

Thus, a failure to distinguish between two antagonistic forms of 'paganism'-- nature-worshipping 'animism', which might have existed in pre-classical Greece, and man-centred 'polytheism', which certainly existed in classical Greece-- could lead to the invalid



argument that Christianity freed up the classical world to assault its forests with the axe. In fact, however, though the beauty-loving Greeks could well appreciate the charm of the forest, and though the Roman poet Ovid could playfully imagine it populated with dryads, there is no religious reason why the later Graeco-Roman world should have been more reticent than the Christian missionaries to chop down vast tracts of forest.

To be fair to White, though his attribution of 'animism' to all of antiquity is far too general, his argument may retain some merit. He has in mind the Christianizing of the Germanic and other European peoples, who may well have been 'animist' in his sense. It thus may be true that Christianity 'de-animated' the forests of Europe and thus removed a barrier to the technical dynamism of the Franks, Germans, Slavs, and others. This, however, would prove only that Christianity was in Mediaeval Europe a factor in the development of mastering attitudes. It would not prove that Christianity added anything in this respect to the classical world. As shown above, the Greeks and Romans abandoned 'animism' independently, and felt bound to preserve only certain sacred groves. Thus, the mastery hypothesis, insofar as it concerns trees, is at best of limited historical and

geographical application.

The practical consequences of the 'de-animation' of trees and the 'desacralization' of great tracts of forest in classical times are well-documented. It is clear-- from any standard work on ancient practical arts-- that wood was a widely used commodity in antiquity. Vast amounts of wood were used in ancient ships, commercial and military, in siegeworks, on Roman roads, for furniture, for the massive support posts needed in stone buildings, and for hundreds of other things. In fact, so much wood was used that deforestation in certain parts of the pre-Christian world was a serious problem. Russell Meiggs, perhaps the only classicist ever to devote an entire work to ancient forestry, tells us, "We learn from Strabo that owing to the exhaustion of fuel on the island, the iron-ore of Elba, the richest source of iron in Italy, had to be taken to Populonia on the Italian coast to be smelted."<sup>11</sup> Obviously the tree-spirits and sacred groves of Elba were not as important to the ancient Romans as a good supply of iron! Further, not only the Greek and Roman, but other Mediterranean civilizations had apparently come to see trees as 'inanimate' or 'profane'. It is recorded in the Bible itself that a 'pagan' Phoenician king, Hiram of Tyre, apparently unconcerned

about the sacredness of woods, cut for Solomon "all the timber of cedar and cypress that he desired" from the forests of Lebanon (I Kg. 5.10). The great cedars of those forests, it should be added, were also coveted in large numbers by the 'pagan' Egyptians and Babylonians, according to the researches of Meiggs.<sup>12</sup>

Lest it may seem that, in reacting to the exaggerations of the mastery writers, this discussion has tended to deny any restraints existing in the ancient world regarding the use of trees, the point may be granted that classical literature does speak of sacred restraints upon logging. Meiggs points this out briefly in his book. However, as already explained, these restraints applied only to sacred groves. And even regarding sacred groves, Meiggs's evidence shows that religion was not always an effective restraint, for two reasons. First, sacredness is in the eye of the beholder; second, not everyone in the ancient world was very pious. On the first point, Meiggs tells us that Plutarch records Sulla's plundering of the sacred groves of Athens to obtain wood for siege equipment.<sup>13</sup> The gods of Athens were not Rome's gods, not Sulla's gods. Why should he respect their forests? On the second point, Meiggs recounts that Caesar performed a similar outrage in Spain, when he took up an axe and,

voluntarily assuming all guilt, swung the first stroke against a sacred Gallic grove, so that his soldiers would not be inhibited from felling the trees necessary for his campaign.<sup>14</sup> One presumes that Caesar cared nothing for the allegedly sacred quality of the trees, and was simply allaying the pious scruples of some of his men; alternately, if he had some religious misgivings, he was able to subdue them in the name of expediency.

To conclude these remarks on 'animism' and 'desacralization' in relation to trees, groves, and forestry, one may say that the proponents of the mastery hypothesis are in error both about the conceptions of ancient religion and about the actual ancient forestry practices. The remnantial 'animism' and the scattered 'sacred groves' made no serious dent in the tree-felling activity of the ancient Mediterranean and Near Eastern world. Neither the Greeks nor the Romans nor any of the other great peoples needed to be told by the Bible that it was permissible to cut down trees.

The Use of Animals in the Ancient World

The mastery hypothesis, affirming as it does the spiritual life and sanctity of trees in pagan culture, must out of theoretical consistency affirm the same thing about animals, which are by their capacities for motion and sensation much more obviously 'animate' or 'ensouled'. It must affirm that pagan civilization was built upon a reverence for the living, divine, or sacred quality of animals, and that this reverence put severe limitations upon the employment of animals for human purposes. And this is demanded not only by the need for theoretical coherence, but also by the text of Genesis, in which the 'dominion' spoken of is specifically over the animals. Was the teaching of Genesis unique in this regard? Did the ancient non-Israelite cultures revere animals too much to use them?

Perhaps the Jains of India revered animals that much. Even today, some of them go to such extremes as to wear screens over their mouths to avoid inhaling and hence killing any insect.<sup>15</sup> But the Jains are an extremist minority in India, and the Buddhists, who also avoid killing animals, are a minority, too. The Hindu majority is free to eat meat (though not beef), and Hindus kill and

eat poultry, sheep, and goats. In any case, the basis of the general aversion to killing animal life in India is not any positive evaluation of nature as divine, but rather the doctrine of rebirth, which teaches that all beings with volition (i.e., humans and animals) have transmigrating souls. To kill an animal is to subject a transmigrating soul, hence a potential human being, to violence. It is therefore avoided. This restraint cannot be accounted for within the framework of the mastery hypothesis, because it is concerned only for humans and animals, not for nature in general. And it is irrelevant for the ancient West, in which the doctrine of rebirth, though found in Plato and Pythagoras, was never widely influential among the common people.

How did ancient Greeks and Romans and Egyptians treat their animals? The fact that they raised the same animals (cattle, sheep, goats, horses, etc.), for the same purposes as we do today, tells the story. Raising animals involves coercion and violence. Cattle must be yoked, horses bridled; such restraints are unnatural and unpleasant. Some animals need prodding, some whipping. Males must be castrated, and castration involves a double violence: the pain and blood involved on the physical level, and the outrage against animal nature, which

properly requires reproduction. Cattle are often dehorned, and pigs de-tusked, to avoid injury to humans or other animals. Hens are denied the natural act of copulation with a rooster, so that they can produce eggs for human consumption. Of course, some animals are killed and eaten.

This violence against animal nature, this subjugation of animal spirit, was even more necessary in the ancient world than in our own. The ancients did not have fossil fuels or electricity; wind and water power were poorly developed. Animals were the main source of non-human power, and non-human power is a necessity for any culture which wants to rise beyond hunting and gathering. Non-human power is required to break hard soil, to move great weights, to carry loads uphill, to achieve speed in travel, and for many other purposes. No ancient civilization, then, could do without animal labour. Not only the Israelites but all the ancient cultures had to make use of it.

If these civilizations had any sense of violating the sacred in their use of animals, it is not usually visible in their writings on practical matters. Homer portrays the heroes of the past as habitual, voracious and

unashamed meat-eaters. Hesiod, our earliest source on classical farming, recounts calmly and without apology (Works and Days, lines 785-791) the best times for castrating horses, sheep, goats, and cattle:<sup>16</sup>

Nor is the first sixth a fit day for a girl to be born, but a kindly for gelding kids and sheep and for fencing in a sheep-cote. . . . On the eighth of the month geld the boar and loud-bellowing bull, but hard-working mules on the twelfth.

Hesiod does not here speak of animals as sacred, or as divinities which can be offended by such an act; nor does he suggest any rituals by which the violated animals may be appeased.

And, even where certain animals were regarded as sacred, as in Egypt, their sacredness did not exclude their being used for human benefit. Feuerbach, a nineteenth-century thinker of the first order, who had read vast amounts of literature on both classical religion and the beliefs of modern 'primitives', remarked on the peculiar yet widespread combination of reverent and utilitarian attitudes toward animals.<sup>17</sup> Human beings simply are not as theoretically consistent as the mastery hypothesis supposes. Or, if we are to suppose that the ancients were theoretically consistent, their theory relating the sacredness of animals to the utility of



animals was subtler than that proposed by the mastery writers. For the ancients, apparently, the cow could be a manifestation of a goddess such as Hathor, yet simultaneously be milked, yoked, prodded, bought and sold as a brute.

This is not to say that there was no intellectual sentiment in the ancient world against the utilisation of animals for human purposes. Lovejoy and Boas gather numerous classical passages in which it is suggested that, at the dawn of human history, human beings lived in harmony with animals, neither enslaving nor eating them.<sup>18</sup>

But, these authors say, the usual understanding of the classical authors was that this Golden Age was gone beyond recovery, and that in the present dispensation men had the need and the right to subject animals to their ends.<sup>19</sup> The main exception to this position came from authors such as Porphyry, who argued, if not for freeing animals completely from slavery to humans, at least for freeing them from being killed for food.<sup>20</sup> Such scruples, however, were found mainly among the philosophical and religious elite.

In summary, the peoples of the ancient high cultures of the West felt no more restraint in their use

of animals, even their 'sacred' animals, than did their Israelite or Christian contemporaries. The mastery hypothesis is simply bankrupt on this point.

#### River-Gods, Sacred Waters, and Ancient Engineering

According to the mastery writers, not only animals and plants but waters-- especially moving waters such as rivers, streams, and springs-- are supposed to be alive, even divine, or part of a sacred order. How, according to the mastery hypothesis, should this thought have affected the ancient West, and how did it in fact affect the ancient West?

Diverting a river is manipulative. The 'natural' course of a river is established before humans arrive on the scene. Interpreting this course in 'animist' terms, one would suppose that the river-spirit would not wish to be driven off his desired path; interpreting it in terms of an 'organismic' view of the cosmos as a giant living being, one would suppose that a diversion would correspond to cutting a blood vessel and reattaching it, perhaps to the wrong organ; interpreting the course as an emanation of a cosmic Mind, one would conclude that changing it would amount to making the world a less rational, less

perfect mirror of the divine. On any understanding of 'paganism' offered by the mastery writers, the manipulation of watercourses would have been noticeably rare in the ancient world (outside of Israel, presumably). This means that ancient men would only with great difficulty have persuaded themselves to divert streams for reasons such as: draining swampy areas; irrigation; supplying drinking water, bathing water, and waste-carrying water for cities; turning mill-wheels. And of course, the means used to divert the water (dams, canals, dikes) would have been highly suspect.

How is it, then, that histories of ancient technology provide so many examples of canals, tunnels, dams, dikes, aqueducts, and so on? Diocletian's engineers built a dam to create the artificial Lake of Homs-- 15 square miles!-- for both flood control and water supply purposes.<sup>21</sup> Darius of Persia ordered a canal dug from the 'sacred' Nile to the Gulf of Suez, which would 'unnaturally' mix the waters, to make commerce possible between the Mediterranean Sea and the Indian Ocean.<sup>22</sup> Water-driven mills existed in Roman times, as we know from Vitruvius and other sources;<sup>23</sup> the pagans obviously did not fear to put the river-gods to work as slaves, grinding corn!

It is true that there was a certain ancient sentiment against diverting watercourses. Both Feuerbach and Clarence Glacken (but, curiously, none of the mastery writers) point out a passage from Tacitus (Annals, I.79) in this regard.<sup>24</sup> Tacitus tells the story of how the Reatines opposed a plan to prevent the Tiber from flooding by diverting some of its tributaries. The Reatines argued that "Nature had made the best provision for the interests of humanity, when she assigned to rivers their proper mouths-- their proper courses-- their limits as well as their origins". But this argument was not necessarily sincere, or at least not necessarily indicative of all the reasons for the protest. The Reatines, along with the Florentines and Interamnates, protested also on the grounds that the new plan would do much damage to their cities, crops, and countryside. Tacitus himself refrains from declaring the religious argument the crucial one: "Whatever the deciding factor-- the prayers of the colonies, the difficulty of the work, or superstition-- the motion of Piso, 'that nothing be changed', was agreed to".<sup>25</sup>

Another classical passage sheds doubt on the idea that altering the course of rivers was considered impious.

Herodotus (I.75) tells the story that Thales enabled the Lydian army to get over the river Halys by digging a new channel, splitting it into two fordable streams.<sup>26</sup>

Herodotus expresses no scruple, either on his own behalf or on behalf of any of Thales' contemporaries, that this action was against the divine order. Unless the mastery writers can produce passages contradicting the sense of this one and the massive evidence for hydro-engineering in the Mediterranean world, it seems that the notion that the ancient civilizations feared to alter waterways cannot stand.

#### Mother Earth, Agriculture, and Mining

It fits in well with the mastery hypothesis that the Earth was considered by many pagan peoples to be a female divinity, the Great Mother and nourisher of all life, including human life. During the earlier stages of Mediterranean cultures, the Earth may have been the most important goddess. Even in later times, when the gods became more oriented to the human than to the natural world, aspects of Mother Earth survived in Demeter in Greece, and in Ceres in Italy. This view of the earth, which placed the human race and the land it occupied in an organic, quasi-personal relation, would appear to be in

contrast to the 'Biblical' one, which-- according to the mastery writers-- placed the species in a detached, impersonal relation with the land, one of 'subjugation' (Genesis 1.28). It would seem, then, that the pre-Christian, non-Israelite pagans ought to have been very careful how they treated her, which would have inhibited them from technical development in many ways-- if the mastery hypothesis is correct.

Now breaking the surface of the earth is violent and intrusive; unless done only in extreme necessity and with the protection of prayers and rituals, it surely must have been deemed sacrilegious. Ploughing, quarrying, and mining must therefore have been deemed wicked, or at least highly dangerous to one's soul. Agriculture, therefore, must have been forbidden; ancient peoples must have been taught by their priests and poets to survive only on what the earth would freely yield: berries, fruits and vegetables. Similarly, the building of great stone monuments must have been deemed a sinful enterprise; subjects must have been ordered by their rulers to make tombs, statues, temples, and other things out of fallen timber, or, at the most, of uncut stone lying freely above ground. Again, digging for metallic ores would be akin to sexual assault; ancient miners ought to have allowed

themselves to take such ores only from the exposed faces of mountains and gorges. Such are the logical conclusions of 'earth-worship' as envisioned in the mastery hypothesis.

Strangely enough, however, the pagans practised agriculture, mining, quarrying, and other operations upon the earth quite aggressively. Regarding agriculture, crops were grown everywhere in the ancient West, not merely in Israel. In endeavours other than agriculture, many ancient civilizations outdid Israel by a considerable measure. The people of Samos carved an aqueduct tunnel through half a mile of mountain;<sup>27</sup> the Romans blemished the face of the earth throughout Europe, Asia, and Africa with their roads; the Egyptians quarried millions of tons of stone to build the pyramids, and carved out colossi such as the Sphinx and the figures at Abu Simbel. Invasive mining techniques were also widely practised. This last point is particularly interesting, since one of the mastery writers, R. J. Forbes, himself provides massive evidence for it, in the volume on mining in his formidable series on ancient technology.<sup>28</sup> He does not see the contradiction between his detailed empirical studies, which establish pagan energy and aggressiveness toward nature, and his broad, speculative affirmation of

the mastery hypothesis, which alleges pagan passivity before nature.<sup>29</sup>

It should be admitted, however, that at least one ancient author, Herodotus, recounts an incident suggesting ancient scruples about altering the earth. The passage can be found in Feuerbach: "Herodotus tells us that the people of Cnidos wished to dig a trench through their isthmus to make their land an island, but the Delphic oracle opposed it, saying, 'Zeus would have made an island had he wished'."<sup>30</sup> Perhaps Herodotus here records an actual example of religiously-grounded restraint, and perhaps the sentiment he attributes to the oracle was widespread enough in antiquity to limit, on occasion, drastic alteration of the land. Yet if such a conservative view had been consistently effective, no serious environmental transformation would have been possible at all, and the tremendous outbursts of engineering activity in the ancient Levant and Mediterranean would be totally inexplicable. In any case, the story as we have it appears, on a superficial reading, to support the mastery writers' picture of 'paganism'. A central detail, however, destroys the apparent fit. The 'pagan' prohibition against changing the present disposition of the earth is based on a decisively



'non-pagan' understanding; it is not a 'living' or 'divine' earth that will be offended by the proposed canal, but Zeus the maker of the earth, who wishes things to be the way they are. An almost 'Biblical' view of creation by a personal God seems to be attested here, which suggests-- against the hypothesis-- that a Biblical understanding of God is not psychologically incompatible with a conservative attitude toward the earth. Only passages which clearly link a timid approach to nature with 'animist' or 'organicist' views are of any use to the hypothesis, and these the mastery writers simply do not provide.

In sum, there is very little evidence that pagan reverence for nature inhibited the ancient West's aggressive exploitation of the earth, any more than it hindered the exploitation of trees, animals, or rivers.

To students of ancient Western architecture, engineering, agriculture, war, domestic arts, or urban planning-- indeed, to students of the ancient West in general-- much of this chapter will appear platitudinous, and hardly worthy of presentation in a dissertation. Yet a rather straightforward enumeration of facts about

antiquity had to be included, in order to counteract the totally unfounded generalization of the mastery writers that the ancients were passive and deferent toward nature. In fact, the ancient Greeks, Romans, Egyptians and others were habitual and even innovative modifiers of nature, altering it to suit their purposes. They were neither sentimental forerunners of the Romantics nor ignorant savages cringing before every crack of thunder. With the means available to them, they consciously mastered the world about them.

This does not mean that the ancient West practiced, or wished to practice, an unlimited mastery over nature. It does not deny the distinction made by the mastery writers between the ancient West and modern technological civilization. It does deny, however, that the ancients differed from the modern West and from the teaching of the Bible by a religiously-grounded refusal to operate upon nature in any way. The ancient pagans, no less than the ancient Israelites, assumed that they had a certain right of 'dominion' over the world of nature.

Nor should this be surprising, since the cultures which produced the Bible, the Ugaritic epics, and the Iliad were linked by trade, political contact, and

technology transfer. The great Near Eastern scholar Cyrus Gordon affirms that "Greek and Hebrew civilizations are parallel structures built upon the same East Mediterranean foundations".<sup>31</sup> Confirming this, the authoritative Old Testament scholar James Barr says: "The material and technical culture [of Israel] was . . . absolutely continuous with that of Israel's neighbours".<sup>32</sup> And if the material and technical culture was absolutely continuous between Israel and the rest of the ancient West, then the attitude which produced that continuity must also have been continuous in key respects. Whatever religious differences concerning nature lay between Biblical Israel and its pagan neighbours, they cannot justify the demonstrably false claim that 'pagan' religiosity led, or must have led, to a passive submission to nature.

## Chapter Two

### Views of Progress and Mastery in Antiquity

In the previous chapter it was established that the ancient Mediterranean and Near Eastern peoples behaved as if they, like the Biblical Adam and Noah, had been given 'dominion' over nature. The 'pagan' religiosity of these peoples was not, in most areas of life, a serious detriment to their mastering activity. Virtually every modification of nature, every display of technical prowess described in the Bible-- Cain's city, Noah's vineyard, and Solomon's temple are typical examples-- has a pagan parallel. Nor should this parity between pagan achievements and those described in the Bible be particularly surprising, since the Bible itself teaches that the commandments about 'dominion' and 'subduing' were given, not to Israel alone, or to Christendom alone, or to readers of the Bible alone, but to the whole race of Adam, that is, to all mankind. That is, from the Bible's own account, we should have expected that 'Biblical' and 'pagan' peoples would behave alike with regard to mastery of nature. From the Bible's own account, we should expect to see, even in races and cultures which have never heard of the Bible, evidence of a human impulse to fill, subdue, and have dominion over the earth.

But, according to the mastery writers, the 'pagans' were precisely those who did not understand or accept the teaching formulated in Genesis 1. Those mastery writers who are anti-Biblical would account for this by saying that the 'pagans' were either blissfully ignorant of the possibility of human dominion, or that they were aware of it but rejected it as unnatural or dangerous. Those mastery writers who are pro-Biblical would argue that the 'pagans' must have originally known of God's exhortation to dominion, but forgot or neglected their human capacity and responsibility, and 'fell' (to use Berdyaev's word) into the ignorance of 'nature worship'. How such a fall can be accounted for in Biblical terms is unclear; it cannot be a direct result of the Fall of Adam, since Adam's sons Cain and Abel were clearly worshippers not of nature but of the Lord (Genesis 4.1-7). Yet somehow, insist the mastery writers, the pagans did fall into nature-worship, and such worship must have imposed restraints regarding the use of nature. For even if, as shown in the previous chapter, the cruder forms of nature-worship, such as 'animistic' reverence for tree-spirits, had died off by classical times, the more sophisticated form of paganism ought also to have had a restraining effect. Reverence should have followed, they argue, even from the 'organismic' or 'pantheistic' visions

of the world put forth by the various schools of Greek philosophy. How then, from the point of view of the mastery hypothesis, can the fact of ancient mastery be reconciled with the anti-mastery bias implicit in pagan philosophies of nature?

The apparent contradiction between pagan theory and pagan practice vanishes if an important distinction is observed. Pagan religious and philosophical thought was not opposed, generally speaking, to the use of natural objects per se, to the transformation of nature by art per se, or to the investigation of nature per se; all of these could be undertaken, it was thought, within an understanding of the proper bounds or limits of human action. What pagan religious and philosophical thought resisted was what Roszak or Foster would call 'Cartesian' or 'Baconian' mastery: that irresistible human power over things which would follow from the attainment of exhaustive knowledge of the causes of natural phenomena. Such a mastery, it was feared, would be unlimited by any reverence for the order of things as given; it might turn man from a user into an abuser of nature; it might also make man quite dangerous to himself. (These concerns, it should be added, were not alien to the Old Testament, as will be shown in Part Two below.) Hence, about the

limited mastery of nature-- by means of those arts and inventions without which life would be unpleasant, uncomfortable, or even unbearable-- pagan thought had only incidental scruples. The pagans could, then, in perfect consistency, affirm a rightful (though not unlimited) 'dominion' over land and sea, animals and plants. The divine or sacred character of the bonds which held the universal frame together did not imply that all things within that frame were to be worshipped by human beings, or that none of them could be appropriated for human use.

That pagan thought, in particular Graeco-Roman thought of the pre-Christian era, was not averse to the idea of a limited mastery of nature, can be made clear from a close examination of certain classical ideas and texts, and corroborated by references to competent modern scholarship on classical antiquity. In this chapter such an examination is undertaken. Certain central religious and philosophical ideas of the ancient Near East and of the classical world, singled out by the mastery writers as having anti-scientific, anti-technical, or anti-mastery implications, are scrutinized. These ideas can be stated here in brief, as follows.

First, the later Greeks and Romans believed that

the world was periodically destroyed and recreated, ad infinitum; such a 'cyclical' view, which excluded the Biblical idea of open-ended, linear history, depressed the progressive, optimistic impulses without which science and technology cannot flourish. Second, classical Greek and Roman thought, especially later Stoic thought, inherited from ancient Mesopotamia the lore of astrology, which was 'fatalistic' and taught resignation rather than the Biblical notion of free will, without which bold initiatives toward mastery are psychologically impossible. Third, classical Greek and Roman thought tended, unlike Biblical monotheism, to regard the universe as a great organism, as a divine living being; such a view implied that the alteration of the universe by man was a thing unholy. Fourth, classical Greek and Roman thought, in comparison with Biblical thought, was not sufficiently anthropocentric; it pictured man as being at the mercy of the gods, fate, or the rhythms of the cosmos, unable to assert his characteristic power or dignity. Fifth, classical Greek and Roman thought, untutored in the Biblical doctrine of creation, and haunted by 'animism', 'organicism', or 'pantheism', adopted a biological understanding of motion and was thus unable to imagine the combination of mathematics with a mechanical view of nature, which alone could produce modern physics and



modern mastery. Sixth, Greek philosophers such as Socrates and Plato thought it was the duty of man to 'conform to nature' or be guided by nature, rather than to rule over it, as taught by Genesis 1. Each of these notions will be discussed in a separate section.

### The Influence of Cyclical Views of Time on Human Endeavour

Stanley Jaki has argued that the universal belief in cosmic cycles in antiquity hindered the development of mastery over nature. Ancient civilizations, he claims, having a cyclical rather than a linear understanding of time, could never develop a sense of 'progress'. They could not believe in the idea of a self-sustaining, ever-increasing, limitless development of the arts and sciences, because they thought that all human progress must eventually run up against the wall of universal destruction; for the cosmos was periodically destroyed and renewed according to inescapable regularities in the order of things. Each time the human race was re-created, it was believed, it had to re-learn, beginning from the barest rudiments, the knowledge which in the previous world cycle had given it some limited mastery over nature. And, not long after the race had achieved a modest level of mastery over its environment, the inevitable

dissolution would recur. Such a view of the world, Jaki argues, militated against the development of the optimistic, forward-looking frame of mind which we associate with the modern age. Speaking of the cyclical view of paganism in general, he writes:<sup>1</sup>

If there is a major characteristic common to them all it is their being steeped in a concept of cosmos and history subject to endless, repetitious cycles. That in all those cultures-- Chinese, Hindu, Maya, Egyptian, Babylonian, to mention only the most significant ones-- science suffered a stillbirth, can be traced to that mesmerizing impact which the notion of eternal returns exercised on them.

In the case of Greek cosmology, this cyclical view of things is found in the Stoic doctrine that a worldwide conflagration recurs in every Great Year-- that year being determined by the return of the heavenly bodies to their original configuration-- and in certain statements of Plato. Of this Stoic-Platonic tradition Jaki writes:<sup>2</sup>

Such a cosmos and history were trapped in the treadmill of endless repetitions which found many startling portrayals in the works of ancient Greek authors. Possibly the most memorable of them is the description in Plato's Statesman of the rattling and trembling of the world machine, prior to its starting another of its great cycles or Great Years. Obviously, the development of crafts and sciences had also to be subject to the same circularity. In fact, Aristotle remarked that whatever could be contributed by the crafts to the comfort of life had already been achieved several times in former ages. The remark, implying a smug evaluation of the present, could hardly be a stimulus for scientific curiosity and creativity. The stagnation of Greek science from the late

fourth century on should not therefore be the cause of undue surprise.

For Jaki, as for his mentor Pierre Duhem, the great contribution of Christianity to the West was that it repudiated the pagan Greek cosmology by 'de-divinizing' the heavens. This de-divinizing process had two good effects: the first, to be discussed in a subsequent section, was that de-divinizing the stars made possible mechanical models of the heavens; the second, which is relevant here, was that de-divinizing the stars eliminated the notion that their eternal cyclical motion governed or controlled events on the earth, especially insofar as their conjunction in the Great Year regularly brought about an end to all progress. Biblical religion was thus crucial in replacing pagan cosmology with Newtonian science and pagan helplessness with modern confidence in progress:<sup>3</sup>

Among those facts Duhem singled out one as being of uppermost and decisive importance for the whole future of science which was still to see its viable birth. The fact was the Christian refusal to accept the ancient pagan dogma of the divinity of the heavenly regions and bodies. While it is true that some Greeks, notably Democritus and Anaxagoras, held all bodies to be of the same material nature, the foremost Greek thinkers from Plato to Ptolemy firmly upheld the divinity of the heavens. In that crucial respect the Greek genius was unable to break a pattern characteristic of all ancient cultures. It failed in its scientific endeavour precisely because of the mesmerizing impact of a divine sky

determining everything on earth according to its perennial revolutions. Within the perspective of that cyclic determinism everything on earth, even the processes of history, could but turn into the treadmill of a vicious circle. In that outlook it was impossible to decompose the reality of motion into impetus and inertia and thereby lay the foundations of classical physics. Equally important, the spectre of that treadmill made it impossible to muster confidence in progress based on the investigation of nature.

For man to free himself of the monstrous conception of a divine realm of celestial bodies ruling all processes on earth, physical as well as human, man needed the perspectives of Christianity.

The Jaki-Duhem argument thus makes three assertions. First, classical paganism, believing that the heavens were divine and eternal, believed that the cyclically recurring patterns of the stellar world shaped the human world below into parallel recurring patterns. Second, the prospect of such recurring patterns must have exerted a depressing influence upon the ancient mind, and psychically inhibited the development of the arts and sciences. Third, Biblical thought, by destroying the divinity of the stars, repudiated the cyclical idea of time and established a linear view of history which was congenial to the idea of progress in human affairs, including the human mastery of nature. Each of these assertions needs to be dealt with in turn.

Now, according to Jaki's own massive research effort, Science and Creation, the connection between believing in the divinity of the heavens and believing in a cycle of cosmic dissolutions is accidental, not necessary. For while some ancient cultures studied by Jaki, such as the Babylonian, affirmed the influence of the stars as deities upon human events,<sup>4</sup> and other ancient cultures studied by him, such as the Hindu, affirmed that the world was destroyed and recreated periodically,<sup>5</sup> in none of the cultures he reviews except the late Graeco-Roman was the causal connection between the stars and the cycles posited. Therefore, if the Biblical de-divinization of the heavenly bodies destroyed the cyclical notion of time held by Graeco-Roman paganism, it was a fortunate coincidence. The de-divinization of the heavens would have had no such effect upon the Hindu doctrine of cycles, nor even upon earlier classical notions of world-ages such as those described by Hesiod. Those who are inclined to believe that everything happens in cycles do not need to postulate divine heavenly influence; they may with equal reason say that the repetitive movements of the heavens (conceived as non-divine) are simply another expression, not the cause, of the cyclical character of things. Therefore, Jaki's argument that the Biblical de-divinization of the stars

logically guaranteed the destruction of the cyclical view of time, and its replacement by the linear view, is inadequate.

Jaki's argument would be stronger if he did not try to make one Biblical teaching-- the doctrine that the stars are created rather than divine-- do double duty. The de-divinization of the heavens (Genesis 1.14-19) is not-- if we rely on the Biblical context-- directed against theories of cosmic cycles, but against the worship of the various heavenly bodies, and probably also against astrological fatalism (which will be taken up in the next section). There is, however, a Biblical teaching which does oppose, at least implicitly, all 'pagan' teachings, Graeco-Roman or otherwise, about recurring dissolutions of the world. That teaching is found, as Combs and Post point out,<sup>6</sup> in the Noah story. There, after Noah emerges from the Ark, God makes a promise, in the form of a covenant with Noah (and with all the animals!), that there will never again be another Flood to destroy the earth and all flesh, and that the heavenly motions and earthly seasons will continue for ever (Genesis 8.20-9.17). Because of this covenant, the stability and future existence of the cosmic order are guaranteed. The possibility of a 'linear' view of history, insofar as it

comes to the West from the Bible, is rooted in the Noahic covenant rather than in the de-divinization of the stars.

Even on the basis of the Noah story, it is doubtful if Jaki could establish all that he (along with White, Cox, and Grant) wishes to assert, i.e., that the Biblical understanding of time is oriented to open-ended progress, to the human making of history.<sup>7</sup> Since it is not the intention of this work to elucidate the Biblical understanding of 'history', no attempt will be made here to refute decisively the connection made by the mastery writers (and other scholars) between the Biblical idea of 'linear time' and modern ideas of progress. Here it will suffice to note two points. First, even the great modern exponent of the idea that the Bible taught the West 'linear' time, Biblical scholar Oscar Cullmann, does not claim that Christian 'linear time' implies 'linear secular progress' in the modern sense; those who regard the connection between Christianity and the idea of historical progress as one of the certain results of modern Biblical scholarship should carefully read Cullmann's Christ and Time.<sup>8</sup> Second, anyone who wishes to stress the forward-looking hopefulness of the Christian view of time has to face the obvious fact that Christian eschatology, no less than pagan cyclical thought, puts a term to the

duration of the world. Indeed, according to many Christian calculations, the length of time allotted for human progress before the Second Coming has been considerably less than the tens of thousands of years posited by classical authors<sup>9</sup> or the trillions of years posited by Hindu Puranas.<sup>10</sup> The psychic climate produced by Christianity would thus seem to have been at least as inhibiting as that produced by paganism.

The latter conclusion has the support of German philosopher and intellectual historian Karl Lowith, who argues in his Meaning in History that, though the Biblical conception of time is linear rather than cyclical, it is also finite rather than infinite; it therefore differs from the modern conception, which is both linear and infinite. He concludes:<sup>11</sup>

Neither genuine Christianity nor classical antiquity was profane and progressive, as we are. If there is any point where the Greek and the biblical views of history agree with each other, it is their common freedom from the illusion of progress. The Christian faith in the incalculable intervention of God's providence, combined with the belief that the world might at any moment come to a sudden end, had the same effect as the Greek theory of recurrent cycles of growth and decay and of an inexorable fate-- the effect of checking the rise of a belief in an indefinite progress and an ever increasing manageability.

Jaki's first and third assertions, then, have been



disposed of by the foregoing discussion. This leaves only the second, that the belief in cycles is inherently depressing and therefore must have sapped ancient hopes of discovery and mastery. Why does Jaki believe this? The power of his negative evaluation of cycles appears to rest, not in any analysis of the character of cyclical time, but from the very unflattering, even polemical words and phrases he uses to describe it. He writes of "the mesmerizing impact" of the notion of eternal returns, implying that it dulled ancient capacities. He calls the cycles "endless repetitions", a "treadmill", or a "vicious circle", all of which terms suggest boredom, frustration, or pointlessness. Such expressions are not arguments, but merely indications of an emotional response, an emotional response which is by no means universal. If Jaki were writing in the spirit of Eliade, he might instead speak of the cycles as 'joyous renewals of cosmic life'; if he were writing in the spirit of Bergson, he might regard the cycles as provisions for 'endless opportunity for fresh adventures of the life force'. If he were writing out of a sense that 'historical' existence is the piling up of sin upon sin, and that the race is tending toward depravity, he might regard the cosmic dissolutions as 'cleansing' or 'purifying' in effect. If he were writing out of a fear of the possibility of a universal tyranny

enforced by unlimited technology, he might speak of periodic world-deaths as 'liberating' for the human race. His selection of wholly negative expressions appears to tell us much more about his own progressive, optimistic view of history than it does about the actual effects of cyclical views upon the ancient spirit.

Further, there is a psychological improbability in Jaki's contention. We are not sad at dawn because we know that night must inevitably follow; we are not sad at the first chirping of the birds in spring because we know that winter must come. A person who lacked the capacity to do a day's work or to embark on a six-month construction job due to depression about the cyclical character of existence would hardly be considered emotionally normal, either today or in ancient times. How much less so, then, would we expect ancient peoples to have been deterred by the prospects of world-dissolutions tens of thousands or tens of millions of years in the future? Has our civilization been similarly deterred by the modern equivalent of the Great Year doctrine, that is, by certain cosmologists' notion that the universe 'oscillates' every eighty billion years or so, destroying all life and order in each contracting phase? Have we not, even as popularizers of science have disseminated books and films

presenting this view, drilled for oil under the Arctic Ocean, unravelled the DNA molecule, split the atom, and sent space probes to the outermost reaches of the solar system? The fact that the greatest of our scientists tell us that, in all probability, our race will someday be extinct has not prevented us from making gigantic strides in the conquest of nature, and from hoping to make even greater ones.

To conclude this section: the mastery writers provide no convincing argument for the claim that the pagan doctrine of cyclic universal dissolutions was a factor seriously inhibiting the rise of mastering attitudes. The alleged psychological effect of a cyclical cosmology is, as far as the mastery writers present it, improbable; further, it appears to be based wholly on modern likes and dislikes and not at all on an analysis of ancient attitudes. It can be granted that the cyclical concept militated against the idea of infinite progress, but this does not exclude considerable progress, and in any case infinite progress is excluded also by the eschatological vision of Christianity. The attempt of the mastery writers, therefore, to make the 'Biblical' side of the Western thought appear 'progressive' and the 'pagan' side appear stagnant, based upon an alleged

difference between Biblical 'linear' time and pagan 'cyclic' time, must be deemed unsuccessful.

The Heavenly Bodies, Astrology, and Human Freedom

The chain of reasoning employed by the mastery writers regarding astrology is something like the following. If the stars were divine, then they could exert a powerful influence, even a compulsion, upon the affairs of the lower world, non-human and human alike. The destinies of individuals and nations were thus bound up with the wills of the heavenly bodies, which wills could be known, though not altered, by the 'fatalistic' science of astrology. Since the Bible taught that the stars were not divine and demoted them in status to mere lights in the sky, the Bible undermined the very basis of the astrological determinism taught by Israel's Mesopotamian neighbours; this teaching prevented Israel from lapsing into a spiritual slavery to the heavens. The Bible performed a similar service later, for the Roman Empire, when Christians appealed to the Old Testament teaching to repel the contemporary surge of astrological fatalism. The heir of these victories was Christian Europe, where the scientific and technological revolutions began. Europeans, imbued with the certainty that the

stars could not dictate the course of human life, were free from imaginary determinisms and understood the future as genuinely open for experimentation and progress.<sup>12</sup>

Now the notion that the de-divinization of the stars liberated the human will from the teaching of determinism is not peculiar to the mastery hypothesis. It can be found in the writings of Biblical scholars, Jewish moral thinkers, and Christian apologists.<sup>13</sup> In these writings, however, the 'will' which astrology threatens is not seen to be the will to technological mastery but the will to live rightly. Astrological science, insofar as it was deterministic in character, had to be attacked on ethical grounds, because a rigorous determinism undermines the belief that human beings are responsible for their actions, and hence destroys the basis of morality, criminal justice, and the political order. Insofar as there is evidence that belief in astrology does, or did in ancient times, subvert morality, this interpretation of the Bible's intentions seems plausible. After all, no one denies that the Bible is concerned with moral action and the practice of justice, or that the Bible associates certain of Israel's pagan neighbours simultaneously with the worship of the heavens, with astrology, and with wicked living.

It is more difficult, however, to argue, with the mastery writers, that the Biblical de-divinizing of the stars was aimed at removing the inhibitions of Israel (and, mutatis mutandis, of Christendom) regarding the study and manipulation of nature. One does not, after all, find Biblical passages which rail against the Babylonians for having too low a level of science or engineering. The mastery writers must be arguing, then, something like this: the Biblical authors may not have been consciously concerned to pave the way for scientific and technical advance, but they unwittingly served that cause by de-divinizing the stars; this action denied the basis of astrology, which eliminated ancient fatalism and set men free to conquer nature. The Biblical de-divinization of the stars was thus a necessary condition for, though not a conscious initiator of, the modern project of mastery.

It seems a reasonable proposition that an optimistic, technological civilization would require freedom from 'fatalistic' doctrines. It also seems to be true that at times in the ancient West, astrological determinism had a widespread influence upon both the rulers and the masses. Therefore, the inference of the

mastery writers about the effects of the Bible seems possible. There are, however, several difficulties with their account: first, astrology's range of influence in time and space was quite limited; second, the period of Graeco-Roman antiquity in which astrology was most influential coincided with great advances in science and engineering; third, astrology need not be linked, and was not always linked, with fatalism and human helplessness; fourth, there are parts of the Bible which appear to teach, as much as did astrology or any other pagan form of divination, that the actions of individuals and nations are determined, not by free will, but by an inescapable superhuman ordinance.

On the first point, astrology was not believed at all times or by all peoples of the ancient Mediterranean world. The Frankforts remind us of the difference between Egypt and Mesopotamia in this regard: "In Mesopotamia . . . man was at the mercy of decisions he could neither influence nor gauge. Hence the king and his counselors watched for portents . . . in the sky . . . which might reveal a changing constellation of divine grace . . . In Egypt neither astrology nor prophecy developed to any great extent."<sup>14</sup> And Edith Hamilton tells us: "Astrology, which has flourished from the days of ancient

Babylon down to today, is completely absent from classical Greece. There are many stories about the stars, but not a trace of the idea that they influence men's lives."<sup>15</sup> In other words, Egypt could not possibly have been hindered by astrology, and Greece would never have been hindered by it had it not picked it up from the East during Hellenistic times. Therefore, the failure of Egypt and of pre-Hellenistic Greece to master nature cannot have had anything to do with astrological fatalism. The mastery hypothesis at this point suffers from lack of generality.

On the second point, even in the case of the Hellenistic and Graeco-Roman periods, in which astrology was a factor, there is a simple empirical problem, that is, that great advances in science and engineering occurred then. Marshall Clagett, to name only one of many historians who express a similar view, regards the Hellenistic period of Greek science as the greatest, and discusses numerous brilliant scientists and engineers of later antiquity, including Archimedes, Eratosthenes, Heron, Ptolemy, and Galen.<sup>16</sup> How is it that a period in which the stars were experienced as determinants of human destiny could produce such results? It seems that either astrological belief was less prevalent during this era than the mastery writers claim, or the depressing effect



of astrological belief was less pronounced than the mastery hypothesis affirms.

