

LIFE RESPONSIBILITY VERSUS MECHANICAL REDUCTIONISM: WESTERN WORLD-VIEWS OF NATURE FROM PANTHEISM TO POSITIVISM

Richard Allen

Formerly of the University of the West Indies, St Augustine, Trinidad

Giorgio Baruchello

Faculty of Law and Social Sciences, University of Akureyri, Iceland

Keywords: Animist world-view, Biblical world-view, biology, cosmologies, cosmology, function, Greek science, Greek world-views, hierarchy, mechanism, metaphysics, nature, organism, organisms, philosophy, polytheism, positivism, progress, reductionism, responsibility, secularism, natural science, teleology, universe, world, world-and-life-views, world-views

Contents

1. The modern Western idea of 'the natural world'
 2. Other cosmological patterns
 3. The Biblical view of the world
 4. Ancient Greek science and philosophy
 - 4.1. Organism and 'Mechanism'
 - 4.2. Beings and Being
 - 4.3. Cyclical Cosmology
 - 4.4 Attitudes towards the Universe
 5. The mediaeval world-view
 6. The impact of the 'mechanistic' universe of Newtonian science
 - 6.1. Reductionism
 - 6.2. Direct Implications of Reductionism.
 - 6.2.1. The Missing Third Realm
 - 6.2.2. Quantification
 - 6.2.3. Teleology and Functions
 - 6.3. Indirect Implications
 - 6.4. Reactions against the New View of Nature and its Alleged Implications
 - 6.5. Positivism
 7. The distinctiveness of life and some recent developments
 - 7.1 Some Distinctive Features of Life
 - 7.2. Prospects for more adequate Pictures of the World
 - 7.3. Human Responsibility Today
- Glossary
Bibliography
Biographical Sketches

Summary

All modern Western world-views incorporate the idea of the natural world, distinct from both the artificial world of human creation and the trans-natural creative activity of God.

That view of the natural world comprises the presuppositions of modern natural science, distinct from ‘magical’, polytheistic and world-denying cosmologies. It is the idea of a contingent yet rationally ordered universe, which the human mind can understand by way of observation and experiment, and which is good for the human mind to know and understand. Its origins are twofold, both of which are breaks with the old inclusive and polytheistic cosmologies: the Biblical idea of creation, and Greek natural philosophy and science. They were brought together in the new Christian civilization of Europe. The scientific revolution of the 16th and 17th centuries replaced the specifically Greek elements in the mediaeval picture of the world with a mechanistic picture of the world, largely adequate for physics and later chemistry, but lacking provision for living beings and biology. It gave rise to ‘reductionism’, the belief that the methods of physics and chemistry should be applied to all knowledge or that higher levels of existence are ‘nothing but’ lower ones. The world in this perspective was held to lack meaning and purpose, whilst its life-support systems were being either underplayed, silently presupposed, or obliterated from view. This modern mechanistic picture made it possible for novel forms of world- and life-negation to emerge. Its emphasis on the abstract, synchronic and immutable representation by means of physical-mathematical expressions led to ‘otherness’ from the represented living world, which is embodied, diachronic and mutable. Revealingly, the idea of mastery over the natural world, to be aided by new technologies, replaced that of stewardship, a mastery often unconstrained by any law. Reductionism also provoked reactions such as Romanticism, pantheism, and rejections of science and technology. Today significant changes in natural science itself offer prospects for more adequate pictures of the natural world, while the rise of ‘environmental ethics’ manifests a new sense of human responsibility and a lessening of the idea of unconstrained mastery over nature, as the environmental damages caused by humankind’s life-blindness can no longer be ignored.