On the third point, one has to ask if astrology in ancient times was necessarily 'fatalistic' or 'deterministic'. Did it imply that there was no real human freedom? This all depends, of course upon how the 'divinity' of the stars was interpreted. Were the stars called 'divine' because they were 'gods', that is, immortal beings having individual personalities and wills? Or were they called 'divine' because they were manifestations of an eternal, impersonal, all-powerful, all-pervasive force which governed the cosmos? In the former case, astrology would be a handmaid of religion; it would attempt to determine the powers and interests of each astral god, and to determine what human action might be taken to avoid that god's wrath or gain that god's favour. In the latter case, astrology would be part of a deterministic natural science, one which revealed the cosmic patterns which would inevitably impinge upon puny individuals and negligible civilizations. In the former case, astrology would be compatible with human freedom to escape crises, to innovate, and to chart a forward course; in the latter case, astrology would be compatible only with an intellectual amor fati, such as that of Spinoza.

Now, which was the understanding of ancient astrology? Or, more precisely, which was the understanding of the various ancient astrologies, since (though Cox and Jaki are not always clear about this) the Babylonian astrology of 2,000 B. C. was not, apparently, identical with the Hellenistic astrology of 300 B. C. and afterward?

In the older Babylonian astrology, in Jaki's account, the stars were divinities in the 'polytheistic' sense, that is, that they were individual divine personages, capable of being placated or outraged:<sup>17</sup>

Obviously, a cosmos . . . of such [mythological] origins could not function as a paradigm of impersonal order but only as the personification of wilfulness. Sumerians, Babylonians, and Assyrians were convinced that every part of nature had a will of its own, often capricious and standing in continual conflict with one another. Such parts of nature, or forces of nature, could in their belief be pacified only by prayer and sacrifice.

Jaki's depiction squares with the account of the Mesopotamian scholar Leo Oppenheim: astrology was a form of divination, and the purpose of divination is not to disclose an irresistible doom, but to inform the client of the forces at work, and to direct him to the auspicious and away from the inauspicious moments for action.<sup>18</sup> And

this makes sense; why would a Mesopotamian king have bothered to consult an astrologer, if the astrologer was bound to tell him that no policy shift could change the date on which the kingdom would fall? The very idea of consulting an astrologer, like that of consulting a doctor or an economist, presupposes that the course of events is at least partly alterable if one possesses the requisite knowledge. One must note, however, that this conception of astrology was not 'deterministic'; there can be no determinism in the cosmos if the gods are capricious. The Babylonian universe was not, for Jaki, overly-determined; rather, it was so under-determined as to be sub-rational and not fit for scientific inquiry. 'Fatalistic', then, is not an appropriate term for the earlier Babylonian astrology. This is worth noting, since Cox, who appears to be making the same contrast between the Bible and the Babylonians, offers a clashing account of Babylonian astrology, in which "the stars are experienced as determinants of human destiny".<sup>19</sup>

Regarding the later Hellenistic astrology, Cox's and Jaki's arguments can be better harmonized around the idea of 'fatalism' or 'determinism'. For in that period religious and philosophical thought tended to understand the stars less as personal gods and more as powers in an

impersonal cosmic order. In this view, the stars could not be bargained with or appealed to; they laid out human destiny coldly and impartially. One might think, then, that at least in principle the mastery hypothesis is relevant here. But how consistently was this determinism adhered to by non-philosophers? According to the Belgian classicist Franz Cumont, the Romans never ceased to regard the stars as "propitious or baleful deities",<sup>20</sup> and so did not succumb utterly to "fatalism":<sup>21</sup>

And, doubtless, some adepts of astrology, like the Emperor Tiberius, neglected the practice of religion, because they were convinced that fate governed all things. Following the example set by the Stoics, they made absolute submission to almighty fate and joyful acceptance of the inevitable a moral duty, and were satisfied to worship the superior power that ruled the universe, without demanding anything in return. . . . The masses, however, never reached that height of resignation. They looked at astrology far more from a religious than from a logical standpoint. The planets and constellations were not only cosmic forces, whose favorable or inauspicious action grew weaker or stronger according to the turnings of a course established for eternity; they were deities who saw and heard, who were glad or sad, who had a voice and sex, who were prolific or sterile, gentle or savage, obsequious or arrogant. Their anger could therefore be soothed and their favor obtained through rites and offerings; even the adverse stars were not unrelenting and could be persuaded through sacrifices and supplications.

Thus, it appears that, while Graeco-Roman astrology was indeed interpreted in a fatalistic way by certain systematic religious thinkers, it did not need to

have the effect affirmed by Jaki and Cox. Inconsistently, perhaps, yet not unlike readers of horoscopes in our own day, the later Graeco-Roman peoples could believe in the predictive power of the stars, yet simultaneously hold that human beings had the freedom to barter with or evade the stellar influence. The prevalence of astrology, then, was not incompatible with a sense of human liberty.

The fourth point about astrology is the one most damaging to the case of the mastery writers. One must keep in mind that their contrast is always between 'pagan' and 'Biblical'. Their portrait of pagan helplessness before the power of the stars, therefore, is impressive only insofar as they can show that no corresponding helplessness is taught in the Bible. If Biblical thought posits a power other than the stars which exerts an equally deterministic influence against man's ability to shape the future, then the kinship affirmed between Biblical and modern progressive thought is untenable.

Of course, orthodox Jewish and Christian thought has always maintained that the Bible teaches the doctrine of free will, that God allows for man's decisions. This claim, however, has not always seemed to fit with other claims of orthodoxy. One might think, for example, of

Calvin's doctrine of predestination. Calvin affirmed the reality of the decretum horribile-- the inscrutable decree, from before Creation, which assigned some to salvation, some to damnation, at God's pleasure. In various treatises (e.g., On the Eternal Predestination of God), Calvin strained to reconcile this decree with the Christian affirmation of free will. His success in persuading his readers was mixed; the Cambridge Platonist Henry More, one of the most learned and philosophical thinkers of the seventeenth century, abandoned his childhood Calvinism, saying that he could never accept "that hard doctrine concerning Fate".<sup>22</sup> More's advised use of the classical word 'Fate' rather than the official theological term 'predestination', emphasizes his opinion that Calvinism denied human freedom just as rigorously as had certain 'pagan' religious thinkers.

The issue, however, is not Calvin's understanding of human freedom, nor that of Augustine, nor that of Aquinas; for the mastery writers (except for Collingwood and the early Foster) do not claim to take their bearings from systematic theology, but from 'Biblical' thought. Therefore, in order to verify that at the root of the 'Judaeo-Christian' tradition there lies a doctrine of freedom compatible with the modern ideas of progress, one

must look directly at the Bible.

It seems hard to deny that the Bible sometimes speaks as if human beings have no ability to alter events, as if both moral choice and the fate of nations rests entirely with God and not at all with man. In the story of the Exodus, it seems that God deliberately shapes Pharaoh's will toward evil ["I will harden Pharaoh's heart", w<sup>e</sup>hizzaqtî<sup>â</sup> eth-lēbh-Par<ōh, Ex. 14.4; "And the Lord hardened the heart of Pharaoh", wayhazzēq 'Adōnāy eth-lēbh Par<ōh, Ex. 14.8] so that he can destroy Pharaoh and gain glory against Egypt. If the Biblical author did not intend this conclusion, why did he choose language with such a deterministic flavour? In a crueller example, from the New Testament, the boy blind from birth is blind, not due to his sin or his parents', but due to God's decree from the beginning, that Jesus might at the appropriate time declare God's glory by healing him (John 9.3). Here the text seems to be teaching that human suffering is sometimes caused neither by human wickedness nor by any limitation upon God's power over the material world, but by an inscrutable and unalterable divine will. Surely in neither of these Biblical passages do we find ourselves in an atmosphere resembling the modern. Pharaoh and the boy are not free; they are, in the vernacular,

'fall guys', manipulated by the divine intentions. From the modern point of view championed by Jaki and Cox, how is this 'Biblical' teaching morally superior to astrological determinism?

Again, the Biblical representation of prophecy smacks of fatalism, at least in some passages. Matthew's Gospel is loaded with Old Testament prophecies, apparently understood as inescapable predictions. Reading Matthew, one feels that Judas, the Pharisees, Pilate, Peter, and the others must do what they do-- betray, deny, humiliate, and kill Jesus-- in order for the Messiah to die and redeem mankind as was prophesied. Indeed, Matthew's Gospel establishes a 'fatalistic' mood at the outset by including in the birth narrative of Jesus a group of pagan astrologers (the Magi) who correctly use their stellar science to predict the time and place of the birth of the King of the Jews!

This is not to say that all Biblical prophecy has to be interpreted as prediction of inescapable future events. Clearly, many of the Old Testament prophecies are intended as warnings, threats, or exhortations rather than prognostication. The prophets often seem to be saying, as it were: 'If you, Israel, behave in such-and-such a way,



you will be very sorry; you will lose your land, be sold into slavery, etc. But if you behave in the prescribed way, it will go well with you; you will have milk and honey, etc.'. But, insofar as many prophecies of the Old and New Testament are apparently intended to predict the smallest details of the future, it must be conceded that Biblical prophecy often parallels Hellenistic astrology in its potential to undermine the human sense of freedom.

It seems, then, that there is something to be said for Calvin's position; the Bible does not teach unequivocally the modern doctrine that human beings are radically free, able to make the future completely according to their wills. Alongside passages which undoubtedly suggest free will, one can place numerous passages which suggest that everything which happens is arranged in advance by the Lord of History. In de-divinizing the stars, the Bible eliminated the influence of the pagan gods, but not of the Biblical God, upon human affairs. It is therefore an oversimplification of Biblical teaching to argue that the Bible, by destroying astrology, created the modern sense of freedom and hence the potential for the conquest of nature. Indeed, one has to wonder whether writers such as Jaki and Cox, both trained in divinity and presumably aware of the

Biblical passages cited above, are nearly as concerned to understand the Biblical sense of history as they are to demolish pagan attitudes which they think to be incompatible with the modern belief in progress.

#### Dominion Within a Divine Cosmos: Stoicism

It is the contention of the mastery writers that pagan thought regarded the world as 'divine' and 'alive', and that this belief prevented them from affirming a proper human dominion over nature. For, if to chop down a tree was to kill a minor divinity (as White suggests), or if to dam a river was to interfere with the vital processes of the cosmic organism (as the 'hylozoic' or 'organismic' view of paganism, described by Jaki and Collingwood, implies), then ancient men, out of reverence for the divine and sacred life in the world, would have been subdued in their attitudes and activities. Now it has already been shown, in the previous chapter, that the ancients did not in practice allow notions of 'aliveness' or 'sacredness' of nature to interfere overly much with their mastery of it. The task of this section is to show that even in theory the divinity or sacredness of nature did not exclude the idea of dominion. In fact, the ancient school which most insisted on the divinity of

nature-- Stoicism-- was, if Cicero can be believed, equally insistent that the greater part of creation was designed for man and that he had a right to use it.

In Cicero's dialogue On the Nature of the Gods, the character "Balbus", who represents Stoicism as Cicero knew it, describes nature as a great living God; the world as a whole, the heavenly bodies, and the elements themselves are pervaded with divinity (Book II, chs. vii-xxviii). A typical passage in Balbus's discourse which expresses this view is II.xiii:<sup>23</sup>

Again, what can be more illogical than to deny that the being which embraces all things must be the best of all things, or admitting this, to deny that it must be, first, possessed of life, secondly, rational and intelligent, and lastly, endowed with wisdom? How can it be the best of all things? If it resembles plants or even animals, so far from being highest, it must be reckoned lowest in the scale of being. If again it be capable of reason yet has not been wise from the beginning, the world must be in a worse condition than mankind; for a man can become wise, but if in all the eternity of past time the world has been foolish, obviously it will never attain wisdom, and so it will be inferior to man. Which is absurd. Therefore the world must be deemed to have been wise from the beginning, and divine.

Thus, for Balbus, as for Plato's cosmological theorist Timaeus (Tim. 29e-34b), the world is a living, rational, divine, being, embracing within itself all lesser beings, divine, animate, and inanimate. It is then

'divine' or 'sacred' in terms of the mastery hypothesis, and therefore Balbus presumably was against the idea that human beings should master it. However, Balbus says quite the opposite. The following passages of Balbus's speech (II.xxxix, liii-liv, lxii-lxiii) demonstrate that not only the human modification of nature but an almost swaggering anthropocentrism was part of Stoicism:<sup>24</sup>

(1) Then why need I speak of the race of men? who are as it were the appointed tillers of the soil, and who suffer it not to become a savage haunt of monstrous beasts of prey nor a barren waste of thickets and brambles, and whose industry diversifies and adorns the lands and island and coasts with houses and cities.

(2) Here somebody will ask, for whose sake was all this vast system contrived? For the sake of the trees and plants, for these, though without sensation, have their sustenance from nature? But this at any rate is absurd. Then for the sake of the animals? It is no more likely that the gods took all this trouble for the sake of dumb, irrational creatures. For whose sake then shall one pronounce the world to have been created? Doubtless for the sake of those living beings which have the use of reason; these are the gods and mankind, who assuredly surpass all other things in excellence, since the most excellent of all things is reason. Thus we are led to believe that the world and all things that it contains were made for the sake of gods and men.

(3) What other use have sheep save that their fleeces are dressed and woven into clothing for men? . . . Then think of the dog, with its trusty watchfulness, its fawning affection for its master and hatred of strangers, its incredible keenness of scent in following a trail and its eagerness in hunting-- what do these qualities imply except that they were created to serve the conveniences of men? Why should I speak of oxen? the very shape of their backs makes it clear that they were not

destined to carry burdens, whereas their necks were born for the yoke and their broad powerful shoulders for drawing the plough.

There is nothing in the above passages to support the idea that pagan philosophy opposed the mastery of nature. The first passage praises mankind for improving nature by the activities of land-clearing, agriculture, and city-building. The second passage exalts man, the rational being, above everything in nature, classing him in this respect with the gods. The third passage makes quite clear that the subjugation of animals is ordained by their natural characteristics; by ruling them, man is not offending against nature but taking up his proper place in it.

In fact, one would struggle to find in the Old Testament any passages more exalting of man, bluntly anthropocentric, and utilitarian than these. Neither Genesis 1 nor Psalm 8, as will be shown in detail in Part Two, affirms any mastery more extreme than what is found in Balbus's speeches. In fact, as will appear, the Old Testament affirms quite decisively that Creation exists for man and the animals; Biblical anthropocentrism is carefully qualified to exclude a purely utilitarian view of non-rational creatures.

This interpretation of Stoicism as favourable to mastery is confirmed by the analysis of Balbus's doctrines offered by John Passmore, and by some remarks of Clarence Glacken.<sup>25</sup> Even more important than the fact that the Stoics approved of mastery, however, is the fact that they approved of it while holding that nature was divine. The Stoics did not infer, as do the mastery writers, that the divinity of the world is incompatible with its control by man. Rather, they took a considerable degree of mastery for granted and, at least in Balbus's speech, went out of their way to praise and justify it. Nor should this be surprising; one finds exactly the same combination of assertions-- the divinity of the world as a whole, the godlike rationality and hence superiority of human beings, and the rightfulness of ruling over land, vegetable and animal life-- in Plato, Aristotle, and other classical writers. Foster's claim-- that classical philosophy was "an intellectualized form of nature-worship"<sup>26</sup>-- is perhaps true if one has in mind that part of classical philosophy which contemplated the order of the whole, or the divine character of the heavens, but there is little evidence in the writings of classical philosophers, and none supplied by the mastery writers, that classical philosophers therefore advocated passivity before the

natural objects and forces of the sublunary realm. It appears, then, that the pagan, divinized world was no more a barrier to domineering attitudes than the Biblical, 'desacralized' one.<sup>27</sup>

The Chorus from Sophocles' Antigone

Not only Stoic philosophers but tragic playwrights painted a very high picture of man, emphasizing his cleverness and power over all things on earth. Below is Hans Jonas's translation of the famous chorus from Sophocles' Antigone (lines 335-370):<sup>28</sup>

Many the wonders but nothing more wondrous than man.  
This thing crosses the sea in the winter's storm,  
making his path through the roaring waves.  
And she, the greatest of gods, the Earth--  
deathless she is, and unwearied-- he wears her away  
as the ploughs go up and down from year to year  
and his mules turn up the soil.

The tribes of the lighthearted birds he ensnares,  
and the races of all the wild beasts  
and the salty brood of the sea,  
with the twisted mesh of his nets,  
he leads captive, this clever man.  
He controls with craft the beasts of the open air,  
who roam the hills. The horse with the shaggy mane  
he holds and harnesses, yoked about the neck,  
and the strong bull of the mountain.

Speech and thought like the wind  
and the feelings that make the town,  
he has taught himself,  
and shelter against the cold, refuge from rain.  
Ever resourceful is he. He faces no future helpless.  
Only against death shall he call for aid in vain.  
But from baffling maladies has he contrived escape.

Clever beyond all dreams  
the inventive craft that he has  
which may drive him one time or another  
to well or ill.  
When he honors the laws of the land  
and the gods' sworn right  
high indeed is his city; but stateless the man  
who dares to do what is shameful.

This text declares unambiguously the fact of human mastery over nature. While it is not a justification of unlimited control over everything, there is no doubt that it gives man a high place in the order of things. Agreeing with Cicero's Balbus, Sophocles affirms human dominion over all the creatures under the heavens. Further, Sophocles records no hesitation about the rightness of such mastery. Even when he speaks of agricultural activity as 'wearing away' the Earth, the greatest of gods, there is no suggestion of impiety in the context; Sophocles is moved to wonder, not censure, at the power of man. The hesitation Sophocles has about human beings, which is expressed in the final paragraph of the translation, is not over their technical capacity to overcome nature, but over their moral and spiritual waywardness, which may lead them to turn against the laws of the city and the demands of the gods.

Keeping in mind the need to address the mastery hypothesis by comparing the classical material to the



Biblical, one cannot help but comment upon the similarity between the Sophocles passage and the Old Testament passages cited by the mastery writers (Gen. 1.26-29, 9.1-7; Ps. 8). The first observation to make here is that no creature mentioned in Genesis 1 or 9 or Psalm 8 is missing from the Sophocles passage. Animals of the land, sea and air are understood to be given into the hand of man, in the pagan quite as clearly as in the Biblical text. Hunting, fishing, and the servitude of domestic beasts are taken for granted. The second point to note is that the language about 'wearing away' (apotruesthai: 'to rub away', 'to vex', 'to harrass') the great god Earth sounds at least as aggressive as the Biblical statement about 'subduing' the earth. (It may be even more aggressive, since, as will be shown in Chapter Four below, the violent aspect of 'subduing' in Genesis 1 has been overstressed by some interpreters.) In sum, then, Sophocles' chorus can be seen as a succinct statement of a human mastery over nature equal to that preached by the Bible.

In fact, the mastery Sophocles describes is more penetrating than that described in the Bible. Man's mastery includes considerable control over "baffling maladies". Whereas 'pagan' practice had tended to treat

many diseases as something caused by demons or gods and hence beyond human ability to cure, the Greek thinkers tried to show that all disease was rooted in nature, and hence could be combatted by science and art. A typical Hippocratic author of about 400 B. C. writes: "I am about to discuss the disease called 'sacred'. It is not, in my opinion, any more divine or more sacred than other diseases, but has a natural cause, and its supposed divine origin is due to men's inexperience . . ."29 The Bible, on the other hand, tends to retain the 'pagan' idea that disease is a punishment sent from God (especially in the Old Testament) or is a consequence of demonic activity (especially in the New Testament). Sickness is regarded not as a defect of nature which can be rectified by art, but as a positive evil of spiritual origin. Thus, words meaning something like 'physician' occur hardly at all in the Old Testament, and occur only slightly more in the New,<sup>30</sup> and healings which occur in the Bible are almost uniformly attributed to God, one of the prophets, or Jesus. In this area, then, Sophocles' estimate of man's power over nature is greater than the Bible's.

Also, whereas the Bible simply affirms man's dominion over nature, Sophocles stresses that man has earned that dominion by his 'inventive craft', his

'cleverness', his 'speech', and his 'thought'. This seems to be a much more explicit account of the roots of mastery: human dominion comes from thinking and contrivance. Such a text would appear to offer a more promising basis for later Western developments than would the rather naked Biblical account, which does not say how human dominion has been or is to be established.

To conclude this section: it is undeniable that the Greek playwright Sophocles, no less than the narrator of Genesis or the Psalmist, noticed the immense capacity of man to dominate nature. If the unelaborated statements about 'dominion' found in Genesis and Psalm 8 can be interpreted as justifications of unlimited technological mastery, then so can the more suggestive verses of Sophocles, and the mastery writers' distinction between 'pagan' and 'Biblical' collapses. On the other hand, if, as seems more likely, neither Sophocles nor the Bible had in mind anything more than the sway man held over nature through the normal arts and sciences of the ancient world, the distinction will be equally invalidated.

#### Mechanical Views of Nature in Classical Antiquity

According to a number of mastery writers,

including Foster, Collingwood, Hooykaas, Oakley, Duhem, and Jaki, Christian thought made a fundamental break with the classical philosophy of nature. For the ancient Greek thinkers, they say, nature was understood as a vast organism, and its parts understood as interacting vital organs, each striving to fulfill its purpose in the whole.<sup>31</sup> The Bible, they say, rejected this organismic view, which rested on pagan 'animism' or 'pantheism'. The Bible 'de-divinized' nature, especially the heavens, and thus stripped nature of the 'life' which was entailed by its divinity. The West thus came to think of nature as a gigantic artifact, of which the parts were non-living, which was governed by mechanical laws of motion. It was the insight that nature was understandable in mechanical terms which allowed the seventeenth-century thinkers to work out the mathematical laws governing the movement of the heavens; it was the same insight which allowed for the great technological advances by which we have learned to manipulate nature for our benefit. Thus, say the mastery writers, it is certain that, if it had been left up to the Greeks, the West never would have developed the mathematical-mechanical conceptions required for its intellectual and practical dominion over nature.

Now two assertions are being made here: first,

that the Bible, taught, implied, or at least leaned toward a mechanical understanding of nature; second, that Greek thought did not teach, or could not possibly have taught, such a conception. Both claims seem to require qualification. The first claim rests upon the uncertain deduction that the Bible, in 'de-divinizing' nature, also 'de-animated' it; this deduction is not demonstrable from the Biblical text, as will be shown in Chapter Three below. The second claim rests upon a very limited acquaintance with Greek ideas of nature, and, as will be shown in this section, cannot withstand examination.

'Greek' or 'classical' thought about nature was not a homogeneous whole. Not all of Greek thought was 'organismic' or excluded the possibility of mechanical models of nature. The mastery writers tend to think of Greek science as Platonic science, Aristotelian science, Stoic science, or as some blurry version of the three. They lightly skip over, if they do not utterly ignore, the existence of Epicurean science, even though most of are aware that many seventeenth-century 'mechanical' thinkers, including Bacon and Gassendi, consciously opposed elements of Epicurean atomism to Aristotelian theories.<sup>32</sup> They do not usually mention the pre-Socratic philosophers, such as the physicist Anaxagoras, who explicitly 'de-divinized'

the heavens by saying that the sun was a burning rock and the moon was a stone (Plato, Apology 26d), and whose explanations of physical phenomena sound as mechanical as those of Hobbes or Descartes.<sup>33</sup> They do not mention, or pass hurriedly over, the mathematical physics and engineering of the Hellenistic thinkers, including Heron's experiments with steam and Archimedes' work on the lever, which displayed not the slightest trace of 'organismic' thinking.<sup>34</sup> In other words, they ignore the fact that a considerable number of classical writers, none of whom had read the Bible, opposed to the 'organismic' approach of Plato and Aristotle a science of nature which can be called 'mechanical'.

Jaki, in his strident criticism of the failures of late Babylonian astronomy, himself admits that the Hellenistic Greek astronomers differed from their Mesopotamian contemporaries in their use of mechanical models:<sup>35</sup>

The non-scientific character of Babylonian astronomy is strikingly evident from the fact that it has never developed even tentatively a geometrical, or a mechanical model of the system of the planets. This is all the more strange as the scientifically best phase of Babylonian astronomy . . . belong to the same centuries during which ancient Greek astronomy made most extensive use of geometrical and mechanical models to explain the planetary system and the closed, spherical universe. During those centuries that

witnessed the work of Calippus, Eudoxus, Apollonius, Hipparchus, and Aristarchus, contacts were numerous between Greece and Mesopotamia. Nevertheless, Babylonian astronomy shunned outside influences, especially those from Greece . . .

Thus, Jaki would have to admit that his generalization about Greek thought as 'organismic', a generalization based primarily upon his interpretation of Aristotle, the Stoics, and Plato, is inadequate. Nor is it perfectly clear that even Plato was totally opposed to mechanical models of natural things. Classicist R. S. Brumbaugh, who has made a special study of the ancient Greek appreciation of machines, writes: ". . . in crucial passages Plato does write as though he were visualizing mechanical models".<sup>36</sup> And Jaki himself, in a passage quoted earlier (p. 101 above), notes that Plato in the Statesman described the heavens as a huge machine; why then does Jaki choose as the 'official' Platonic view the speech of Timaeus,<sup>37</sup> in which the world is called an 'animal'? Further, even in the Timaeus the world is an 'animal' only in a metaphorical sense; it does not breathe, eat, excrete, or reproduce; it has no organs of sensation and no limbs for local motion; it can move only in a circle (cf. 32d-34b). Its broad plan of 'organization' is nothing like the arrangement of 'organs' in a biological 'organism'; it is rather a spherical

arrangement of celestial bodies around a central earth. Plato scholar Desmond Lee likens the cosmos of the Timaeus not to an animal but to an armillary sphere.<sup>38</sup>

It is not in Plato, however, that the most impressive evidence for Greek mechanistic thinking is found. The most noteworthy ancient advocates of mathematical-mechanical approaches to nature were the Hellenistic thinkers, among whom were Archimedes, Heron, and Eratosthenes. These scientist-engineers made advances in pure mathematics, employed models to understand natural phenomena, and designed and sometimes constructed mechanical contrivances, including steam-powered automata. Also, they were aware of, though uninterested in, the possibility of applying their mathematical-mechanical science to the control of nature.

The greatest of these scientist-engineers was Archimedes, who made great strides forward in mathematics, physics, and, if several ancient accounts can be believed, military technology. The last-named field is of the most interest here. Plutarch, in his Life of Marcellus, tells us of one amazing achievement of Archimedes:<sup>39</sup>

And yet even Archimedes, who was a kinsman and friend of King Hiero, wrote to him that with any given force it was possible to move any given



weight; and emboldened, as we are told, by the strength of his demonstration, he declared that, if there were another world, and he could go to it, he could move this [world]. Hiero was astonished, and begged him to put his proposition into execution, and show him some great weight moved by a slight force. Archimedes thereupon fixed upon a three-masted merchantman of the royal fleet . . . seated himself at a distance from her, and without any great effort, but quietly setting in motion with his hand a system of compound pulleys, drew her towards him smoothly, and evenly, as though she were gliding through the water. Amazed at this, then, and comprehending the power of his art, the king persuaded Archimedes to prepare for him offensive and defensive engines to be used in every kind of siege warfare.

We learn the details of this siege warfare from Diodorus Siculus, who records how Archimedes defended Syracuse from the Roman army of Marcellus:<sup>40</sup>

Archimedes, the famous and learned engineer and mathematician, a Syracusan by birth, was at this time an old man, in his seventy-fifth year. He constructed many ingenious machines, and on one occasion by means of a triple pulley launched with his left hand alone a merchant ship having a capacity of fifty thousand medimni. During the time when Marcellus, the Roman general, was attacking Syracuse both by land and by sea, Archimedes first hauled up out of the water some of the enemy's barges by means of a mechanical device, and after raising them to the walls of Syracuse, sent them hurtling down, men and all, into the sea. Then, when Marcellus moved his barges a bit farther off, the old man made it possible for the Syracusans, one and all, to lift up stones the size of a wagon, and by hurling them one at a time to sink the barges. When Marcellus now moved the vessels off as far as an arrow can fly, the old man then devised an hexagonal mirror, and at an appropriate distance from it set small quadrangular mirrors of the same type, which could be adjusted by metal plates and small hinges. This contrivance he set to catch the full rays of the sun at noon, both summer and winter, and eventually, by the reflection

of the sun's rays in this, a fearsome fiery heat was kindled in the barges, and from the distance of an arrow's flight he reduced them to ashes. Thus did the old man, by his contrivances, vanquish Marcellus.

Now this account of the role of Archimedes in defending Syracuse is regarded by most historians as somewhat exaggerated, or even utterly fanciful. In particular, the burning of the ships with mirrors has been rejected, both because it is not found in the earlier versions of the story and because it has not proved replicable in modern times. On the other hand, the straightforward tone and the detailed descriptions given by Plutarch, Polybius, Livy and Diodorus suggest that the incidents described have some historical basis in Archimedes' actual technical interests. Such is the opinion of classical historian G. E. R. Lloyd.<sup>41</sup> Moreover, even if the stories are accounted as complete fabrications, they show that ancient historians, if not ancient engineers, had the concept of human art exalted by mathematics, and acknowledged the possibility of wonders worked by technology. They show that the non-Platonic, non-Aristotelian fusion of art and mathematical science, claimed by Foster as the unique conception of Bacon, Descartes, and the Royal Society,<sup>42</sup> was at least imaginable to the non-Christian world of antiquity, and owed nothing to the Bible for its inspiration.

In another way, too, these passages conflict with the picture of classical man portrayed by the mastery writers. In reading them, one encounters no expressions of censure, no tone implying fear or suspicion, no suggestion that Archimedes overstepped proper human limits in his attempt to conquer nature by applying mechanical insights to it. Instead, one detects reverence for Archimedes and admiration for his accomplishments. Yet how, on the grounds of the mastery hypothesis, could the classical writers have had any reaction to Archimedes' work other than to fulminate against him as the most impious of men, probing unnecessarily into nature's ways and performing unnatural feats of mechanical art?

Of course, it is true that Archimedes, unlike Francis Bacon, was not interested in creating a modern technological civilization. But this lack of interest was not caused, as far as the ancient accounts tell, by any pious scruples about nature on Archimedes' part. Plutarch accounts for it by suggesting that Archimedes, like other explorers in mechanical physics, was hindered by Platonic prejudices against establishing scientific conclusions from sense-evidence rather than from pure reason and against 'dirtying one's hands' in manual operations:<sup>43</sup>

For the art of mechanics, now so celebrated and admired, was first originated by Eudoxus and Archytas, who embellished geometry with its subtleties, and gave to problems incapable of proof by word and diagram, a support derived from mechanical illustrations that were patent to the senses. . . . But Plato was incensed at this, and inveighed against them as corrupters and destroyers of the pure excellence of geometry, which thus turned her back upon the incorporeal things of abstract thought and descended to the things of sense, making use, moreover, of objects which required much mean and manual labour. For this reason mechanics was made entirely distinct from geometry, and being for a long time ignored by philosophers, came to be regarded as one of the military arts.

Now Plutarch grants, in his account of Archimedes and Hiero, that Archimedes deviated from the Platonic ideal insofar as he taught Hiero by manual demonstration and helped to defend Syracuse; but he does not forget to add to that account that Archimedes left behind him no treatise on military technology, because he regarded arts that administered to practical needs as "ignoble and vulgar".<sup>44</sup> This shows, for Plutarch, that Archimedes remained true to the Platonic ideal of science. In reference to the mastery hypothesis, it shows something else: for Archimedes, the large-scale mastery of nature was not something too divine to attempt, but something too banal to bother with. Thus, it was a judgment that philosophic dignity would be compromised by applied science, not a 'pagan' doctrine of nature, which hindered the better Greek engineers from proceeding according to

the Baconian ideal of mastery.

Of course, some of the mastery writers, notably White and Forbes, have argued that the low estimate of applied science in the classical world, connected with a low estimation of manual labour, was also overthrown by Christianity; they have in mind the value attributed to work in monastic life, and the consequences of this 'work ethic' for the West.<sup>45</sup> Their argument has plausibility, but, as it rests upon Christian ideas of ethics rather than upon Biblical ideas of nature, it does not need to be examined in the present essay.

#### Plato and Aristotle on "Conforming to Nature"

Michael Foster, in a passage quoted in the Introduction to his work, argued that in 'Greek' thought man was to conform to rather than to master nature:<sup>46</sup>

There is a difference between ancient and modern attitudes to nature. On the ancient view, man is a part of nature, and his true destiny is to conform himself to it, "to live according to nature". Such a life was the end to be achieved by philosophy, and in a broad sense by science; the two were not very sharply distinguished. . . .

In modern times science has acquired a different aim, that of mastery over nature. This new aim is expressed by the prophets of the new era, Bacon and Descartes. Bacon in his Novum Organum speaks of "the interpretation of nature and the dominion of man" (De Interpretatione Naturae et Regno Hominis).

Descartes claims that it is possible to introduce a new physics which would make men "lords and possessors of nature" (Discourse on Method, part VI). This practical direction of modern science is connected with the fact that it gave birth to a technology and hence to the scientific transformation of the world. . . .

This attitude of man to nature, characteristic of modern science and characteristically un-Greek, has a Biblical source. In Genesis 1.28 man is commanded "replenish the earth and subdue it". In Psalm 8 the psalmist says "Thou madest him [man] to have dominion over the works of thy hands, thou hast put all things under his feet".

Now the careful reader of the above quotation will notice that Foster slips, apparently unconsciously, from one meaning of nature to another as he writes. He appears to be trying to contrast, in his first and second paragraphs, the attitude which makes man "part of nature", and therefore subservient to it, and the attitude which places man above and outside nature, as its master. By "nature", therefore, he seems to intend the non-human world and its processes. The Greek thinkers, he implies, were 'pagan' because, in trying to "conform to nature", they were affirming that they ought to respond to the external world, rather than to make demands upon it, as the Bible urges. Yet the "nature" to which the Greek philosophers felt bound to conform was, as Foster the political philosopher must have known, not any object or natural process, but human nature, understood normatively:

the rationally cognizable "form" or "idea" to which man, the rational animal, ought to shape himself. Of course, a thinker will contemplate the 'natures' of other beings in order to help determine the specific characteristics of human 'nature' and hence to establish the place of man in the order of things, but this is respect for the proper arrangement of the world, not 'nature worship'; there is no implication that humans should imitate or be subservient to other natural beings. "Plato and Aristotle never believed", wrote Leo Strauss, that the "stars, heaven, sea, earth, generation, birth and death" give answers to questions of human conduct.<sup>47</sup> Plato knew that the natural things were, in themselves, "mute riddles", and sought wisdom not in them but in the non-external, in human discourse or logoi.<sup>48</sup>

Strauss's statement is verifiable from a passage in Plato. In the Phaedrus-- the only dialogue in which Socrates is shown outside the city, that is, in 'nature'-- Phaedrus remarks on Socrates' lack of acquaintance with the countryside beyond the Athenian walls. Socrates replies (230d): "You must forgive me, dear friend; I'm a lover of learning, and trees and open country won't teach me anything, whereas the men in the town do". Socrates is concerned primarily with the human things, and the human

things-- especially the ethical and political good-- can be learned only from discourse in the city and about the city, in which human beings live. He does not expect to find profound truths about life by communing with tree-spirits; his philosophy is not, as Foster claims "an intellectualized version of nature-worship".<sup>49</sup> It is not nature-worship at all, but a quest to find the good for man, a quest which, in the language of the mastery hypothesis, is much more 'Biblical' than 'pagan'.

In fact, the attempt by Greek philosophers to determine the moral demands of human nature implied rather than denied the mastery of external nature. For philosophy, the leisurely search for truth, is possible only in a 'high' culture, that is, a cultural enough technically advanced to guarantee the basic comforts of life, and to free up time and energy, at least for a gifted few, to think, talk, and argue. Philosophy as Foster understands it was born, not in the Peruvian jungle, but in the Greek polis, in which the arts (agriculture, navigation, weaving, metalworking, woodworking, and so on) had transformed the 'natural' environment into something which was far more than merely natural. Plato and Aristotle never advocated abandoning urban life for some imagined primitive, non-technical



society; instead, they sought to perfect the polis. Therefore, they tacitly assumed that the life in accordance with human 'nature' required a degree of mastery over 'nature' conceived as non-human objects and forces.

Limitations Upon the Mastery of Nature  
in Classical Thought

In each of the sections of this chapter, an attempt has been made to show that the thought of pagan Western antiquity was not, either by its own explicit statements of its principles or by the deductions which the mastery writers have made from those principles, opposed to 'mastering nature' in the broad sense of the phrase. However, as stated in the introductory part of the chapter, the classical thinkers did not believe in the unlimited or infinite mastery of nature. Just as in pagan practice, a small portion of the total forested land was reserved for the gods and not for human wishes, so in pagan theory certain ideas set bounds upon human ambitions.

One of these ideas, already discussed, was the notion that the universe is periodically destroyed in

conflagrations or floods; this view implied that scientific and technological progress would from time to time be interrupted. Such an interruption would have been deemed fitting or proper by most classical thinkers, since they believed that nature was organized, on the whole, for the good of everything in it, including man. If God (whether conceived as outside the world as its maker or inside the world as its vital principle) determines or causes the world to perish at fixed intervals, that determination or causation is divine, fair, and good. To rail against it would be to set up human desires against the divine Mind or the divine Nature itself; such an attitude would be rebelliousness or even madness. Any limitations upon human progress implied by the cyclical nature of things, therefore, could easily be understood by most classical thinkers as providential and to be gratefully submitted to.

Perhaps a more significant cause of the hesitation of classical thinkers to affirm an unlimited mastery over nature was classical thought's appraisal of the ambiguous character of man. We have already seen, in the Sophocles passage, that man, though wise in the ways of dealing with nature, remains open to great acts of injustice and impiety. How then might he act if he were to gain an

utterly penetrating vision of external things, and hence come to possess powers which were genuinely godlike? Might he not be tempted to overstep his own 'nature', that is, the proper bounds set for him, both in relation to non-human things and in relation to his own kind? This danger is hinted at by Xenophon (Memorabilia 1.10-15). In the course of defending Socrates from the charge of impiety, Xenophon turns his attention to the criticism Socrates aimed at certain investigators of nature who sought to grasp 'divine' or 'heavenly' things:<sup>50</sup>

No one ever saw or heard Socrates say or do anything irreverent (asebes) or unholy (anosios). He did not hold discussions on the nature of the universe (ta panta) as most of the others did, and he did not speculate as to what the "cosmos", as the sophists called it, was like, or by what laws (tines anankai) each part of the heavens (hekaston ton ouranion) came into being. Furthermore, he declared that people who even thought about such matters were foolish. He would first ask them whether they had entered upon investigations of these problems because they thought they knew enough about human affairs (ta anthropina), or whether they thought that they were doing their duty by dismissing human affairs (ta men anthropeia) and speculating on divine concerns (ta de daimonia). . . . These were not the only questions that Socrates raised about the theorists. [He said] "Like the men who learn human knowledge (ta anthropeia) and believe that they will apply their knowledge for their own advantage or for whomever they choose, so men who study divine questions (ta theia) think that when they know the laws (anankai) by which everything comes into being (hekaston gignetai), they will, when they choose, create (poein) winds, water, seasons, and everything else like these that they may need. Or have they no hope (he men ouden oude elpizousin) for any such thing, but find it enough

simply to know (gnonai monon) how each of these phenomena occurs?" This is what Socrates had to say to the men who dealt with these questions. As for himself, he was always discussing human problems and examining questions like, "What is reverence (eusebes)?" "What is irreverence (asebes)?" "What is good? or evil? or justice? or injustice?" . . . Men who know the answers to questions like these, he thought, are truly noble (kalos k'agathos) . . .

In this important passage, Xenophon makes a contrast between knowledge of nature and knowledge of human matters. The pursuit of the latter is a good for human beings; in fact, it leads to the highest good, the perfection of human nature, the state which entitles a man to be called kalos k'agathos. The pursuit of the former, however, is ambiguous; for knowledge of nature is knowledge of 'divine' (daimonia, theia) things, and divine things surpass human things in their ability to wreak good or evil. Knowledge of divine things will yield power not presently given to human beings, power not merely to re-arrange or exploit the given natural environment by modest contrivance, but to produce natural things themselves out of the fundamental principles of the universe. There is no guarantee that such knowledge will be used well. It may be used to alter or destroy the order of the world. It may be used by a few to enslave entire nations, or the race itself; such would be the most inescapable of tyrannies. Indeed, the mention, early in

the passage, that the ones inquiring into nature are sometimes known as "sophists", calls to mind those Sophists, the opponents of the Platonic Socrates, who were known for their justification of the rule of the strong. It seems, then, that mastery over nature in this sense-- over the eternal divine necessities which produce all things-- may not be good for men to have.<sup>51</sup>

When Bacon in his New Atlantis described chambers where his scientists made lightning and other natural phenomena, he was projecting as a legitimate goal of science the unlimited control over nature which Xenophon here suggests may be both irreverent (asebes) and destructive of humanity. It seems, then, that the mastery writers are right to insist that the Greeks (especially Socrates, Plato, Xenophon, and Aristotle) were hesitant to assert an unlimited dominion over nature. The grounds for this hesitation, however, were not a theoretical commitment to 'animism' or 'pantheism' or 'organicism' or some other 'pagan' model of nature, but to a healthy and reasonable fear that, once in control of superhuman (i.e., 'divine') generative powers, man would be a danger to himself. Both his political freedom and his quest for moral excellence would be constantly vulnerable to the temptations posed by his new capacities.

And, it must be added, this fear of unlimited human freedom is found not only in classical thought but in the Bible; the story of the Tower of Babel expresses, in part, the concerns of Socrates and Xenophon. In Parts Two and Three below, the Babel story will be interpreted to show that on the question of boundless technical achievement, the Bible is closer to the 'pagan' than to the 'Baconian' view.

#### Conclusion

Based upon the above discussions, the following assertions can be made about classical thought on man's dominion over nature.

First, classical Graeco-Roman thought took it for granted that man had dominion over the lower beings, exactly as did the Bible. Regarding the parts of the universe below the heavens, classical thought was highly anthropocentric. This anthropocentrism is most clearly seen in Stoicism, but is not hard to discern in Platonism or Aristotelianism.

Second, classical thought believed that it was

possible for the arts and sciences to advance, and was not frustrated either by notions of astrological determinism or by belief in the cyclical destructions of the cosmos. Belief in the cyclical destructions of the cosmos made it impossible for progress in the arts and sciences to be infinite; but this was of little concern to ancient thinkers.

Third, several Graeco-Roman scientist-engineers of the Hellenistic period, including Archimedes, Heron, and Eratosthenes, conceived of and contributed to a mathematical and mechanical natural science, and were aware of its potential practical applications; these thinkers, uninformed by the Bible, anticipated to a considerable extent later developments in European science. These thinkers, however, were not moved by the goal of complete technological mastery, not because they held to any pagan theology of nature, but for social reasons. They did not think a technological civilization would be worth building. The basis of this may have been an anti-manual snobbery, a love of pure theoretical knowledge, or simply satisfaction with the level of comforts and industries then existing.

Fourth, an important body of classical thought,

represented primarily in the writings of Plato, Aristotle, and Xenophon, had hesitations about the unlimited mastery of nature on moral and political grounds. Human beings, according to this body of thought, were not always virtuous; therefore, it would be unwise to put unlimited power into their hands. Neither an individual, nor a society, nor the race as a whole could be trusted not to abuse unlimited power over nature. Human beings ought to be constrained by limits, limits which the technological conquest of nature would dissolve. The dangers imagined by the writers who thought in this way were not specified, but it can be imagined that they had in mind: tampering with the balance of nature; destroying existing entities and creating new ones; enslaving other individuals or nations by means of irresistible weapons or devices; pursuing the knowledge and control of nature so exclusively that the quest for human virtue is forgotten.

Part One of this essay has now been completed. It has been shown that neither in practice nor in theory did 'pagan' man hesitate to assert an extensive 'dominion' over natural objects. The two extreme pictures of pagan man painted by the mastery writers-- the helpless, passive victim of nature and history on the one hand, and the



Romantic seeker of wisdom and harmony on the other, have both been shown to be exaggerations. Pagan man was neither too afraid of nature nor too absorbed into nature to dream of mastering it. Pagan man's position was more complex and subtle. Nature was beautiful, orderly, filled with life, partly divine, partly sacred, and in important ways to be respected-- yet it was, in large part, inferior to man and made for his use. In most of these respects, the pagan attitude is not different from that taught in the Bible. Therefore, the schematizing of possible attitudes toward nature into the extreme attitudes characterized as pagan passivity and Biblical domination obviously needs correction. That correction cannot be made, however, until the Biblical attitude toward nature is more systematically set forth. The next two chapters undertake this task.

PART TWO:

Nature and Mastery in the Old Testament

### Introductory Remarks

By establishing that ancient Western 'paganism' neither preached nor practiced a simply passive attitude toward nature, the previous chapters have seriously weakened the basis of the mastery hypothesis. For if 'paganism' cannot be simply identified with 'nature worship' and with a conservative stance regarding the manipulation of nature, then the use of 'paganism' as a foil for the virtues of the Bible-- as by Cox, Foster, Jaki, and others-- or as an ideal of which the Bible falls woefully short-- as by Roszak, White, Suzuki, and others-- becomes impossible.

This, however, is not the only weakness in the mastery hypothesis. For, not only 'pagan' but also 'Biblical' thought is subtle and complex. Upon examination it appears that, just as paganism cannot be equated with total reverence for nature, neither can Biblical thought be equated with total contempt for nature. Just as paganism defied the schema of the mastery writers by proving to allow considerable scope for human modification and control of natural objects and forces, so the Biblical text defies the same schema by implying and

at points demanding that human beings restrain themselves in their mastering activities. The burden of the next two chapters is to show this latter point, by a careful consideration of relevant passages of the Old Testament, or Hebrew Bible.

It may be asked why the investigation should be limited to the Old Testament, why the New Testament and the later Jewish and Christian traditions about nature and human mastery are not equally relevant. The answer to this question is implicit in the hypothesis itself. The hypothesis tacitly assumes or explicitly states that the core teaching of the entire Judaeo-Christian tradition regarding nature and man's place in it is found in the Old Testament: in Genesis, in Psalm 8, and in the general Old Testament rejection of nature-worship as idolatry. The mastery writers therefore feel no need to exposit the New Testament, which they presume is consonant with the Old, and when they call upon the post-Biblical, theological tradition (Augustine, Bishop Tempier, etc.), they presume that this tradition was an attempt, largely successful, to translate the Old Testament teaching about Creation into metaphysical language about nature.<sup>1</sup> Therefore, according to their own assumptions, it is proper to take the Old Testament as the subject of contention.

A different line of argument is of course possible. One might choose to make a distinction between the Old Testament and the New, and argue that, since the New Testament supersedes the Old as a full statement of Christian teaching, any notions about nature maintained in the New Testament must be taken as properly Christian. This would force the consideration of passages ignored or evaded by the mastery writers. For example, the New Testament is replete, as the Old Testament is not, with demons and demonic possessions. The symptoms of the people possessed by demons in the New Testament seem to be those of various diseases, such as epilepsy and mental illness. Jesus cures these diseases not by medicine but by the methods of exorcism. The mastery hypothesis, contending that nature became conquerable only when it was conceived of as impersonal matter, cannot explain the rise of scientific medicine in a world in which sickness is believed to be caused by demons rather than by bacteria, and in which Jesus is depicted as something closer to a shaman than to a biochemist. With its belief in evil spirits, the New Testament world seems much more 'pagan' than the Old, which is almost completely free of such notions. The conclusion would seem to be that Christianity, being incompatible with the clear-headed, rational account of nature given in Genesis, could not

have been the ground of modern mastery; but such a conclusion would throw the mastery hypothesis into utter disarray. Therefore, out of charitable motives, it is best to stay on the mastery writers' ground, and to dispute their findings only on the basis of the Old Testament.

In attempting to evaluate the mastery hypothesis from the Old Testament evidence, one has to carry out the investigation in the light of the hypothesis itself, which is built upon the ideas of 'desacralization' and 'dominion'. Therefore, two broad questions have to be asked: (i) in what sense does the Old Testament 'desacralize' or 'de-divinize' or 'de-animate' nature, and what consequences does this entail for the understanding of nature? (ii) in what sense does the Old Testament demand or allow for human 'dominion' over nature, and what, if any, are the limitations upon such dominion? Chapter Three below responds to the first of these inquiries, Chapter Four to the second.

The remaining remarks in this section-- on interpretive procedure, scholarly and intellectual sources, and the presentation of results-- are aimed at orienting the reader to the approach taken to the Bible in

the two chapters.

The mastery writers exhibit a somewhat unsystematic approach to interpreting the Old Testament. This is true of their Biblical commentary in general, and most obvious in their argument about 'dominion'. In claiming that the Bible preaches 'dominion', they rest a great amount of weight upon a few striking passages-- Genesis 1.26-28, Genesis 2.19-20, and Psalm 8.5-8-- but pay little attention to the literary context of these passages. The literary context generally ignored includes not only the immediate context (i.e., the neighbouring verses), but also the broader context-- those large units of the Bible (e.g., Genesis 1-11, and that entire body of Psalms which portray nature) in which the smaller units are located and have their meaning. Such a procedure must strike anyone trained in the reading of the Bible-- or of any literature-- as insufficient. Just as it is unsafe to interpret a line from a Shakespearian play or a Platonic dialogue without taking into account the speaker and the setting, and without having a sense of the whole work, so it is unreliable to derive a doctrine of dominion over nature from a few Biblical statements, unless these have been carefully related to other Biblical statements and to the sense of the Bible as a whole.

Therefore, in the following chapters, what is offered is a reading of the Old Testament which is closer and more careful than that of the mastery writers. It is closer and more careful for two reasons. First, it looks more intently at the context of the specific passages (Genesis 1, Psalm 8, etc.) employed by the mastery writers, in order to determine whether the mastery writers' claims for those passages should be accepted. Second, it looks at a large number of Biblical passages which are not considered by the mastery writers, and tries to evoke from such passages an account of Biblical thought about nature, an account which can serve to test the statements of the mastery writers. The results of this closer and more careful reading are not exhaustive, and the interpretation is offered tentatively rather than authoritatively; it is, however, complete enough to show the inaccuracy of the mastery writers' reading, and, it is hoped, complete enough to make a modest contribution to the understanding of Biblical thought on nature.

No particular theological stance, either Christian or Jewish, is here adopted. Precisely because the mastery writers affirm that the Jewish and Christian traditions are ultimately derived from, and to be measured by, the



Old Testament text, only the text as it stands prior to any theologizing is the basis of argument. Of course, it is difficult to eliminate all possible theological bias, and even more difficult to block the subtle influence of centuries of traditional exegesis, but a sincere attempt has been made to rely upon the text alone.

Further, no particular school of interpretive method is here adhered to. The only procedure employed is that of attentive reading of the text, both for its details and its broader sweep. From the point of view of many Biblical scholars, this rather open-ended approach may be found wanting, as lacking in methodological precision; however, it can be justified by pragmatic considerations. The situation is that the questions raised by the mastery writers-- about the Biblical understanding of nature and its implications for science, technology, etc.-- have hardly begun to be explored by specialist students of the Bible (as opposed to philosophers, theologians, and historians with an interest in the Bible). Under these circumstances, it seems permissible (and it is probably even necessary) for those students of the Bible who are not advanced technicians in questions of interpretive method to make a start toward a coherent exposition of Biblical thought on nature. Fools

go where specialists fear to tread-- and sometimes they discover things worthy of specialist attention. It will be a great compliment to this work if its preliminary explorations can arouse some Biblical scholars to think about the Biblical idea of nature and to turn their investigative and interpretive training toward confirming or correcting the account offered in the next two chapters.

The secondary literature which has been drawn upon in the discussion of the Bible is of two kinds. The first kind is responsive, written as a reply to one or more of the mastery writers, or to the hypothesis in general. The writers of these responses are not all Biblical scholars by training, though all of them make insightful comments about the Bible. The most important of them for the present argument are James Barr, Bernhard W. Anderson, Rolf Gruner, F. B. Welbourn, Jacques Ellul, John Passmore, and Paul Santmire. The second kind of literature is general, including commentaries on Biblical books, and monographs and short articles on Biblical topics. The writers of this literature are almost all trained Old Testament scholars. The most useful of these have been Henry Wheeler Robinson, Umberto Cassuto, Bernhard W. Anderson, Claus Westermann, Leo Strauss, Robert Sacks, and

Eugene Combs. For the overall understanding of Biblical thought, and the overall approach to interpretation, the greatest debts of this work by far are owed to Combs, Sacks, Strauss, and Ellul. These must receive a special acknowledgement here, for without their pioneering attempts to combine philosophical and exegetical work, the interpretation offered below could never have been conceived.

Though the arguments given in the following chapters can for the most part be derived from the standard English renderings of the Old Testament, the original Hebrew Bible has been consulted. Where a point needs to be made from the Hebrew text, transliterations of relevant Hebrew words or phrases are placed in parentheses after the English translation. A key to transliterations is found on page vii of this work. For the most part, only the 'root form' of the relevant words has been presented, but on occasion, where the actual forms appearing in the Hebrew text are significant, they have been exactly transliterated. The English translation quoted, unless otherwise noted, is the Revised Standard Version. Other versions which have informed the discussion are the King James Version and the renditions of Combs, Sacks, and Cassuto.

For the sake of brevity, the convenient term 'Bible' has been adopted in place of 'Old Testament' or 'Hebrew Bible' in the next two chapters. Since the mastery hypothesis understands the New Testament's teaching about nature to be identical with that of the Old, this abbreviation is not only convenient but accurate for the present context.

### Chapter Three

#### Biblical Nature: Desacralized but Not De-animated

The first element in the argument linking the Bible with the rise of technological attitudes is the notion of 'desacralization' (called by various mastery writers also 'de-divinization', 'de-spiritualization', 'disenchantment', or 'de-animation'). It is best, before evaluating the notion from a Biblical point of view, to present it in its most convincing form, more convincing if possible than the form found in any individual mastery writer; this will serve the interests of both fairness and clarity. The first part of this chapter, accordingly, presents a full exposition of 'desacralization', written from the point of view of a champion of the mastery hypothesis.

For the mastery writers, the main stream of modern thought has been committed to the view that nature is not holy, not divine, not living, not intelligent, and not moral. This view did not always hold sway, but came to be as the result of a shift in the interpretation of nature which may be called 'desacralization'. 'Desacralization'

was the bold stroke by which the Bible re-interpreted nature as wholly 'profane' or 'secular', as devoid of spiritual power, as inanimate, sub-rational, and sub-ethical. 'Desacralization' deprived nature of all the virtues which the 'pagans', in their 'polytheistic', 'animistic', 'magical', or 'pantheistic' view of the world, imputed to it. The Old Testament, by disseminating a 'desacralized' view of nature (first to Jews, later to Muslims, but most importantly to the Christian West), destroyed the pagan way of thinking about nature, and hence also the pagan way of relating to nature.

How, according to the hypothesis, did the Bible accomplish this? First, it taught that there was only one divine being: "Hear, O Israel, the Lord our God, the Lord is one" (Deut. 6.4). Any other supposed gods were simply non-existent, figments of the perverted pagan imagination, whose falsehood was proved by the failure of Baal on Mount Carmel (I Kings 18). Second, in consistency with the first point, it taught that natural objects were in no way partakers in the divinity of this One, but merely, as it were, his artifacts. All natural objects, no matter how large, powerful, beautiful, long-lasting, or otherwise impressive, were wholly non-divine creatures of the one divine being (Genesis 1). The stars and planets, the

towering cedars and mighty rivers, the mountains and the raging sea, all had their source in God's divine power, but did not themselves partake of divinity.

This view has the consequence that nature is unworthy of religious reverence. Some natural things may be quite admirable (e.g., a California redwood), but admirable only as creations of God, analogous to those artificial things (e.g., a masterfully-made chariot) which are the manufactures of man. It would make no more sense to worship a giant redwood than to worship a chariot which one has made with one's own hands. One knows there is nothing mysterious, divine or holy in the chariot, because it is made from lifeless and inert materials. The writer of Isaiah ridicules idol-makers for not grasping this fact (Isaiah 44.8-21).<sup>1</sup> Similarly, one must know there is nothing godlike in a redwood, because it, too, is merely made-- from the non-divine, primordial nothingness which preceded creation. It, and all other natural objects, no matter how beautiful, useful, or overpowering in emotional effect they may be, are all essentially profane, not sacred. Man can, and should, relate to everything in nature as he relates to a chariot, to a machine, to a bowl or spear. He should worship nothing natural, follow nothing natural, look for ultimate wisdom from nothing

natural. Thus, Moses reminds Israel (Deut. 4.16-19):

Beware lest you act corruptly by making a graven image for yourselves, in the form of any figure, the likeness of male or female, the likeness of any beast that is on the earth, the likeness of any winged bird that flies in the air, the likeness of anything that creeps on the ground, the likeness of any fish that is in the water under the earth. And beware lest you lift up your eyes to heaven, and when you see the sun and the moon and the stars, all the host of heaven, you be drawn away and worship them and serve them, things which the Lord your God has allotted to all the peoples under the whole heaven.

For the Bible, then, nature is neither divine nor sacred. Nor, according to the hypothesis, is it 'animate' or 'alive', as it was in 'paganism'. For the 'life' attributed to nature by paganism was bound up with the 'divinity' of nature. Without the presumption of the divinity of nature, the Greek and Roman myths would never have peopled the mountains, forests, streams, fields, and waters with oreads, dryads, sylphs, fauns, undines, and other such spiritual, personal beings. The destruction of pagan religious ideas by Biblical teaching therefore had the inevitable result of destroying the sense of 'aliveness' of natural things. Thus, the Bible removed the key psychological obstacle-- the 'animation' of nature-- which stood in the way of the objective study and utilitarian treatment of the world. It was thus the necessary condition for the rise of modern scientific and



technological mastery.

One of the most important aspects of Biblical 'desacralization', says the hypothesis, was the stripping of divinity from the heavenly bodies. The heavenly bodies were seen as deities in the ancient Near East, and the divine power and knowledge attributed to them justified the practice of astrology. Astrology was a great ethical danger, for it taught men that their lives were determined by the remote and relentless heavenly bodies; it taught them that they were not free. The heavenly bodies thus had to be demoted. Genesis 1, speaking against the pagan neighbours of Israel, did this very clearly; the stars and planets lost their personal character and became mere artifacts. The sun and moon are not, in the Creation story, called 'sun' (shemesh) and 'moon' (yāreach), but only the 'greater light' (mā'ôr gādôl) and the 'lesser light' (mā'ôr qātôn). The terms 'sun' and 'moon' might vaguely recall the ancient Near Eastern deities bearing the same names, and blur the sharp distinction the text wants to make between the divinity of the Creator and the non-divinity of his creatures.<sup>2</sup> As mere 'lights', the heavenly bodies are clearly not gods, but created beings, useful mainly for the reckoning of time-- 'for signs and for seasons and for days and years'-- and for lighting up

the earth (Gen. 1.14-15). As such, they do not rule man but serve him.

There is a second important point, says the hypothesis, concerning the status of the heavenly bodies. The heavenly bodies are not only non-divine and hence unworthy of worship; they are also inanimate and hence capable of being understood as mere 'objects'. For Isaiah's relentless criticism of hand-made idols as mere artifacts seems to imply that other things that men falsely worship, which include the stars, are also artifacts (if of God) and hence similarly inanimate. The motions of the heavenly bodies must therefore be seen as akin to the motions of wheels or other devices, which operate by mechanical forces, rather than to the motions of living things, which operate by striving, intention, or will. It was this Biblical notion of the 'de-animation' of the heavens upon which the seventeenth-century thinkers drew (consciously or unconsciously) when they established modern mathematical-mechanical physics. For the Bible, says the hypothesis, had taught them that the interpretation of planetary motion as an intelligent or striving motion was grounded in an idolatrous, 'pagan' view in which the stars and planets were alive.

The mechanical-mathematical physics of the seventeenth century was not limited in its application to the planets and other inanimate bodies. Some influential thinkers sought to extend the new science over what we would now call 'organic' forms. For animals and plants, too, might be regarded as tiny, complicated machines, whose apparent intentions or strivings are really epiphenomena masking the necessities of unconscious physical laws. Descartes and Hobbes adopted this position. All motion in nature, whether of 'inanimate' or 'animate' beings, was fundamentally 'nothing but' the operations of inert, impersonal matter. Descartes wrote:<sup>3</sup>

. . . if there were any machines which had the organs and appearance of a monkey or of some other unreasoning animal, we would have no way of telling that was not of the same nature as these animals.

And Hobbes wrote:<sup>4</sup>

For seeing life is but a motion of Limbs, the begining whereof is in some principall part within; why may we not say, that all Automata (Engines that move themselves by springs and wheeles as doth a watch) have an artificiall life? For what is the Heart, but a Spring; and the Nerves, but so many Strings; and the Joynts, but so many Wheeles, giving motion to the whole Body, such as was intended by the Artificer?

Such comparisons allowed the early modern scientists to begin to think of even 'animate' matter as in an important sense 'inanimate', that is, mechanical or

machinelike, and this paved the way for a clear conscience about experimentation on living beings. The members of the Royal Society, in fact, took it for granted that such experiments were morally acceptable methods of advancing human knowledge and power, and they were, of course, for the most part convinced Christians who had absorbed the Biblical notion of 'desacralization' in their youth. Thus, there was a line of reasoning in Christian Europe which ran from 'de-divinization' to 'de-animation' and hence to the unrestricted manipulation of nature. According to the mastery hypothesis, then, the Bible must be acknowledged not only as the source of the basic assumptions of modern astronomy and physics, but also as the root of all 'mechanistic' forms of biology and psychology, and as the religious justification for vivisection and kindred operations. 'De-sacralization', then, led to the rise of what some would call a wholesome mastery over nature, others a demonic cruelty toward it. For the new, analytical, dissecting approach to living things could yield, on the one hand, modern medicine, and on the other, cold and inhumane operations upon healthy creatures, undertaken out of mere irresponsible curiosity.

To sum up the argument of the hypothesis on this point, then, the Bible proclaims a 'desacralized',

'de-divinized', and 'de-animated' world of nature. This implies that there is nothing religiously wrong with human attempts to understand and manipulate nature, including living things (except, in some cases, for man). From this teaching the Western world learned that it is quite permissible to probe every crevice of nature with the methods of modern natural science, to travel into outer space, to play with the genetic code, and so on, because in all such activities no divinity is offended, nothing sacred violated. Only God and other human beings need to be treated with the restraints due to divinity, holiness, or life; all else is, in essence, matter for us to manipulate.

#### The Notion of 'Desacralization'

Now in order to show that the argument made by the mastery writers is inadequate, it is not necessary to deny everything that they say. Much of what they affirm about 'desacralization' in the Bible is warranted by the Biblical text. But at a crucial point their account of 'desacralization' leads them to misread the Bible. This happens because the notion of 'desacralization' which they employ is insufficiently precise. The concept which they call 'desacralization' (among other names) is actually a

fusion of at least three distinct notions, which can be appropriately named 'desacralization', 'de-divinization', and 'de-animation'.

These three terms, if used carefully, are not identical in meaning. Something which is 'desacralized' has lost its 'sacred' or 'holy' character; something which is 'de-divinized', its 'divine' or 'godlike' character; something which is 'de-animated', its 'animate' or 'living' character. Now 'divinity', 'holiness', and 'life' are not by definition bound together in a thing. They may all apply to one thing, or they may not. The Biblical God, for example, is 'divine' and 'living' and 'holy' all at once, and perhaps his angels are, too. But nothing else has all three of these attributes; some things have two, others one only, others none at all. There are things which are 'divine' (i.e., non-mortal) and 'living' (i.e., possessing thought, will, and the capacity to act in the world), but decidedly not 'holy': Satan and the fallen angels (as interpreted by Milton), for example. There are things which are 'holy' but neither 'divine' nor 'alive': Mount Sinai, for example. There are things which are 'living' which are neither 'divine' or 'holy': the beasts of the field, for example. And there are things which are none of the above: the sand of the

desert, for example. From this short list, which could be refined, it is easy to see that attachment to a Biblical view of the world does not require one to picture all created things as simultaneously 'desacralized', 'de-divinized' or 'de-animated'.

Further, the term 'desacralization', when used in its precise sense, is irrelevant to the hypothesis. It is true that natural objects are not, in general, 'sacred' or 'holy' for the Bible, but this is not because the Bible, in contrast to paganism, 'desacralized' nature. For even in paganism nature was not generally sacred. As was explained in Chapter One, 'sacred' is a term of distinction, implying the existence of its opposite, 'non-sacred' or 'profane'. The very fact that the pagans designated certain groves as 'sacred' implies that other groves were not 'sacred', were 'profane'. Therefore, the fact that the oaks at Dodona were 'sacred' to Zeus no more made all oaks, or all of nature, 'sacred' to the Greeks than the fact that Mount Sinai was 'holy' (qādôsh) made all mountains, or all of nature, 'sacred' for the Hebrews. In addition, for the pagans as well as for the Bible, the category of the sacred was not especially connected with natural objects; there were 'holy traditions', 'holy men', 'holy ceremonies', 'holy writings', 'holy implements', and

so on. In sum, the Bible, just as did pagan thought, demarcated reality by means of the notion of 'sacredness'; the difference lay in the particular natural, artificial or human things demarcated, and in the God in whose name the demarcation was pronounced.

The term 'desacralization', therefore, is conceptually inadequate for the mastery writers' claims. According to their hypothesis, it is not in 'desacralizing', but in 'de-divinizing' and 'de-animating' nature that the Bible repudiated paganism and laid the ground for modern mastery. But this last statement, too, requires some thought. Since 'divine' and 'animate' are not identical in meaning, is there not a need to distinguish between the corresponding terms 'de-divinize' and 'de-animate'? Does the Bible's depiction of nature imply both 'de-divinization' and 'de-animation', or perhaps only the former of these?

#### Biblical 'Nature' De-divinized

It can be granted at the outset that the Old Testament consistently 'de-divinizes' nature. The notion of 'de-divinization' is implied, as the arguments of Foster and others make clear, in the very notion of a



transcendent Creator. For if nature is to be in any sense divine, then either some things in nature are gods (as in 'star-worship' or 'polytheism' or 'animism'), or nature as a whole somehow 'contains' God (as in 'pantheism'). But these things are ruled out by the story in Genesis 1. That no part of nature is divine is clear from the fact that none of the categories of things (beasts, herbs, seas, etc.) which God creates are dignified by the name 'god' ('el'). That nature as a whole is not divine is clear from the way God is depicted: he is 'outside' of what he makes, detached from it, looking over it to determine that it is 'good'. These notions, clearly established at the very beginning of the Bible, are confirmed in countless other Biblical passages, such as the above-quoted Deuteronomy 4.

This is not to say that in the Bible there are no other beings which have some share, albeit perhaps a lesser one, in divinity. Throughout the Biblical text, there are numerous references, both oblique and direct, to other divine beings, conceived of as members of God's 'court' (Gen. 1.26, 3.22, 11.5; Job 1), as God's 'sons' (Gen. 6.4), or as God's 'messengers' or 'angels' (passim). But these divinities are not 'nature-gods'; they are not personifications of natural objects or forces, and they

are not attached to particular natural beings such as the sea, the air, and so on. They rove freely, and are, like God, 'above nature'.

It could be argued, on the basis of Job 38.4-7, that the Bible equates some of these divine beings with the heavenly bodies:

Where were you when I laid the foundation  
of the earth? . . .  
when the morning stars sang together  
and all the sons of God shouted for joy?

Since the poetic device of parallelism is characteristic of the book of Job, the last two lines are probably meant to be equivalent in meaning. If this is so, the 'morning stars' (kôkh<sup>e</sup>bhê bhôqer) would be 'the sons of God' (b<sup>e</sup>nê 'elôhîm), and this suggests that the writer of Job regarded at least certain heavenly bodies as divine. Against this, one might contend that the writer of Job was using poetic formulae which he inherited from pagan antiquity, but did not take literally. Granting, however, that the writer might have considered certain heavenly bodies to be minor divinities, two things remain clear from the context of Job: these divinities are far below God in majesty, and they are not objects of worship. In other words, the main thrust of Old Testament teaching against worshipping nature-- expressed in such crucial

passages as Genesis 1 and Deuteronomy 4-- is not threatened by this anomalous passage in Job, once it is read in context.

One can say, then, as a summary statement, that the Bible completely or virtually 'de-divinized' nature; on this point the mastery writers are in accord with the text. But there is no reason to make the mastery writers' subsequent inference, which is that the Bible also 'de-animated' nature. As already stated, a thing may be 'alive' without being 'divine'. Therefore, the Biblical grounds for saying that nature is 'inanimate' must be independent of the Biblical grounds for saying that nature is 'non-divine'. Surprisingly, the mastery writers never supply such independent grounds. They appear to presume that since the Bible opposed the 'pagan' doctrine of the 'divinity' of nature, it also must have opposed the 'pagan' doctrine of the 'animation' of nature. They therefore fail to produce even a single Biblical passage to show that nature is 'inanimate' in the sense required by modern mastery. They do not even notice that they need to do so.

In fact, as will be demonstrated in this chapter, they would have a difficult time if they were to try. For

the Biblical conception of nature, though radically 'de-divinized', appears to be anything but 'de-animated'. The Bible, though perhaps in a different manner than 'paganism', presents nature as vibrant with 'life'. Natural beings are for it 'animate', in the sense that they have 'soul', or something analogous, by which they can respond to the activities of both man and God. This claim, which at first glance may appear improbable or even incredible, will be elaborated in the remainder of this chapter.

#### De-animation and the Notion of 'Breathing Life'

The notion of 'de-animation', taken literally, poses a problem when applied to nature as a whole. For it then implies that nothing in nature, not even 'animals' are 'animate', which is a contradiction in terms, since the entire notion of 'animation' is suggested by the existence of 'animal' life. However, this etymological inconsistency can be overlooked as a mere technicality. The real point of the mastery hypothesis appears to be, not that there is nothing 'animate' in nature, but that the 'animate' beings-- particularly human beings and animals-- represent a very small part of an 'inanimate' world, and that even non-human 'animate' beings-- such as

birds and beasts-- are, in crucial respects, akin to 'inanimate' ones, fit 'objects' for the impersonal scrutiny of the scientist and natural 'resources' for human use.

Now there is a special sense in which the Bible sets off what we might call 'animate' beings-- humans and animals-- from the rest of the natural world, a sense which might give rise to the idea that the Bible supports the modern idea that nature is largely 'soulless'. That sense is expressed in the use of phrases such as 'living creature' (nephesh hayyāh), 'breath of life' (nishmath hayyîm) and 'breath-wind of life' (nishmath-rûah hayyîm) in passages such as Genesis 1.20-21, 1.24-25, 2.7, and 7.21-22:

And God said, "Let the waters bring forth swarms of living creatures [nephesh hayyāh], and let birds fly above the earth across the firmament of the heavens." So God created the great sea monsters and every living creature [nephesh hayyāh] that moves, with which the waters swarm, according to their kinds, and every winged bird according to its kind.

And God said, "Let the earth bring forth living creatures [nephesh hayyāh] according to their kinds: cattle and creeping things and beasts of the earth according to their kinds." And it was so. And God made the beasts of the earth according to their kinds and the cattle according to their kinds, and everything that creeps upon the ground according to its kind.

. . . then the LORD God formed man of dust from the

ground, and breathed into his nostrils the breath of life [nishmath hayyim]; and man became a living being [nephesh hayyah].

And all flesh died that moved upon the earth, birds, cattle, beasts, all swarming creatures that swarm upon the earth, and every man; everything on the dry land in whose nostrils was the breath of life [nishmath-ruah hayyim] died.

Thus, the Bible distinguishes animals and men from other created things-- firmament and seas and earth and greater and lesser lights and stars and plants-- by virtue of a notion of 'life'. A 'living' thing (hayyah or nephesh) differs from other things because it has in it 'breath' (as shown in the passages above), and because it has blood (dam, which is linked with nephesh in Gen. 9.4-5). Since rocks, rivers, and so on, are not described in the Bible as having 'breath' or 'blood', it is in a sense true to say that for the Bible the non-human, non-animal world is a 'lifeless' world. The question remains, however, whether the notion of 'animation', as it is used in discussions of the character of nature, is necessarily connected with the presence of breath or blood; there may be other justifications for calling a thing 'animate'. If there are such justifications, then the Bible must be investigated further to uncover ways in which even the non-breathing, non-blood-containing creatures might be considered by it to be, though not 'alive', yet 'animate'.

At least two examples of perhaps 'non-living' but 'animate' beings come immediately to mind: the heavenly bodies and vegetation. Regarding the heavenly bodies, it was quite clear to the Biblical authors that these beings moved. Further, this motion was, judging from appearances, self-initiated; the orderly movements of the planets seems to imply in them a capacity for local motion, guided by faculties analogous to intelligence and will. Therefore, whether or not the heavenly creatures could be classed as nephesh hayyāh, as 'living' beings, they certainly seemed to be 'ensouled' or 'animate' beings. Regarding vegetation, it was also quite clear to the Biblical authors that plants, insofar as they grew, reproduced, consumed water, burst into life in the spring, and so on, had much in common with human and animal life. Though they were not nephesh hayyāh, because they lacked 'breath' and 'blood', yet they, too, were in a sense 'animate' beings, striving to preserve their kind.

Therefore, while the Bible clearly distinguishes humans and animals by their possession of a certain property of 'life', the Biblical authors must have taken note of the other dimensions of what we might call 'animation' or 'liveliness'-- the capacity for

self-generated motion, for nutrition, for reproduction, for response to the environment-- which were found in the rest of Creation. They must have had an inkling, if not a clear conception, of a broader category of 'animation' or 'soulfulness' or 'vivacity', a property or set of properties which could be found, if not in all of nature, at least in some beings other than men and animals.

Now this conclusion, reached provisionally by reasoning, can be confirmed by the Biblical text. The Bible does consistently speak of the breath-lacking, blood-lacking created beings-- not only the heavenly bodies and plants, but all the other beings as well-- as if they, too, were imbued with something we might in English call 'life'. Thus, while preserving an obvious and significant distinction between men and beasts on the one hand and the rest of nature on the other, it does not go so far as to radically 'de-animate' nature. This will become clear in the next section.

#### The Animate Character of Nature as a Whole

In Psalm 96, vv. 11-13, all of nature is asked to praise God because he judges the peoples of the earth with righteousness:



Let the heavens be glad, and let the earth rejoice;  
 let the sea roar, and all that fills it;  
 let the field exult, and everything in it;  
 Then shall all the trees of the wood sing for joy  
 before the Lord, for he comes,  
 for he comes to judge the earth.  
 He will judge the world with righteousness,  
 and the peoples with his truth.

Now, in no formulation of the mastery hypothesis is this passage central to the discussion of 'the Biblical view of nature'! Here, nature is treated as if it were alive, in fact as if it were human. It is supposed to recognize and applaud the justice which the Lord brings to the world. And not only a few 'sacred' groves, but all trees, and other natural beings as well, are urged to lift their voices up! Nature is here represented as filled with expectation, vibrancy, responsiveness. Why might one not conclude, then, that for the Biblical author nature was as 'alive' as it was for the 'pagans'?

In a similar passage, Psalm 148.1-13 reads:

Praise the Lord! Praise the Lord from the heavens!  
 Praise him in the heights!  
 Praise him, all his angels,  
 praise him, all his host!  
 Praise him, sun and moon,  
 praise him, all you shining stars!  
 Praise him, you highest heavens,  
 and you waters above the heavens!  
 For he commanded and they were created.  
 And he established them for ever and ever;  
 he fixed their bounds which cannot be passed.  
 Praise the Lord from the earth,  
 you sea monsters and all deeps,

fire and hail, snow and frost,  
stormy wind fulfilling his command!  
Mountains and all hills,  
fruit trees and all cedars!  
Beasts and all cattle,  
creeping things and flying birds!  
Kings of the earth and all peoples,  
princes and rulers of the earth!  
Young men and maidens together,  
old men and children!  
Let them praise the name of the Lord,  
for his name alone is exalted;  
his glory is above earth and heaven.

Of course, the advocates of the mastery hypothesis could find a passable reply. If they were to turn to Biblical scholarship, they could find many commentaries explaining that, though Biblical theology is resolutely opposed to the doctrines of 'animistic' or 'polytheistic' cultures, Biblical authors felt free to use the literary imagery of those cultures. That is, according to many scholars, the Hebrew poets made use of the literary treasures of a rejected ancient Near Eastern mythology, in order to create a poetry suitable to glorifying God. What better way to glorify God than to depict all of nature as alive, personal, and filled with gratitude and awe toward its divine master and Creator? Of course, say the scholars who argue in this way, the Hebrew poets were not deluded by the literal sense of their words; they were insulated by their Creation doctrine against 'pagan' views of nature, and knew themselves to be working in 'mere'

metaphors. This same line of argument could be applied against any attempt to adduce numerous similar passages from the Psalms, Job, Isaiah, and other poetic books (e.g., Isaiah 44.23, 49.13, Psalms 19.1-4, 114.1-8), in which natural objects are said to, or urged to, rejoice, sing, praise, glorify or otherwise respond to God or his earthly activity.

When one considers how much Biblical scholarship has been dominated by Protestants, and when one considers the anti-pagan animus which has been so central to Protestantism, it may not seem surprising that scholarship should rush in to neutralize any Biblical text which shows any sign that nature is alive. The question is, does this interpretation of Biblical poetry, which eliminates any doctrinal significance from these passages, arise from an open and sympathetic study of the Biblical text? Or are modern prejudices being read back into the Bible, because both Protestant orthodoxy and technological science desire a non-vital, mechanical conception of nature? This question cannot be settled immediately; nor can it be answered satisfactorily in the present work. It does seem fair, however, to raise suspicions about the fundamental assumptions and motives of such a line of Biblical interpretation, when another line is possible but not

considered. And, as the following interpretation shows, it is quite possible to read the Bible-- even the so-called 'prose' parts of the Bible, where the text appears to speak directly rather than metaphorically-- as teaching that nature is, as Psalms 96 and 148 suggest, 'animate'.

Earth, Soil, Vegetation: Generativity and Moral Capacity

In several prose passages, the Bible appears to represent the earth as 'alive', as having responsiveness, co-operativeness, generative power, and even moral involvement with its surroundings. The first such passages are found, ironically, in Genesis 1, which is supposed to prove precisely the opposite, that the Bible 'de-animates' nature.

In Genesis 1, God seems to be asking the earth to participate in his creative activity, and the earth appears to be able to respond, though not to the degree God wishes. The relevant verses are vv. 11-12 and 24-25:

And God said, "Let the earth put forth vegetation [literally, 'vegetate vegetation', a cognate accusative construction, tadshē' deshe'], plants yielding seed, and fruit trees bearing fruit in which is their seed, each according to its kind, upon the earth." And it was so. The earth brought forth vegetation [literally, 'caused vegetation to come forth', tôtsē' deshe'], plants

yielding seed according to their own kinds, and trees bearing fruit in which is their seed, each according to its kind. . . .

And God said, "Let the earth bring forth [tôtsē'] living creatures according to their kinds: cattle and creeping things and beasts of the earth according to their kinds." And it was so. And God made [ya<sup><</sup>as, root ā<sup><</sup>sāh] the beasts of the earth according to their kinds and the cattle according to their kinds, and everything that creeps upon the ground according to its kind.

The first significant fact about this passage is that God addresses the earth in the matter of creating the animals. Why should he do this? Why does the Bible not have God say, "Let there be animals upon the earth", and then record the result-- "and God made the animals"? Does the address not suggest that God regarded the earth, at least initially, as understanding, responsive, and co-operative? Do not such characteristics suggest the possibility that the earth has a kind of life in it?

This possibility has been carefully explored by A. E. Combs and Robert Sacks,<sup>5</sup> and their investigations yield a result relevant to the question of the 'animation' of nature. Building upon the discoveries of Rabbinical expositors,<sup>6</sup> they note that in this section of Genesis there are two exhortations of God to the earth, and two actions consequent upon those exhortations. They note the subtle shift in the verbs employed for each exhortation

and consequent action, and suggest a reason for the shift. In the first exhortation God expects the earth to 'vegetate' vegetation, but finds that it instead 'brings forth' vegetation. In the second exhortation God asks the earth to 'bring forth' living creatures, but in the end the earth seems to do nothing and God 'makes' them. The suggestion seems to be that God expects, or hopes, that the earth is generative or productive, that it has life implicit within it. His expectations are justified, but only partly. The earth, though not literally able to 'vegetate' vegetation, as if it were itself identifiable in nature with the vegetable, can at least 'sprout forth' or 'cause to sprout' vegetation. It has enough of the springs of 'life' in it to generate and nourish the life of plants. By using the verb 'cause to sprout' again in calling forth animal life, God seems to expect that earth has enough 'life' in it to generate the animal as well. But it cannot produce animals in this way; God has to 'make' them. The earth can produce plants but not animals, growing organisms but not nephesh hayyāh. God wanted the earth to be more fully involved in the process of creation, but found it wanting. The earth co-operated up to a point, but then, due to a lack of 'living' power, ceased to do so.

If the Combs-Sacks analysis is correct, it suggests that for Genesis the earth is not conceived as a mass of inert matter, but as a creative agent, having a limited principle of 'life' within, and a quasi-personal capacity of interaction with God.