1. The Modern Western Idea of ‘The Natural World’

Over recent decades questions concerning environmental degradation, pollution, extinction of species, global-warming and the like, have forced themselves into the news, because of the great and rapid increase in the world’s population, the demands thus made upon natural resources, and the power of modern technology. In great part this has been the result of their world-and-life-views. A world-and-life-view includes a picture of the world, its structure, fundamental constituents, origin and destiny, and a view of the place, origins, destiny, duties and meaning of human life within it. The idea of the ‘natural world’ is itself a product of world-views, as may be seen by a brief comparison with the other principal types of world-view. The defining features of the Western idea of the natural world is one of:

1. a real system of things and events, which exist in their own right and are neither an ‘illusion’ (with ourselves included) nor a projection or creation of our own minds;
2. a coherent system of things and events in space and time, such that it exhibits laws and patterns, the same laws and patterns apply throughout it, therefore it is a universe and one that the human mind can aspire to understand;

3. a differentiated universe of distinct and increasingly complex orders of existence – primarily, merely physical things, plants, animals and persons – for which correspondingly more complex categories, concepts and modes of understanding are required;

4. a contingent system of things and events that the human mind can grasp and understand but only by discovery by both observation and experiment, on the one hand, and, on the other, the creation and imaginative application of hypotheses, models and mathematics, and not by any simply deductive thinking as if it and its constituents existed necessarily and could not be otherwise;

5. a genuinely temporal system of irreversible changes and not of one continuing state nor of an endlessly repeating cycle;

6. that system is itself independent of management or action on it from outside by God or supernatural forces and by ‘artificial’ human action.

Almost every part of this has been disputed by rival outlooks within the modern Western world, yet those disputed parts continue in them precisely because they are opposed or radically re-interpreted and are not simply ignored or forgotten.

The principal difference between this Western world-view and the mythologizing ones of earlier civilizations is that water, sky and earth are understood in the former only as physical substances while the latter use the language of ‘generation’, of processes of vegetative and animal reproduction, to narrate these events by which the present order of the cosmos came into existence. To refer to this as ‘animation’ and ‘personification’, as if it were a literary device, would be misleading, since it would presuppose that a clear differentiation, in modern Western terms, had already been made among merely physical beings, plants, animals and persons. On the contrary, the language of these cosmologies should be interpreted as embodying only inchoate, vague and fluctuating distinctions among different orders of existence. These have only a limited coherence in the cosmos because of the very plurality of gods, their struggles with each other and with other forces, and their dependence upon the one cosmos that they inhabit.

2. Other Cosmological Patterns

One development from polytheism, and often continuing with it when the individual gods are regarded as manifestations of one divinity, has been to view the cosmos as an organic unity, a single organism, with one or more streams of life or other forces flowing through it, and so to regard all things as divine to some degree. The proper conduct of human life is therefore to immerse oneself in this flow of life, which can only be lived and felt. Therefore there is little scope for a natural science that would look for definite and law-like connections among events, specific examples and patterns of ascertainable causes and events. Indeed, the same also applies to human events, so that what matters in politics and social life is a symbolic manifestation of cosmic forces and patterns, to attune society to them, rather than the formulation and execution of policies to achieve specific outcomes.

An almost constant feature of both pantheist and polytheist cosmologies is that time is conceived as the recurrence of cosmic cycles of different ages, generalized from the familiar and all-important cycles of day and night, the seasons of the year, and birth and death. Therefore speculation upon these cosmic cycles, rather than scientific investigation of specific causes and effects, is the way to understand what is happening in the world, human and non-human, by locating the present period in the appropriate stage of the cosmic cycle. Moreover, the prospect of endless recurrence can give rise to a sense of purposeless and pointlessness in life, and thus for a desire to be released from it, as happened in India where the doctrine of individual reincarnation became universal.

These world-views have broken with the all-inclusive cosmos of polytheism and pantheism, and place the supreme and unchanging reality beyond it. But they regard the world and all within it as something from which to escape, because its eternal recurrence is meaningless, or it is ultimately 'illusion' and unreal, or it is only too real and evil. For example, the Advaita Vedanta ('Non-dualist') school in Hinduism, held that only Brahman, 'Ultimate Reality', is real and all finite things, ourselves included, are 'illusion' (*mithya* or *maya*). And the Gnostic movements that arose in the Middle East at the same time as Christianity held that human beings are sparks of the one Light, fallen or seduced into, and now trapped within, the physical and therefore evil universe, from which their aim should be to find their way back to the Light. In none of these world-and-life-views is there any real or lasting interest in the world, for the aim is to free oneself from it.