For some readers, the above interpretation will seem strained; it might seem just as likely that all the verbs refer simply to God's shaping the inert stuff of the earth into the bodies of plants and animals, and that this is compatible only with the idea of an inanimate nature. In such a view, the form of the exhortation to the earth and the details of verb forms are merely literary details, having no significance for the notion of nature in the passage. Because such an objection is possible, it is best not to press the idea too much, but to show further examples. Therefore it is appropriate to turn to another passage, this one from Genesis 4.

Cain, as everyone knows, murdered his brother Abel. When God asks him where his brother is, he pretends he does not know, drawing the following response from God (Genesis 4.10-12):

What have you done? The voice of your brother's blood is crying to me from the ground. And now you are cursed from [min] the ground [hā'adāmāh],

which has opened its mouth to receive your brother's blood from your hand. When you till the ground [hā'adāmāh], it shall no longer yield to you its strength; you shall be a fugitive and a wanderer on the earth ['eretz].

The agent of the 'cursing' is not named, but from the context it seems that it may be the bloodsoaked ground ('adamah: 'ground', 'soil', 'land'). And certainly it seems to be the ground, not God, which is refusing to lend its strength to Cain's future agricultural efforts. On the face of it, the ground appears to be sensitive to human unrighteousness and to revolt against it. The ground, then, appears to be 'alive' in some mysterious way. Now this passage cannot be written off as 'mere metaphor', since it is intimately connected with the action of the rest of the narrative of Genesis 4: the curse on the ground causes Cain to go off to the land of Nod, and ultimately to build a city and to father a line of artisans, one of whom invents metal implements which can overcome the unyieldingness of the soil (Genesis 4.22).

The passage from Genesis 4 is not alone in suggesting that the ground is a quasi-moral agent, responding to human good or evil in an almost personal way. Similar notions can be derived from Genesis 19 and



Leviticus 18.

In Leviticus 18.24-30, Moses, having been told by the Lord to forbid various dietary and sexual practices as abominations, is commanded to say to the people of Israel:

Do not defile yourselves by any of these things, for by all these the nations I am casting out before you defiled themselves; and the land became defiled, so that I punished its iniquity, and the land vomited out its inhabitants. But you shall keep my statutes and my ordinances and do none of these abominations, either the native or the stranger who sojourns among you (for all of these abominations the men of the land did, who were before you, so that the land became defiled); lest the land vomit you out, when you defile it, as it vomited out the nation that was before you.  
[emphasis added]

Here the land is regarded as "defiled" by its Canaanite inhabitants, as tainted by the wickedness of their actions. This does not mean that the land is itself guilty of 'sin', since the land is not the agent of the evil. But the land has been made to participate in the evil, and hence has become unclean, unhealthy, sick. And, as a sick man vomits out that which is the cause of his sickness, so the earth, with the help of God, is vomiting out the Canaanites, and will vomit out the Israelites if they should prove similarly wicked.

This image of the land ('eretz) being 'infected'

by evil, and being desirous of fighting the infection, is reminiscent of the passage from Genesis 4 already discussed, in which the ground or soil ('adāmāh) appears to curse Cain and refuses to cooperate with him. Since the passage in Genesis 4 is in a 'narrative' portion of the Bible, and since the above passage is from a 'legal' text, the conclusion appears to be that the 'animation' of the earth is not merely a convention of Hebrew 'poetry', but is a recurrent Biblical theme. It is possible, then, that the Biblical text means what it seems to say, that the earth itself, both in its large-scale aspect ('eretz: 'earth', 'land', 'country') and in its more intimate sense ('adāmāh: 'land', 'soil', that which is worked by man) is 'moral' and hence 'animate'.

A further piece of evidence to support this conclusion is found in Genesis 19.26, where the story of Sodom and Gomorrah (Genesis 18-19) comes to its climax. There it is said that God rains down fire and brimstone upon Sodom and Gomorrah, utterly destroying them: ". . . and he overthrew those cities, and all the valley, and all the inhabitants of the cities, and what grew on the ground." [emphasis added]

Why would God have to destroy not only the people

but also "what grew on the ground ('adāmāh)"? Why destroy the vegetation when the people are at fault? In the modern understanding, vegetation is amoral, outside the categories of sin and punishment; its destruction is unintelligible given such a conception. But the story becomes perfectly comprehensible if it is assumed that sin defiles not only the inhabitants of a place but also the place itself. In this view, everything the inhabitants have produced out of the soil is produced out of wickedness and shares in that wickedness. The vegetation itself is therefore defiled along with Sodom and Gomorrah; it must die as well.

That this is a likely interpretation is confirmed by the parallel between the rain (root mātār) of fire which consumes Sodom and Gomorrah and the rain (root mātār) of water, or Flood (Genesis 6-8), with which God destroys the earth. As in the Flood not only man but "all flesh", that is, all animal life, had to be destroyed because of the general corruption emanating from man (for which see the section immediately following this one), so in the rain of fire everything in the Sodom valley, even the vegetation, must be consumed. It appears then that vegetation, like the earth, is not regarded by the Bible as merely a kind of organic 'stuff', but as a quasi-

personal entity which can become, as it were, like the company it keeps.

The psychic 'connectedness' between human life and the life of soil and vegetation is not surprising; it is adumbrated in Genesis 2.7, where it is said that God formed man ('ādām) from dust from the ground ('adāmāh). The similarity between the Hebrew words for 'man' and 'ground' reinforces the connection established in the passage. Man is a 'groundlike' being: he comes from the ground, he eats food won from the ground (Gen. 3.17, 4.2, 9.20), he returns to the ground at death (Gen. 3.19). His life and well-being are bound up with the ground; his fortunes depend upon his good relations with it. Likewise, the ground is dependent upon man; without man it would not be cultivated and bring forth its best fruits. The ground feeds man; man tends and nurtures the ground. The two are intertwined. There is a certain consistency, then, in the Biblical notion that the moral character of the land affects, or is affected by, that of the human beings who dwell in it.

#### The Moral and Legal Dimensions of Animal Life

It is clear that in the Bible animals are like

human beings insofar as they possess the breath of life, require vegetable nutrition, can move, and can multiply on the earth. What is often not noticed by readers of the Bible-- especially by those who tend to think, with Descartes, in terms of absolute contrasts between 'spiritual' or 'moral' man and 'spiritless' or 'amoral' nature'-- is that animals belong not only to the biological but also the moral and legal spheres of existence. This claim, however surprising, is demonstrable without any strain of exegesis, as the following discussion will show.

Before the Flood, God sees that "all flesh had corrupted their way upon the earth" (Genesis 6.12). "All flesh" (kol-bāsār) here includes the animals, as is clarified in 6.17 ("all flesh in which is the breath of life"), 6.19 ("every living thing of all flesh, you shall bring two of every sort into the ark"), and especially 7.21 ("all flesh died that moved upon the earth, birds, cattle, beasts, all swarming creatures that swarm upon the earth, and every man").

Thus, though the evil that provokes God to send the Flood seems to emanate from man (Genesis 6.5-6), it implicates the animals, too. Not only men but also the

animals have corrupted their 'way' (derek), that is, perverted their 'nature', or their ordained pattern of behaviour. Exactly how the antediluvian animals perverted their 'way', or what role the corruption of men played in stimulating this perversion, is not clear, but the imputation of some moral error to the animals is fairly plain. This idea is further developed in other Biblical passages, which will now be considered.

In Genesis 9, which begins the narration of life after the Flood, God gives a set of pronouncements to Noah, to his family, and to all the creatures which were preserved in the ark. Among those pronouncements is: "For your lifeblood I will surely require a reckoning; of every beast I will require it and of man" (Genesis 9.5; emphasis added). Not only men but animals (hayyôth-- all animals, wild and domestic) must die if they take a human life. Animals are here addressed as if they are not only morally but also legally responsible.

That 'legal' is a legitimate word in this context is borne out by the laws in Exodus and Leviticus. In Exodus a specific statute of Israel states that if an ox gores a man or a woman or even a slave, the ox is to be stoned (Exodus 21.28-32). Why 'stoned'? Why such a

cumbersome and slow procedure? If the ox is to be 'done in' merely because it is deemed dangerous to other humans, any way of killing it will do, and many ways are faster than stoning. But the ox is not to be slain merely upon such pragmatic grounds; it is to be slain because it is guilty of violating one of God's laws, of killing a human being. Hence, the formal legal punishment, stoning, is appropriate.

A similar idea of animal 'crime' seems to be involved in this passage from Leviticus (20.15-16): "If a man lies with a beast, he shall be put to death; and you shall kill the beast. If a woman approaches any beast and lies with it, you shall kill the woman and the beast; they shall be put to death, their blood is upon them." Why is the beast also to be put to death? According to the typical modern view, animals are 'amoral', and the beast cannot be thought 'guilty' of anything. Lacking understanding of 'sin' and lacking free will, it must be regarded as a merely passive, complacent, submitter to the evil desires of the man or woman involved. How could one say that the animal 'deserves' punishment? The Bible would seem to reply that the animal is not wholly passive; in its co-operation it exhibits perverse tendencies of its own. It therefore bears responsibility for transgressing

against the function assigned to it in Creation, and is rightfully condemned to death according to the Law. In the aforementioned Genesis 6.12, the corruptions of the 'way' (derek) of the pre-Flood animals may have been of the kind forbidden by this statute.

The idea that animals can be responsible for their actions may be present also in Exodus 19.12-13. There, as God prepares to descend upon Mount Sinai to give Israel the Law, he warns the people that they-- and their animals-- are not to go up the mountain or even touch the border of it: ". . . whoever touches the mountain shall be put to death; no hand shall touch him, but he shall be stoned or shot; whether beast or man, he shall not live". In this passage, crossing the border of the mountain is understood as an unauthorized intrusion into the majestic presence of God, and animals are perhaps understood as being, like the Israelites, responsible not to make such an intrusion, whether willfully or through inattention. Such a reading would support, and be supported by, the interpretation of animals offered above. (It has to be granted, however, that another reading is possible: the animals are to be destroyed, not because they deserve punishment themselves, but because their human owners, who have been so careless as to let the animals stray over the



sacred boundary, must suffer the economic penalty of losing valuable possessions.)

If animals are, like human beings, to be subject to legal punishment, it is only right that they also enjoy legal protection. In Genesis 9.8-17, the 'covenant' (b<sup>e</sup>rîth) established by God is not only with man but also with the animals. God promises never again to destroy "all flesh"; every living creature is promised unconditional freedom from fear of another deluge. 'Covenant', one of the most important words of the Bible, is, just as it sounds, a legal term. The use of a legal term to describe God's relations with the animals seems to make certain the conclusion drawn from the above paragraphs: that the animals are not merely living, but quasi-moral or quasi-spiritual beings, entitled to formal, if limited, legal recognition.

Again, if animals are thought of as capable of sin, it makes sense that they will also be thought of as capable of repentance. This notion appears in the book of Jonah. When Nineveh is warned that it will be overthrown in forty days (Jonah 4.4), the king issues a proclamation to the entire city that it is to repent of its evil ways, in hopes of awakening God's mercy. The proclamation reads

(Jonah 4.7-9):

By the decree of the king and his nobles: Let neither man nor beast, herd nor flock, taste anything; let them not feed, or drink water, but let man and beast be covered with sackcloth, and let them cry mightily to God; yea, let every one turn from his evil way and from the violence which is in his hands. Who knows, God may yet repent, and turn from his fierce anger?

Here the animals are represented as either participating in, or tainted by, the general sinfulness of the city of Nineveh. Since they carry the stain of the sin, they too must be cleansed by repentance; they must suffer the deprivations of sinful men and similarly cry out for forgiveness. While this view of the animals is not expressly that of the Biblical narrator, but only that of the king of Nineveh, it is consonant with what has already been shown in other parts of the Old Testament.

The passages discussed above pose great problems for most modern interpreters, since they are not accustomed to judging the actions of animals by moral categories. They do not think of animals as having the capacity for choosing between good and bad behaviour, as having a faculty of will which is anything more than an expression of animal passions. In fact, many modern thinkers have gone to the other extreme, and, informed by a Christian (not necessarily Hebraic or Biblical) theology

which insists that animals do not have 'souls', have joined with thinkers like Hobbes and Descartes to speak of animals as mere machines. Yet the Bible seems to impute to animals, if not moral choice in the fullest sense, at least the capacity to respond acceptably or unacceptably to God, and the capacity to partake of sin and be tainted by it.

When this understanding of animal life is combined with the understanding of earth and vegetation already explicated, the special character of the Biblical view of nature emerges. For the Bible, the natural world is 'alive', or 'animate'. In numerous 'prose' passages, the earth as a whole, certain lands in particular, the soil, vegetation and animal life are depicted as vibrant, sensitive, responsive, and reactive to the good and evil wrought by God and man. They enter into moral and even legal relations. They can be obedient or disobedient to God. These facts confirm the impression drawn from the 'poetic' parts of the Bible, that a quasi-human, moral 'life' pervades all of nature-- earth and seas, mountains and valleys, stars and planets. It is therefore fair to conclude that nature is far from 'de-animated' in Biblical thought.

Though this conclusion seems sound as a general statement, the mastery writers might be dissatisfied with the fact that it fails to discuss the heavenly bodies in particular; they might demand a more detailed response to their important argument regarding the de-divinization of the stars and the mechanical view of nature. Before concluding this chapter, then, it seems proper to make some remarks upon the Biblical view of the heavenly bodies and the Biblical conception of 'laws' of nature.

#### The Heavenly Bodies and the Idea of 'Law' in Nature

Two observations can be made initially about the heavenly bodies. First, the stars and planets (including the sun and moon) exhibit at least one important characteristic usually associated with 'life'-- that is, local motion. Second, the passage most often cited in connection with the de-divinizing and de-animating of the heavens, Genesis 1.14-19, does not state whether the local motion of the heavenly bodies is a result of a power, intelligence, or volition within the bodies themselves or of an external imparting of force by God or some other created thing. It is thus not clear whether the Bible conceives the stars to be 'alive' in the 'pagan' sense or whether it considers them to be 'inanimate' in the modern

scientific sense. Now, the mastery writers argue that, because the Bible was hostile toward astrological fatalism, it must have regarded the stars as inanimate in order to deny their deterministic influence. But this argument is not adequate. Augustine, certainly a Biblical zealot when it came to denying the deterministic cosmology behind astrology, did not think it necessary to deny the intelligence of the heavenly bodies. In the City of God (Bk. XIII, ch. 16), he is willing to question the Platonists' attribution of directive mind to the stars, but he does not object to that attribution on the grounds of Christian theology; he merely points out that the intelligence of the planets is undemonstrated and does not have to be accepted uncritically. His position, then, seems to have been that as long as no divinity was imputed to the planets, Creation doctrine remained intact and astrological fatalism was undermined. And his position is in conflict with no direct statement of the Bible.

Another line of argument employed by the proponents of the mastery hypothesis is that the heavenly bodies are described as 'the work of God's fingers' (Psalm 8.3), that is, as artifacts, things made (Hebrew āśāh, Genesis 1.16). The obvious fact that human artifacts are lifeless suggests that their cosmic counterparts must be

equally so. The planetary bodies, then, must move in a machinelike rather than a lifelike manner, a conclusion which makes modern science possible. But this line of reasoning does not follow Biblical usage. The animals, which are certainly not 'inanimate' in Biblical thinking, are also said to be made (ʿāsāh, Genesis 1.25). The verb translated 'made' in the Creation story indicates that a thing is brought into being by something outside itself (i.e., by God), but tells us nothing of the character of that thing. It is thus impossible to determine the nature of the stars from the notion of 'making', however 'de-animating' the normal sense of that verb is in English.

Of course, all of this is merely negative evidence; it fends off the dogmatic claim of the mastery hypothesis that the planets must have been treated as inanimate by the Bible, but does nothing to show the converse, that the heavenly bodies were in fact regarded as animate. Yet, once the above objections are disposed of, there seems to be no barrier to thinking so. For, as shown above, the Biblical authors envisioned all of nature as in some sense 'alive'; there is no reason they should have excepted the planets. Passages such as the one from Job quoted above (Job 38.5-6), in which the 'morning

stars' shout for joy as God lays the foundations of the earth, suggest that the heavenly bodies were, though not 'divine', certainly 'alive'.

Also, in thinking about the question of whether the heavenly bodies are 'animate', one should not narrow the essence of 'animation' to the capacity for local motion. 'Living' things have other characteristics, including the power to affect other beings. Aristotle reports that Thales believed the magnet to be 'alive', because it had the power to move iron (De Anima, 1.ii. [405a19]). If Thales could have thought this about such a limited entity as a magnet, how easily might other ancients have thought it about the sun and moon! The Biblical authors could not have failed to be impressed by the sun's ability to light, warm, and revivify the earth. They could not have been unaware of the subtle connections between the phases of the moon and certain changes in weather and in animal and human behaviour. They must have respected the sun and moon as great and important powers. It would not have been at all unreasonable for them to conclude that these bodies were in some way 'alive'.

Does the Biblical text lend any support to this suggestion? It seems so. The mastery writers like to

emphasize that the heavenly bodies are stripped of divine status, and that they serve as lowly 'lights' and 'signs'. They do not lay any emphasis on the equally important point made by Genesis 1.14-19 (and repeated in Psalm 136.7-9), which is that the heavenly bodies 'rule' (māshal) the day and the night. The verb māshal is in most Biblical contexts associated with the great power and responsibility of kings. The parallel of the sun and moon with kings, then, suggests that the sun and moon, in directing the vital alternation of day and night, perform the directive, apportioning, sustaining, nurturing role of kings, giving life and order to the cosmos as the king gives life and order to the state. One does not have to conceive of them as gods, anymore than one has to worship the king as a god, in order to think of them as both life-giving and living. Thus, not only from the motion of the heavenly bodies, but from the power of the two most prominent heavenly bodies, the Biblical authors in all probability inferred a tremendous 'vitality'.

To all of this discussion the mastery writers might respond: the most important point for the history of physics is not whether the Biblical authors supposed the planets to be 'animate' in some allowable sense of the word, but whether the Biblical text can be construed as



compatible with the idea of 'laws of nature'. Suppose the Biblical authors did think that the planets sang in their orbits; could they not have been singing to the tune of Newton's Laws? The central point for the Hebrew poet might have been that the planets were happy to obey God's will; the central point for later physics was simply that the planets obeyed God's will. The introduction of the notion of God's will into human thinking about nature struck down pagan conceptions of striving planets and paved the way for the idea of natural 'laws', and hence for mathematical physics.

In discussing the mastery writers' position on this point, one has to remember that the mastery writers do not claim that the Bible taught seventeenth-century physics, but only that the Bible laid the basis for that physics. One cannot object to their claims on the grounds that Newton did not appear in the time of King David. Their hypothesis allows for, and even requires, a considerable period of development while the implications of God's willful ordering were worked out and the concept of natural laws arose. Still, the hypothesis does depend upon the claim that the ordering of the planets, and of nature generally, is described in the Bible in a way that is at least compatible with the later developments.

Therefore, it would be possible in principle to falsify the hypothesis by an appeal to the description of nature's workings given in the Biblical text; that description might not allow for 'laws of nature'.

As it turns out, the Bible's description of nature does not seem sufficiently clear to either establish or disestablish the mastery hypothesis. The following remarks, therefore, are not intended as further arguments against the mastery writers, but as clarifying explorations, aimed at setting forth some of the things which the Bible does say about the relation of 'law' to 'nature', and showing what needs to be explored by future investigators.

The closest that the Bible can come to the notion of 'law' in nature, is, it seems, the notion rendered 'decree' or 'ordinance' or 'fixed order', which are translations of the masculine noun hōq (pl. huggîm) or its feminine parallel huggāh (pl. huggōth). The motion of the sun and moon and stars, the alternation of day and night, the establishment of heaven and earth and seas-- all of these can be seen as expressions of hōq (e.g., Job 28.26, Job. 38.31, Proverbs 8.29, Jeremiah 31.35-36, 33.25-26). How are these 'decrees' or 'ordinances' conceived? As

natural 'laws' in the seventeenth-century sense, or as something else?

The primary meaning of h<sup>o</sup>q seems to be 'something prescribed'.<sup>7</sup> It refers, in the first instance, to written or engraved decrees or laws, but it applies in a broader sense to decrees, regulations and laws generally, whether they pertain to matters 'civil' or 'religious'. It is applied frequently to the regulations prescribed for Israel at Sinai (Leviticus 18.4, Numbers 9.14, Deuteronomy 4.1, and many other places). Since the purpose of h<sup>o</sup>q is, as it were, to 'bind' men to the proper course, and since the Bible teaches that the heavens are similarly 'bound' by 'ordinance', it might be suggested that there is a parallel between human obedience to divine commands, and the regularities of the heavenly bodies to the same. This parallel might suggest the notion of imperative or necessary 'laws of nature' as understood by the mastery writers.

Support for this idea might be found in Job 38.31, where God asks: "Can you bind the chains of the Pleiades, or loose the cords of Orion?" The imagery of physical constraint (chains, cords) seems to suggest a kind of mechanical necessity, which, paralleled with "the

ordinances of the heavens" (huqqôth shāmayim) in verse 33, may indicate an intimation of a notion of 'natural laws'.

However, there is a fundamental difficulty with this conclusion. If the notion of 'ordinance' is rooted primarily in the human experience of prescriptive 'law', then it implies the submission of a personal will to commandments rather than the operation of an impersonal necessity. The laws at Sinai, after all, are directed to humans who are quite capable of disobeying them. It therefore seems at least as likely that the heavenly bodies were conceived as entities possessed of free will, but totally obedient to God, than that they were conceived as moved by unconscious forces. Support for this notion is found in Jeremiah 33 (vv. 20, 25-26), where the term 'ordinances' (huqqôth) is made parallel with the legal term 'covenant' (b<sup>e</sup>rîth). The orderly changes in the cosmos are understood as results of a 'covenant' or legal agreement between God and the cosmic beings. 'Covenant', like 'ordinance', suggests a relation between willing beings rather than an impersonal law. It therefore seems possible to assert that in ancient Hebraic thought the agent of cosmic change is 'law', understood not as impersonal necessity, but as an agreement honoured by quasi-personal beings.

Further, even if it be supposed that the Biblical notion of 'law' governing the heavenly bodies is akin to the modern, impersonal idea of 'laws of nature', there is the difficulty that the notion of 'ordinance' is applied only to the greater cosmic realities-- day and night, sun and moon, heaven and earth and seas, lightning and thunder and rain. One does not find Biblical references to the 'fixed ordinances' behind the flowing of rivers, the growth of plants, the behaviour of animals, the production of precious jewels in the earth, and so on. Therefore, the idea of universal laws, which apply equally to heavenly and mundane affairs, equally to inorganic and organic matter-- is lacking. The Bible cannot, then, be cited as a forerunner of Galilean and Newtonian physics, on the one hand, or of Hobbesian and Cartesian mechanistic biology, on the other.

The results of the inquiry into the 'animation' of the heavens can now be summarized. The Bible does not attempt to explicate the cause of heavenly motion. It does not attribute the movement of stars and planets to any 'pagan' principle of intelligent striving, nor does it deny the existence of such a principle. One may conjecture, on the basis of certain phrases in Job and

elsewhere, that the heavenly bodies are thought to move under external constraint, under 'laws' which 'bind' their motion. Or one may conjecture, on the basis of 'contractual' language found in Jeremiah and elsewhere, that the heavenly bodies are thought to move by virtue of their 'consent' to the scheme established by God at Creation. It is hard to say which conjecture should be preferred, because the theoretical relation between legal compulsion and natural necessity is simply not worked out clearly in the Biblical text. Therefore, any parallel drawn between the Biblical conception of the order of nature and the seventeenth-century conception of 'laws of nature' must remain open to question.

One could certainly grant to the mastery writers this much: Biblical 'ordinances' may indeed have been transformed into modern 'laws of nature'. However, it is hard to imagine this occurring without the introduction of technical concepts such as 'motion', 'reason', 'necessity', 'proportion', 'time', and so on-- all of which had their origin not in the Bible but in 'pagan' Greek philosophy. Therefore, the Biblical idea that nature is a collection of artifacts, moving in response to God's will, may have contributed to the rise of modern physics, but the establishment of modern physics would

seem to be more properly described as the synthesis of Biblical and Greek ideas rather than as a self-unfolding of a purely Biblical idea. At points, the mastery writers seem to be willing to restrict their claim to this, and at such points their hypothesis seems plausible.

### Conclusion

The results of this chapter, which were reached by independent reflections upon the Biblical view of nature stimulated by the claims of the mastery hypothesis, can be confirmed by the similar interpretation advanced by the noted Biblical scholar H. Wheeler Robinson. Robinson, writing before most of the mastery writers and unconcerned with their hypothesis, summarized his study of the Hebraic view of nature in this way:<sup>8</sup>

Nature is alive, not only in animal and tree and plant, but also in spring and river, in star and stone. In various degrees this life has psychical as well as physical qualities, comparable with those of the human body, and in close and quasi-conscious sympathy with man.

It seems then, that though the Biblical 'nature' may not teem with the spirits, daimones, and genii of classical antiquity, it is infinitely more 'alive' than the seventeenth-century mechanical 'nature' to which it is

compared in the mastery hypothesis. The early modern 'objectification' of nature as 'mere matter in motion' or 'unliving artifact' or 'soulless mechanism' seems to be without Biblical warrant.

The 'animate' or 'spiritual' character of nature presented in the Bible invalidates one of the mastery writers' two main arguments, the argument from 'desacralization'. This leaves only the argument from 'dominion', an argument which is carefully examined in the next chapter.



## Chapter Four

### The Limitations of Dominion

The Biblical notion of human 'dominion' is the second main element in the mastery hypothesis. In one sense, it is the more important of the two elements. For the 'desacralization' of nature, even if it implied all that the mastery writers claim, could at best be a necessary rather than a sufficient condition for the rise of technology. It could be said to have generated an indifferent attitude toward natural objects, but no positive impulse toward mastery. And without such a positive impulse, the indifferent attitude toward nature generated by 'desacralization' might not have brought to birth a dynamic technological society. Therefore, the fact that the Bible directly assigns to man some kind of 'mastering' role over nature is of utmost importance to the hypothesis. This is doubly so due to the result of the previous chapter; without the support of the invalidated argument from 'desacralization', the entire weight of the hypothesis must rest on the Biblical notion of 'dominion'. The purpose of this chapter is to show that the 'dominion' argument, too is faulty, since the

Biblical idea of dominion is inadequate as a theoretical basis for the kind of mastery practised in modern technological civilization.

The mastery writers' basis for arguing that the Old Testament grants man the right to conquer nature is found primarily in the book of Genesis. Near the very beginning of Genesis (1.26-29) we are told:

Then God said, "Let us make man in our image, after our likeness; and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth." So God created man in his own image, in the image of God he created him; male and female he created them. And God blessed them, and God said to them, "Be fruitful and multiply, and fill the earth and subdue it; and have dominion over the fish of the sea and over the birds of the air and over every living thing that moves upon the earth." And God said, "Behold, I have given you every plant yielding seed which is upon the face of all the earth, and every tree with seed in its fruit; you shall have them for food."

Here, says the hypothesis, is a very impressive picture of man. He is a godlike being, the only godlike being in all Creation, and he is given "dominion" over all living creatures. He is given the right to occupy and "subdue" the entire earth, and to use the things that grow upon it for his sustenance. The notion "image of God" and "dominion" seem appropriately joined here; as God has

dominion over the whole of Creation, man, his "image", has dominion over the earth within it. And as God is omnipotent and his rule over Creation unqualified, so is man's mastery over nature utterly complete.

To buttress the hypothesis, its supporters often go to Psalm 8.5-8, in which man praises God for the dominion he has given to the human race:

Yet thou hast made him little less than God,  
and dost crown him with glory and honour.  
Thou hast given him dominion  
over the works of they hands;  
thou hast put all things under his feet.  
all sheep and oxen,  
and also the beasts of the field,  
the birds of the air, and the fish of the sea,  
whatever passes along the paths of the sea.

In this Psalm the phrases "the works of thy hands", and "all things", suggest that everything in Creation is subjected to the power of man. Animate and inanimate, every natural object is under man's sway. This view of man, like that seen in Genesis 1, would seem to lend itself very easily to the technological quest.

Now the 'dominion' argument of the hypothesis is based primarily on these two passages. It is therefore essential that they be examined as carefully and as fully as possible. It is also essential to remember that the

Genesis passage is taken out of a narrative context, and that important elements of meaning may be overlooked without a grasp of the import of the entire narrative, which extends at least through the 'primeval history' (Genesis 1 through Genesis 11) and in many ways beyond these chapters into the rest of the Old Testament. The following lengthy discussion of a single problem in the 'dominion' passage of Genesis 1 will show just how large the necessary narrative context may be.

#### Dominion, Vegetarianism, and the Eating of Animal Flesh

The first quotation above, from Genesis 1, does indeed paint an impressive picture of man, but it does not give him an unqualified dominion. One limitation of his rule is obvious upon careful reading. Man is granted vegetation, but no flesh, as food. He does not have access to everything in Creation which is edible; the animals are excluded. Though under human sway, they are not completely reduced to the status of means; they are ends of Creation in their own right, deserving to enjoy existence. Thus, after indicating that God has provided for human nourishment (1.29), the text goes on to add that animals, too, are meant to have "every green plant" for food (1.30).

The fact that the animals were not originally intended to be eaten, which tells against the notion of unlimited dominion, is either unnoticed or not taken seriously by those who hold to the mastery hypothesis. Those (such as White) who notice the difficulty at all overcome it by amending Genesis 1 with Genesis 9.2-3, in which Noah and his sons (and hence all his ancestors up to the present time), are given the right to kill and eat animals.<sup>1</sup> Also, probably, they supplement man's diet on the basis of Genesis 2.19-20, in which Adam's naming of the animals, according to them, symbolizes the complete subjugation of animal to human life. Only by an appeal to such passages could the mastery writers possibly make the transition from the vegetarian picture of Genesis 1 to modern factory farming. But is such an appeal legitimate?

A method of Biblical interpretation which allows the interpreter to stitch together passages from widely-separated portions of narrative (Genesis 1, 2, and 9) is a method which totally ignores the literary character of the Biblical story. It assumes that individual sentences represent individual doctrines. But the Bible cannot be read this way without distortion. In order to correct this distortion, it is necessary to

depart a little distance from the specific issues at hand to glance at Genesis 1-9 as a complete narrative. The following account of that narrative will be far from adequate from many points of view, but it will cover enough of the main themes of Genesis 1-9 to supply a perspective on the hypothesis concerning dominion.

First, Genesis 1, Genesis 2, and Genesis 9 are three different, yet carefully interrelated, narratives, each of which makes a special contribution to discerning man's relation to nature. Genesis 1 represents man as the crown of creation in a world which supplies all his needs and is seen by God as "very good". Genesis 9 represents man as we know him, man after the Flood: struggling to stay alive in a world which is ungenerous and often harsh. Genesis 2, the story of the Garden, begins to describe the events which explain why the actual situation of man, described in Genesis 9, does not live up to the ideal postulated in Genesis 1. This summary statement needs to be explicated more fully, as follows.

In Genesis 1 is found a very high view of man and a high estimation of the goodness of creation. Regarding man, he is created last; his entry into Creation is the climax of the story. Further, he is made 'in the image of

God', and he is not said to be made out of the substance of any lower existing thing. These facts emphasize man's quasi-divine character and man's position, as it were, high above Creation. In line with this, man has 'dominion' over the animals and fills and 'subdues' the earth. He rules, occupies, and controls everything under the heavens.

Regarding the goodness of the rest of creation, several points can be made. There is vegetation to feed every living thing, animals as well as men. The heavenly bodies provide light and regulate the succession of days and seasons. Everything is orderly, everything is well-made. Whenever an evaluative word is attached to something, the word is "good": the plants are "good", the animals are "good", the whole is "very good". (It is true that man is not said to be 'good', but the narrative passes over this in silence. The reader tends not to notice-- until after he has read Genesis 2 and 3.) Evil, if it is found at all in the world, is not acknowledged. Of physical evils, there is no mention of animal eating animal-- it is implied that all living things are vegetarian. More important, while there is much description of life-- fruitfulness, swarming, creeping, and so on-- there is no mention of death. Of moral evils

there is no mention. The word 'sin' does not occur. Social evils are also absent. There is no inequality. Slavery is not mentioned, and men and women appear to be equal in rank, neither ruling the other, both ruling over Creation.

Genesis 2, which introduces the Garden of Eden, paints quite a different picture of things. Genesis 2 is not a chronological continuation of Genesis 1, but a parallel account of beginnings. It seems to presume, or at least allow for, the Creation of heaven and earth as described in Genesis 1, but is distinguished from Genesis 1 by a different description of the creation of man, woman, soil, vegetation, and animal life. Man as depicted in Genesis 2 seems not so lofty, and the world neither so bountiful nor so subservient. Regarding man, it is not said that he is made in the 'image of God', but that he is formed out of the 'dust of the ground'-- a more humbling image. He still has something godlike in him, for the breath of life in him comes directly from God (verse 7), but the 'image of God' is now modified by combination with the lowness of the earth. Man, being derived from the dust, is not so far above the earth; he is partly akin to it. Nor does he have 'dominion' over anything. Whereas in Genesis 1 God put man on the earth to rule it, in



Genesis 2 man is given only a garden to till and to keep, or, in a less traditional but perhaps more accurate translation, to serve (ʿābad) and to guard (shāmar). Thus, in Genesis 1 Creation existed largely for man; in Genesis 2 man exists largely or entirely to serve part of Creation.

Regarding the earth, it appears to be not so hospitable a place. In Genesis 1, the earth could bring forth vegetation; in Genesis 2, there is no vegetation without rain and the tillage of the ground by man (v. 5); God has to plant the first garden himself. There is a sense that Creation requires work to be made comfortable. As for the animals, in Genesis 1 man ruled them, but in Genesis 2 they are created to be his companions, not his servants (vv. 18-20). And the garden of Eden itself is not as unambiguously good an environment as was its parallel in Genesis 1, the earth; for, though containing adequate nourishment, the garden also contains a possibility unmentioned in Genesis 1-- death, which will follow from eating the fruit of the tree of knowledge of good and evil (2.17).

The differences characteristic of Genesis 2 are worked out more fully in Genesis 3. Man and woman disobey

the commandment not to eat of the fruit, and evil begins to appear. One of the consequences of their disobedience is the subjection of woman to man (3.16). Another is the enmity between the serpent and the human race (3.15). Thus, in the first account of Creation men rule animals but not women; in the second account men rule women but not animals, or at least not all animals. The female half of the human race, in Genesis 1 granted dominion, is now consigned to a form of servitude. Further, man and woman are evicted from the garden of plenty out into the world of harshness, in which the ground will require labour, the sweat of man's brow, to be made fruitful (3.17-18). Finally, man will know of death.

In Genesis 4, man outside the garden encounters difficulties and does not handle them well. After being warned of 'sin', Cain murders his brother Abel (4.8), bringing about the first of many deaths; Lamech also kills, taking unnecessarily violent vengeance for lesser injuries (4.23-24). In Genesis 6, evil 'multiplies', and men with knowledge of good and evil prove to have wicked imaginations in their hearts (6.5). Thus, God decides to abort his ruined Creation. The Flood destroys virtually all life, and brings things back to a watery, chaotic state reminiscent of the primordial state described in

Genesis 1.1-2. When the Flood waters recede, Noah and his wife emerge upon the earth as its sole possessors, a second 'male and female', as it were, recalling Genesis 1.26-28, but they carry with them the history of human failing and suffering recounted in Genesis 3-8. Thus, Genesis 9 is, effectively, a third, and more accurate, account of human beginnings, uniting the theme of earth-possession from Genesis 1 to the themes of human failing and environmental harshness developed in Genesis 2-8.

With this overview of Genesis 1-9 in mind, one can begin to see the inadequacy of the procedure by which the mastery writers fuse together the dominion of Genesis 1, the animal-naming of Genesis 2, and the animal-eating of Genesis 9. The inadequacy can be set forth as follows.

It is true that in Genesis 9 God gives postdiluvian man the right to eat the animals. This right, however, is not accompanied by the same grand and joyous tones of mastery which accompanied the bequest of Genesis 1. The passage in full (9.1-7) reads:

And God blessed Noah and his sons, and said to them, "Be fruitful and multiply, and fill the earth. The fear of you and the dread of you shall be upon every beast of the earth, and upon every bird of the air, upon everything that creeps on

the ground and all the fish of the sea; into your hand they are delivered. Every moving thing that lives shall be food for you; and as I gave you the green plants, I give you everything. Only you shall not eat flesh with its life, that is, its blood. For your lifeblood I will surely require a reckoning; of every beast I will require it and of man; of every man's brother I will require the life of man. Whoever sheds the blood of man, by man shall his blood be shed; for God made man in his own image. And you, be fruitful and multiply, bring forth abundantly on the earth and multiply in it."

The alert reader will notice that the language used here is similar to that used in Genesis 1, but also that the content and tone of the passage is quite different. The similarity and the difference are both quite intentional. The similarity is meant to recall the "very good" Creation postulated in Genesis 1, while the difference is meant to emphasize what has gone wrong with that "very good" world. Note first that man's "dominion" over the animals has been replaced by the "fear" and "dread" of the animals for man. This is not surprising, since the animals are about to become man's food, but the point is that the pronouncement in Genesis 9 is meant primarily to show the contrast with the bequest of Genesis 1, not merely to add to it. Men can now eat animals, but there is a terrible loss: fear and dread have entered Creation, and have become ingredients in man's dominion over the animals. A benign and bloodless rule has become,

from the animals' point of view, a harsh tyranny.

Nor is this all. Violence to humans, too, is recognized as a part, however unwelcome, of the new order. There is considerable mention of blood, of lifeblood, and of shedding blood. There is talk of requiring a reckoning from living beings who do violence. The world of Genesis 9 is a world in which murder and capital punishment are realities. What has happened to the harmonious cosmic vision of Genesis 1? It has been modified by what is learned in Genesis 2-8. It is modified by the recognition of the unpleasant realities discussed in the above summary: desire (Eve's, 3.6), knowledge of good and evil (Adam's and Eve's, 2.17, 3.5-7), shame (Adam's and Eve's, 2.25, 3.7), fear (Adam's, 3.10), death (Adam's, 3.19), murder (Cain's, of Abel, 4.8), niggardliness of the earth in yielding food (to Adam and Cain, 3.17-19, 4.10-12), vengeance (Lamech's, 4.23-24), and wickedness (of the men before the Flood, 6.5). The joy of being ruler of the world is now complemented by sadness; man knows of hunger and death, and recognizes the reality of his own evil and the necessity of a harsh justice. The notion of "the image of God" recurs here for the last time in the Old Testament, and it is invoked to urge restraints upon human action, not to describe the extent of human dominion over

nature. The likeness of man to God, still not fully clarified, now appears to serve more as an incentive to justice or righteousness than to man's conquest of the external world.

In light of the above remarks, it can be seen that the permission granted to eat meat is not a thing which is celebrated by Genesis, but rather an adjustment to a situation which is far from the 'ideal' postulated by the beautiful story of the seven-day creation. Meat is eaten by men who are hungry and violent; man was not created to be either of these. All talk about man's dominion over the animals, including the right to eat them, should be measured by these considerations.

Further, in this passage man's right to eat the animals is subject to a condition. He may not eat the meat with the blood; the blood must be drained first. The blood (dām) is intimately connected with the life-breath or life (nephesh), and somehow the violent killing of the living animal (nephesh hayyāh) for food is tolerable to God if the animal is rendered 'lifeless' by the draining of blood. We need not inquire into the prehistoric understanding of physiology which doubtless lies behind this prohibition; for the present purpose, it is enough to

recognize that it is a prohibition, a restraint upon the appropriation of nature's goods. Further, it is a restraint for all of mankind, including the peoples who will later be called 'Biblical', since Noah is the ancestor of Israel as well as of all pagan nations. In fact, this restraint seems even more important for the 'Biblical' peoples than for others, since, as will be remarked further below, it is embodied in the laws of Moses.

Thus, after a detailed consideration of the context surrounding the Genesis statements about human dominion, having employed the question of meat-eating as a focus, one comes to a preliminary conclusion which seems to be the opposite of that drawn by the mastery writers. Man is not pictured as a wholly godlike being with an utter license to dominate everything natural; rather, he is pictured as a partly godlike being, a fusion between the lofty "image of God" and the lowly "ground", who from the time of Noah forward is to require restraint in the exercise of his intellect and power.

Genesis 2 On the Naming of the Animals

The inadequate interpretive procedures demonstrated in the previous section re-appear again in the mastery writers' consideration of the passage in Genesis 2 in which Adam names the animals. Cox calls this naming "crucial",<sup>2</sup> and White claims that it symbolizes human power over them.<sup>3</sup> These writers have in mind not only the fact of meat-eating, but the broader notion of man's rational superiority over brute creation, which allows him to lead the animals into servitude. Now it has already been stated, in the summary of Genesis 1-9 presented above, that throughout Genesis 2 man is presented not as the master of Creation, but as its servant; the language of dominion-- ruling, subduing, becoming mighty, and so on-- is conspicuously absent. This fact renders the mastery writers' position on the naming open to serious doubt. And that doubt is only increased when the actual passage cited by the mastery writers is examined. Genesis 2.18-21 reads:

Then the Lord God said, "It is not good that the man should be alone; I will make a helper fit for him." So out of the ground the Lord God formed every beast of the field and every bird of the air, and brought them to the man to see what he would call them; and whatever the man called every living creature, that was its name. The man gave names to all cattle, and to the birds of the air, and to every beast of the field; but for the man there was not found a helper fit for him.



It is hard to see in what sense the naming of the animals portrayed here is "crucial". In fact, it appears to be incidental. The purpose of parading the animals in front of Adam is not to present him with subjects to be ruled, but to determine whether Adam will deem any of the creatures to be a "helper fit for him". In the event, Adam names the animals, but nothing is said about the names or their significance, and the only certain conclusion is that none of the names denotes the appropriate kind of "helper". The important part of the story lies not in the naming of the animals, but in the next segment, in which God makes a woman and brings her to the man (2.21-22). The woman, whom Adam calls "bone of my bones, and flesh of my flesh" (2.23), is accepted by him, though, as Combs and Post note, she is never said to be "a helper fit for him".<sup>4</sup> The theme of the story is the difficulty of finding a companion fit for man; to make the naming of the animals central to the passage is to do literary violence to it.

Moreover, even if it were to be granted, against the obvious reading,<sup>5</sup> that the point of the story is about human power over the animals, what kind of power do the mastery writers imagine is associated with 'naming'? They

do not specify, so one can only try to complete their thought by conjecture. Perhaps they have in mind the idea expressed by the Biblical scholar Gerhard von Rad: "Let us remind ourselves once more that name-giving in the Orient was primarily an exercise of sovereignty, of command. This passage, therefore, stands close to [Genesis 1] 28b in spite of the completely different presentation of the material."<sup>6</sup> Or perhaps they have in mind the 'primitive' and 'magical' belief that knowing the 'name' of something will give one power over that thing.<sup>7</sup> Neither line of thought is of much help to the hypothesis. On the first explanation, if Adam's name-giving is likened to the commands of an Oriental potentate, then Adam's command is limited, not total, since the Oriental king (if he is a proper king and not merely a cruel despot) will command the energies of his subjects but will not claim their lives (if they are law-abiding). According to this image, Adam could make use of animal labour, but would do improper violence by killing animals for food. The second explanation, in which Adam's names are interpreted as magical controls, would indeed establish the point claimed by the mastery writers, but at a high cost to the coherence of their hypothesis. For if the Bible is to be presented as a text which lays the groundwork for modern experimental science and modern technology, it can only be

an embarrassment that in one of its most technological-sounding moments it teaches that human mastery comes from an obviously 'pagan' notion such as the magical power of names.

Probably the only expression of the mastery writers' connection of 'naming' and 'dominion' which might survive examination is the formulation in which 'naming' is taken to be connected with 'reason' and 'science'. This formulation, which was attempted by Bacon and his followers, may indeed be what the mastery writers have in mind; their argument would be stronger if they would say this. In any case, the impossibility of the Baconian interpretation of Genesis 2 will be shown in Part Three below.

For now, then, it is safe to conclude that, both on literary and theoretical grounds, there is little likelihood that the passage in Genesis 2 about naming the animals has anything to do with modern mastery.

#### The Image of God and Dominion

In stressing the Genesis 1 passage on 'dominion', some of the mastery writers allege a strong connection of

the idea of 'dominion' with the idea of the 'image of God'. They seem to infer that the most important thing about man's 'godlike' status is that it gives him the power or the right to rule over the rest of Creation. They do not, however, make any attempt to exposit the Biblical sense of the phrase 'image of God' before applying it to support their hypothesis. Once again, their procedure seems selective and uncontrolled, and it is necessary to ask whether the primary sense of the 'image of God' has anything to do with human mastery over nature.

As stated above, the notion of the 'image of God' never re-appears in the Old Testament after Genesis 9, and in the Genesis 9 passage it is invoked not to suggest human power over nature but to suggest human restraint regarding murder. The only other appearance of the notion, in Genesis 5.3, again bears no evident connection with the idea of mastery, but seems merely to indicate that the 'image', whatever it is, is conserved through human generation: "When Adam had lived a hundred and thirty years, he became the father of a son in his own likeness, after his image, and named him Seth." If we eliminate these two passages as evidence for a connection between 'image' and 'dominion', we are left with only the

passage in Genesis 1. Since it is precisely the passage in Genesis 1 in which the alleged connection is debatable, we reach an impasse. The Biblical evidence is insufficient either to prove or to disprove the connection which the mastery writers wish to establish.

If we turn from the text of Genesis itself and look to the history of its interpretation, we find evidence which seems to count against the mastery hypothesis. According to the Biblical scholar James Barr, the majority of interpreters until recent times have interpreted the 'image' without reference to physical dominion:<sup>8</sup>

. . . until comparatively modern times the dominant Christian theological exegesis was one which connected the image of God in man with man's immortal soul, his reason, his spirituality; something of this is already present as early as the Apocryphal Wisdom of Solomon ii. 23. Under this sort of interpretation the relation of man to the rest of nature, and especially the animal world, tended to be thought of not as the practical question of control, technology and exploitation, but as the superiority of the rational being, with his immortal soul, over that which is soulless and mortal. As I have already suggested, it was only in fairly modern times, with a loss of conviction in the traditional exegesis (largely because historical study made it seem now quite unlikely that the Hebrew Genesis was concerned with rationality and the immortal soul) that an exegesis which laid great emphasis on the dominion of man over nature became prevalent. We must therefore doubt whether the Genesis passage, under the interpretation which it enjoyed for most of its historical life, can have

had so great an effect in encouraging man in practical measures of exploitation and domination.

In other words, even if it could be established that the text of Genesis did intend the 'image' of God to be a license for unlimited mastery, the mastery hypothesis would still be invalidated. For no influential Western interpreter of Genesis realized this, or could have realized this, until after the rise of modern Biblical scholarship, and since modern Biblical scholarship did not take hold on the Western mind until at least a century after the Industrial Revolution, this interpretation of the 'image' of God could not have been greatly influential in turning the West towards mastery. At most, it could have served as a post factum justification of mastery.

Barr's argument would seem to be partly valid and partly invalid. With regard to the theological exegesis of Genesis, he is probably right to say that the 'image of God' was generally unconnected with mastery over nature. And up to the end of the Middle Ages, theological exegesis was almost all that was available. But with the Renaissance came the possibility of independent, humanist exegesis, and, as will be shown in Part Three, that exegesis, which was fundamental for shaping the spirit of the modern world, did lay stress on the connection between

the divine image in man and the mastery of nature. The mastery writers, then, touch on an important truth in mentioning the significance of the 'image of God' as a modern theme. On this point, the weakness of their grasp on the Biblical text is compensated for by the sharpness of their insight concerning its historical outcome.

The remainder of this chapter is devoted to answering three questions which are pertinent to the mastery hypothesis. First, what kind of human dominion, benevolent or harsh, is intended by the Bible? Second, over which created things does that dominion extend, and over which does it not? Third, what qualifications or limitations apply to man's use of things which are in his domain?

#### Man's Dominion: Moderate Monarchy or Unlimited Tyranny?

In some formulations of the mastery hypothesis, the words translated in Genesis 1.26 and 1.28 as "have dominion" (rādāh) and "subdue" (kābash) are seen as significant indicators of the character of man's dominion. These words are sometimes said to indicate that man's dominion is unlimited or unqualified, or that it is harsh and involves imposing human will ruthlessly upon a

reluctant nature. From the point of view of Foster or Cox, such strong language is a blessing because it frees man to do whatever must be done to make the world suit him. From the point of view of White or Roszak, or of a Platonist like George Grant, such strong language is irresponsible because it must lead to unbridled human assertion and the ravaging of Creation by human greed and carelessness.

Now the Old Testament scholar James Barr, who is familiar with both the Hebrew text of the Bible and the main outlines of the mastery hypothesis, has almost succeeded in laying these philological arguments to rest.<sup>9</sup>

He shows that the verb "have dominion" (rādāh) means nothing more than "rule" in the general sense, and therefore cannot be construed (without due context) to carry any sense of harshness, repressiveness, or harmful domination. He also argues that the verb "subdue" (kābash), though having connotations of aggressiveness, need not imply anything more than the force needed to till the ground and grow food on it. The evidence he gives for rādāh seems conclusive; his argument about kābash needs a bit of supplemental reasoning.

It can be granted that kābash is a strong word.



It is used to describe the military invasion of the land of Canaan by Israel (Numbers 32.22,29; Joshua 18.1). Further, it is used there in conjunction with the word "earth". Joshua 18.1, describing the scene at Shiloh after the conquest, says " . . . the land (literally "earth", 'eretz) lay subdued before them." God's command to mankind in Genesis thus seems to commission something like Israel's military conquest of Canaan: a violent and unrelenting operation to control the earth. However, the military analogy is misleading. The violence of the invader is not directed against the land he invades, but against the land's current occupants. In fact, it would be foolish for the invaders to use force on a military scale against the land, for then the land would be harmed, and lose the value which makes it worth conquering. Therefore, if one insists on a parallel between the use of "subdue" in Genesis and in Joshua, one would have to argue that 'subduing the earth' in Genesis means, not plundering or ravaging it, but occupying it for use, by reproductive expansion ("Be fruitful and multiply, and fill the earth and subdue it").

Barr's conclusion is thus correct: the kind of dominion envisioned in Genesis 1 cannot be shown by merely philological arguments to be a harsh or violent one. And,

turning to non-philological grounds, it seems unlikely that the Bible would stress the harshness and unlimitedness of human dominion. For if man has "dominion" then he is like a king, and the ideal Biblical king is neither harsh nor unlimited in his behaviour. The good king, as every reader of the Bible knows, rules for the good of his subjects, while the bad king or tyrant rules for the good of himself (cf. Deuteronomy 17.14-20 and 1 Samuel 8.1-18). The good king rules by law and uses a minimum of force; he does not wish his people, except lawbreakers, to fear him. The bad king overthrows law, does not hesitate to use force, and prefers that all his subjects fear him. It would seem odd that the Bible would describe man's relation to the natural environment in terms of the kind of political tyranny it detests and consistently opposes.

Thus, while it would be possible to argue that the verbs used in Genesis suggest a rigorous dominion, it would be going too far to say that they imply an unrestrained manipulation of nature. Neither Foster's defense of unlimited experimental science nor Roszak's hostility towards the excesses of modern industrialism can find a legitimate basis in the Hebrew vocabulary.

Having dealt with the question of the tone of man's dominion over nature, we may now turn to the question of its scope.

#### Limitations on the Range of Dominion

What exactly is it over which the Bible declares us to have 'dominion'? Before replying, with the mastery writers, 'all of nature', one should pause to consider some elementary facts of Biblical usage.

As many competent scholars have pointed out, the word 'nature' has no exact equivalent in Biblical Hebrew.<sup>10</sup> The King James translators were sensitive to the fact: the English word 'nature' is absent from the Authorized Version of the Old Testament.<sup>11</sup> In fact, even though Greek has the word 'nature' (physis), that word is not found in the Gospels, the Acts of the Apostles, or Revelation.<sup>12</sup> To put these facts into the phrasing of many modern theologians, one could say that 'nature' is not a 'Hebraic' concept. The ancient Hebrew writers, therefore, would not have written of 'dominion over nature'. For 'nature', they would have had to substitute other words.

One sense of the word 'nature' is 'the proper or characteristic behaviour of things'. We use this sense of 'nature' when we say 'it is the nature of dogs to bark' or 'it is the nature of vapour to rise'. Biblical Hebrew can express this by using the word derek or the word 'ōrah, either of which can be translated as 'way' or 'manner'. The 'way' of women is menstruation (Genesis 18.1, 31.35). The 'manner' of man is to have sexual intercourse with a woman (Genesis 19.31). However, these words are not perfect synonyms for 'nature', because they do not pertain primarily to the 'natural properties' of things, but to social or ethical behaviour; the Bible is filled with phrases such as 'his wicked ways' or 'the manner of the Philistines'. The idea of 'way' in the Bible thus blurs the distinction between 'nature' and 'custom' or 'convention', and does not isolate a realm of 'natural' occurrences in the way the modern mind does.

Another sense of the word 'nature' is 'the collection of all non-artificial objects' or 'everything in Creation'. Biblical Hebrew cannot render this sense in a single word. If a Biblical writer wants to speak about 'the world' in this way, he has to use a longer, more descriptive expression, 'the heavens and the earth'. In

the Bible, the world is seen as divided into two great parts, the above and the below, the heavens and the earth. The term 'earth' is not quite accurate for the lower part of the world, for the lower part itself comprises two distinct parts, the earth and the seas (Genesis 1.9-10); thus, to be fully accurate, one would have to express this sense of 'nature' by the phrase 'heavens and earth and seas'.

These linguistic facts require a re-assessment of the claim that the Bible teaches 'dominion over nature'. Does the Bible teach dominion over the operations of natural things ('ways'), or only over the natural world as the collection of all things ('heavens and earth and seas')? Regarding the first possibility, there do not seem to be any Biblical passages which say that man is able to, or should try to, dominate or alter the 'ways' of natural things. The only 'ways' which he is encouraged to alter are his own, which are often evil. Yet the basis of modern technological society is precisely a tampering with non-human 'ways'. It is not the 'way' of lightning to be contained in wires, or the 'way' of a cow to be impregnated by refrigerated semen instead of by a live bull. Modern man undertakes not merely to use or command created things, but to drastically alter their characters

or their habits. Such an understanding of 'dominion over nature' is simply not envisioned in the Bible, so it is impossible to claim that the Bible originated it, and it is impossible to be sure whether the Bible would approve of it or even condone it.

What about the notion of nature as 'all natural objects'? Surely man is given dominion over nature in that sense? Surely Genesis 1 and Psalm 8 make that clear? Not quite. In those passages man is explicitly given rule over only part of the Creation. To begin with Psalm 8, if one looks closely one sees that "the works of thy hands"/"all things" over which man is made to rule (root māshal) refer, despite their seeming generality, to only a limited number of creatures. These creatures are carefully listed: "all sheep and oxen"-- domestic animals; "the beasts of the field"-- wild animals, perhaps also the 'creeping things'; "the birds of the air"; and "the fish of the sea, whatever passes along the paths of the sea". In other words, man is meant to "rule" (māshal) over the animals, not over 'nature' as a whole. If one looks at Genesis 1, one finds a list of which is essentially identical. Man is meant to "have dominion over" (radah) "the fish of the sea", "the birds of the air", and "every living thing that moves upon the earth"

(1.28). The dominion is again over living beings rather than over nature as a whole.

What about the earth? Is it not under human 'dominion' by virtue of the fact that it is to be 'subdued' (Gen. 1.28)? One has to be careful here, in light of the difference in meaning between the two relevant verbs, a difference discussed in the previous section. The 'dominion' (root rādāh), which is over the animals, suggests something like rule or authority, whereas 'subdue' (root kābash), which refers only to the earth, may in this context mean nothing more than 'occupy' or 'settle'; the suggestion of an imposition of human will over the earth may be utterly missing, especially in light of the fact that strenuous, sweat-producing agriculture, which employs force upon the land, is not contemplated until Genesis 3.17-19. It must be granted, however, that after the Fall, when farming becomes a necessity, the earth, along with the animals, is understood to be in some sense under human control. Thus, even though the Hebrew word rendered 'have dominion' (rādāh) is not used of man's relationship to the earth, one can legitimately say that the Bible permits human beings to take charge of and exploit the earth.

But the word 'earth' must be emphasized. As explained above, 'earth' is not 'nature', but only a part of it. It is distinguished from the sea, and more importantly from the heavens. Man is explicitly given rule over the earth, but not over the sea or the heavens. The lack of rule over the sea is not terribly important; man can quite happily leave that dangerous and unruly realm to the lordship of the great whales and sharks (if that is how the tannînim of Genesis 1.21 are to be construed), provided he is allowed to steal a few fish from it when necessary. But the exclusion of the heavens is far more significant.

That the heavens are not part of man's domain is clear not only from Genesis 1-- which makes such a precise distinction between heaven and earth and then tells man to subdue only the earth-- but from many other parts of the Bible. Psalm 115.16 is quite explicit on this point: "The heaven's are the Lord's heavens, but the earth he has given to the sons of men." In addition to such clear and deliberate divisions, there are many other passages which show that the heavens are peculiarly associated with God and far above the earth and the affairs of men. A passage which shows the heavens as the part of Creation especially related to God is Psalm 104.1-4. There, the light of the



heavenly bodies is God's dazzling cloak, the sky is his dwelling-place, and the aerial phenomena are his means of travel and communication:

Bless the LORD, O my soul!  
 O LORD my God, thou art very great!  
 Thou art clothed with honour and majesty,  
 who coverest thyself with light as with a garment,  
 who hast stretched out the heavens like a tent,  
 who hast laid the beams of thy chambers on the  
 waters,  
 who makest the clouds thy chariot,  
 who ridest on the wings of the wind,  
 who makest the winds thy messengers,  
 fire and flame thy ministers.

Not only are there many such passages which locate God in the heavens (Psalm 11.4, Job 22.12, 2 Samuel 22.14, to name only a small fraction of them); there are also many passages which contrast God's possession of heaven with man's confinement to the lower world. These latter depict God as looking down on, or coming down to, the earth from his heavens (Psalm 33.13, 53.2; Genesis 11.7, among others).

One of the motifs of the story of the Tower of Babel (Genesis 11.1-9) appears to be that man belongs on earth rather than in heaven. The postdiluvian men were supposed to "fill the earth" (Genesis 9.1), that is, spread out over its surface, in a horizontal direction. Early on, however, they sought to remain in one place on

the plain of Shinar (Genesis 11.2), and to expand in a vertical direction by building a city and tower with its top in the heavens (Genesis 11.4). The Lord did not like this project, and, by confusing the language of the tower-builders, caused them to abandon their goal and scatter over the face of the earth (Genesis 11.9). It appears that the Lord wishes man to stay close to the earth and to keep out of the heavens. Of course, there is much more than this to the Babel story, and that story will be discussed again further below; the present aim is merely to establish its earth-bound picture of human destiny.

That man is not meant to rule over the heavens, or the cosmic processes associated with them, is expressed in a more obvious way. Genesis 1.16-18 tells us that the sun and the moon were set in the firmament to "rule" (māshal) the day and the night. They clearly have their own dominion over the diurnal changes in the world, as man has his dominion (māshal, Psalm 8.6) over the creatures who dwell upon the surface of the earth. Further, their dominion over day and night entails a partial dominion over the inhabitants of the earth, including man. For, by controlling the day and night, they control the tides, the activity of green plants, and the waking and sleeping

habits of all animal races, including the human. Man and his kingdom therefore exist under the powerful, not to say deterministic, influence of the sun and moon. His mastery, even in the lower world, is decisively circumscribed by the authority of a larger realm.

Are there any practical consequences of the exclusion of the heavens from human dominion? In the ancient world, the restriction was of little moment, since the heavens were unattainable. But today, the question is real. If the heavens are God's home, or God's throne, or, less literally, are in some sense reserved for God, then the modern attempt to 'conquer space' would seem to be an attempt at usurpation. Since the stars, planets, comets, meteoroids, and cosmic gas belong to God, and were not part of the original bequest to man, man would seem to have no right to them. At least, no right to control them; perhaps he would retain the right to investigate them; investigation could be interpreted as an act of piety, a desire to contemplate the wisdom of God.

If the exclusion over control of the heavens were to be taken in the strictest sense, any attempt to regard the rest of the universe as 'resources' for human use would be ruled out. Carting moon minerals back to earth

to replace the ones we have squandered would be, in essence, an act of plunder. Colonizing another planet, presuming it has even the simplest living beings on it, would be an act of invasion. Testing nuclear weapons on asteroids or uninhabited planets would be an act of vandalism.

One might easily respond: such prohibitions are foolish; the human race is not about to repudiate the benefits of the conquest of space on the grounds that an ancient text with an erroneous cosmography limits man's dominion to the earth. This is doubtless a correct assessment of the practical situation. But if the Biblical understanding of the heavens were operative today, the above argument would be unassailable. And it is precisely the contention of the mastery writers that the Biblical understanding of nature is operative today. Therefore, they are found once again exercising their procedure of selective reading. Cox and Foster praise the Bible's gift of dominion, but say absolutely nothing about the Bible's restriction of that dominion to the earth. White and Roszak blame the Bible for granting man total control over nature, but pass over the fact that the Bible reserves the largest part of nature, the heavens, for God's exclusive use. Something in the ethos of the

mastery hypothesis causes its proponents to lay emphasis upon everything in the Bible that smacks of modernity, and to ignore everything in it that smacks of paganism. They may think that any special connection of God with the heavens is naive, primitive, or 'polytheistic', but that connection is made by the same Biblical authors who taught dominion over the animals and subjugation of the earth.

#### The Mosaic Law and the Limitations on Dominion

So far, it has been established that the Bible envisions human rule to be over the earth alone. What must also be understood is that even on the earth man's dominion is not unrestricted. One such restriction, prohibiting the eating of blood with flesh (Genesis 9.4), has already been mentioned. That restriction, however, merely foreshadows the much more systematic code of human restraints found in the laws of Moses. These laws, which are said to be Israel's wisdom and understanding in the sight of the nations (Deuteronomy 4.6), set forth many restrictions upon the use of the soil and of plant and animal life. Though many of the specific restrictions are no longer thought to be binding upon either modern Jews or modern Christians, as a whole they embody principles of restraint which cannot be disdained or ignored by those

who attempt to understand Biblical thought. In this last section, an attempt will be made to evoke some of the principles which lie behind the various Mosaic restrictions.

A convenient starting-point for the investigation is the Biblical attitude toward the treatment of soil, crops, and trees. On this topic, Deuteronomy 20.19-20 is suggestive:

When you besiege a city for a long time, making war against it in order to take it, you shall not destroy its trees by wielding an axe against them; for you may eat of them, but you shall not cut them down. Are the trees in the field men that they should be besieged by you? Only the trees which you know are not trees for food you may destroy and cut down that you may build siegeworks against the city that makes war with you, until it falls.

This passage can be interpreted in two ways. It can be interpreted in the most direct fashion as a law designed to protect the interests of fruit trees, to guard them from irresponsible action by human beings; or, it can be interpreted as agricultural advice dressed up in legal form to promote merely human interests. In the latter interpretation, the cutting down of fruit trees is forbidden because it is foolish; it will take years to re-grow such a valuable source of food, and other, non-fruit bearing trees could serve equally well to make

siege equipment. Such a reading of the passage, though possible, yields a result which counts against the anti-Biblical version of the mastery hypothesis; it shows the Bible to be a manual of careful conservation rather than an anti-environmental tract. This point is made well by Jacques Ellul.<sup>13</sup>

It seems, however, that the former interpretation is preferable. This commandment seems to set a limit on human exploitation not out of mere enlightened self-interest, but out of respect for the created purpose of each thing. Fruit trees are for nourishment; cedars and other great trees are for the needs of human construction. To use the wood of a fruit tree for timber seems to be a violation of the tree's 'nature', and to impose human will upon it in an improper way. Man has the right to use the things of the earth, but not in any way whatsoever. This reading seems to catch more accurately the protective nuance in the question: "Are the trees in the field men that they should be besieged by you?"

A passage just as significant is found in Leviticus 25.1-7. There the Lord tells Moses to proclaim to the people:

When you come into the land which I give you, the

land shall keep a sabbath to the Lord. Six years you shall sow your field, and six years you shall prune your vineyard, and gather in its fruits; but in the seventh year there shall be a sabbath of solemn rest for the land, a sabbath to the Lord; you shall not sow your field or prune your vineyard. What grows of itself in your harvest you shall not reap, and the grapes of your undressed vine you shall not gather; it shall be a year of solemn rest for the land. The sabbath of the land shall provide food for you, for yourself and for your male and female slaves and for your hired servant and the sojourner who lives with you; for your cattle also and for the beasts that are in your land all its yield shall be for food.

In light of the mastery hypothesis, the above passage is very difficult to interpret. Why should the land ('earth', 'eretz') keep a sabbath? Why should it have a rest? To say the earth 'needs a rest' would imply that it is capable of 'activity' and 'exhaustion', which is to suggest that it is in some way 'alive'. This is, of course, compatible with the results of Chapter Three above, but the main point here is not so much the possibility that the earth is 'animated', but the fact that man's dominion over it is restricted by law.

As in the case of the law about fruit trees, it is possible to interpret the passage as simply a legal formulation of sound principles of resource management. A good farmer does not use the same field continually; he lets it lie fallow every few years, which enables it to



renew its productive capacity. This law, then, may be simply an exhortation not to exhaust one's land and hence lower one's yields.

Such an interpretation is again hard to accept. A merely agricultural statement would not belong in the Laws of Moses; it could be found in any ancient Near Eastern equivalent of the Old Farmer's Almanac. This law, however, is more than merely agricultural; it is a restriction upon use of the land couched in religious terms. It appeals to the holy institution of the 'sabbath'. The number of years in the recommended land use cycle-- seven-- is obviously the same as the number of days in the human work cycle. Because of this schematic element, it seems highly likely that religious more than agricultural motives lie at the root of the statute. Thus, though it is quite likely that increased yields would be a consequence of the law, they do not seem to be the explanation for the law.

A truer explanation would appear to be that of Ellul: Man is never to assume that all of creation exists solely for him. It exists for itself as well. As the animals share in the weekly sabbath to enjoy the Creation for themselves, so the land is to share in the septennial

sabbath, to be wholly itself, to operate in Creation for the glory of God rather than the service of man.<sup>14</sup> The law thus sustains an attitude toward nature in which the land has its own proper dignity and man has his proper limitations.

The laws of Israel restricting the use of animal life are more numerous. The most obvious examples are the laws (found in Leviticus 11) which forbids Israelites to eat of the 'unclean' animals. This greatly limits the flesh-eating privilege granted to man in Genesis 9, since the 'unclean' animals make up a considerable part of the animal kingdom. One might object that the taboo upon 'unclean' animals cannot be used as example of limiting the use of 'nature', since it is not respect for 'nature', but rather fear of ritual impurity, which imposes the restriction. In response to this one could argue that the origin of the notion of 'uncleanliness' in animals is unclear, and that it may well have been grounded in certain 'natural' features of the animals in question. However, this discussion can be set aside; the laws of Israel supply many clearer examples of a genuine respect for other natural beings. The examples below are taken from the list assembled by Welbourn,<sup>15</sup> and further examined with a view to evoking the limiting principles

involved.

The Mosaic Law forbids boiling a kid in its mother's milk (Ex. 23.19, 34.26; Deut. 14.21). Biblical scholars of a historical bent have attempted to account for this peculiar prohibition as a reaction to a specific pagan ritual, described in Ugaritic texts, involving a meat-and-milk meal, but there is no hard evidence for this,<sup>16</sup> and there is a simpler explanation. The mother's milk, by nature, is meant to be a source of life and nourishment for the infant mammal, not an accessory to its killing. It is harsh enough to a mother goat to take her kid away and kill it; it is positively perverse, contrary to nature, to expect the mother to supply her own milk to make the meal more delectable. Here the 'natural' (or, in a more Biblical phrasing, 'created' or 'divinely established') ties between mother and infant restrict man's dominion.<sup>17</sup>

Deuteronomy 22.6-7 reads:

If you chance to come upon a bird's nest, in any tree or on the ground, with young ones or eggs and the mother sitting upon the young or upon the eggs, you shall not take the mother with the young; you shall let the mother go, but the young you may take to yourself.

Why must the mother be let go? The law does not

say; perhaps the idea is that human beings have the right to kill individual animals, but not entire family lines. Therefore, the mother must be set free to produce more offspring. This may be meant to approximate the levirate law (Deuteronomy 25.5-10), in which the brother of a husband who dies childless must give his seed to the wife, so that his dead brother's line will live on. If this is the explanation, then the notion of 'family' in the Bible is more penetrating than normally realized, extending beyond the human into the animal realm. Whatever the reason, the prohibition establishes a limit on man's mastery over the birds, one which one might find in a pagan society but would hardly find in a world full of factory-raised chickens.

Deuteronomy 25.4 says: "You shall not muzzle an ox when it treads out the grain". Again, the purpose of this restriction is not stated, but seems to be deducible. The ox is engaged in work which is, to it, repetitive and purposeless, for several hours a day, treading on the heads of the grain. It would naturally like to nibble as it works. Such nibbling may occasion some loss to the owner, which is why some owners would muzzle the ox. The evil in this appears to be the unwillingness of man to share the fruits of the labour with the servant who has

performed it. Given the general emphasis in the Old Testament upon the proper treatment of sojourners and slaves, this seems the likely explanation. Alternatively, the evil could rest in the unnatural discomfort to the animal. However this may be, some notion of the 'humane' treatment of animals is here expressed, and this notion would seem to point to more general applications and a set of principles restraining human tyranny over animals.

If the Old Testament wanted to teach an unlimited mastery over animals, it would have no motive for including such restrictions. But if, as already shown, the Old Testament regards animals as in some ways quasi-human, then these odd indications of respect make perfect sense. The laws of Israel hardly contain a systematic declaration of animal rights, yet they are not quite so ruthless as is sometimes supposed.

In general, man's dominance over the animals in the Bible is limited by the fact that the happiness of animals, like the happiness of men, is an end or purpose of the arrangement of Creation. God cares about the welfare of the animals, not merely to maintain a supply of food and labour for man, but because they are 'good' in themselves (Gen. 1.21,25). This is why, at the end of the

book of Jonah (4.11) God says, "And should I not pity Nineveh, that great city, in which there are more than a hundred and twenty thousand persons who do not know their right hand from their left, and also much cattle?"

[emphasis added] This is why, as John Passmore points out,<sup>18</sup> the beautiful Psalm 104 celebrates simultaneously God's care for humans and animals. Since men and animals are both meant to benefit from existence in the world, man's dominion over the animals is necessarily partial.

In an era in which large-scale genetic engineering looms nearer, one could not leave the subject of 'dominion over nature' without mentioning the anti-mixing statute found in Leviticus 19.19: "You shall not let your cattle breed with a different kind" (RSV), more accurately: "Of your cattle you shall not interbreed two kinds (kil'ayim)". Whether this intends the narrow stricture that one type of bovine is not to be bred with another, or whether it excludes only the mixing of bovines with animals outside the bovine group (the Hebrew word for 'cattle' does not refer exclusively to bovines), the principle of maintaining 'kinds' has to dampen the ambitions of modern promoters of radical genetic experimentation. Associated with this statute are some other anti-mixing laws (Leviticus 19.19, Deuteronomy

22.9-11), against seeding a field or vineyard with two kinds of seed, and against wearing garments made of a particular mixture of substances, wool and linen ('unnatural', perhaps, because one is animal-derived, the other plant-derived). Certainly under Mosaic Law the possibilities of human dominion are hedged all about by restrictions respecting the 'nature' or 'way' of things.

To conclude this section: the Laws of Moses put restrictions on man's dominion which are inconsistent with the claims of the mastery hypothesis. On the one hand, the restrictions contain far too much 'pagan' respect for nature to please modernist mastery writers such as Cox; on the other hand, the restrictions suggest principles which appear ecologically and spiritually healthy, blunting the criticism of anti-Biblical mastery writers such as Roszak and McHarg.

It is now possible to make a general statement about the "dominion" of man as it is conceived in the Bible. The kind of dominion which man is intended to exercise (as opposed to the kind which man may attempt to exercise) is: first, firm but not cruel; second, only over the earth and its inhabitants; third, restrained even

upon the earth by a respect for other created beings and their 'ways'. The notion of 'dominion' put forward by the mastery writers is, as an interpretation of the Biblical text, as untenable as their notion of 'desacralization'.



PART THREE:

The Early Modern Transformation of the Idea of Mastery

### Introductory Remarks

The conclusions arrived at so far amount to this: it is a great oversimplification to represent the possible human attitudes toward nature as two theoretical contraries, 'pagan' and 'Biblical', 'Biblical' being understood as virtually synonymous with 'modern'. For it has been shown that both Biblical and pagan thought agree with modern thought insofar as they assert a degree of human dominion over natural things, and that both Biblical and pagan thought disagree with modern thought insofar as they display certain scruples about unlimited human dominion. It cannot be said, then, that Biblical thought, understood in contradistinction to pagan thought, was particularly associated with the unbounded human aspirations associated with the modern 'conquest of nature'. Modern technological civilization is, according to the literary evidence, no more the offspring of Jerusalem than of Athens or Babylon.

Though this result in itself seems to be enough to invalidate the mastery hypothesis, it would be unjust to the mastery writers not to press the inquiry a little

further. For it appears that their connection of modern mastery with the Bible, though inadequate as a guide to the Biblical text, is quite valuable as an insight into the history of interpretation of the Biblical text, and thereby into the history of Western thoughts and attitudes. It turns out to be the case, more often than even the mastery writers indicate, that the modern idea of mastery was, from its inception, expressed in Biblical language. And it turns out that the correct conclusion to be drawn from this fact is, not that the Bible taught modern mastery, but that the language of the Bible was adopted in order to legitimate ideas of human dominion which were not themselves Biblical in origin or spirit. To establish this conclusion is the purpose of this third and final Part of the present work.

#### The Shift from Ancient to Modern Mastery

The notion of human mastery or dominion over nature can be understood in a weak or a strong sense. In the ancient and mediaeval world, as the previous chapters have shown, the predominant sense was the weak one. Mastery meant primarily the immediate appropriation of natural things for human use (e.g., trees for timber, oxen to draw the plough), and secondarily a limited capacity to

direct natural forces (e.g., the wind, in navigation) or to intervene in biological processes (e.g., by employing trial-and-error methods of improving breeds). A fairly safe generalization is that human dominion was understood to be broad but not deep. Subsequently, however, in the early modern period (ca. 1450-1700), 'dominion' began to take on a new sense, the strong one. A much fuller mastery, deeper and consequently also broader, was envisioned. Man was said to be capable of penetrating the inner secrets of each thing, and of grasping the principles which interconnect all things. This knowledge of natural principles was affirmed by many to be of great or even infinite value, because the understanding of such principles would inevitably yield new arts of immense benefit to mankind. Thus, Leonardo da Vinci studied the anatomy of birds and designed flying machines; the alchemists investigated the properties of substances and asserted that they could turn lead into gold; a new chemical science of medicine was launched by Paracelsus; Bacon and others envisioned science-generated utopias. The idea of the total subjection of nature, regarded in earlier eras as either a dream or a nightmare, emerged as a genuine possibility and an object of fervent hope and striving.

One cannot help but wonder about the intellectual and emotional springs of the early modern vision. The mastery writers suggest that the most important of those springs were supplied by the Bible. As has been argued above, this suggestion in its simple form must be rejected; still, the central 'Biblical' notions isolated by the mastery writers-- 'desacralization', 'dominion', and 'man in the image of God'-- retain some power for historical explanation once their claim to be properly Biblical is abandoned. This is so, first because these notions (as understood by the mastery writers rather than by the Bible) do seem to be psychologically compatible with modern attitudes, and second because these notions could easily have been made to seem like teachings derived from the Bible. It is therefore worth considering what role these concepts may have played in the formation of early modern teaching about the control of nature by human beings.

Desacralization: A Condition but not a Motive

It cannot be denied that what the mastery writers call 'desacralization'-- the denial of divinity and life to nature-- played a role in the rise of modern science and technology. Many early modern thinkers who championed

human mastery affirmed that mastery would not be achieved until nature was regarded as non-divine and inanimate; one thinks of Bacon, Descartes, and Hobbes. On the other hand, many great minds of the period, influenced heavily by the conceptions of the Stoics, believed that everything in the universe was 'alive'-- pulsating with desires, driving toward natural ends, and acting in sympathy or antipathy to the influence of everything else-- yet simultaneously affirmed that men could learn the secrets of nature and turn them into useful arts. Such views can be found in many writers of the Italian Renaissance, such as Tommaso Campanella, and in alchemical writers such as Paracelsus;<sup>1</sup> Collingwood himself, speaking of the sixteenth-century understanding, says "man's mastery over nature was conceived not as the mastery of mind over mechanism but as the mastery of one soul over another soul".<sup>2</sup> Therefore, one cannot assert that early modern notions of nature were uniformly 'desacralized', or that 'desacralization' was the precondition of the mastering orientation.

The above argument is not invalidated by the fact that the 'animist' view of Campanella and Paracelsus was a failure in comparison to the 'inanimist' position of Bacon and Descartes. It does not matter that the 'mechanical'

notion of nature eventually yielded great human power over nature, whereas the 'organic' notion yielded none. For the point is not that early modern 'animist' views were correct interpretations of nature, but only that those who held to such ideas of nature were not prevented thereby from desiring control over nature. The fact that Paracelsian magic strove for the same goals as Baconian science shows that the spirit of mastery was independent of the theory of nature. Though the triumph of the mechanical philosophy eventually tied the cause of mastery to the doctrine that nature was inanimate, a commitment to the mechanical view was not, in the beginning, a prerequisite of membership in the amorphous company of early modern thinkers which sought to extend the bounds of human dominion. Therefore, 'desacralization', though useful in accounting for the triumph of the mechanical idea of nature in the seventeenth century, is unable to explain why thinkers should have been ardently pursuing mastery in the sixteenth.

#### The Biblical Motifs 'Dominion' and 'Image of God'

Though 'desacralization' may be ruled out as the Biblical idea which generated the modern attitude, two other Biblical notions suggested by the mastery writers--

the notion of 'dominion' and the notion that man is made 'in the image of God'-- should not be. For these conceptions were drawn upon by a number of early modern writers to evoke a new, loftier view of man. The thinkers of the Italian Renaissance, the Paracelsians, and the English Baconians all appealed to these ideas, which they represented as Biblical teachings. According to them, the Bible taught that man was meant for dominion; that this dominion was to be achieved through knowledge of nature; that human technical activity was virtuous; and that man was divine in essence, a kind of God on earth. In the interlocking of these themes, man became viewed as a Demiurge, a divine, knowing, creative master of nature. It can be said, then, that the mastery writers' errors hit near the truth: an early modern re-interpretation of the Bible took the ideas 'dominion' and 'image of God' and, by isolating these from their Biblical context, made them the centre of a bold new human project, the conquest of nature.

The decisive formulation of this bold new project is found in the writings of Francis Bacon and his followers, and it is the Baconian expression of it which will be the centre of attention in Chapter Five below. Before one can grasp fully the Baconian statement,



however, one needs to understand the roots of Baconian thought, which lie in the Renaissance doctrine of man. The remaining remarks in this introduction, therefore, are devoted to this topic.

In the Image of God: The Renaissance Re-interpretation

It is surprising that the mastery writers make little or no mention of the period known as the 'Renaissance'. Collingwood deals with it somewhat, and Hooykaas takes it into account, but the others virtually ignore it. Foster, Cox, and even Roszak write as if the history of the idea of mastery can be traced from the Bible directly through Protestantism, as if the Renaissance did not precede, accompany, and subtly penetrate the Reformation. This misleads the mastery writers, because it focuses their attention upon desacralization (definitely a Protestant theme), but causes them to underemphasize the novel interpretation of Genesis 1.26-- containing the idea that man is in the image of God-- which is a commonplace of Renaissance thought.

It is not that the mastery writers are unaware of the phrase 'image of God'; as has already been shown, they

see it as quite important. But they tend to blend it, if not actually to equate it, with the idea of 'dominion' which is found beside it in Genesis 1.26. They therefore do not consider the potency of the idea of 'image of God' by itself: how it might be, and in fact was (by Renaissance writers) connected with scientific knowledge, human technical activity, and the daring theme of 'creativity'. For Renaissance thinkers, the 'image of God' was far more than a statement about man's right to rule over nature; it was a claim that man shared in the most fundamental activity of God-- the activity of creation. The idea that human beings are or can be 'creative' or 'creators', bringing radical novelty into the world, is obviously important for the rise of the modern spirit of mastery. Therefore, by failing to give due weight to the Renaissance, the mastery writers miss a vital link in the history they are trying to trace.

The Renaissance period saw the recovery and translation of much ancient literature. The complete Plato, for example, was translated into Latin for the first time by Marsilio Ficino (1433-1499). A very important body of ancient literature was the Hermetic corpus-- the group of texts attributed to 'Hermes Trismegistus'. Hermes Trismegistus was supposed by the

early Renaissance writers to be an ancient Egyptian, a contemporary of Moses, who was a master of spiritual and natural knowledge. He had allegedly passed down a secret teaching, which had reached Plato, Plotinus, the Jewish Cabalists, the alchemists, and others, and which combined the truths of pagan mysteries, pagan philosophy, and Christian revelation. For over a century after Ficino translated the Hermetic corpus from Greek into Latin, the European mind was fascinated by the syncretic visions of the legendary Hermes. Though it was later proved by Casaubon that the Hermetic texts had nothing to do with Egypt, and were in fact impostures of the early Christian era, their themes pervaded European philosophical, religious, and scientific thought.