3. The Biblical View of the World

Paradoxically, the decisive break with the all-inclusive cosmos of the polytheistic systems occurred among a people, the ancient Hebrews, who showed no evidence of an interest in natural science and mathematics.

Traces of the old cosmologies do remain in the Jewish scriptures, and it was not until much later that it was first explicitly stated that God created the world from nothing and not from any pre-existing chaos (2 Maccabees 7:28; c. 180 BC). Likewise, the existence of other gods was not formally denied until Second Isaiah declared that Yahweh was the only God and the God of all mankind (44:6, 8; 45:5-6, 14, 21, 22; c. 539 BC). In the meantime the attitude of the Hebrew prophets, such as Elijah (1 Kings 18:25-9), was a 'practical monotheism': the other gods were declared to be powerless and hence to be ignored.

Although the world is still pictured as consisting of the three planes of sky and water above the earth, the earth, and the waters under the earth, into which the original water of Middle-Eastern cosmologies, divided itself, this division was the work of God who is implicitly outside and above it the watery chaos from which he creates the world purely by his word: "Let there be light", and there was light', etc. (Gen. 1:1 - 2:4, composed c. 950 BC, but clearly using much older materials). Furthermore, when creation is complete, 'God saw everything that he had made, and, behold, it was very good' (Gen. 1. 31; cf. Ps): there is nothing in the world opposed to, let alone threatening, God. The second story (Gen. 2:4-24, c. 900-750 BC) simply begins, 'In the day that the Lord God made the earth and the heavens [or waters] . . . ', and continues with the creation of man.

In neither version are there any kaleidoscopic transformations from primeval elements to individual deities nor any use of physical, vegetative or sexual processes that are to be found in the old, polytheistic cosmologies. The all-inclusive cosmos has been clearly broken and differentiated into the one God, who reveals himself to Moses as 'I am that I am' (Exodus 3:14), and who is distinct from and sovereign over the world which he creates, and the created world in space and time. Without capricious deities within it, and instead subject to the one God who has created it and whose nature is 'steadfast love' (Psalms 5:7, 13:5, etc.), the world has, implicitly, a rational and constant order, a body of laws that can be discovered by careful enquiry.

As for mankind and his place in the world, God creates them in his own image (Gen. 1:26): that is, as well as being an animated body like the animals (Gen. 2:7), each human being has a moral and spiritual nature. Man is given dominion over the rest of the earth, and all that is on it, and told to multiply and subdue the earth (Gen. 1:26, 28, 2:15, 19-20; Ps. 8:5-8). Indeed, the earth has been prepared for him or is then made for him (Gen. 2:8ff). Men, therefore, are not masters of the earth in their own right but as the servants of God. Mankind is placed between God and the earth, responsible *to* God and *for* the earth. Disobedience of God, symbolized by eating of the fruit of the tree of the knowledge of good and evil, and thus reaching for equality with God (Gen. 3:1-7), brings the punishment of ejection from the garden of Eden, that is, from fellowship with God, and to a life of toil and not just work (Gen. 3:19). Later, the prophets warn of the 'Day of the Lord', not a day or reckoning solely for Israel's enemies but also for Israel, when God will judge his people who are accountable for him for their treatment of each of other. Yet by implication or extension their treatment of the world around them could be included in their responsibilities.

The Hebrew Scriptures are therefore concerned with the whole sweep of history as the dealing of God with his people, from creation through the distant past to chronicles of the recent past, and to prophetic warnings and hopes about the future. Thus history, and the whole world in which it occurs, have a direction and a purpose, viz. the self-revealing, saving and redeeming acts of God, most importantly the call to Abraham, the revelation to Moses, and the rescue of the Israelites at the Red (or Reed) Sea. It is a conception that remains part of the Western consciousness today, though often filling the general scheme with very different contents.