Much of the Hermetic literature seems to be worthless babbling, and represents a very immature mysticism. However, one theme of the Hermetic texts, picked up by the Renaissance and greatly elaborated, was the idea that man is nearly divine in character and power, because he is made in the image of God. The following passage, from Scott's edition of the Hermetica, is particularly striking:<sup>3</sup>

If then you do not make yourself equal to God, you cannot apprehend God; for like is known by like. . . . Think that for you too nothing is impossible;

deem that you too are immortal, and that you are able to grasp all things in your thought, to know every craft and every science, find your home in the haunts of every living creature; make yourself higher than all heights, and lower than all depths; bring together in yourself all opposites of quality, heat and cold, dryness and fluidity . . . grasp in your thought all this at once, all times and places, all substances and qualities and magnitudes together; then you can apprehend God.

The themes in the above passage-- likeness to God, immortality, nothing being impossible for man, the mastery of all arts and sciences, the comprehension of all nature by the human mind-- are themes which were eventually linked with Genesis 1.26 and carried through the Renaissance into the modern age. Charles Trinkaus, who has written a massive two-volume work dedicated to expositing the theme of the image of God in the Italian Renaissance, shows the reappearance of these themes in these passages from Marsilio Ficino:<sup>4</sup>

. . . the mind of man, however, the inventress of innumerable and different things, is supported by the use of innumerable words, as though by a certain worthy interpreter of itself, and it is furnished with hands as well which are most apt instruments for making the innumerable inventions of the mind; indeed the same nature would have given these instruments to animals also if there were in them an interior craftsman who would use such instruments. Therefore the mind in comprehending conceives of as many things in itself as God in knowing makes in the world. By speaking it expresses as many into the air; with a reed it writes as many on paper. By making it constructs as many in the material of the world. Therefore he would be proven mad who would deny that the soul, which in the arts and in governing

competes with God, is divine.

Since therefore man sees the order of the heavens, whence and where they move and by what measures and what they bring about, who will deny that he is endowed with a genius, as I would put it, that is almost the same as that of the Author of the heavens, and that man would be able to make the heavens in some way if he only possessed the instruments and the celestial material . . . ?

These are very powerful passages. Man is divine, because of his mind, his capacity for language, his ability to comprehend the world, and his ability to express what is in his mind through his actions. In particular, he is divine in producing 'the arts' and 'governing', in which he 'competes with God' for excellence. Further, human art is limited only in practice, not in principle; it is imaginable that man could himself make the heavens! These comparisons with God are not by Ficino, or many of his contemporaries, deemed blasphemous or irreverent. It is right to emphasize man's godlike qualities and power, which (for Ficino) are taught in Genesis 1.26 as well as in the Hermetic literature.

Trinkaus supplies many more powerful passages from Italian Renaissance thinkers which 'divinize' man for his scientific, technical, or 'creative' capacities, and justify the divinization by direct or oblique references

to Genesis 1.26 and the image of God in man. It is unnecessary to reproduce them here; the gist of them can be stated in the words of another Renaissance expert, Agnes Heller:<sup>5</sup>

An awareness of the creative and self-creative power of man was one of the major experiences of the Renaissance world. During the early Renaissance these powers seemed boundless. One writer after another discovered that the attributes of God were in fact the attributes of man.

That is, the 'image of God' in man, which would appear, on the surface, to establish only that man is like God in some respect, becomes understood as an 'equals' sign: man is God, in all important respects.

To the accounts of Trinkaus and Heller one may add the interpretation of Cassirer, who tells us that the picture of Adam in Genesis 1.26 was modified by combination with the 'Prometheus motif' of Greek myth, to produce a striking new picture of the human essence:<sup>6</sup>

. . . we have reached the point at which the Adam motif undergoes the inner transformation that enables it to merge with the Prometheus motif. . . . Man is a creature; but what distinguishes him above all other creatures is that his maker gave him the gift of creation. Man arrives at his determination, he fulfills his being, only by using this basic and primary power.

For Cassirer, then, the Italian thinkers 'fleshed

out' the 'image of God' in man by connecting it with human technical capacity, symbolized by fire in the story of Prometheus. When Genesis 1.26 is explained in terms of the Prometheus myth, the emerging picture is of Man, the being who is legitimately godlike because of his technical, creative capacity.

Thus, according to a number of well-established Renaissance scholars, the Old Testament idea of the image of God, transformed by various other notions (by Hermetic ideas, by the Prometheus myth, and perhaps other things), became a major theme in the self-understanding of Renaissance man. It became a justification for the new, expansionist society of Renaissance Italy, and for new, more extreme doctrines of man's mastery over nature.

Nor was this new doctrine restricted to Italy. It is not difficult to show that the notion of the 'image of God' is connected with novel arts, a penetrating science, and the ideal of mastery over nature in non-Italian thinkers of the period. A striking example is Paracelsus (1493-1541), the Swiss physician and alchemist. In the writings of Paracelsus one can find the notion that God and all the natural powers of the heavens dwell in man,<sup>7</sup> that human thought is a power akin to that which created

the stars and elements,<sup>8</sup> that man is assigned the task of developing the given world into something vastly superior by art,<sup>9</sup> and that the art of the alchemist is parallel to the 'separations' by which God created the world.<sup>10</sup> The school of thought which made Paracelsus its champion was one of the main vehicles by which the Biblical notion of the divine image in man became associated with the new, mastering attitude toward nature.

Now in Chapter Four above, it was shown that the notion of the image of God had not been, in orthodox theological exegesis of the Bible, understood in this Renaissance manner. The image of God had been understood to represent the rational or moral element in human nature, not the domineering or creative one. Thus, the Renaissance reading of the text represented a major breakthrough. Therefore, by the time of Francis Bacon, a novel understanding of human power over nature, based on a re-interpretation of Genesis 1.26, was in the air, and though it would not always be stated so directly and dramatically as it was by the Hermetic writers, the Italian thinkers, or the Paracelsians, it would remain a subtle and powerful element in all subsequent thought. It would complement and thus support the novel interpretation of human 'dominion' which would triumph in the seventeenth



century.

With this background in mind, it is now possible to examine closely how the Baconian understanding of nature was justified in terms of Biblical 'dominion', and thus how modern mastery tried from the outset to represent itself as 'Biblical'.

## Chapter Five

### Baconian Technological Science and Biblical Dominion

The ideas discussed in the previous introductory section-- ideas about man's godlike stature, theoretical capacity, and technical prowess-- emerged in Renaissance Italy but quickly became the common property of European thought generally. Eventually, they found their way to England, where they were absorbed by Francis Bacon and his followers. Bacon and the Baconians took from these earlier writers everything that exalted man, his mind, and his technical activities, and built it into their own vision of a new science, a technological science, which would be justified by the practical wonders which it would work for the benefit of mankind.

Baconian science, however, was more than a continuation of Renaissance science. Along with the Renaissance, Baconianism emphasized the high rational and creative potential of man, but in addition, it fostered a new, more aggressive attitude toward nature, an attitude which can be identified as the dominant modern one, the one which is praised or denounced by the mastery writers.

And this new attitude toward nature, while certainly not unconnected with the notion of 'the image of God', was more often directly linked by the Baconians with the Biblical understanding of 'dominion'. The Baconians pointed to the Bible, especially the Old Testament, as their inspiration for the idea of a virtually unlimited human dominion over nature, a dominion to be sustained by a penetrating inquiry into nature and an intensive manipulation of nature through human art.

It is quite appropriate, then, that several of the mastery writers (Foster, Grant, Roszak, and Collingwood) mention Bacon by name or clearly have him in mind when they formulate their hypothesis. It is in Bacon, more than in any other early modern thinker, that they see, and are right to see, an apparent connection between Old Testament thought and modern technological mastery. It is therefore important to examine the character of Bacon's technological science alongside its Biblical justification.

Such an examination proves to be quite fruitful; it reveals two facts of great significance. First, by applying the results of Part Two above, one can show the Baconian interpretation of the Bible to be inadequate.

Second, by comparing Baconian exegesis with that of the mastery writers, one can discover that the mastery hypothesis offers no Biblical arguments for modern mastery which was not found centuries earlier by Bacon and his allies. Taken together, these two facts mean that the mastery hypothesis, insofar as it depends upon exegesis of the Old Testament, is simply a repetition of a much earlier attempt to justify modern attitudes by appeals to Scripture, an attempt which was no more adequate then than now, despite its historical success.

In this chapter, a close analysis of Baconian ideas about science, nature, and human art, undertaken alongside a study of Baconian Biblical exegesis, will illuminate the rise of those modern attitudes which have occupied the attention of the mastery writers, and in so doing will show how a faulty seventeenth-century Biblical interpretation is connected to a faulty twentieth-century history of ideas-- that is, to the mastery hypothesis.

#### Desacralization and Final Causes in Nature

Baconianism stood firmly for what the mastery writers call the 'desacralization' of nature. It repudiated the view, held by many Renaissance thinkers,

that nature was alive and purposive. It denied the quasi-personal connections which the alchemists and magicians often declared to exist between nature, man, and God. It strove to place man, with God, above an impersonal nature which could be regarded in a detached or 'objective' manner. Bacon censured the idea of a divine or living nature, declaring it to be false and in fact un-Christian:<sup>1</sup>

For as all works do shew forth the power and skill of the workman, and not his image; so it is of the works of God; which do shew the omnipotency and wisdom of the maker, but not his image; and therefore therein the heathen opinion differeth from the sacred truth; for they supposed the world to be the image of God, and man to be an extract or compendious image of the world; but the Scriptures never vouchsafe to attribute to the world that honour, as to be the image of God, but only the work of his hands; neither do they speak of any other image of God, but man.

This passage, which without the literary archaisms might easily have come from Cox or Foster-- note the references to Genesis 1 and Psalm 8-- seems to support the contention of the mastery writers that modern science is a product of the Biblical 'de-divinization' of nature. Nature will not be properly understood, says Bacon, until it is distinguished from God, and studied as an artifact, as the work of God's hands. The 'heathen opinion' of a living nature-- expressed in Stoicism and in Plato's Timaeus in antiquity, and still very much alive in the

Hermetic and alchemical writings of Bacon's day-- leads to bad science because it springs from false theology.

For Bacon, it was not only the Hermetic-alchemical understanding of nature which was steeped in 'heathen' theology. The other major line of thought of his time, the Scholastic, was also 'heathen' insofar as it treated natural beings as purposive, operating according to 'final causes'. Bacon called the use of final causes in natural science the confusing of 'Metaphysics' with 'Physics'.<sup>2</sup> The separation of Metaphysics from Physics, that is, the separation of the discussion of the divine purpose behind motion from the discussion of the efficient cause of motion, was implied for Bacon by the separation of God from machinery of the world. The fact that the Aristotelian Scholastics 'confused' the two realms of explanation was proof that they were still under the spell of the 'heathen' vision, in which God is not properly distinguished from the powers of nature. Again, the mastery writers seem to have correctly located a 'desacralizing' Biblical element at the heart of modern natural science.

Before concluding, however, that Bacon derived his allegiance to the 'desacralized' world-view from the

Bible, one should take into consideration certain facts. As was shown above in Part One, 'heathen' thought about nature was not uniform. Many pre-Christian thinkers, notably the atomists, rejected 'animism', 'pantheism', and 'purposiveness' in their interpretation of nature. Writers such as Democritus, Epicurus and Lucretius sought to explain change in nature purely in terms of matter and motion. Bacon was well aware of the atomist line of thought; Democritus is cited favourably by him more than once.<sup>3</sup> He knew, then, that within 'heathenism' itself there could be found a largely 'desacralized' vision of nature. The issue, then, was not 'Biblical' against 'pagan' ideas of nature, but 'inanimate' and 'non-purposive' against 'animate' and 'purposive' ideas of nature. The fact that the 'right' side in the conflict-- that nature was inanimate-- could be shown to be compatible with the Bible (as Bacon read it) does not prove that Bacon's own devotion to the 'right' side was derived from the Bible. There is no proof, as Foster baldly asserts, that Bacon and the other early moderns (e.g., Gassendi) derived their non-teleological science from Christianity and then reinforced it with an appeal to the atomists;<sup>4</sup> it seems equally likely that the atomism came first and the religious consideration was a welcome afterthought, or even an insincere justification.<sup>5</sup>

It can be granted, however, that even if Bacon did not owe his 'desacralized' picture of nature to the Bible, he certainly defended it by means of the Bible. One can therefore say that the mastery writers correctly reconstruct the history of ideas when they connect the Bible with the modern, inanimate picture of nature. This history, however, is valuable only as the history of a misinterpretation, since, as shown in Chapter Three above, the idea of 'de-divinization' (which Bacon correctly discerns in the Bible) does not imply the idea of 'de-animation' (which Bacon's non-purposive Physics requires).

To summarize: the mastery writers are correct to assert that a de-animation of nature was essential to the birth of modern science, and to indicate the role of Bacon in that regard, but they fall into the error of Bacon in asserting that de-animation is part of the Biblical world view, and they extend a generous trust toward Bacon in believing that his choice of models of nature is dictated by Scripture rather than by his conviction that only the inanimate model could yield the mastery required by the spirit of the Renaissance.



Bacon, Cowley and Sprat: Violence Toward Nature

Bacon taught that knowledge of nature would come only from prying into it, invading it, and violating it. This belief was shared and promoted by two of Bacon's great glorifiers, Bishop Thomas Sprat (1635-1713) and poet Abraham Cowley (1618-1667). Sprat wrote a 'history' (actually an apologetic tract) of the Royal Society of London (the first modern scientific society), in which he praised that group for its Baconian spirit; Cowley wrote an ode to Bacon and Baconianism which was prefixed to Sprat's work. Writers like Sprat and Cowley, though second-rate minds, were among the intelligentsia of the age. They therefore provide a valuable register of early modern values concerning the study and manipulation of nature. Further, the fact that Sprat was a Bishop indicates that the views of Bacon were not seen as antithetical to certain contemporary (not necessarily orthodox) versions of Christianity. In what follows, passages will be drawn from Bacon, Sprat, and Cowley, to illustrate the Baconian theme that nature is the deserving object of human aggression and violence.

Nature is often represented in Baconianism as holding secrets from man, as keeping back from him

knowledge which should be his. In Sprat's History of the Royal Society, phrases such as 'the secrets of nature' or 'the mysteries of nature', referring to the knowledge which the new science seeks, are very common.<sup>6</sup> Sometimes the penetrating of these mysteries is discussed in rather strong language, as when Sprat declares that European man has not yet had time to 'pierce into' all the 'secrets' of America.<sup>7</sup>

Often connected with the theme of 'secrecy' in Baconian writings is the theme of 'invasion of privacy'. Man is seen as bold, aggressive, not afraid to search out what is hidden using any and every means, including intrusive new instruments such as the telescope and microscope. In this theme, nature is sometimes personified as female, and the learning of her secrets analogous to gaining access to her bedroom. The following passage, typical of the Baconian mindset, is from Cowley's ode to the Royal Society:<sup>8</sup> [emphasis added]

Natures great Works no distance can obscure,  
 No smallness her near Objects can secure.  
Y'have taught the curious Sight to press  
Into the privatest recess  
Of her imperceptible Littleness.

• • • • •  
 Y'have learn'd to Read her smallest Hand,  
 And well begun her deepest Sense to Understand.

Themes involving females are common in Bishop

Sprat. At one point, he uses a sexual metaphor, relating the new science of nature to the enjoyment of the sexual favours of a woman. He claims that the 'Beautiful Bosom' of Nature will be 'Expos'd' to our view, so that we can enter into its 'Garden' and 'satisfy' ourselves with its 'plenty'.<sup>9</sup> In another place, more strikingly, he combines the themes of sex and violence, suggesting a near-coercion of nature analogous to the rape of a half-willing woman:<sup>10</sup>

Whoever will make a right, and a fortunate  
Courtship to Nature, he cannot enterprise, or  
attempt too much: for She (as it is said of other  
Mistresses) is also a Mistress, that soonest  
yields to the forward, and the Bold.

The above image is noteworthy not only for its combination of violence and sexuality, and for the fact that it was written by a Bishop, but for its similarity (and probably direct reference) to the view of Machiavelli that Fortuna (chance) was a woman who could be beaten down and vanquished by the right sort of man.<sup>11</sup> Machiavelli was, of course, speaking of political fortune, but there is a clear parallel between the political science of Machiavelli and Hobbes and the natural science of Bacon and Descartes. The parallel is in the spirit; man seeks mastery over all circumstances, historical or natural, which inhibit his desires. His opponent, political or natural necessity, is pliant if the right techniques of

persuasion and coercion are used, and if too scrupulous an attention to morality is not paid. The use of such Machiavellian imagery, even if unintended, reveals the ruthless, amoral character of the new science and the new scientists envisioned by Sprat and his fellow Baconians.

So far, then, these Baconian themes have become visible: the penetration of the secrets of nature, and the kinship of this penetration with acts of violence and rape. Now it would be possible to argue that such passages are meant only to say something about scientific method, i.e., that it must be an intellectually bold and penetrating kind of thinking. But it is clear in Sprat and Bacon that the method of thought and the treatment of nature must be one. The method of thought includes experiment, which involves working on real natural objects. Sprat is not squeamish, but rather delighted, about some of the scientific operations which the Royal Society was willing to perform on natural objects. He approves of studies of the effect of vipers' bites on dogs, of attempting to feed a carp in the air, of killing toads with salts, and of other cruel (and mostly worthless) operations.<sup>12</sup> He shows no reservations whatsoever in describing these experiments; he does not even apologize, in the name of human knowledge, for the

cruelty done to the animals. At his peak of ruthlessness, Sprat praises his colleague Wren as the author of the 'noble' experiment of injecting liquors into animals' veins, resulting in purging, vomiting, intoxication, death, and other phenomena.<sup>13</sup>

This kind of violence in experimentation was demanded by Bacon himself. In Preparative Towards A Natural and Experimental History, Bacon speaks of the value of studying nature as it undergoes the transformations brought about by the various human arts (dyeing, metalworking, etc.); the violent manipulations of human art instruct us about nature by, as it were, wringing its secrets out of it:<sup>14</sup>

Among the parts of history which I have mentioned, the history of Arts is of most use, because it exhibits things in motion, and leads more directly to practice. Moreover it takes off the mask and veil from natural objects, which are commonly concealed and obscured under the variety of shapes and external appearance. Finally, the vexations of art are certainly the bonds and handcuffs of Proteus, which betray the ultimate struggles and efforts of matter. For bodies will not be destroyed or annihilated; rather than that they will turn themselves into various forms. Upon this history therefore, mechanical and illiberal as it may seem (all fineness and daintiness set aside), the greatest diligence must be bestowed.

The myth of Proteus, the Greek shape-changing god who was hard to hold because of his ability to change

himself into a fish, a bird, fire, water, and so on, is developed more fully by Bacon in a passage from The Wisdom of the Ancients, in which he recommends applying the methods of the arts in a more directed and inquisitorial manner:<sup>15</sup>

This fable seems to point at the secrets of nature, and the states of matter. For the person of Proteus denotes matter, the oldest of all things, after God himself . . . The herd, or flock of Proteus, seems to be no other than the several kinds of animals, plants, and minerals, in which matter appears to diffuse and spend itself . . .

. . . . .

And thus far the fable reaches of Proteus, and his flock, at liberty and unrestrained. For the universe, with the common structures and fabrics of the creatures, is the face of matter, not under constraint, or . . . wrought upon and tortured by human means. But if any skilled minister of nature shall apply force to matter, and by design torture and vex it, in order to its annihilation, it, on the contrary, being brought under this necessity, changes and transforms itself into a strange variety of shapes and appearances; for nothing but the power of the Creator can annihilate, or truly destroy it; so that at length, running through the whole circle of transformations, and completing its period, it in some degree restores itself, if the force be continued. And that method of binding, torturing, or detaining, will prove the most effectual and expeditious, which makes use of manacles and fetters; that is, lays hold and works upon matter in the extremest degrees.

Here then, is still another feature of Baconian science. It is not merely curious about secrets, not merely violent and rapacious in probing into those

secrets, but subtly, craftily, calculatingly violent, employing the torture of experimental procedures. This torture, unlike simple domination, forces natural objects not simply to gratify man (as the older arts sought to do), but to reveal their inmost natures to him, and hence to render themselves open to all future forms of manipulation.

Of course, it can be argued that Baconian science, though violent and ruthless against nature in experiment, need not imply such violence in application. Some animals will have to be tortured, but eventually, once animal nature is fully grasped, the applications of the knowledge will benefit the animals. Some lakes will have to be polluted, but eventually, once the principles of freshwater biology are fully understood, it will be possible to devise industrial plants which pour only healthy effluents into the water. And so on. Certainly Bacon's ideal scientists, portrayed in New Atlantis, do not seem like cruel or violent men in their personal lives, and certainly they do their best to create a healthy environment for those around them.

Nonetheless, it must be insisted that the language of Bacon and his followers about man's relation to nature,

the language of penetration, of sexual conquest, of coercion, of torture, has no Biblical parallel. The experimental procedures recommended by the Baconians have no Biblical basis. The Bible speaks of a human dominion over lesser creatures which is qualified, because those creatures are valuable in God's eyes; Baconianism speaks of an invasive and brutal tyranny over creatures which is unqualified, since it considers nature only as an object of human knowledge and a source of human power and comfort.

#### Bacon and Sprat on Dominion

Bacon very often refers to the Creation stories of Genesis 1 and 2 when supporting the notion that man is meant to have dominion over nature. For example, he writes of 'the sovereignty and power' which man had 'in his first state of creation',<sup>16</sup> clearly alluding to Genesis 1.26-28. Again, he remarks about man's original knowledge of nature, which, when recovered, will enable him, as it enabled Adam, to name and command the other creatures,<sup>17</sup> which claims are obviously based upon Genesis 2.19-20. Bacon thus leans heavily on the same verses used by the mastery writers, which shows that over four centuries the Biblical apologetic for technological



mastery has not been very inventive. The purpose of this section is to explicate more fully Bacon's arguments, and then to show their inadequacy. His account of Genesis 2.19-20 will be examined first.

It was shown in Chapter Four that 'mastery' interpretation of Genesis 2.19-20, which gives Adam control over the animals because he names them, has no textual foundation, but is a far-fetched conjecture. Bacon gives no more direct evidence for this claim than any modern proponent of the mastery hypothesis. It seems, however that he had a reason in mind, which can be discovered by thinking about the role of language in his conception of natural science.

Bacon devoted many passages, in the Novum Organum and other works, to a campaign for the improvement of the language of science. He thought that no accurate knowledge of nature could proceed from terms which are in any way indistinct or tainted by vain imaginings. He thought that many of the terms current in scientific discussion (whether Scholastic, alchemical, or other) were such imperfect labels for natural powers and processes that they were bound to mislead pursuers of natural knowledge. Premature theorizing would introduce

inaccurate terms, and inaccurate terms would further impair good theorizing:<sup>18</sup>

The syllogism consists of propositions, propositions consist of words, words are symbols of notions. Therefore, if the notions themselves (which is the root of the matter) are confused and over-hastily abstracted from the facts, there can be no firmness in the superstructure. Our only hope therefore lies in a true induction.

There is no soundness in our notions whether logical or physical. Substance, Quality, Action, Passion, Essence itself, are not sound notions: much less are Heavy, Light, Dense, Rare, Moist, Dry, Generation, Corruption, Attraction, Repulsion, Element, Matter, Form, and the like; but all are fantastical and ill defined.

Bacon specifically attacks the terminology applied by Aristotelians to motion. He claims that the terms 'local motion', 'alteration', 'generation', 'corruption', 'augmentation', and 'diminution' are worthless because they are merely surface descriptions, telling us nothing about the real causes of motion and the hidden structures which cause things to move in the way they do.<sup>19</sup>

In sum, Bacon thought that a reform of science required a reform of language-- a careful, disciplined assigning of useful names which would correspond correctly to nature. It must be this sense of the importance of names in science which led him to claim that Adam's naming the animals gave him power over nature.

Granting Bacon's connection between language and science, one yet has to find his Biblical exegesis faulty. The imposing of names required by Baconian theory could only be the result of an arduous process of scientific learning, which Adam could not possibly have conducted in the Garden. Since the arts were not invented until after the Fall (see Gen. 4), Adam could have had no scientific implements or machines with which to inspect, manipulate, and torture nature after the Baconian pattern. Therefore, the naming of the animals in Genesis 2.19 cannot be an account of man gaining knowledge of nature; at most it could be evidence of a knowledge man already had before the naming. But neither Genesis 2 nor Genesis 1 mentions any such knowledge. Even if scientific knowledge is embraced in 'knowledge of good and evil'-- a conclusion which Bacon rejects, as will be shown below-- Adam did not have it when he named the animals, which occurred before the eating of the forbidden fruit.

There is another, more obvious problem with Bacon's use of Genesis 2.19-20 which might just as easily be addressed to the mastery writers. Bacon speaks of man's command over the 'creatures', playing upon an ambiguity of the English word. In the Genesis passage the

word translates the Hebrew nephesh hayyāh, defined by the context to include 'beasts of the field', 'birds of the heavens', and 'cattle' (v. 20). What Adam names are the animals, and not even all of those; the sea creatures are omitted. Bacon, however, has in mind the broader sense of 'creatures', that is, creat-ures, things created; i.e., 'nature' as a whole. As can be deduced from Chapter Four above, such a shift between meanings would not be possible in Biblical Hebrew; the words for 'create' (bārā'), 'animal' (nephesh hayyāh), and 'nature' ('heaven and earth', shāmayim w<sup>e</sup>'eretz; 'way', derek), are all distinct and etymologically unconnected. Even in English translation it comes across clearly that Adam names only a part of the whole creation; Bacon's interpretation stretches the sense of the text beyond the breaking point.

In summary, it seems hard to accept Bacon's appeal to Genesis 2.19-20 as anything more than a grasping for a 'proof-text', and harder still to understand why so many modern scholars, with even less reason than Bacon, have followed in his footsteps.

By far the most important passage for Bacon is the passage in Genesis 1 which speaks of man's dominion over the earth. For Bacon, human dominion is rightful, and

hence the technological natural science which secures that dominion is also rightful. Yet, natural science is a form of knowledge, and Bacon's project is haunted by the opinion that the knowledge of nature resembles that knowledge (of good and evil) which caused man to Fall. He thus has to distinguish between proper and improper knowledge, and insist that the knowledge of nature is permitted to man:<sup>20</sup>

My next [admonition is] that . . . they fall not into the opposite error . . . that the inquisition of nature is in any part interdicted or forbidden. For it was not that pure and uncorrupted natural knowledge whereby Adam gave names to the creatures according to their propriety, which gave occasion to the fall. It was the ambitious and proud desire of moral knowledge to judge of good and evil, to the end that man may revolt from God and give laws to himself, which was the form and manner of the temptation. Whereas of the sciences which regard nature, the divine philosopher [Solomon] declares that "it is the glory of God to conceal a thing, but it is the glory of the King to find a thing out" [Prov. 25.2]. Even as though the divine nature took pleasure in the innocent and kindly sport of children playing at hide and seek, and vouchsafed of his kindness and goodness to admit the human spirit for his playfellow at that game.

It would be possible, by a long textual argument, to make a case that 'knowledge of good and evil' does not refer to 'moral' knowledge, as Bacon conceives it, but to the knowledge which produces the arts and sciences. This was the view of older Biblical scholars such as Wellhausen and Tennant, and it seems to lie between the lines in the

modern work of Combs.<sup>21</sup> However, granting Bacon's premise, it is unclear why man should ever have lost his original knowledge of and power over nature. Textually there seems little ground for it: the Fall story does not say that Adam will lose his power over any creatures other than the stubborn ground and the biting serpent (Gen. 3.17 ff.). In including all the creatures, Bacon is probably following post-Biblical exegetical traditions (Jewish and Christian) about a general alienation of man from nature after the Fall. Yet, even if this broader understanding of the Fall is granted, a difficulty remains: on Bacon's principles man cannot have lost his command, since he still (presumably) calls the creatures by the same correct names he called them in the Garden. Or has the Fall destroyed Adam's memory of names, or changed the animals' natures, so that they no longer correspond to their old names? Neither Bacon nor the Bible answers these questions, which is not surprising, since the exegesis is strained. Genesis 1 and 2 make no connections, Baconian or otherwise, between 'dominion', 'naming', and 'science'.

It is to stay far closer to the text to argue, with Ellul, that technological science, or indeed, any kind of science or art, was not part of the original knowledge of man, but only became necessary or even

possible after the Fall, when man first encountered nature as an antagonist. The progress in the arts and sciences is, in this view, the result of man's attempt to alleviate the suffering and disorientation incident upon the Fall, not a restoration of a previous technological dominance.<sup>22</sup>

Further, if it were true that the Fall had the effect of causing man to lose his dominating natural science, what in the Bible would justify trying to win such knowledge back? If the Fall was a just response of God to man's disobedience, then presumably everything about the Fall, including man's ignorance of the deeper secrets of nature, is for the good. Would not an attempt to restore the human race to its pre-Fall dominance be much like an attempt to fight back into the Garden, against the flaming sword of the wrathful cherubim (Gen. 3.24) and against the will of God? Would it not be a rejection of God's sovereignty and a most egregious sin?

Bacon has some difficulty with this objection. He answers it primarily by an appeal to Solomon. Solomon, he says, was famed for wisdom about nature, having made speeches about 'all verdure' from the cedar to the moss, and also of 'all things that breathe or move'.<sup>23</sup> Bacon's text here is I Kings 4.33. He presumably thinks that

Solomon, the wise king, is meant as a model for post-Fall mankind. The same Solomon also made the remark about God concealing and the King finding out (Proverbs 25.2, quoted above), which leads Bacon to the suggestion that God hides natural secrets from man only with the intention that man should find them out.

Bacon's interpretations (the suspicious would say subterfuges) are feeble. Regarding his appeal to Solomonian natural science, three points count decisively against it. First, Solomon's wisdom was not earned by scientific investigation, but given by God (I Kings 4.29). The case of Solomon therefore appears to teach that knowledge comes not from human initiative (Bacon's contention) but as a result of divine inspiration. Second, in describing the content of Solomon's natural wisdom, the text says simply: 'He spoke of trees, from the cedar that is in Lebanon to the hyssop that grows out of the wall; he spoke also of beasts, and of birds, and of reptiles, and of fish' (I Kings 4.33). Such a bare statement provides no ground for asserting that Solomon's knowledge of nature went beyond mere description, which is not natural science in Bacon's sense. Third, it is not certain that Solomon's 'knowledge' of nature was natural science at all; Biblical scholars have suggested that



Solomon spoke of plants and animals only in parables, to convey moral knowledge.<sup>24</sup>

Regarding Bacon's suggestion that God wishes man to play 'hide and seek' with knowledge of nature, the passage he uses is wrenched violently out of context; Proverbs 25.1-4 is about kings uncovering human motives, not about mankind uncovering the secrets of nature. Nor would the idea that man's search for natural secrets is a playful activity fit in well with the seriousness of the Fall story, in which the rupture between man and God (and the earth) is no game.

Bacon may have been aware that such appeals to the Bible were, on close inspection, rather flimsy. It is quite possible that he was not serious about them at all, that they were intended not as interpretation but as propaganda. One must remember that he wrote in an age in which Christian piety was still more authoritative than the desire for material progress; he therefore had to convince his Royal patron and his public that the latter was not incompatible with the former. Any conflict that might exist between his teaching and that of the Bible had to be resolved without sacrificing his teaching. And there certainly seems to be a conflict; for the purpose of

science as Bacon envisioned it was to bring into being a technological society in which the effects of the Fall would be largely, if not completely, reversed. He would not decisively rule out even immortality-- the intended state of Adam and Eve in Eden-- as a possible result of his science:<sup>25</sup>

. . . it is a restitution and reinvesting (in great part) of man to the sovereignty and power (for whensoever he shall be able to call the creatures by their true names he shall again command them) which he had in his first state of creation. And to speak plainly and clearly, it is a discovery of all operations and possibilities of operations from immortality (if it were possible) to the meanest mechanical practice.

By using the subjunctive form 'if it were possible' regarding immortality, Bacon neglects to 'speak plainly and clearly' in favour of it, but he could easily have said so if he thought immortality clearly an impossible result of science. He also could easily have denounced immortality as an improper goal for fallen, unwise, disobedient, sinful man. But he does neither. To understand why, one has to remember the great hope of the alchemists, to produce the elixir vitae, the potion of eternal life. Bacon opposed the theories of the alchemists, but was steeped in their spirit; he would snatch the fruit of the Tree of Life if he could.

Other Baconians did not fail to hope that the Tree of Life, or at least the Trees of Wealth, Health, Longevity, and Comfort, might be obtained by human means, without waiting for divine grace to restore the Edenic state. Sprat, at the end of his History, urges that the new science will "impart to us the uses of all the Creatures, and shall enrich us with all the Benefits of Fruitfulness and Plenty."<sup>26</sup> This prospect causes him to prophesy: "So neer is Mankind to its happiness . . ."<sup>27</sup> Bishop Sprat sounds as if he is speaking of the Eschaton! 'Happiness' is for him no longer the state of soul of the perfectly good man (the Greek 'pagan' ideal) or the state of the saved after the Second Coming (the Christian 'Biblical' ideal), but the state of the scientifically enlightened human race (the modern secular ideal). However much Bacon and Sprat might have sprinkled their works with the pious platitude that man cannot attain blessedness without God, the thrust of their work is that the interruption of human dominion is only a technical problem, not the inevitable state of fallen man. In other words, they assert that Genesis 1 by itself, and without the qualifications of Genesis 2-11 (not to mention the New Testament) is the true standard and goal for man in the present age. This selective reading of the Old Testament has worked marvels: it has justified a secular scientific

society, and it has produced in our day a mastery hypothesis, which praises (or blames) the Bible for the ambitions of some of its most unreliable (if not simply untrustworthy) interpreters.

#### Sprat's Baconian Defence of the Arts

The Baconians connected man's dominion over nature not only with natural science but with human arts, especially with the new and improved arts which were expected to follow from the perfection of natural science. They thus had to overcome the suspicion traditionally aroused by novel technical achievements. The Greek suspicion of new ways of manipulating nature, described in Xenophon, was noted in Chapter Two above. The Biblical suspicion is illustrated in the story of the Tower of Babel. As the tower rises up toward heaven, God expresses concern that "nothing that they propose to do will now be impossible for them" (Gen. 11.6), and resolves to go down and disrupt the project. The latter passage was particularly dangerous to the Baconian dream, because it was found, not in a 'heathen' text, but in Holy Scriptures, to which the Baconians were publically beholden. Their task, then, was to find Scriptural justification for the arts, and to neutralize those

Scriptural passages which might seem antagonistic or even hesitant about technical progress.

Bacon grounded his Biblical apology for the arts in a set of 'proof-texts'-- passages of the Old Testament in which learning, sciences, arts or inventions are mentioned favourably, or at least without hostility, in connection with some important Biblical character. One such passage he found in Genesis 4,<sup>28</sup> which describes some technical achievements of the men before the Flood. This passage was borrowed (without acknowledgment) by Sprat, who developed it for use in the 'Epistle Dedicatory' to the History of the Royal Society. Writing to the King (Charles II), and defending the new natural science of the Royal Society, Sprat attempts to praise that science for its connection with the useful arts, and defend the arts on the basis of the Old Testament:<sup>29</sup>

Nor has the True God himself omitted to shew his value of Vulgar Arts. In the whole History of the first Monarchs of the World, from Adam to Noah, there is no mention of their Wars, or their Victories: All that is Recorded is this, They liv'd so many years, and taught their Posterity to keep Sheep, to till the Ground, to plant Vineyards, to dwell in Tents, to build Cities, to play on the Harp and Organs, and to work in Brass and Iron. And if they deserv'd a Sacred Remembrance, for one Natural or Mechanical, Your Majesty will certainly obtain Immortal Fame, for having establish'd a perpetual Succession of Inventors.

Sprat, in the style of his master, pulls his examples indiscriminately from quite distinct passages-- in this case, Genesis 4, Genesis 5, and Genesis 9-- without noting the subtly evaluative narrative context. Genesis 5 is the account of the line of Seth, who replaced Abel, who was slain by his brother Cain. Seth, not Cain, is the only man after Adam who explicitly retains the 'image of God' (Genesis 5.1,3). The Seth line, which includes Enoch who 'walked with God', produces Noah, the righteous man, whose family is the only one spared in the Flood. The Seth line invents nothing before the Flood; its only noted technical achievement, the Ark, is built from instructions by God. The inventions to which Sprat refers do not belong at all to the Seth line and should not be attributed to them.

Genesis 4, on the other hand, is the account of the line of Cain, the murderer, who flees from the face of the Lord. Cain builds the first city. His descendant, Lamech, is a vengeful bigamist; his children invent the arts (Genesis 4.19-24). It is odd that the Bible should make such a contrast between the two lines, and then attribute the city and the arts to Cain's line, unless it wishes to point out the ambivalence of the city and the arts. The city and the arts are associated with crime,

flight from God, and violence. They seem good, yet have origins in things that are not good. There may be an evil orientation or possibility inherent in them. Sprat, like many modern technophiles and urbanophiles, including Harvey Cox, does not notice these subtleties of the text.

As for Genesis 9, it is true that Noah plants the first vineyard there, after which he becomes drunk, is seen naked in his tent by his sons, and lays a curse upon his grandson which introduces slavery into the world (Genesis 9.20-27). The first vineyard, though representing agricultural progress, is associated with moral and political degeneracy. Sprat does not mention this, either.

The level of exegesis in Sprat's book as a whole does not rise above the level of that represented above. On the whole, it is comparable to Foster's citation of Genesis 1 and Psalm 8: mere 'proof-texting'. Only once does he admit that there may be some tension between Baconian schemes and the Biblical teaching, and that is in a reference to the Babel story. Braver than Bacon (who avoids interpreting the passage), he attempts to tackle the threat directly:<sup>30</sup>

This is truly to command the world; to rank all the varieties, and degrees of things, so orderly one upon another; that standing on the top of them, we may perfectly behold all that are below, and make them all serviceable to the quiet, and peace, and plenty of Man's life. And to this happiness, there can be nothing else added: but that we make a second advantage of this rising ground, thereby to look the nearer into heaven: An ambition, which though it was punish'd in the old World, by an universal Confusion; when it was manag'd with impiety, and insolence: yet, when it is carried on by that humility and innocence, which can never be separated from true knowledg; when it is design'd, not to brave the Creator of all things, but to admire him the more: it must needs be the utmost perfection of humane Nature.

Sprat here understands the mounting Tower of Babel as a metaphor; it represents the 'rising ground' of Baconian knowledge, which, beyond a certain point, will enable the human race to understand the heavens themselves, or, less literally, the deepest secrets of nature, known only to God. There is nothing evil or dangerous about this for Bishop Sprat, provided it is carried out with the right intentions. He attributes bad intentions ('braving the Creator') to the Babel-builders in Genesis, and good intentions to the members of the Royal Society. The Biblical men were proud, setting their technical creation against God; the Royal Society, following Bacon's dictum, dedicates its discoveries, in Christian charity, toward the relief of the human estate.



One has to ask whether the Biblical story suggests such a sharp separation between the fact of technological prowess and the motives which guide its use. When God deliberates over the significance of the building of Babel, he does not complain of the motives of the builders. He does not say 'Behold, they are building this tower into the heavens, and are proud and rebellious, and hate me, and wish to rule heaven and earth alone.' He says (Gen. 11.6): 'Behold, they are one people, and they have all one language; and this is only the beginning of what they will do; and nothing that they propose to do will now be impossible for them.' This seems to mean either (i) 'because they are one people with one language, they will be able to do whatever they propose, that is, complete their mighty tower,<sup>31</sup> which I deem undesirable'; or, (ii) 'because they are one people with one language, they will not only be able to complete their tower, but will be able to accomplish many other amazing things, some of which are not appropriate for them'. In either interpretation, the text seems not concerned with human motives but with human capability. It may be, as Sprat says, that the motive of the builders was unacceptable, but that motive is not simply a brash attitude ('braving the Creator') inseparable from the project itself; it seems that the quest for unlimited human power is not

morally neutral, but in itself improper. From the point of view of the Biblical writer, then, there seems to be no clear distinction between the project at Babel and the goals of Baconian science. Both embody human aspirations toward unlimited capability.