This view of the world, as created by God and thus good and having a rational order, and of the place of humanity within it, is taken for granted and not explicitly restated in the New Testament of Christianity. Additionally, in the New Testament, the place of God in the universe is characterized as more explicitly transcendent than in the ancient Jewish scriptures; the consummation of God's purposes in relation to the world and the destiny of humankind are decisively placed beyond this world and this life. Several of the parables, such as that of the vineyard (Mark 12:1-11), relate God to his people in rather clear terms of a landlord who has rented his property to tenants or who has given it to the care of a steward, and then calls the tenants or steward to account for what they have done. Thus they repeat and intensify the imagery of Genesis: humanity has rule over the earth and the things on it, but is subject and responsible to God who, in turn, is superior to all both humanity and the earth. This has been expressed in the idea of 'stewardship': cultivation and care for a world which we do not own outright and cannot treat just as we please.

Whereas in the Old Testament God's love and purpose are focused upon Israel, his particular people in history, in the New Testament Christ died and was raised for all mankind, to whom the apostles preached the good news of the redemption of humanity and the world and the life to come with God.

4. Ancient Greek Science and Philosophy

In contrast with the people of Israel, the ancient Greeks, inheriting a polytheistic cosmology and cosmogony, did engage widely in increasingly non-mythological speculations about the universe and in empirical studies of particular features of it, and also created an impressive system of geometry. The Greeks also established continuing centers of learning, such as the schools of philosophy, including other studies, in Athens and the great library and 'museum' at Alexandria in Egypt. It will have to suffice here to mention some principal features of Greek thought concerning the universe and to note how far they departed from the old cosmologies.

Greek science and philosophy, not distinguished at the time, began with the Ionian natural philosophers of the 6th BC: Thales, Anaximander and Anaximenes. They speculated about *phusis* or *physis* ('nature'), a term deriving from an old Indo-European word meaning 'growth', and used to refer to the world around us. The use of one word, *phusis*, already suggests an incipient idea of a universe, and not of two or three distinct regions (Sky and Earth, or Sky, Earth and the waters under the Earth). What they produced was later termed a *logos*, an 'account', more particularly a rational account, one that is reasoned. They could aspire to give a *logos* of *phusis* because the universe is a *kosmos*, an 'order'.

Greek thinkers were principally concerned with two connected problems: how to account for the interplay of permanence and change, how one thing can change into another; and how many different things can yet be one sort of thing. Hence early answers in terms of a single 'world-stuff' or element – water, air, fire – and then a combination of all three plus earth, which accounted for them being ultimately one sort of thing, and for each being the same thing through its manifest changes.

Of Thales we know little. He is reported as saying that the principle (*arché*) of all things is water, although in fact he may have meant the original water of Mesopotamian and Egyptian cosmogonic mythology, out of which everything else emerged (*arché* can mean both 'principle' and 'origin' or 'beginning'). Whatever may have been Thales' intentions, his successors did seek more and more to understand the world by looking for progressively more abstract and comprehensive principles in it to explain how the world operates and not by a myth about its origins. Beginning with Anaximander, who held the *arché* must be 'the infinite', *to apeiron*, for any finite substance would be long exhausted, and it must be without sensible qualities if it is to be the unchanging ground of all changes, they adduced reasons for their own hypotheses and for rejecting former ones, and thus founded a tradition of intellectual speculation, criticism and revision.

The results of this new way of thinking were remarkable, as can be seen in the history of Greek astronomy. They not only continued the astronomy of the Babylonians, the observation and charting of the paths of the sun, moon and stars, but went beyond what

could be observed. Anaximander broke with the three-leveled cosmos of the myth, which had provoked the question of what supported the earth, to imagine it as a ball floating in space with sun, moon and stars circling around it on spokes radiating from it. And in the 3rd C. BC, Aristarchus of Samos calculated the sizes of the moon and sun and their distances from the earth (but not with modern accuracy), and Eratosthenes of Cyrene calculated the circumference of the earth with surprising accuracy. Aristarchus also suggested that the sun was at the center of the universe, but the older, geocentric, view prevailed. These results were possible also because of the Greek development of geometry as a systematic science and as a paradigm for certitude, stringent demonstration and theoretical activity.

4.1. Organism and ‘Mechanism’

One possible outcome of these developments was what would be called, centuries later, a ‘mechanistic’ picture of the universe, one in which all events are, or result from, the transmission of motion or forces from one physical body to another. Such a possibility was realized already in the Atomism of Leucippus (5th C. BC) and Democritus (c. 460 - c. 370 BC), according to which the universe consists of atoms moving in an infinite and otherwise empty space. Atoms, ‘indivisibles’, are eternal, invisible, absolutely small and incompressible, devoid of qualities, differing only in size and shape. All the things that we experience, their qualities and changes (the ‘macroscopic’ world) consist of different and changing amounts, arrangements and positions of these atoms. Atoms and motion are uncaused. In the beginning a whirling movement brought atoms together to form larger bodies and worlds, but this happened by ‘necessity’ and not by design nor for any purpose. In contrast, Anaxagoras (5th C. BC) introduced *nous*, ‘mind’, the ‘finest and purest of all things’, and probably possibly taken to be a special kind of matter. In the beginning, *nous* intentionally put the randomly moving atoms into the whirling motion precisely in order to bring about the present state of the world. Plato (427-347 BC) recorded Socrates (469-399 BC) as being delighted when he first heard Anaxagoras’ doctrine and its implication that things, *all* things, are as they are because it is good that they should be so, but as then becoming disappointed when he learned that Anaxagoras gave only ‘mechanical’ explanations of specific events, including human actions.

Dissatisfied with the limitations of Anaxagoras’ understanding of reality, Socrates gave up the study of nature and turned to that of the human being alone. But the requirement for explanation in terms of ‘final causes’, ends aimed at, was generalized and systematized only in the metaphysics of Aristotle (384-322 BC), which made explicit what had been more implicitly present in much Greek thinking about nature: that it is an organism, a whole of parts which mutually function to serve the whole. Hence the earlier conceptions of a common material substrate have been termed ‘hylozoism’, a doctrine of ‘living matter’, that everything is alive to some degree, although just how this was understood is not clear. Aristotle (384-322 BC), who created systematic biology, required four ‘causes’ or ‘reasons’ (*aitia*) for a proper and complete explanation of anything: the ‘efficient’ cause which brings it into being (approximately the modern sense of ‘cause’); the ‘material’ cause, that of which it is composed; the ‘formal’ cause which makes it a specimen of its sort, *what* it is; and a ‘final cause’, the goal immanent in the process. Before Aristotle, Plato had given an account of the universe as an organism with a soul, *psuché* (or *psyche*). Because it is the universe, there is nothing physical apart from it: it is

an organism without an environment, and so it has no sense organs, no digestion and no limbs. Yet because it is alive it moves, and moves with a uniform circular motion on its axis – it is a perfect sphere. He also argued that ‘soul’ is the only cause of motion. Hence in both Plato’s and Aristotle’s cosmologies, the heavenly bodies are moved by intelligences within them. The implications of the presence of such intelligence were very different for them. Aristotle was not eager to suggest that any other type of being exists outside this ordered universe, although some elements in this direction can be retrieved in his work (see next section). Plato, on the contrary, addressed repeatedly and most explicitly the possibility of the existence of a transcendent realm, which is the philosopher’s goal to become worthy of. Indeed, to this end, Plato even recovered the use of myth for philosophy when no claim could be made to definite knowledge