This is not the place to attempt an exhaustive interpretation of the Babel story, but a significant point may be suggested. The connection between the unity of language (Gen. 11.1) and the unprecedented technical achievement of the Tower seems to adumbrate the Baconian connection between proper scientific terminology and the mastery of nature, and even more strongly to foreshadow the contemporary connection between a universal scientific language and the universalizing power of modern technology. As the contemporary world moves closer to becoming a 'global village' in which the various cultures are being more or less swiftly homogenized into a new urban world-order, one cannot help but think of the Babel story, in which God dissolves a dangerous urban unity of mankind into distinct language groups or 'nations', each dwelling in not wholly urbanized 'lands' (compare Gen. 11.4,8-9 with Gen. 10.5,10-11,20,31). The modern age can be seen, then, as a reversal of God's action at Babel. One is tempted to say that the Biblical author had a dim

intuition of the possibility of unlimited mastery over nature, and wrote the Babel story to show its unacceptability.<sup>32</sup>

Thus, if Sprat insists on the parallel between the Babel project and Baconian technological ambitions, his Biblical defence of Baconian science is undermined. The Babel story, read in Sprat's terms, treats the new science as either offensive to God or dangerous for man, or both, and as something to be avoided. Man, it appears, should be content with the modest arts described in Genesis 4, and not attempt to raise himself to a superhuman level of technical development.

The results of this Chapter can be summarized as follows. Bacon and his disciples, having absorbed the Renaissance view of man as a creator, combined with it a novel idea of dominion over nature. This dominion was to be based on a non-teleological natural science which would inform advanced and utterly new arts. This new dominion over nature and the accompanying enthusiasm for technical development were justified by appeals to Biblical passages concerning dominion and the arts. These appeals, many of which are found in the modern mastery writers, were at

best inadequate, normally contrived, and at worst insincere. They fail, as the mastery hypothesis fails, to convince any critical reader that Baconian technology is Biblical in content or spirit. Insofar as the Bible comments upon the possibility of unlimited mastery, it maintains a certain healthy suspicion, not unlike that seen in Xenophon.

### Conclusion to Part Three

It now seems clear that the mastery writers, in accepting a distinction between 'pagan' submission to nature and 'Biblical' mastery over nature, and in accepting that 'Biblical' mastery is the soul of the modern age, have followed the lead (one is inclined to say: have been taken in by the strategy) of that Renaissance spirit which culminated in Baconianism. The early modern thinkers, especially Bacon, were powerful and subtle minds interested in the birth of a technological society. It was convenient for them to denigrate the Greeks, who were against such a society, as 'pagans', and to appeal to the Bible, which spoke of man's dominion, man's likeness to God, of the 'science' of Moses and Solomon, of the arts of Cain and Noah, and of the

'lifelessness' of nature, all of which could be fused together to justify modern mastery. The illegitimate yet tempting transformation of Biblical teaching which these writers effected has been very commonly accepted as the Biblical teaching, not only by the mastery writers but by Western civilization. Thus, early modern thinking, by appealing to the Bible against the Greeks, managed to justify a way of life which is neither Greek nor Biblical.

This result shifts the burden of praise, or criticism, from the text of the Bible to the writings of its early modern interpreters. The real opposition is not between 'Biblical' and 'pagan' thought, but between pre-modern, anti-mastery interpretations of the Bible and modern, pro-mastery readings of it. This, in turn, is a reflection of the quarrel between ancient (primarily Greek) philosophy and modern philosophy over the goodness of technological progress. Therefore, writers such as White, Roszak, McHarg, Suzuki, and Grant have no cause to attack the Bible over the idea of unlimited dominion; their anti-mastery weaponry would be better directed against the Renaissance deification of man. Similarly, writers such as Foster, Cox, and Berdyaev have no reason to praise the bible for 'desacralizing' nature; they should instead commend Francis Bacon and Bishop Sprat, who

by 'de-animating' nature, were first able to justify the torture of animals. Xenophon should be set against Bacon, and the Royal Society against Plato's Academy; the Bible should not be made a party to a conflict which it did not initiate.

### Conclusion: Review and Implications

The tasks set forth in the Introduction have now been accomplished. The mastery hypothesis has been shown to be untenable, and its main inadequacies have been shown to be due to its willingness to accept the Biblical interpretations of certain early modern thinkers. It remains to summarize the case against the hypothesis, to estimate its contribution to thought, and to draw some conclusions concerning some of the larger issues raised by the mastery writers.

### The Mastery Hypothesis: Summary Refutation and Evaluation

The main ideas of the mastery hypothesis are two. First, Christianity, due to its 'Hebraic' denial of other gods and idol-worship, 'desacralized' nature, stripping it of divinity and life, leaving it as a collection of inanimate objects and substances fit for any kind of human exploitation. Second, the Old Testament, in which the Christian account of Creation is contained, taught man that he was an exalted, godlike being, appointed to have dominion over everything in the universe. These two

notions, desacralization and dominion, were the primary sources Western man's technological dynamism. They made the difference between pagan passivity and modern unlimited control over nature.

In Part One, the picture of paganism painted by the mastery writers was shown to be overly schematic and in need of many qualifications. It was demonstrated that the more civilized pagan peoples-- the Babylonians, Egyptians, Greeks, and Romans-- were quite comfortable with the thought of modifying nature through human action, and demonstrated no more practical inhibitions in this regard than did ancient Israel. This was so because their reverence for nature was not nearly so great, and their respect for man not nearly so little, as is often supposed by writers who generalize about 'paganism'. It is true that ancient paganism was generally opposed to the idea of unlimited mastery over nature; in this, however, as Part Two would show, it did not differ from the Hebraic teaching of the Old Testament.

In Part Two, the Old Testament was seen to present nature as non-divine but still 'animate', responsive to both man and God by virtue of a quasi-moral faculty. This understanding of nature, while differing somewhat from



pagan 'animism', 'polytheism', or 'pantheism', is yet not totally alien to pagan thought and feeling, and it is incompatible with the 'inanimist' or 'mechanistic' view of nature of which it is alleged to be the root. Further, the Old Testament understanding of human dominion over nature proved to be much more limited than alleged by the mastery writers. It was shown that the dominion of man excluded the heavens and was limited to the earth, and that even on earth that dominion was modified by a recognition that the earth, vegetation, and animals were also concerns of God.

In Part Three, an attempt was made to explain how the mastery writers had been led to such simplified pictures of 'Biblical' and 'pagan' thought, and how they had come to link Biblical thought with technological dynamism. A partial investigation, covering only the early modern period, showed that Renaissance thought, beginning in Italy, manifesting itself throughout Europe in alchemical and magical thought, and culminating in English Baconianism, drew upon Biblical phrases to evoke a radically new, non-Greek, non-Biblical, view of man. The Italian thinkers made an especially concentrated appeal to the Biblical statement that man was made in the image of God, but interpreted the image of God to mean

'creativity', 'technical capacity', and the like, with very little Biblical or traditional Christian warrant. The Baconian movement made a special appeal to the Biblical statement about 'dominion', linking it with the arts and sciences pertaining to the mastery of nature, but failed to respect the limitations on dominion and technical development contained in the stories of the Fall, the Cain line, and the Tower of Babel. The mastery writers, it was suggested, were aware of the Biblical claims of early modern thought, but not sufficiently critical of them to notice the distinction between the Bible proper and its Renaissance-Baconian transformation.

In summary, the mastery writers have produced a hypothesis which sheds light on the wrong object. In attempting to show the mastering bias of 'Biblical' as opposed to 'pagan' thought, they have missed the real contrast, which is between the radically domineering modern stance and the more modestly assertive ancient attitude. The praise or criticism which they direct to the Bible ought to be directed to distinctively modern developments.

The Value of the Mastery Hypothesis

Though the mastery hypothesis proves to be untenable, yet the mastery writers' work is not completely without value. While the extreme statements-- found in Cox, in Jaki, in Suzuki, in Lynn White's Science presentation, and in Foster's later writings-- have little merit, the more cautious statements, which appear most often in Grant, Berger, and White's other writings, are useful. For the more cautious statements make a distinction between what the Old Testament teaches and what has been made of the Old Testament by various writers and various ages. Such a distinction makes it possible to preserve several useful elements of the mastery hypothesis while rejecting what is false in it.

For example, the argument of Duhem, Collingwood and the early Foster, which connects the de-divinization of the stars with the rise of the mechanical conception of nature, is dogmatic in its assertion that Biblical nature is inanimate, but insightful in its observation that certain Christian thinkers understood the Bible to require an inanimate nature. Whereas the assertion contributes nothing to our knowledge of the Bible, since it is demonstrably false, the observation contributes something

to our knowledge of the history of ideas about nature. Similarly, the argument of Berger, Grant, and Roszak, which connects Old Testament 'desacralization' with ruthless Protestant mastery, is unenlightening insofar as it misconstrues the Hebraic understanding of nature, but valuable as a commentary upon the character of a Protestant civilization which would eagerly adopt that misconception. In general, one could say that the mastery writers are of little value when they 'back-read' later currents of thought into the Old Testament, but of great value when they show how the Old Testament was accommodated to the reigning ideas and practices of modern Western civilization.

Beyond its value for the history of ideas, the mastery hypothesis leads to some conclusions which may be relevant for the contemporary situation. The mastery writers enable us to see that the Baconian interpretation of the Bible helped to generate, or at least to justify, the whole pattern of relationships between man and nature which is characteristic of modern technological civilization. As a result, they lead us to consider whether a differing interpretation of the Bible might entail a different understanding of nature and hence a different model for our own relations with nature. In

Part Two of this work, an attempt was made to lay the groundwork for such an interpretation. Much more remains to be discovered about the Biblical doctrine of nature, but enough has been shown to indicate that the Baconian understanding of the Bible is an impoverished one, and that another interpretation-- one focusing less upon isolated passages about mastery and subjugation and more upon oft-repeated statements about the vitality and moral quality of nature-- is possible.

This conclusion will not surprise readers of older theological literature. British theologians and naturalists from the seventeenth century to the nineteenth were deeply moved by the portraits of nature painted in the Psalms and in Job, and generally understood nature as something to be contemplated, to be marvelled at, and to be grateful to the Creator for, rather than as something to be interrogated, manipulated, and made to serve narrowly human interests. Indeed, if one were to conduct a thorough search of early modern Christian literature, one might well find that the emphasis on 'dominion' in the modern sense is not found outside of Bacon, Sprat, and their associates, and that it was never thought to be implied by Christianity until the time of Hegel. This, however, is a topic for another dissertation.

Thus, one can say that the mastery hypothesis, by leading one to see that the modern age is not Biblical but Baconian, undermines itself, but consequently opens up the possibility of criticizing Baconianism by an appeal to the Bible itself.

There are other things of value to be gained from reflection upon the mastery hypothesis. To see this, however, one has to look less at the hypothesis itself and more at what is implicit in it. Implicit in the mastery hypothesis are certain judgments about modern mastery, and a certain intellectual framework involving a sharp dichotomy between 'Biblical' and 'Greek' thinking. An examination of these implicit features illustrates the pitfalls which lie in wait for intellectual historians whose work revolves around Western religion.

#### The Mastery Hypothesis as a Barometer of the Times

To make the first point clear requires some historical perspective. A major shift in Western intellectual attitudes seems to have occurred after the Second World War. The shift was from an almost unqualified optimism about the future of technological

society to a more guarded and often bluntly pessimistic judgment. The nineteenth century believed in progress; everything was getting better in the world. Scientific and technological advances were made almost daily, and were universally celebrated. The novels of Jules Verne showcased the marvels of the future. Pasteur was conquering disease. It was hard to think of man's mastery over nature as anything but auspicious. This hopeful spirit remained alive in the first part of our century. Bergsonian evolutionism became for many a substitute religion. Educators and propagandists, both of the right and of the left, believed that science was to be the cornerstone of a utopian world civilization. About mid-century, however, a new mood began to be felt. The nuclear threat, DDT in the food chain, massive social changes accompanying industrialization, air pollution, and other things led many to the technological science which had sustained the earlier progress. There was a reaction, both popular and intellectual, against the previous unthinking acceptance of the idea of mastering nature and building technological utopias. The reaction is clearly visible in the works of Paul Goodman, Jacques Ellul, E. F. Schumacher, and the Club of Rome.

Both the early optimism and the later reaction

have been preserved for historical inspection in the mastery hypothesis. The earlier mastery writers-- Duhem, Foster, Collingwood, and Berdyaev-- breathe confidence in modern science, and also of the truth of the Christian civilization which produced modern science. Students of Hegel, Schelling, and other apostles of historical thought, they believed that the West, Christianity, Science and Progress were fundamentally identical. To praise science was to praise Christianity; to attack Christianity was to attack science. The later mastery writers, by contrast, sound a different note. Though some of them, such as Jaki and Cox, still apparently believe in the doctrine of progress which held their grandfathers, many others, such as Grant, Roszak, White, Toynbee, Suzuki, and McHarg, have taken to heart the events of the twentieth century, and betray grave doubts about both the mastering orientation of modern science and the Christianity which appears to have sustained that science.

The turnabout is logically sound, and just; Christianity could not reasonably claim the right to bask in the praise accorded it when modernity was being universally lauded, and then seek to escape the consequence of roasting in the criticism when the tide of opinion shifted. The position of the later mastery



writers was implicit in the position of the earlier ones; once Christianity had been dragged in as an explanation for modernity it could not easily be expelled. But the central point is that the mastery hypothesis is much more than a historical argument about Christianity's role in the mastering of nature; it is deeply coloured by the modern era's need to justify itself, or condemn itself, in spiritual terms.

This insight explains some of the characteristic oversights of the mastery hypothesis. For example, Roszak, Suzuki, and Grant, all of whom are harsh toward Western dynamism, earnestly desire to locate the source of our aggressive quest for dominion over nature, and are therefore too quick to blame the Old Testament for the use made of it by later movements of thought. Similarly, Foster, Cox, and Jaki, all of whom are enamoured with modernity, earnestly desire their own Christian religion to obtain as much credit as possible, and are therefore too quick to credit the Old Testament with Baconian, Cartesian, or Newtonian insights concerning nature. The mastery writers on the whole, then, tend to confuse several distinct tasks: the task of determining what a religious text teaches, the task of determining that teaching's historical influence, and the task of judging

whether that teaching in its original or transformed versions is socially valuable or detrimental. The first task is primarily that of the literary scholar, the second primarily that of the historian, and the third primarily that of the philosopher or theologian. A thinker may be literary scholar, historian, and philosopher all in one, but must keep the roles logically distinct. Otherwise, exegesis, history, and social criticism blur together in such a way that none of them is reliably done.

This result seems to have a general application, since not only the mastery writers but all historians of ideas are, by the nature of their work, vulnerable to such confusions.

Variation Upon an Academic and Theological Cliche:

'Christian' vs. 'Pagan', 'Hebrew' vs. 'Greek'

The second implicit component of the mastery hypothesis is its adherence to a popular set of absolute contrasts between 'Greek philosophy', 'mythic worldviews', or 'classical thought' on the one hand, and 'Hebraic thinking', 'Biblical teaching' or 'Christian doctrine' on the other. Perhaps the most commonly paired of these terms are 'Greek' and 'Hebrew'. The alleged contrasts

between 'Greek' and 'Hebrew' understandings of life have become commonplaces, almost dogmas, of modern academic thought. For over a century Biblical scholars, theologians, and scholars in general have been steeped in teachings such as the following: Hebrew time is linear, Greek time cyclical; Hebraic man is a unity, Greek man a duality of body and soul; Biblical man feels, classical man thinks; Genesis is historical, Homer mythological; Christian love is unselfish, Platonic love selfish; etc.

Now in itself, the task of distinguishing 'Hebraic' from 'Greek' thinking is a legitimate scholarly task. Distinctions have intellectual merit; they make things clearer. The difficulty is that distinctions can be overly schematic, and can tend to turn cultures into caricatures. No competent Hebraist or Classicist would deny that there are important differences between Biblical and classical thought, but all Hebraists and Classicists ought to be suspicious of exaggerated, idealized portraits of 'Hebraic' and 'Greek' thought, which refuse to acknowledge anything in common between them.

This sort of idealization is at work in the mastery hypothesis. Foster, Cox, Baillie, Grant, and Berger tend to present the possible world views as two,

the Christian (= Protestant = Biblical = Hebraic) and the Pagan (= Scholastic = Greek). Collingwood lacks the Protestant/Hebraic emphasis but still comes up with Christian (= The Athanasian Creed, meaning primarily Creation Doctrine) and Pagan (= Aristotle). Jaki, similarly, offers us Christian (= Creation Doctrine) and Pagan (= Scholasticism = Greek Thought = Ancient High Culture). Roszak, White, and Toynbee suggest Christian (= Old Testament) and Pagan (= Franciscan Panpsychism = Shamanism = Animism = Eastern Thought). Suzuki and Ikeda suggest Christian (= Old Testament) and Eastern (= Buddhism). Despite differences in the labels, all of these schemes (except possibly the last) express the stock academic distinctions between 'Hebraic' and 'Greek' or 'pagan'. The mastery writers characterize freedom, will, creativity, and historical dynamism as 'Hebraic' and order, harmony, contemplation, passivity, and static culture as 'Greek' or 'pagan'.

The inadequacy of these stock characterizations for discussing the domination of nature has been shown in the course of this work. They lead the mastery writers into easily avoidable errors. Were these writers not blinkered by such academic cliches, they would not totally overlook the existence of Democritus and Lucretius, of

Archimedes and Heron, of the dam of Homs and the aqueduct at Samos; nor would they fail to see the restrictions on man's use of nature found in the Mosaic Laws or the anti-technological hints in the Babel story. They would see that both pagan and Biblical thought allow for a degree of mastery, but that both pose certain limitations upon human freedom. They would see that the general attitudes of antiquity had little in common with those of the Romantic poets and that the Bible was not written by Bacon, Hegel, or Arthur C. Clarke.

And the issue is still deeper, for the Hebraic-Greek cliché is not merely an academic one. It has deep roots in the theological polemics of the West; it recalls ancient oppositions: Jehovah and Baal, Israel and the Canaanites, Tertullian and the Hellenizers, Augustine and Plotinus, Geneva and Rome, Revelation and Philosophy. The West has exhibited a disturbing tendency to oversimplify choices about faith, thought, and action by polarizing doctrines and peoples. It seems to be no accident that most of the mastery writers are personally oriented according to such polarizations. Many of them are decisively Protestant, and traces of old debates survive in the gusto with which they attack the remnantial 'paganism' in Catholic theology: this is more or less

obvious in Foster, Collingwood, Baillie, Gilkey, Hooykaas, and Klaaren. Cox, the archetypal American Protestant theologian, seems to style himself after Elijah as he debunks the 'animist' illusions of ancient Levantine paganism. Stanley Jaki, the Benedictine, writes about pagan fatalism and helplessness in a manner more appropriate for an apologist than for a scholar intent upon a sympathetic grasp of ancient cultures. On the other side, Roszak attacks the Christian tradition with a zest that springs from more than dislike of Christianity's technological consequences; he frankly prefers pagan to Christian spirituality. The shape of the mastery hypothesis appears to be largely determined by underlying theological conflicts of this type.

Therefore, one might well conclude that the great polarities established by the religious conflicts of the West have had a debilitating effect upon modern scholarship. Beginning as religious alternatives, 'Hebraic' and 'Greek', 'Christian' and 'pagan', have become quasi-technical academic terms which serve to categorize views of nature, history, the soul, etc., in a Procrustean manner. The mastery writers, partly because of their theological biases and partly because of their immersion in academic patterns of understanding, have

allowed such contrasts to control their thinking about the history of the idea of mastery.

Once again, there is a general application. Not only the mastery writers, but intellectual historians, literary critics, theologians and others, could greatly improve the quality of their thought and writing if they would resolutely abandon the artificial and unreliable Hebrew-Greek dichotomy.

#### Restraints Upon the Conquest of Nature

Finally, something must be said about the relation of religion to the modern mastery of nature. What is the proper role of religion in a technological society? Should it, with Foster and Cox, pronounce a benediction upon the modern project? Should it, with Roszak, pronounce curses? Should it become involved in particular scientific and technical questions, approving of this line of research, forbidding that kind of application, and so on? These are important questions, which religious thinkers cannot avoid without being charged with either irresponsibility or impotence. This closing section, accordingly, offers a few pertinent remarks.

First, it must be said that Roszak, White, Grant, McHarg, and others have been right to emphasize the dangers of the mastery of nature, both to the natural world and to human beings. They have been right to say that any religion worth practising, whether Christian, Jewish, or pagan, cannot countenance the destruction of species or the poisoning of the environment. They have been right to warn of the spiritual evils, and the potential for political tyranny, which are latent in genetic engineering and cybernetics. They have been right to lament the rise of a purely technical civilization in which traditional human values-- genuine political participation, local culture, cultivation of the contemplative faculties-- are rapidly being extinguished.

In this respect, Foster, Cox, Baillie, and several other Protestant mastery writers appear to be weak. They have subscribed to a version of Christianity which has no ability to criticize the modern world at the fundamental level. Since the modern world is, for them, the product of a linear view of history, a doctrine of radical human freedom and creativity, and a doctrine that the universe is made for man, and since these are all, for them, orthodox Christian beliefs, they have to pronounce the modern world as the realization of Christian faith. The



technological potential of man is not for them demonic or even ambivalent, but providential. They would grant that modern mastery can be used for evil, but would refuse to put to question the rightness of the mastery itself.

But this position can amount to emptiness. Foster argued (in 1947!) that there was nothing wrong or un-Christian about genetically pre-determining the sex of children, since God was obviously soon going to put this power into human hands.<sup>1</sup> This seems to imply that whatever men can do, they have the right to do, provided that doing it will not violate the expressed will of God. But is there not a need for limiting principles in situations where the will of God cannot be determined? Many people, even the non-religious, feel uncomfortable at the thought of pre-determining the sex of their children, and, as we now know, genetics has the potential to determine far more than this. Has God left us the option of eliminating left-handed people? Of splicing together human and animal genes? (This latter question is no longer fanciful, for in 1988 a Maryland laboratory produced a new breed of pig by inserting into pig DNA a human growth-hormone gene.) And, finally, has God left us the option, now quite conceivable, of establishing genetics-based human society like that pictured in

### Huxley's Brave New World?

The Foster-Cox type of progressive Protestantism cannot supply limiting principles to the applications of science, because there is no place for the concept of 'limit' in its thought. If the notion of 'limit' is conceived after the pattern of classical myth or of Greek philosophy, as something inherent in the 'nature' of things or the 'nature' of man, it is rejected by this progressive Protestantism as a pagan, un-Biblical denial of radical human freedom. And, if the notion of 'limit' is conceived to be the idea of divine positive law, such as one can find in the Mosaic legislation, it is irrelevant for this same Protestantism on the grounds that the Christian New Covenant invalidates the 'legal' parts of the Israelite Old Covenant. On this latter point, since the examples discussed above pertain to genetic engineering, it is pertinent to remind the reader of the Mosaic law against mixing 'kinds' of animals. One might think that a 'Hebraic' Protestantism would see in this law a crucial limiting principle, but the kind of Biblical reading practised by the Protestant mastery writers is very selective, ignoring the inconvenient parts of Hebraic thought (such as the laws), while insisting on the convenient ones (such as dominion).

It is clear, then, that although all of the mastery writers have erred in intellectual history, the error of those who are critics of Biblical thought is more insightful than the error of those who are apologists for Biblical thought. For the error of the critics is motivated by the pressing question: How can we find limits to technological mastery? And, since the critics have seen the Bible and the Christian tradition prostrate before technology, being used to justify and feed it, it is right that they demand an accounting from those who claim to represent Christianity. If Christianity is not guilty as charged, then Biblical interpreters should be able to provide an alternate, non-Baconian reading of the Bible. One cannot find this in the pro-technological mastery writers.

One can, however, find it elsewhere. Jacques Ellul, like Foster and Cox a 'Biblical' or 'Hebraic' Protestant, but unlike them a strident critic of modernity, has begun to articulate a Biblical view of nature, art, science, and technological mastery. Some of his ideas have been appropriated, and built upon, in the present work. He sets the forth the teaching of the Bible as the fundamental alternative to modern technological

society. Without denying the value of human freedom, including the freedom to use the resources of nature, Ellul qualifies that freedom from the standpoint of the Biblical notions of Creation and Law. He therefore attempts to do justice to the twin truths of human liberty and human restraint. Those who wish for a 'Biblical' critique of modern mastery would do well to begin with Ellul.

Ellul's purely Biblical approach will not appeal to everyone, but there are other religious paths along which one might seek for limiting principles. For those who completely reject the Bible and opt for a 'pagan' or 'Eastern' approach, numerous writings are available. The most obvious author to mention is Theodore Roszak, who, despite his unfair assessment of Biblical thought and his tendency to romanticize paganism, remains persuasive in his claim that certain elements of pagan thought lend themselves to a healthy integration of man and nature. While a number of popular writers who have taken this line have failed to rise above a rather naive and superficial celebration of the tribal, the Oriental, and the esoteric, it would be rash to conclude that non-Biblical traditions have nothing of intellectual substance to teach us about our relations with nature.

Still another religious position from which one might attempt to discern the proper bounds of human mastery is the Greek-Christian natural law tradition. Interest in this position has been revived in recent years by George Grant and Leo Strauss. The natural law tradition would seek to make judgments upon the propriety of human actions by determining whether or not they are in accord with 'nature'. 'Nature' in this way of thinking means, not natural objects themselves, but their essence or purpose: what they are fit for, what they ought to be if they are to conform to the rational and good order of the whole. 'Nature' is thus a prescriptive term, with morally binding force. If it is possible to determine that a particular expression of human mastery over nature is 'unnatural', that is, working against the fulfillment of the 'natural' ends of human or non-human beings or against the 'natural' order of the universe, then it is possible, in natural law terms, to condemn that action. The natural law approach has the advantage that it is potentially compatible with either a 'Biblical' or a 'pagan' orientation. It arose among the pagan Greeks, but was adapted by Scholastics like Thomas and Anglicans like Hooker; by the latter it was seen as supplying the criteria of 'natural' morality, which could be

complemented by the revealed or 'supernatural' morality of the Christian revelation. Thus, George Grant, with his Platonic understanding of Christianity, can portray natural law as a criterion compatible with both Greek philosophy and Biblical teaching, and as an understanding of limit contrary to the modern spirit.

No further attempt will be made here to pursue the thought of Ellul, Roszak, or Grant, since each thinker is worthy of a separate dissertation. In closing, however, it seems appropriate to suggest that a close reading of these thinkers, with an eye to the question of the limits of human mastery, would be a logical and profitable sequel to the reading of this work.

NOTES TO DISSERTATION

Notes to Introduction (pp. 1-51)

1. Harvey Cox, The Secular City (New York: Macmillan, 1965), p. 21.
2. Lynn White, jr., "The Life of the Silent Majority", in Medieval Religion and Technology (Berkeley: University of California Press, 1978), p. 146.
3. Nicolas Berdyaev, The Meaning of History, trans. Reavey (London: Geoffrey Bles, 1936), p. 117.
4. Michael B. Foster, "Christian Theology and Modern Science of Nature (I)", Mind XLIV (1935), p. 450.
5. Ibid., pp. 450-451.
6. Theodore Roszak, Where the Wasteland Ends (Garden City, New York: Anchor [Doubleday], 1972), p. 132.
7. Pierre Duhem, quoted in Stanley Jaki, Uneasy Genius: The Life and Work of Pierre Duhem (The Hague: Martinus Nijhoff, 1984), p. 404.
8. Stanley Jaki, Science and Creation (Edinburgh: Scottish Academic Press, 1974), pp. 94-95.
9. Ibid.
10. Harvey Cox, op. cit., p. 22.
11. Ibid., p. 24.
12. Lynn White, jr., "The Historical Roots of Our Ecologic Crisis", Science, March 10, 1967, p. 1206.
13. R. G. Collingwood, The Idea of Nature (London: Oxford, 1945), p. 170; cf. An Essay on Metaphysics (London: Oxford, 1940), pp. 185-227, 248-257. On pp. 213-227 of the latter work Collingwood discusses the scientific implications of the Athanasian Creed.

Notes to Introduction (continued)

14. R. G. Collingwood, An Autobiography (London: Oxford, 1939), pp. 77-78.
15. For fully-developed versions of this argument, see: M. B. Foster, "The Christian Doctrine of Creation and the Rise of Modern Natural Science", Mind, XLIII (1934), pp. 446-468, and "Christian Theology and Modern Science of Nature", Mind XLIV (1935), pp. 439-466 / Mind XLV (1936), pp. 1-27; Francis Oakley, "Christian Theology and the Newtonian Science: The Rise of the Concept of the Laws of Nature", Church History, XXX (1961), pp. 433-457; Reijer Hooykaas, Religion and the Rise of Modern Science (Grand Rapids: Eerdmans, 1972).
16. Stanley Jaki, Science and Creation (Edinburgh: Scottish Academic Press, 1974), p. 229.
17. Arnold Toynbee, in The Toynbee-Ikeda Dialogue (Tokyo: Kodansha International, 1976), p. 39.
18. Lynn White, jr., "The Historical Roots of Our Ecologic Crisis", Science, March 10, 1967, p. 1206.
19. Daisetz T. Suzuki, "The Role of Nature in Zen Buddhism", Eranos-Jahrbuch, XXII (1953), p. 292.
20. Lynn White, jr., "The Historical Roots of Our Ecologic Crisis", Science, March 10, 1967, p. 1205.
21. M. B. Foster, "Greek and Christian Ideas of Nature", Free University Quarterly, 1958, p. 126.
22. Foster, in "Man's Idea of Nature", The Christian Scholar, XLI (1958), p. 365, writes: "If the modern scientific world view was derived from Christianity, why did it not appear sooner? Why did it take sixteen centuries to alter men's view of nature? The answer is, I think, that it is one thing to adopt a faith but quite a different thing to let that faith permeate all departments of thought and action. The process of permeation is slow, difficult, and imperfect. The Christian doctrine of the brotherhood of all men, for example, was accepted for over seventeen centuries before it permeated the sphere of social practice sufficiently to bring about the abolition of slavery



Notes to Introduction (continued)

in the Western world. It took the Christian doctrine of creation a slightly shorter time to permeate men's views of nature sufficiently to form the basis of modern natural science." White's version of the argument is similar, except that he marks the accomplishment of Christianizing earlier, in the later Middle Ages, by which time the peasants of Europe had sufficiently thrown off pagan animism to take a newly aggressive attitude toward nature. The arguments of White and Foster do not contradict but complement one another; White is interested in physical aggressiveness toward nature, Foster in mechanistic physics, the former of which can be regarded as a logical first step toward the latter. One of White's sources, Samuel Sambursky, who can hardly be grouped with the mastery writers in other respects, writes in The Physical World of the Greeks (London: Routledge and Kegan Paul, 1963), pp. 242-3: "With the spread of Christianity, natural problems only took second place to the main concern of humanity-- its relations with the Creator. The petrification of science in the period of commentators and scholastics kept the knowledge of nature amassed by scientific research at the level attained by Aristotle until the beginning of the modern era. But this long period of immobility also brought about a slow, steady change in man's attitude to the cosmos. The last traces of the old Greek mythological subservience to the cosmos were eliminated by the influence of Christianity and the organized Church. By divorcing man and his vital interests from natural phenomena the Church helped to create the feeling that the cosmos was something alien and remote from man. It was this feeling that prepared men's minds for the next stage in which the investigator faced nature as its dissector and conqueror and thereby ushered in our own scientific era which still, after four centuries, retains its vigour undimmed."

23. George Grant, "In Defence of North America", in Technology and Empire (Toronto: Anansi, 1969) p. 19.

24. Ibid., pp. 18-20.

Notes to Introduction (continued)

25. Peter Berger, The Sacred Canopy (Garden City, New York: Doubleday, 1967), pp. 111-113.
26. Nicolas Berdyaev, op. cit., p. 113.
27. Stanley Jaki, Science and Creation (Edinburgh: Scottish Academic Press, 1974), pp. 19, 43-44, 99.
28. Ibid., p. 357.
29. Nicolas Berdyaev, op. cit., pp. 113, 118.
30. Daisetz T. Suzuki, op. cit., p. 294.
31. Ian McHarg, "The Plight", in Harold Helfrich, ed., The Environmental Crisis: Man's Struggle to Live with Himself (New Haven: Yale University Press, 1970), pp. 25-26.
32. Theodore Roszak, op. cit., pp. 102, 114-115, 118.
33. Arnold Toynbee, in Toynbee and Ikeda, op. cit., pp. 40-41; Lynn White, "The Historical Roots of our Ecologic Crisis", Science, March 10, 1967, pp. 1206-1207. Contesting the picture drawn by White of St. Francis as representative of a pagan or Eastern kind of nature-piety, a recent book attempts to demonstrate that Francis's respect for nature can be accounted for wholly within the Western Christian tradition, by looking at his Biblical, liturgical, and theological sources. See Roger D. Sorrell, St. Francis of Assisi and Nature (New York: Oxford, 1988).
34. Lynn White, op. cit. (note 33), p. 1206.
35. Peter Berger, op. cit., pp. 106-107.
36. George Grant, quoted in Larry Schmidt, ed., George Grant in Process (Toronto: Anansi, 1978), pp. 146-147.

Notes to Introductory Remarks to Part One (pp. 53-64)

1. For this etymology see Encyclopedic Dictionary of Religion (Washington, D. C.: Corpus Publications, 1979), Vol. O-Z (III), p. 2643, and The Catholic Encyclopedia (New York: Encyclopedia Press, 1911), Vol. XI, p. 388. The article in the latter work contains an extensive discussion (pp. 388-394) of paganism from a historical and theological point of view.
2. Numa Denis Fustel de Coulanges, The Ancient City (Baltimore: Johns Hopkins University Press, 1980).
3. Walter Otto, The Homeric Gods: The Spiritual Significance of Greek Religion, trans. Moses Hadas (New York: Pantheon, 1954).
4. See The Secular City (New York: MacMillan, 1965): for Gogarten see p. 17, for Radcliffe-Brown p. 22, for Weber pp. 23-4; the notes are on p. 37.
5. See "What Accelerated Technological Progress in the Middle Ages?" in O'Connor and Oakley, eds., Creation: The Impact of an Idea (New York: Charles Scribner's Sons, 1969): p. 95 and footnotes 28 and 29. White quotes his authors correctly, but a note of caution is necessary. Sambursky's account of Greek ideas of nature and science does not, on the whole, lend much support to the idea of 'pagan' thought found in the mastery hypothesis, since it affirms a strong kinship between Greek and modern science; furthermore, the passage to which White refers (quoted in note 22 to the Introduction to this work) is a very brief and undeveloped statement in Sambursky's conclusion. It reads more like a tentative suggestion than a well-worked-out argument. Forbes's statement, on the other hand, does commit him to the mastery writers' position, although, as will be mentioned further below in Chapter One, Forbes's own work on the history of actual technical achievements undermines his hypothetical history of attitudes.
6. See The Meaning of History (London: Geoffrey Bles, 1936): Schelling is acknowledged directly on p. 108, and the whole discussion is unmistakably Hegelian in character. Berdyaev's debt to these thinkers is acknowledged in any standard account of his thought.

Notes to Introductory Remarks to Part One (continued)

7. See "The Christian Doctrine of Creation and Rise of Modern Natural Science", Mind, XLIII (1934), pp. 456-7, where Foster treats Greek "Olympian religion" as a form of nature religion without any reference at all to either primary texts (e.g., Homer) or to contemporary scholarship on the Olympian gods.
8. See The Sacred Canopy (Garden City: Doubleday, 1967), pp. 113-114, and p. 207, notes 19-22. One must add that, while the statements of Voegelin, Frankfort and Eliade used by Berger are doubtless either wholly correct or highly probable remarks about pagan religion, it is doubtful that any of these writers would accept everything that Berger draws from them, and still more doubtful that they would accept the mastery hypothesis as a whole. Their various accounts of ancient religion and culture seem a good deal more subtle than that of the mastery writers. Note that Berger is also, like Cox, indebted to Gogarten and Weber; for his acknowledgments to these writers see again p. 207.
9. See Natural Science and the Spiritual Life (London: Oxford, 1951): Foster is acknowledged along with others, including Whitehead, on pp. 11-22; Berdyaev is quoted on p. 30.
10. For Grant's indebtedness to the account of Foster, see Philosophy and the Mass Age (Toronto: Copp Clark, 1959), pp. 44, 113 n.6; see also English-Speaking Justice (Toronto: Anansi, 1985), pp. 59, 100 n.19. Grant knows the implication of White's work on the Middle Ages, even before White's full formulation of the mastery hypothesis; he quotes from White's Medieval Technology and Social Change, in "Tyranny and Wisdom", in Technology and Empire (Toronto: Anansi: 1969), p. 106 n.37. He acknowledges his debt to Eliade's understanding of 'paganism' in Philosophy in the Mass Age, pp. 15, 113 n.3.

Notes to Chapter One [Pagan Practice] (pp. 65-94)

1. Lynn White, "The Historical Roots of Our Ecologic Crisis", Science, March 10, 1967, p. 1205.
2. Arnold Toynbee, The Toynbee-Ikeda Dialogue (Tokyo: Kodansha International, 1976), p. 38.
3. White writes: "What we do about ecology depends on our ideas of the man-nature relationship." (emphasis added; op. cit. note 1 above, p. 1206). Note the word 'ideas', which implies intellectual constructs of reality. Of course, White and most of the mastery writers (especially Roszak) would explain that they mean by 'ideas' something more vital than this: the ways of perceiving, feeling, and regarding nature, deeply rooted, which operate not only on the rational plane (in systematic thought about nature) but on social and psychic levels more hidden and subtle. While recognizing this, we must still be critical about alleged pagan 'ideas of nature' and their effects. Many of the ideas we think characteristic of pagan cultures may have belonged, not to the world of practical people, but to the world of discourse of philosophers, priests, and literary people, upon whom we greatly depend for our picture of 'pagan' thought about nature. For example, if we took Ovid as representative of the Roman religion of his time, we might think that all Romans believed in dryads, sylphs, and so on; Edith Hamilton, however, tells us that Ovid thought such beliefs nonsense, in agreement with the other Roman poets. See her Mythology (Boston: Little, Brown, and Co., 1942), pp. 15, 18. As will be shown in this chapter, the implications of such statements for the 'pagan idea of nature' are not properly considered by the mastery writers, whose account often seems to be based more on a rather literal reading of classical myth and poetry than on a careful study of the work of ancient historians, geographers, agricultural writers, and engineers; whose ideas about nature are presumably more relevant to the claims of the hypothesis.
4. Lynn White, op. cit., p. 1206.
5. Sir J. G. Frazer, The Golden Bough (abridged edition; London: MacMillan, 1922), pp. 144-158.

Notes to Chapter One [Pagan Practice] (continued)

6. Ibid., p. 146.
7. Ibid., p. 149.
8. Ibid., pp. 146-147.
9. Porphyry, De L'Abstinence, Tome I, trans. Bouffartigue (Paris: Société D'Édition "Les Belles Lettres", 1977, pp. 45/46 (French/Greek), sec. 6.
10. Walter Burkert, Greek Religion, trans. Raffan (Cambridge: Harvard, 1985), p. 174 sec. 3.3.
11. Russell Meiggs, Trees and Timber in the Ancient Mediterranean World (London: Oxford, 1982), p. 378.
12. Ibid., chapter 3, passim.
13. Ibid., pp. 171, 378.
14. Ibid., pp. 170-171.
15. Feuerbach, in Lectures on the Essence of Religion, trans. Manheim (New York: Harper & Row, 1967), pp. 41-42, writes: "The Jains set up "regular animal hospitals even for the lowest and most despised varieties, and pay poor people to spend the night in these places set aside for vermin, and let themselves be eaten alive. Many wear a piece of canvas in front of their mouths lest they swallow some flying insect and so deprive it of life. Others take a soft brush and, for fear of crushing some animal, sweep the place where they mean to sit down. Or they carry a little bag of flour or sugar or a jar of honey with which to feed the ants or other animals." [Feuerbach's source here is Ersch und Gruber, Encyclopadie.]
16. Hesiod, Works and Days, trans. Evelyn White, in Vol. 57 of The Loeb Classical Library (Cambridge, Mass.: 1914), pp. 60-61.
17. Feuerbach, op. cit.; see, for example, pp. 82-83.
18. Arthur O. Lovejoy and George Boas, Primitivism and Related Ideas in Antiquity (New York: Octagon, 1980), pp. 32-34.

Notes to Chapter One [Pagan Practice] (continued)

19. Lovejoy and Boas, op. cit., p. 16: "The Golden Age of Greek mythology was originally, indeed-- so far as the texts indicate-- irrelevant to man's life as it now is; it was enjoyed by a different breed of mortals, in a different condition of the world and (in one version) under different gods, and no practical moral could therefore consistently be drawn from it for the guidance of the present race. It was by implication irrecoverable, at least by men's own efforts." Here the reference is general, not specifically to the relation of man to the animals, but it includes this, as the list on p. 14 shows.
20. Ibid., p. 33.
21. K. D. White, Greek and Roman Technology (Ithaca: Cornell, 1984), p. 102.
22. Ibid., p. 227.
23. Lynn White, "The Life of the Silent Majority", in Medieval Religion and Technology (Berkeley: University of California Press, 1978), p. 143. See also R. J. Forbes, "Power", in Charles Singer et. al., eds., A History of Technology, Vol. II (Oxford: Clarendon Press, 1967), pp. 601 ff., who gives an account of Roman water-mills. Of course, Forbes and White both argue that, though the water-mill was invented in pagan times, it was not developed fully until Christian times, and that this was partly due to pagan inhibitions. This argument is not strictly logical; if the pagans had the inhibitions they are supposed to have had, how could they have used water-mills at all? The mastery writers simply do not articulate the details of the relation between alleged pagan sensibilities and alleged pagan practices.
24. Feuerbach, op. cit., pp. 170-171; Clarence Glacken, Traces on the Rhodian Shore (Berkeley: University of California Press, 1967), pp. 134-135.
25. Tacitus, Annals, Book I, trans. Jackson, in Vol. 249 of The Loeb Classical Library (Cambridge: Harvard, 1931), pp. 378-379.

Notes to Chapter One [Pagan Practice] (continued)

26. Herodotus, The Persian Wars, trans. Rawlinson, in Vol. I of The Greek Historians (New York: Random House, 1942), p. 33.
27. A. Neuberger, The Technical Arts and Sciences of the Ancients, trans. Brose (New York: Barnes & Noble, 1969), pp. 420-422.
28. R. J. Forbes, Studies in Ancient Technology, Vol. VII (Leiden: E. J. Brill, 1963). Neither in this book on mining nor in any of his other eight volumes does Forbes seem at all concerned with any ancient religious inhibitions upon practical activity, which is odd, if they were so much a part of the ancient world. One works through the Contents and Index pages in vain to find any reference to 'spirits', 'animism', 'nature-worship', 'rituals', or related topics; further, perusing the text, one finds only the lengthy technical discussions which would be expected in works on these topics.
29. R. J. Forbes, "Power", in A History of Technology, Vol. II (see note 23 above), p. 606.
30. Feuerbach, op. cit., p. 170.
31. Cyrus H. Gordon, The Common Background of Greek and Hebrew Civilizations (New York: W. W. Norton, 1965), p. 30.
32. James Barr, "Man and Nature-- The Ecological Controversy and the Old Testament", Bulletin of the John Rylands Library, 55 (1973), p. 26.



Notes to Chapter Two [Pagan Theory] (pp. 95-156)

1. Stanley Jaki, The Origin of Science and the Science of its Origin (South Bend, Indiana: Regnery/Gateway, 1979), p. 93.
2. Ibid.
3. Ibid., pp. 69-70.
4. Stanley Jaki, Science and Creation (Edinburgh: Scottish Academic Press, 1974), chapter 5.
5. Ibid., chapter 1.
6. A. E. Combs and Kenneth Post, The Foundations of Political Order in Genesis and the Chandogya Upanishad (Lewiston, N. Y.: Edwin Mellen, 1987), pp. 375-376.
7. Cox writes (Secular City, p. 23): "For the Bible, neither man nor God is defined by his relationship to nature. This . . . frees both of them for history". By "history" Cox means 'history-making activity', i.e., the shaping of events by the will of God and God-inspired individuals or peoples. The future is radically open, not limited by the cramping effects of recurring natural cycles. White writes ("Historical Roots", p. 1205): "Like Aristotle, the intellectuals of the ancient West denied that the visible world had had a beginning. Indeed, the idea of a beginning was impossible in the framework of their cyclical conception of time. In sharp contrast, Christianity inherited from Judaism . . . a concept of time as nonrepetitive and linear". White connects this linear conception of history with human domination over Creation (ibid.); there is an open-ended stretch of time in which man can make technical progress. Grant, in Philosophy in the Mass Age (Toronto: Copp Clark, 1959), writes: "the very spirit of progress takes its form and depends for its origin on the Judaeo-Christian idea of history" (p. 49). Grant is cautious enough that he does not simply equate the modern doctrine of progress with its Biblical antecedent; still, he tends to treat the modern idea as implicit in the original. One must remember that Grant's account here (pp. 42-53)

Notes to Chapter Two [Pagan Theory] (continued)

is much influenced by Hegel, whom he repudiated later (pp. vii-ix); his mature view on the Christian understanding of time, and on other Christian doctrines, departs from that of the mastery writers once he is persuaded to the position of Simone Weil, who for him reconciles Christianity with Greek thought. His position here is subtle, because he is still willing to grant that Christian religion as it has been interpreted by the West does have something of the character attributed to it by the mastery writers; it has been an aggressive, history-oriented doctrine. But he thinks that true Christianity-- and Foster, Cox, Jaki and many other mastery writers would shudder at the heresy-- is not oriented toward secular progress and worldly mastery, but toward a loveable Eternal as articulated in Weil's Christian Platonism. To the extent that the Old Testament can be interpreted as compatible with Christian Platonism, Grant would accept it; to the extent that it stands against such a doctrine and is aligned with historical triumphalism, Grant (with Weil) would disregard it as a book lacking authority for Christians. Grant is not explicit enough about the Old Testament in his writings, but one gets the strong impression that he suspects that parts of it are responsible for the worst evils of the modern West. See his "Faith and the Multiversity", in Technology and Justice (Toronto: Anansi, 1986), p. 76, and his remarks on pp. 102-103 of George Grant in Process, ed. Schmidt (Toronto: Anansi, 1978). The interpretation of the Old Testament offered in Chapters Three and Four below, while not denying Grant's contention that there is a distinction between the Old Testament and Platonic thought, goes further than Grant, by claiming that neither Greek nor Hebraic interpretations of Christianity are compatible with modern mastery. Grant might not agree with this, but he would probably agree that the attempt to read the the Old Testament as a non-progressivist, non-domineering teaching is worth making.

8. See Oscar Cullman, Christ and Time, trans. Filson (Philadelphia: Westminster Press, 1972).

Notes to Chapter Two [Pagan Theory] (continued)

9. Jaki, Science and Creation, p. 121.
10. Ibid., p. 3.
11. Karl Lowith, Meaning in History (Chicago: University of Chicago Press, 1949), p. 200.
12. Cox, Secular City, p. 24; Jaki, Science and Creation, chs. 5 and 6.
13. Gerhard von Rad, in Genesis (Philadelphia: Westminster Press, 1972), pp. 55-6, argues that Gen. 1.14-19 directly opposed the common ancient Near Eastern belief in the influence of the heavens upon human life, though he does not mention the ethical implications directly. Franz Cumont, in his Oriental Religions in Roman Paganism (New York: Dover, 1956), names several early Christian writers who opposed astrology, and summarizes their moral opposition to astrological determinism (pp. 180, p. 275 n. 47). Included in his list is St. Basil (Hexaemeron, VI, 5). One should not forget that pagan authors such as Cicero argued against astrology on the same moral grounds as did Christians and Jews.
14. H. and H. A. Frankfort, The Intellectual Adventure of Ancient Man (Chicago: University of Chicago Press, 1977), p. 366.
15. Edith Hamilton, Mythology (Boston: Little, Brown, & Co., 1942), p. 18.
16. Marshall Clagett, Greek Science in Antiquity (New York: Collier, 1963), p. 34.
17. Stanley Jaki, Science and Creation, p. 94.
18. Leo Oppenheim, Ancient Mesopotamia (Chicago: University of Chicago Press, 1964), p. 207.
19. Harvey Cox, Secular City, p. 24.
20. Franz Cumont, Oriental Religions in Roman Paganism (see note 13 above), p. 172.
21. Ibid., pp. 180-181.

Notes to Chapter Two [Pagan Theory] (continued)

22. See John Tulloch, Rational Theology and Christian Philosophy in England in the Seventeenth Century, Volume II (New York: Burt Franklin, 1972), p. 306.
23. Cicero, De Natura Deorum (Cambridge, Massachusetts: Harvard University Press, 1933), pp. 157, 159.
24. Ibid., pp. 219; 251; 275, 277.
25. Clarence Glacken, Traces on the Rhodian Shore (Berkeley: University of California Press, 1967), p. 54; John Passmore, Man's Responsibility for Nature (second edition; London: Duckworth, 1980), pp. 14-18.
26. M. B. Foster, "Some Remarks on the Relations of Science and Religion", supplement to The Christian News-Letter #299 (26 Nov. 1947), p. 6.
27. In the interest of fairness, one has to admit that a rejoinder by the mastery writers would be possible here. Dr. Samuel Ajzenstat pointed this out when commenting upon a draft of this work. His idea, worked out in full, would run something like this: It is likely that Foster (for example) would object that passages (2) and (3) above, though spoken by the same Balbus who earlier described nature as a deity, actually presume a quite different doctrine, namely, that nature is an artifact contrived for the purposes of rational beings. For these passages describe the origin of natural things in the language of planning and making rather than in the language of generation out of divine substance. Because of this, Foster could claim that in Stoicism, as in the Bible, human mastery is derived from the doctrine that nature is an artifact rather than an organism. He could insist that Stoic mastery could only be maintained by the unconscious acceptance of a doctrine (that the world is an artifact) which ran counter to official Stoic teaching (that the world is a divine living being). He would not be surprised by this inconsistency, since he finds the same thing in Plato, who (Foster alleges) could not make up his mind whether the world was created or generated (see Christian Theology and Modern Science of Nature (I.), Mind, Oct. 1935, pp. 443-447). Foster would see the speech of Balbus as further proof that classical thought was not

Notes to Chapter Two [Pagan Theory] (continued)

consistent and needed correction by the unequivocal Christian teaching that nature is to be understood as a non-divine product of God's will. Balbus's words seem to provide evidence of a pagan doctrine of mastery only because Balbus has, inconsistently, adopted a non-pagan idea of nature.

One must grant the strength of this potential reply; Balbus does indeed seem to hold together two incompatible ideas of nature. This confusion might be resolved by an expert student of Stoicism, but let us assume for the purpose of discussion that it cannot, and that the objection would be decisive. Would the mastery hypothesis then be vindicated? No; for by employing this line of argument the hypothesis leaps out of the frying pan, but straight into the fire. Suppose that Balbus's attitudes are essentially 'Biblical'. This means that it is possible to come to theoretical and practical conclusions (theism, creation doctrine, mastery) consistent with Biblical teaching even though one has no exposure to the religious traditions founded on the Bible! In what sense, then, can it be said that modern mastery is specifically 'Biblical'?

There seem to be two possible replies. The cautious reply is: had the pagans developed a consistent monotheism, which might have happened under certain conditions, modern mastery could have arisen earlier, but in fact it did not; mastery arose in Christian Europe, not Alexandria or Athens. Since mastery is historically Biblical in origin, the Bible is in a legitimate sense the 'cause'. Yet, no inference can be drawn from this about the worth of the Biblical religions in comparison to 'pagan' ones; if Zeus-worship, properly rationalized, could have had the same effect as the worship of YHWH or Jesus Christ, praise or blame for the specifically Jewish or Christian elements in Judaism and Christianity, (as opposed to praise or blame for monotheism in itself) is out of place. The bolder reply is: no form of paganism could ever of itself have risen to true monotheism and hence to the view of the world as a non-divine artifact. Paganism, by its inherent commitment to reverence for nature, cannot see that clearly; it needs to be enlightened by a positive revelation, and the only such revelation has been the

Notes to Chapter Two [Pagan Theory] (continued)

Bible. It is not surprising that this bolder answer appears to be that of Foster, Collingwood, Jaki, and in fact most of the pro-Christian, pro-modern mastery writers. Such a reply is, of course, rests on the questionable assumption that 'nature-worship' is the 'given' orientation of human beings, and that theism can appear only via supernatural intrusion. This assumption is questionable and may be undemonstrable; it rests, not on any firmly-established links between paganism and nature-worship, but on the Bible itself, or at least on the traditional Jewish and Christian interpretation of the Bible, which is that humanity is to be divided into two fundamental categories: 'nature-worshippers' and 'monotheists'.

In sum: the Cicero passage demonstrates mastering attitudes of at least Biblical intensity; these attitudes arose within paganism; if that paganism was 'organicist' in nature, the mastery hypothesis is simply falsified; if that paganism was quasi-monotheistic, the mastery hypothesis requires the large modification that any monotheistic view, not necessarily a Jewish or Christian one, would imply a doctrine of nature consistent with mastery. This modification would be too much for most of the mastery writers to tolerate, since they wish to praise or blame, not monotheism in the abstract, but Biblical religion in particular.

28. Translated by Hans Jonas in "Technology and Responsibility: Reflections on the New Tasks of Ethics", Chapter One of Philosophical Essays (Chicago: University of Chicago Press, 1974), p. 4.
29. Quoted in Marshall Clagett, Greek Science in Antiquity (New York: Collier, 1963), p. 35.
30. According to Young's Concordance (for publication data on reference books, see Bibliography), p. 752, there are four references to healers in the Old Testament, and only seven in the New. Genesis 50.2 refers to the 'physicians' who embalm Jacob; this passage is instructive as it is a Biblical acknowledgment that the Egyptians, a pagan people, had begun practising medicine in Egypt long before Israel existed as a political entity (and hence, as we now know, long before the 'mastering' teaching

Notes to Chapter Two [Pagan Theory] (continued)

of Genesis was written). Also, 2 Chronicles 16.12 is significant, because it complains that the evil King Asa "did not seek the Lord, but sought help from physicians" to cure his fatal foot disease; the text appears to recommend that wicked men who become ill, should pray rather than call the doctor, which might be good spiritual advice but hardly fits with the idea that the Bible teaches men to master nature for their benefit. Again according to Young's (p. 651) words translated as 'medicine' are found in the Old Testament alone, and just four times.

31. R. G. Collingwood, The Idea of Nature (London: Oxford, 1945), p. 111; Stanley Jaki, Science and Creation (Edinburgh: Scottish Academic Press, 1974), pp. 104-105.
32. For Foster's awareness of the connection between certain pre-Socratic ideas of nature and the rise of seventeenth-century science, see "Greek and Christian Ideas of Nature", Free University Quarterly, 1958, pp. 122-127; for Baillie's acknowledgment of the same connection, see Natural Science and the Spiritual Life (London: Oxford, 1951), pp. 26-28. Of course, both Foster and Baillie insist that there is a difference between atomism in its original pagan formulation and atomism in its Christian formulation by thinkers such as Gassendi; their sketchy argument seems to be that ancient atomism could not provide a basis for a workable science of nature because the atoms were viewed as uncreated rather than as part of a created order. One is inclined to think that the decision whether matter was created or uncreated was less important to the seventeenth-century thinkers than whether the motions of matter could be determined precisely by mathematics. This, however, opens up a new discussion which cannot be pursued here.
33. On the modern-sounding character of the science of Anaxagoras, see the original sources and discussion provided by J. M. Robinson, An Introduction to Early Greek Philosophy (Boston: Houghton Mifflin, 1968), pp. 185-189.

Notes to Chapter Two [Pagan Theory] (continued)

34. Marshall Clagett, in Greek Science in Antiquity (New York: Collier, 1963), pp. 175-176, says that the science of Archimedes appears, from the textual evidence we have, to have been independent of any philosophy of nature. Clagett's remark means that Archimedes could investigate nature using mathematics and experimentation, without committing himself to any 'pagan' doctrines such as 'organicism' or 'animism'. Of course, the mastery writers might well deny that such neutrality is impossible, and that a pagan or Biblical philosophy of nature is always tacitly presupposed in scientific work. But then, the mastery writers are forced back to the dilemma discussed at length in note 27 above: if Archimedes had a 'pagan' philosophy of nature, he could not have so often anticipated modern science, and if he had a 'Biblical' understanding of nature without knowing anything about Judaism or Christianity, then it seems that adherence to Biblical religion is not necessary in order to adopt a philosophy of nature compatible with scientific and technical advance.
35. Jaki, Science and Creation, p. 89.
36. Robert S. Brumbaugh, Ancient Greek Gadgets and Machines (New York: Thomas Crowell, 1966), p. 37.
37. Jaki, Science and Creation, pp. 104-105.
38. Desmond Lee, "Introduction", in Plato: Timaeus and Critias (Harmondsworth: Penguin, 1977), p. 14.
39. Plutarch, Life of Marcellus, trans. Perrin, in Loeb Vol. 87 (Cambridge, Mass.: Harvard University Press, 1917), p. 473.
40. Diodorus Siculus, Library of History, trans. Walton, in Loeb Vol. 409 (Cambridge: Harvard, 1957), pp. 193, 195.
41. G. E. R. Lloyd, Greek Science After Aristotle (London: Chatto & Windus, 1973), pp. 93-95.
42. M. B. Foster, "Some Remarks on the Relations of Science and Religion", supplement to The Christian Newsletter #299 (26 Nov 1947), p. 6.



Notes to Chapter Two [Pagan Theory] (continued)

43. Plutarch, op. cit., pp. 471, 473.
44. Plutarch, op. cit., p. 479.
45. Lynn White, "What Accelerated Technological Progress in the Western Middle Ages?", in O'Connor and Oakley, eds., Creation: The Impact of an Idea (New York: Charles Scribner's Sons, 1969), pp. 97-104; R. J. Forbes, "Power", in Charles Singer, et. al., eds., A History of Technology, Vol. II (Oxford: Clarendon Press, 1967), pp. 605-6.
46. M. B. Foster, "Greek and Christian Ideas of Nature", Free University Quarterly, 1958, p. 126.
47. Leo Strauss, "Correspondence Concerning Modernity", Independent Journal of Philosophy, IV (1980), p. 112.
48. Ibid.
49. M. B. Foster, op. cit. n. 26 above, p. 6.
50. Xenophon, Recollections of Socrates, trans. Benjamin (Indianapolis: Bobbs-Merrill, 1965), pp. 5-6.
51. The interpretation of Xenophon offered here is an attempt to work out the implications of some remarks of Leo Strauss and George Grant. Both of these writers draw attention to the hesitation of classical thinkers regarding the unlimited mastery of nature, and suggest a connection between unlimited mastery over nature and the rise of an irresistible tyranny. One wishes, however, that they had presented a full exegesis of the passage from Xenophon instead of a mere citation, and that they had tried harder to specify some of the limits which classical thinkers thought should be set upon the human manipulation of the fundamental powers of nature. For the start of the discussion, see Leo Strauss, "Restatement on Xenophon's Hiero", in On Tyranny (Ithaca: Cornell University Press, 1975), especially pp. 190 and 226; for the continuation see George Grant, "Tyranny and Wisdom", in Technology and Empire (Toronto: Anansi, 1969), especially pp. 97-106.

Notes to Introductory Remarks to Part Two (pp. 158-167)

1. Collingwood never reduced the 'Christian doctrine of Creation' to those elements of Christian teaching which could be found directly in the Old Testament; in fact, he argued not at all from the text of the Bible but from the Christian theological tradition, specifically from the Athanasian Creed, as mentioned in the notes to the Introduction to this work. He even went so far as to suggest that the Hebrew Bible by itself is an inadequate source for Christian Creation doctrine, since it affirmed (for Collingwood) creation from pre-existent matter: ". . . the idea of absolute creation, of a creative act which presupposes nothing at all, whether a pre-existing matter or a pre-existing form, is an idea which originated with Christianity and constitutes the main characteristic differentiation distinguishing the Christian idea of creation from the Hellenic (and, for that matter, from the Hebrew idea of it expounded in the book of Genesis)." See The Idea of Nature (London: Oxford, 1945), p. 77. Nor did Michael Foster in his earlier writings simply equate 'Christian' with 'Hebraic' or 'Biblical'. About the 'Christian' understanding of God which underlay the doctrine of Creation he wrote: "I mean Christian, not Jewish. The Christian doctrine of God derived much from the Greek and thus included within itself, besides much from Jewish sources [i.e., the Old Testament], much also from the very doctrine [i.e., Greek] which it displaced." In the same article he affirmed: "The Christian doctrine on this [Creation], as on all other subjects, itself includes an element [rationality in God] derived from Greek philosophy, and any doctrine from which all Greek elements are excluded is less than Christian. It is Christian to ascribe to God an activity of will, but it is not Christian to deny to God a theoretical activity or to ascribe to him a blind activity of will." (At this point, it seems, Foster thought that the God of the Old Testament exercised will 'blindly', that is, without rationality.) For these passages, see "The Christian Doctrine of Creation and Rise of Modern Natural Science", Mind, XLIII (1934), p. 465 n. 1, 468. In Foster's postwar writings, such as Mystery and Philosophy, he adopts a more radical position,

Notes to Introductory Remarks to Part Two (cont'd)

arguing that a true Christian theology must reject 'Hellenic' and endorse 'Hebraic' thought-models. It is only during this part of his career that he refers his arguments to Old Testament passages, and to that body of modern Biblical scholarship and theology, largely German in origin though with a strong following in English-speaking countries, which liked to belittle or even denounce Greek elements in Christian theology and tradition and to emphasize the 'Hebraic' character of Christianity. Thus, on the question whether the source of modern ideas of nature is to be found in 'Christian theology' as it has been historically understood (creeds, formal systems of metaphysics, doctrines of creatio ex nihilo, etc.) or 'Christian theology' as it has been more recently understood ('Biblical' theology, dependent on the text of the Bible-- including the New Testament-- understood as a purely 'Hebraic' work), the later Foster is more like Cox, whereas the earlier Foster is more akin to Collingwood.

This means that the arguments of Collingwood and those of the earlier Foster, insofar as they do not depend entirely upon the text of the Old Testament, are not vulnerable to all the attacks which might be made upon the mastery hypothesis. The separation of the Foster-Collingwood line of argument from that of the other mastery writers, however, would weaken both lines. For, as Grant and others realize, Foster and Collingwood provide the strongest theoretical account of the link between Christian doctrine and modern science, and give the hypothesis a firm conceptual basis which is missing from White, Suzuki, Cox, Berger, Toynbee, and others. On the other side, once the Foster-Collingwood line of thought separates itself from dependence upon the Biblical text, it becomes open to another line of criticism, that is, that its Christian theology is not 'Biblical' enough, and too much influenced by later metaphysical ways of formulating Christian doctrine which depart from Hebraic simplicity are suspect of 'Greekness'. For example, creatio ex nihilo, which is essential for the Foster-Collingwood argument, cannot be demonstrated from the Biblical text, appears to run against the plain sense of the Biblical text (as Collingwood's remark on Genesis recognizes), and has the odour of 'Greek' rationalization about it.

Notes to Introductory Remarks to Part Two (continued)

In fact, further examination of the rationalized Christianity of Foster and Collingwood would show that the theology to which they make the Bible conform is not derived from 'Greek' principles, but from the Hegelianism which permeated Oxford during these thinkers' formative years. This, however, is another topic.

Notes to Chapter Three [Desacralization] (pp. 168-219)

1. For this interpretation of the Isaiah passage see Roszak, Where the Wasteland Ends (Garden City, New York: Anchor, 1972), pp. 104-106.
2. This point, derived from a comment upon an early draft of this work, is owed to Dr. A. E. Combs.
3. Descartes, in Part Five of Discourse on Method, trans. Lafleur (Indianapolis: Bobbs-Merrill, 1956), p. 36.
4. Hobbes, "The Introduction" to Leviathan, ed. Macpherson (Harmondsworth: Penguin, 1968), p. 81.
5. A. E. Combs (with Kenneth Post) The Foundations of Political Order in Genesis and the Chāndogya Upanisad (Lewiston, New York: Edwin Mellen Press, 1987); pp. 56-57, 66-67, 95-97; Robert Sacks, The Lion and the Ass: A Commentary On the Book of Genesis (first part: Genesis I-X), in Interpretation: A Journal of Political Philosophy, Vol. 8/2,3 (1980), pp. 37-38, 43-45.
6. Sacks (Ibid., p. 38) quotes Rabbi Judah ben Sholom's remarks (on the earth's failure to comply with God's command) from Bereshith Rabbah; he may well have in mind other Jewish sources; Combs owes his acquaintance with this line of Rabbinic exegesis to Sacks.
7. See the entries on hōq in the standard lexicons: Brown, Driver and Briggs (pp. 248-250) and Holladay (p. 114). For formal listing of reference works see Bibliography.
8. H. Wheeler Robinson, Inspiration and Revelation in the Old Testament (Westport, Connecticut: Greenwood Press, 1979), p. 47.

Notes to Chapter Four [Dominion] (pp. 220-267)

1. Lynn White, jr., "Continuing the Conversation", in Ian Barbour, ed., Western Man and Environmental Ethics (Reading, Massachusetts: Addison-Wesley, 1973), p. 60. Here White is referring to the Western iconographic tradition surrounding Genesis 1.28, though the relation he sees in the artwork between man and the animals is more appropriate to Noah than to Adam: "With his left hand God has seized Adam's wrist, and he is shaking his right index finger at Adam with great earnestness, giving detailed instructions as to his ruling of the fief that has been given him. There is a mood of imminent action, urgency. At one side the animals are huddled, looking a bit frightened. Considering the outcome, they have every right to be." If White interprets the manuscript illustrations well, it would appear that long before the mastery hypothesis emerged, the ground was prepared for it by a Western Christian habit of juxtaposing passages and themes (in this case, Gen. 1 on dominion and Gen. 9 on fear) which in the Old Testament are carefully separated.
2. Harvey Cox, The Secular City (New York: MacMillan, 1965), p. 23.
3. Lynn White, "The Historical Roots of Our Ecologic Crisis", Science, March 10, 1967, p. 1205.
4. A. E. Combs and Kenneth Post, The Foundations of Political Order in Genesis and the Chāndogya Upanisad (Lewiston, New York: Edwin Mellen Press, 1987); pp. 115-118, 132-133.
5. In a comment on an earlier draft of this work, Dr. Combs suggested that the story about naming the animals does contain an idea of human mastery. His argument for this can be summarized as follows. In Gen. 1.28 man is told to have dominion over fish, birds, and all the beasts which creep upon the earth, but not over the "cattle" (b<sup>e</sup>hēmāh), that is, over the large four-footed beasts, usually domestic beasts (hence the Septuagint's ktēnea). In Genesis 2, Adam is expected to name all the living things of the field (hayyath hassādeh) and the birds,

Notes to Chapter Four [Dominion] (continued)

but not the cattle (b<sup>e</sup>hēmāh). Adam, however, names the cattle, as well, which Dr. Combs sees as an example of the human propensity to master more than God offers or intends. If he is right, then it may be that the kind of human mastery known as 'domestication' (taking b<sup>e</sup>hēmāh to mean domestic beasts) is foreshadowed by the naming of domestic animals; indeed, Abel's keeping of sheep in Gen. 4 and Noah's prospect of killing animals for food in Gen. 9 can be regarded as the fulfillment of the human tendency demonstrated by Adam's unauthorized naming of some living things as "cattle", that is, as living things destined to be ruled by man. Two possible objections may be noted here. First, the Septuagint does not support Dr. Combs's reading, since it lists the b<sup>e</sup>hēmāh (ktēnea) among the creatures to be ruled in Gen. 1.28. This is not crucial, since there is no reason to prefer the Greek over the Hebrew text here. More important, perhaps, some may find Dr. Combs's emphasis on the fine distinctions between the different words for 'animal' somewhat over-subtle and hence unreliable. However, his sharp observations are original and hence deserve notice. For Dr. Combs's published comments upon this question, see his "Has YHWH Cursed the Ground? Perplexity of Interpretation in Genesis 1-5", in Ascribe to the Lord: Biblical & Other Studies in Memory of Peter C. Craigie (Sheffield: Sheffield Academic Press, 1988), pp. 272, 281. It should be noted that even if Dr. Combs is right, his reading would not help the mastery writers. For, as he says in his written comments upon the draft of this work, if Genesis depicts mastery as present in Adam's act of naming the animals, it also shows that, in the context of Eden, this mastery is not granted by God but usurped by man.

6. Gerhard von Rad, Genesis, trans. John H. Marks (Philadelphia: Westminster Press, 1972), p. 83.
7. See Sir J. G. Frazer, The Golden Bough (abridged edition; London: MacMillan, 1957), pp. 321-2, and Franklin Edgerton, "Interpretation of the Bhagavad Gita", in The Bhagavad Gita (Cambridge, Massachusetts: Harvard University Press, 1972), pp. 109-110.

Notes to Chapter Four [Dominion] (continued)

8. James Barr, "Man and Nature-- The Ecological Controversy and the Old Testament", Bulletin of the John Rylands Library, 55 (1973), pp. 23-24; see also Claus Westermann, Genesis 1-11: A Commentary, trans. Scullion (Minneapolis: Augsburg, 1984), p. 149.
9. James Barr, op. cit. (note 8), pp. 20-23.
10. Jacob Klein, "On the Nature of Nature", Independent Journal of Philosophy, III (1979), p. 104; Leo Strauss, "Progress or Return? The Contemporary Crisis in Western Civilization", Modern Judaism, Vol. 1, No. 1 (May 1981), pp. 39-40.
11. Robert Young, Analytical Concordance to the Holy Bible (8th edition), p. 688. For full data on standard reference books, see Bibliography.
12. Ibid.
13. Jacques Ellul, "The Relationship Between Man and Creation in the Bible", trans. Temple, in Theology and Technology (Lanham, Maryland: University Press of America, 1984), p. 148.
14. Ibid., pp. 148-150.
15. F. B. Welbourn, "Man's Dominion", Theology, LXXVIII (Nov. 1975), p. 564.
16. See the discussion of Peter Craigie in The Book of Deuteronomy (Grand Rapids: Eerdmans, 1976), pp. 232-233 and notes 17-19: the Ugaritic text has not been perfectly restored, and even if the alleged reading could be established, it would read only "milk", not "its mother's milk"; the difference of detail seems to be very important for the interpretation.
17. For an independent confirmation of this conclusion, see Calum M. Carmichael, The Laws of Deuteronomy (Ithaca: Cornell University Press, 1974), p. 152. Carmichael notes (pp. 152-3 n. 2) that Philo offers a similar explanation in De Virtutibus.



Notes on Chapter Four [Dominion] (continued)

18. John Passmore, Man's Responsibility for Nature (London: Duckworth, 1980), p. 16; Passmore also points out (p. 8) some passages from the book of Job (38.26-27; 39.5-6), which express the same view.

Notes to Introductory Remarks to Part Three (pp. 269-284)

1. See Campanella in A. Fallico and H. Shapiro, eds., Renaissance Philosophy (Volume 1)-- The Italian Philosophers: Selected Readings from Petrarch to Bruno (New York: Modern Library, 1967), p. 339; see Paracelsus in Allen G. Debus, The Chemical Philosophy: Paracelsian Science and Medicine in the Sixteenth and Seventeenth Centuries (New York: Science History Publications, 1977), Vol. 1, pp. 53-54.
2. R. G. Collingwood, The Idea of Nature (London: Oxford, 1945), p. 96.
3. Hermetica, ed. W. Scott, Vol. I (Oxford: Clarendon Press, 1924), p. 221.
4. Charles Trinkaus, In Our Image and Likeness: Humanity and Divinity in Italian Humanist Thought (Chicago: University of Chicago Press, 1970), pp. 486, 485.
5. Agnes Heller, Renaissance Man, trans. Allen (London: Routledge & Kegan Paul, 1978), pp. 79-80.
6. Ernst Cassirer, The Individual and the Cosmos in Renaissance Philosophy, trans. Domandi (Philadelphia: University of Pennsylvania Press, 1972), p. 95.
7. See Paracelsus: Selected Writings, ed. Jacobi (New York: Pantheon, 1958), pp. 14, 40, 45, and The Hermetic and Alchemical Writings of Paracelsus, ed. Waite, Vol. II, p. 289.
8. Selected Writings (see note 7 above), p. 45.
9. Selected Writings, p. 108.
10. Selected Writings, p. 14; Hermetic and Alchemical Writings (see note 7 above), pp. 250, 252.

Notes to Chapter Five [Baconianism] (pp. 285-321)

1. Of The Advancement of Learning, in John M. Robertson, editor, The Philosophical Works of Francis Bacon (Freeport, New York: Books for Libraries Press, 1970), p. 91. For convenience all future references to the Robertson collection will use the abbreviated form, Works.
2. Op. cit., Works, pp. 94-97.
3. De Principiis Atque Originibus, Works, p. 664; Novum Organum, Bk. 2: LI, LXXI.
4. "The Christian Doctrine of Creation and the Rise of Modern Natural Science", Mind, XLIII (1934), p. 456 n. 1.
5. Leo Strauss, in "Correspondence Concerning Modernity", Independent Journal of Philosophy, IV (1980), pp. 106, 111-112.
6. Thomas Sprat, The History of the Royal Society of London, for the Improving of Natural Knowledge, facsimile edition, edited by J. I. Cope and H. W. Jones (St. Louis: Washington University Studies, 1959), p. 116 lines 24-25, p. 122 lines 27-31, p. 131 line 34, p. 34 lines 29-30. For convenience all future references to this work will employ the abbreviated form, History.
7. Sprat, History, p. 383 line 13.
8. Abraham Cowley, "To the Royal Society", VII, prefixed on unnumbered pages to Sprat's History (n. 6 above).
9. Sprat, History, p. 327 line 26.
10. Ibid., p. 124 lines 4-9.
11. Machiavelli, in Chapter XXV of The Prince, writes: "To be brief, I say that since Fortune changes and men stand fixed in their old ways, they are prosperous so long as there is congruity between them, and unprosperous when there is not. Of this, however, I am well persuaded, that it is better to be impetuous than cautious. For Fortune is a woman who to be kept under must be beaten and roughly handled; and we see that

Notes to Chapter Five [Baconianism] (continued)

she suffers herself to be more readily mastered by those who so treat her than by those who are more timid in their approaches. And always, like a woman, she favours the young, because they are less scrupulous, and fiercer, and command her with greater audacity." This translation, by N. H. Thomson, found in M. B. Foster, Masters of Political Thought: Plato to Machiavelli (Boston: Houghton Mifflin, 1941), p. 283.

12. Sprat, History, p. 223.
13. Ibid., p. 317.
14. Preparative Towards A Natural and Experimental History (Par. V.), in Works, p. 405.
15. "Proteus, or Matter", in The Wisdom of the Ancients, found in Works and in most other Bacon collections.
16. Valerius Terminus, in Works, p. 188.
17. Valerius Terminus, in Works, p. 188; Advancement of Learning, Works, p. 61.
18. Novum Organum, Pt. I, xiv-xv.
19. Novum Organum, Pt. I, lxvi.
20. Preface to the Great Instauration, Works, p. 247.
21. F. R. Tennant, The Sources of the Doctrines of the Fall and Original Sin (New York: Schocken, 1968), pp. 12-14; Julius Wellhausen, Prolegomena to the History of Ancient Israel (Gloucester, Massachusetts: Peter Smith, 1973), section on the interpretation of Genesis; Eugene Combs and Ken Post, in The Foundations of Political Order in Genesis and the Chāndogya Upanishad (Lewiston, New York: Edwin Mellen, 1987), offer an interpretation of "knowing good and evil" which may be compatible with this; see pp. 160-163.
22. Jacques Ellul, "Technique and the Opening Chapters of Genesis", Essay 8 in Carl Mitcham and Jim Grote, eds., Theology and Technology (Lanham, Maryland: University Press of America, 1984), pp. 127-128, 132-133.

Notes to Chapter Five [Baconianism] (continued)

23. Advancement of Learning, Works, p. 62.
24. James A. Montgomery, A Critical and Exegetical Commentary on the Books of Kings (Edinburgh: T. & T. Clark, 1951), p. 130; H. Wheeler Robinson, Inspiration and Revelation in the Old Testament (Westport, Connecticut: Greenwood Press, 1979), p. 6.
25. Valerius Terminus, Works, p. 188.
26. Sprat, History, p. 438.
27. Ibid., p. 437.
28. See, for example, how Bacon claims that Scripture gives "honour" to the inventors of music and metal-working, Advancement of Learning, Works, p. 62.
29. Sprat, "Epistle Dedicatory" to the History of the Royal Society, on the four unnumbered pages before Cowley's 'Ode'.
30. Sprat, History, pp. 110-111.
31. This is Cassuto's interpretation; see his commentary on Genesis 11 in A Commentary on the Book of Genesis: Part II-- From Noah to Abraham, trans. Abrahams (Jerusalem: Magnes Press, 1964).
32. A leading contemporary German scholar on Genesis, Claus Westermann, has given a parallel, though sketchy, interpretation along these lines. See his Genesis 1-11: A Commentary, trans. Scullion (Minneapolis: Augsburg, 1984), pp. 554-555.

Notes to Conclusion (pp. 322-345)

1. Michael B. Foster, "Some Remarks on the Relations of Science and Religion", supplement to The Christian News-Letter #299 (26 Nov 1947), pp. 9-12.

## Bibliography

The entries in this Bibliography are arranged in six sections, as follows:

- I. Works expounding the mastery hypothesis, or some significant part of it.
- II. Works written in response to the mastery hypothesis, or to some significant part of it.
- III. Works pertaining to nature and mastery in the thought and practice of pagan antiquity.
- IV. Works pertaining to nature and mastery in the thought of the Old Testament.
- V. Works pertaining to the notion of mastery and its Biblical justification in the early modern period.
- VI. Works having some general relevance to the larger concerns of the dissertation: science, technology, modernity, progress, man in nature, etc.

Many entries could reasonably be repeated in other sections, but for the most part this has not been done. It will be obvious to the reader of the dissertation that works from sections I, II, and VI are likely to deal with the subjects found in sections III, IV, and V. A few entries found in sections I-V are repeated in section VI, because of their general character.

Section I: Works Expounding the Mastery Hypothesis

Note: As discussed in the Introduction, the hypothesis in its full form is rarely found in a single author. The arguments connecting Creation doctrine, contingency, experimental science, and mechanical pictures of nature are found in Baillie, Collingwood, Duhem, Foster, Gilkey, Hooykaas, Jaki, Klaaren, Mascall, and Oakley. Arguments based on the 'desacralization' of nature are found in some of the above authors and also in Berdyaev, Berger, Cox, Forbes, Grant, McHarg, Roszak, Schneidau, Toynbee, and White. Arguments based on Old Testament passages such as Genesis 1 and Psalm 8 are found in Cox, Foster, McHarg, Suzuki, and Toynbee. Arguments based on the notion of 'Christian' or 'Hebraic' historical dynamism are found in Berdyaev, Berger, Cox, Foster, Grant, Jaki, Roszak, Schneidau, and White. Arguments which focus on the historical importance of Protestantism are found in Berger, Foster, Grant, and Roszak, and are implied in Baillie, Cox, and other Protestant mastery writers insofar as Catholicism is understood by them to be linked with the 'pagan' Thomistic view of nature.

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## Section II: Responses to the Mastery Hypothesis

Notes: Anderson, Barr, Derr, Gowan, Passmore, Santmire, Schumaker, Sorrell, and Welbourn attempt to refute the position established by White, always naming him and often grouping him with one or more of Toynbee, MCHarg, and Roszak. Barr's criticism is aimed also at Cox, Berdyaev, and Foster. Gruner attempts to refute Foster and his followers. Ellul reacts vigorously against Continental versions of the mastery hypothesis, in which European theologians praise modern technological society as an expression of Biblical freedom.

Derr and Gowan argue from a Christian perspective that Biblical teaching is innocent of ecological wrongdoing, while praising the Bible for producing the scientific mastery of nature and elevating the human soul beyond nature in importance. Santmire and Schumaker, also arguing as Christians, agree that the attack on the Bible is unfair, but see the need for a less anthropocentric and more ecological reading of the Bible. Santmire in particular admits that there is a domineering strand in the Bible and in Christian thought about nature, but draws attention to the counterbalancing 'ecological motif' which is also present in text and tradition. Sorrell tries to show that St. Francis's 'nature-worship' is hardly pagan but rather is rooted in the Bible and Mediaeval liturgical texts. Ellul, a radically 'Hebraic' Christian, pits the teaching of the Bible against the juggernaut of technological civilization, and denies any fundamental connection between Old Testament thinking and the modern

world. Welbourn and Gruner reveal nothing of their religious inclinations and concentrate their energies solely on showing the logical and historical inadequacies of the mastery hypothesis. Passmore also is silent about religious loyalties, though the conclusion of his study-- that the Biblical understanding of nature has some ecological wisdom to offer to modern man-- will be welcomed by Christian apologists.

Santmire's work is to be recommended as the only thorough historical survey of Christian attitudes toward nature. Ellul's is to be recommended as a model of engaged and practically relevant Biblical exegesis. Anderson and Barr, two of the world's greatest Old Testament scholars, offer the textual insight which comes from a lifetime of Biblical studies. Gruner and Welbourn are clear-headed and well-informed historians of ideas. Passmore, a philosopher, uses the historical discussion as a springboard, proceeding to develop a coherent 'ethical' framework for dealing with contemporary environmental problems.

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