4.2. Beings and Being

The mythological cosmologies, although they narrated how the present world-order came into existence, also pictured that order as both limited and fragile because of the multiplicity of the gods, who emerge with and within it as much as they help to make it. Hence they also depend upon it, and are often in conflict with each other or with destructive forces not subject to them. Though polytheist cults continued among the general populace and formed the official cults of the Greek city-states and then the Hellenistic empires, Greek thinkers – poets, sages, the early natural philosophers, later and more systematic philosophers – were searching for a greater degree of order in the world, which would make the world intelligible. But only Plato made any clear distinction between the one, necessary and unchanging ground or principle of the world, and the many, contingent and changing beings in it. Even then he divided it between, on the one hand, the Forms or eternal paradigms, themselves organized into a system by the supreme Form of the Good, and, on the other, the Demiurge who creates the world as a spatial and temporal copy of them. The Neo-Platonists of the Hellenistic period, although they united, in a way, the Demiurge and the Forms, made the status of the world ambiguous because it comes into being by the seemingly necessary process of ‘emanation’ whereby everything produces an inferior version of itself. This same process both holds among and unites the three eternal ‘hypostases’ of the One, Nous (both Mind and the Forms which it contemplates) and Soul. Each of these three, respectively, emanates the next, and then Soul emanates the world, which would then appear necessarily to exist. Otherwise Greek philosophers tended to make the world itself an all-inclusive and necessary whole (e.g. Xenophon, the Stoics of the Hellenistic period, and Parmenides on one interpretation), or thus to regard its fundamental constituents (e.g. Leucippus and Democritus and their atoms-plus-void). On another interpretation of Parmenides, only Being – one, eternal, unchanging, homogenous – exists, and everything else is ‘not being’ which cannot be thought. Aristotle, though he distinguished God, as the First and Final cause of the world (but not in any temporal sense), nevertheless isolated him from it as engaged only in thinking about thinking, while the world is moved by its desire for him and not by his activity. If the universe is supposed to exist necessarily, such that it could not exist and could not be other than it is, then it is logical also to suppose that the human mind may be able to deduce its structure from some self-evident first principles, and so not to need to engage in observation and experiment. And that is what Aristotle did, in respect of cosmology, in a short passage in *On the Heavens* despite his careful empirical studies in biology and politics.

-
-
-

TO ACCESS ALL THE 26 PAGES OF THIS CHAPTER,
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

Bibliography

There are many histories of philosophy, theology, religion, mythology and science, plus entries in encyclopedias, relevant to each section of the above.

Books relevant to several sections:

Barbour, I. G. (ed.), (1973) *Western Man and Environmental Ethics: Attitudes toward nature and technology*, Reading [Mass.], London, Addison-Wesley. [It includes articles that debate and compare the roles of different world-views.]

Black, J., (1970) *The Dominion of Man: The search for ecological responsibility*, Edinburgh, Edinburgh University Press. [In particular it develops the theme of 'stewardship'.]

Marshall, P., (1992) *Nature's Web: An exploration of ecological thinking*, London, Simon and Schuster. [It contains historical background and recent thought.]

Books relevant to particular sections:

Section 3

Aristotle, Many editions and translations. Individual books are often referred to by their Latin titles. *Metaphysics* [This contains his accounts of the four causes (also in the *Physics*) and his theology.]

Black, J., *The Dominion of Man* [This gives more details of the Biblical view of the world and the role of humanity with it.]

Fackre, G., 'Ecology and theology', in Barbour, I. G. (ed.), *Western Man and Environmental Ethics*. [This also gives more details of the Biblical view of the world and the role of humanity with it.]

On Generation (De Generatione) [It contains his cyclical view of the universe, and the exact recurrence of all events, all due to 'necessity', with the conclusion that because in circles, and thus cycles, there is no beginning nor end, nothing is really before or after anything else.]

On the Heavens (De Caelo) [This contains his brief deduction of the structure of the cosmos, and also uses biological analogies and arguments, likewise in the *Meteorologica*.]

Plato, Many editions and translations. Standard references are by page and paragraph to the Stephanus edition.

Phaedo [97b-98c, on Socrates' reaction to Anaxagoras];

Laws [892b-896d, on soul as the cause of motion];

Timaeus [28a-34c, on the Demiurge's creation of the cosmos in the likeness of the Forms and as an organism].

Section 4

Grant, E., (1996) *The Foundations of Modern Science in the Middle Ages*, Cambridge, Cambridge University Press [A study of the role of medieval universities and natural philosophy as necessary preconditions for the scientific revolution.]

Lewis, C. S., (1964) *The Discarded Image*, Cambridge, Cambridge University Press [A detailed description of the medieval picture of the universe.]

Section 5

Burt, E.A., (1964) *The Metaphysical Foundations of Modern Science*, London, Routledge, 2nd ed. [It focuses upon the reductionist tendencies in the scientific revolution].

Dawkins, R., (1976,1989) *The Selfish Gene*, Oxford, Oxford University Press., [A recent example of a reductionist view of human existence, this time as simply a function of one's genes.]

Descartes, R., *Discourse de la Methode* (1637), many translations and editions. [It contains Descartes' remark that animals can be regarded as mere automata, like so many machines.] *Meditationes de Prima Philosophia* (1641), many translations and editions. [In it Descartes doubts everything and discovers that he cannot doubt his own existence, 'cogito, sum'. He then divides reality into the mental and the physical.]

Galileo, G., *The Assayer* (1623) [Probably Galileo's most famous polemical book, in which he spells out the fundamental tenets of his new science].

Grundlegung zur Metaphysik der Sitten (1785); trans. H.J. Paton, *The Moral Law*, London, Hutchinson, 1948. [Kant's theory of the Categorical Imperative.]

Hobbes, T., *Leviathan*, (1651), ed. M. Oakeshott, Oxford, Basil Blackwell, 1960. [Hobbes' best known book. It contains his account of human existence, and then sets out a political theory based upon it.]

Kant, I., *Beantwortung der Frage: Was ist Aufklärung?*, (1784); 'What is Enlightenment?', in trans. L. W. Beck, R. E. Anchor and E. L. Fackenheim, *On History: Immanuel Kant*, Indianapolis, Bobbs-Merrill, 1963. [It expresses the Enlightenment's rejection of human and divine authority, tradition, etc., in favor of its own idea of reason.]

Kritik der Praktischen Vernunft (1781); *Critique of Practical Reason, and other writings in moral philosophy*, trans. L. W. Beck, New York, Garland Pub., 1976. [It contains Kant's Categorical Imperative and also his argument that we do not know that as 'noumena' we are not free.]

Kritik der Urteilskraft (1790); trans. J.C. Meredith, *Critique of Judgment*, Oxford, Clarendon Press. [It includes his account of functions, etc., as 'regulative principles'.]

Lametrie, *L'Homme Machine* (1748). [An example of the reduction of human existence to that of matter in motion.]

Laplace, P.S., *Traité de Probabilité*, trans. *A Philosophical Essay on Probabilities*, London, Dover, 1951. [A thorough-going account of the universe as a determinist system of matter in motion.]

Sartre, J-P., (1943) *L'Être et l'Néant*, Paris, Galimard; trans. H.E. Barnes, *Being and Nothingness*, London, Methuen, 1958. [An extended account of human being as a totally free subject, *pour soi*, in a meaningless world of mere things, *en soi*.]

Skinner, B.F., (1972) *Beyond Freedom and Dignity*, New York, Bantam Books. [An example of a human science, behaviorist psychology, as a technology for shaping human beings and society.]

Section 6.

Elliot, R. (ed.), (1995) *Environmental Ethics*, Oxford, Oxford University Press [Several of the items included refer to the wider backgrounds of environmental ethics in general and of particular positions within the field.]

Harris, E.E., *The Foundations of Metaphysics in Science*, London, Allen and Unwin, 1965; Lanham, MD, University press of America, 1983; Atlantic Highlands, NJ, Humanities Press, 1993. [It presents a

comprehensive world-picture, incorporating the findings of modern science, using holistic categories to integrate the different levels of existence – physical, biotic and noetic.]

Harris, E.E., (2000) *The Restitution of Metaphysics*, New York, Humanity Books [Parts 2-4 are similar to the previous work, and notable for a general teleological orientation, each lower level requiring completion by the next higher.]

Hartmann, N., (1953) *New Ways of Ontology*, trans. Kuhn, Chicago, Henry Regnery [A detailed account of a hierarchy of levels in the universe.]

Hull, D.L., and Ruse, M. (eds), (1998) *The Philosophy of Biology*, Oxford, Oxford University Press. [A useful collection of papers on contemporary accounts, both reductionist and non-reductionist, of central concepts in biology.]

Jonas, H., (2001) *The Phenomenon of Life: Toward a Philosophical Biology* (1966), Evanston, Ill.: Northwestern University Press. [Motivated by ecological concerns, it attempts to overcome the *de facto* life-blindness of the science that is *de iure* devoted to the study of life i.e. biology. He criticizes its exclusive reliance on analysis i.e. reduction to simpler components and scrutinizes the consequences for biology arising from the assumption of the responsibility imperative: “Act so that the effects of your action are compatible with the permanence of genuine human life”.]

Jonas, H., (1984) *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*, Chicago and London, Chicago UP. [Centered upon the notion of human ‘responsibility’, it extends it to the relationship between the human being and the natural world and, whilst avoiding Utopianism, it argues for a proper balance of present and future.]

Jonas, H., (1996) *Mortality and Morality, A Search for the Good after Auschwitz*, Evanston, Ill.: Northwestern University Press. [Moving from the ethical breakdown experienced by the Western civilization with the institution of extermination camps, it elaborates Jonas’ argument for human responsibility, including that for the natural world.]

MacIntyre, A.C., (1981) *After Virtue: A study in moral theory*, London, Duckworth [A ‘post-post-modern’ revival of an Aristotelian approach, which has inspired debate and further studies.]

Mayr, E., (2004) *What Makes Biology Unique?*, Cambridge, Cambridge University Press. [A defense by a biologist of the distinctiveness and autonomy of biology, that clarifies the concepts used, but which reapplies teleological concepts, such as ‘program’ and ‘information’, in giving what is supposed to be a purely physical location and explanation, in DNA, for goal-directed processes.]

Polanyi, M., (1958) *Personal Knowledge*, London, Routledge, and Chicago, University of Chicago Press. [It contains detailed arguments against reductionism in most of its forms, with examples from all the natural sciences, and an alternative account of the distinctive features of living beings.]

Polanyi, M., (1983) *The Tacit Dimension*, London, Routledge; New York, Doubleday; 1966; reprinted Gloucester, Mass., Peter Smith, 1983;

Polanyi, M., (1969) *Knowing and Being*, London, Routledge; Chicago, University of Chicago Press; 1969. [These, and Polanyi’s other publications after 1958, develop the themes of *Personal Knowledge*, and present a hierarchical universe wherein each lower level leaves open its boundary conditions to be determined by the autonomous operational principles of the next higher level.]

Typographical Note:

In the transliteration of Greek words, ‘έ’ and ‘ό’ have been used, respectively for long ‘e’ (*éta*) and long ‘o’ (*ómega*), because the Extended ANSI Set does not include ‘e’ and ‘o’ with bar accents as are customarily used and which should replace them.

Biographical Sketches

Richard Allen taught philosophy of education at colleges of education in England and Nigeria, at The University of The West Indies, St Augustine, Trinidad. Having studied philosophy at the University of Nottingham, he also obtained an external BD and Ph.D from the University of London. He now edits the

philosophical journal, *Appraisal*.

Giorgio Baruchello is Associate Professor at the Faculty of Law and Social Sciences of the University of Akureyri. He holds a doctorate in philosophy from the University of Guelph (2002) and an Italian *laurea* degree in philosophy from the University of Genoa (1998). His research interests focus on the understanding of cruelty in the history of the Western civilization. He has published in several international journals, including *Symposium*, *Appraisal* and *Philosophy and Social Criticism*. He currently edits the Icelandic electronic journal in Nordic and Mediterranean studies *Nordicum-Mediterraneum* <<http://www.nome.unak.is>>.

UNESCO – EOLSS
SAMPLE CHAPTERS