EDITORIAL COMMENTS

George Howe, Director of the Grand Canyon Experiment Station, has organized a minisymposium on orogeny. The contributed articles will appear in this and later issues of the Quarterly. An outstanding feature of this minisymposium is the question and answer sessions at the end of the articles (with the exception of Howe's introduction).

Ellen Myers discusses some of the scientific views of Aristotle. Of interest are his reasoning from within nature, his pantheistic views and his belief in the eternality of the material universe. Clifford Lillo briefly traces scientific philosophical thought from the Enlightenment to the present "scientific" views of nonreason.

There is an abundance of letters to the editor and book reviews in this issue. Gary Johnson presents a tentative model for the firmament. I am sure he would welcome your comments on his thoughts. Several exchanges concerning recent *CRSQ* articles are featured. A detailed book review answering many anticreationist charges is included. Several of the technical notes offer unique concepts for future research.

Emmet L. Williams, Editor.

INSTRUCTIONS TO AUTHORS

1. Manuscripts shall be typed and double spaced.
2. An original plus two copies shall be submitted to the editor of the Quarterly.
3. All submitted articles will be reviewed by at least two technical referees. The editor may or may not follow the advice of these advisors. Also, the prospective author may defend his position against referee opinion.
4. The editor reserves the right to improve the style of the submitted articles. If the revisions of the editor and referees are extensive, the changes will be sent to the author. If the changes are not suitable to the prospective author, he may withdraw his request for publication.
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6. All references (bibliography) must be presented in the style shown in the Quarterly. If a prospective author is not familiar with the CRS format, the editor will furnish an example reference page.
7. All figures and drawings must be prepared professionally. No sloppy hand drawings or freehand lettering will be accepted. The editor reserves the right to approve submitted figures. Unacceptable illustrations will result in rejection of the manuscript for publication.
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EDUCATIONAL COLUMN

ARISTOTLE AND CREATIONISM: A COMPARISON

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Abstract

Many features of modern science reflect some of Aristotle's scientific views, i.e., reasoning from within nature, the eternality of the material universe, the oscillating universe concept and pantheism. The attempted synthesis of the Biblical world view and Aristotelianism is reviewed.

Introduction

Most American college graduates today are acquainted with the great Greek philosopher Aristotle only vaguely, and usually totally ignorant of his many writings in all areas of human thought. Professional philosophers do better, but prefer Aristotle's ethics and perhaps aesthetics to his philosophy of science, which they believe to be outdated. This is true also for Catholic admirers of the synthesis between Aristotle's philosophy and Christianity attempted by Thomas Aquinas in the thirteenth century, for only 100 years later the Aristotelian-Thomistic cosmology began to be abandoned. A scientific revolution was ushered in by thinkers reasoning from the Biblical Creation perspective, as we shall see. However, their conscious and immensely fruitful dependence upon the Creator of the Bible as their starting point was not imitated by their later successors, who fell back to reasoning from within nature, or implicitly themselves, as Aristotle had done.

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In 1859 Darwin's *Origin of Species* showed a way to make God unnecessary even for explaining the origin of the world, and was hence greeted with open arms. In 1899 Darwin's leading apostle on the European continent, Ernst Haeckel, declared in his enormously popular *Riddle of the Universe* that science had amply demonstrated the eternity of the material universe, that creation, providence and miracles were incompatible with the law of the persistence of matter and force, that ether was a real element, and that organic life arose from the water produced by the geological cooling of the earth (Clark, p. 52). Intoxicated with prevailing materialist-evolutionist bias, the scientific community generally overlooked the fact that actually none of these assertions were, or could be, confirmed by observation. Haeckel offered a welcome religious faith which combined Darwinism with pantheism, monism, and a racist mysticism leading directly to Nazism (Myers, pp. 20-22).

Aristotle and Haeckel

A comparison between Aristotle and Haeckel is instructive. Aristotle, like Haeckel, believed in the eternity of the material universe. He cannot be called a Darwinist evolutionist as he believed in the eternity and fixity of species determined by their eternal, inherent "forms' *(De Generatione et Corruptione,* II). Aristotle, like Haeckel, was a pantheist monist. His divine principle or "prime mover" was in effect one with the highest or outermost sphere of his cosmological hierarchy which consisted of concentric, solid and perfect heavenly spheres. They were guided by their respective intelligences and moved the moon, sun, planets and fixed stars along with them. They also ruled sublunary nature. Aristotle expressly denied creation *(De Caelo,* III) as did Haeckel, and he also denied that his "prime mover" exercised providence over the world *(Metaphysics).* The "prime mover" could know nothing outside itself, and it "moved" the world only in the sense of passively attracting or arousing love for itself in it. Aristotle, like Haeckel, believed in the existence of ether, possibly a fifth "element" of the cosmos. He taught *(Physics,* VIII) that matter and forms were co-extensive and co-eternal with God, a doctrine common to all pagan cosmologies (Jaki, viii and entire book). His philosophy of science is therefore fundamentally incompatible with the Biblical concept of Creation *ex nihilo* by a personal, transcendent, omnipotent God. The racism of Haeckel, deduced from Darwin's principle of evolution by survival of the fittest, was adumbrated in Aristotle's view that the Greeks should not be treated on equal terms with the implicitly inferior "barbarians" of other nations or mingle with them, as Alexander the Great determined in his cosmopolitan policy of conquest (Copleston, 1962a, p. 11).

Somewhat like Haeckel, and much like the vitalist evolutionist philosophers of the nineteenth century, such as Schelling, Hegel, Bergson, and Bergson's disciple Teilhard de Chardin, Aristotle believed in an immanent teleology in natural processes. He postulated the purposeful though unconscious striving of nature's "forms" or "souls" to actualize themselves in fundamental or primary matter (Ross, p. 186). This "animism" in Aristotle's philosophy of science is no archaic curiosity but a recurring phenomenon in the history of human thought. It is particularly prevalent in the neo-paganism now surfacing in the so-called "New Age" emergent evolutionism.

Oscillating Universe Concept

Aristotle's philosophy of science was certainly not reinstated when the Newtonian cosmology was superseded by Einsteinian relativity in the twentieth century. Going beyond Einstein, Aristotle's belief in cyclical processes in the history of man, sublunary nature and the cosmos *(De Generatione et Corruptione,* II; also see Jaki, pp. 112-113) is reiterated in the latest speculations about an allegedly everlasting expanding and contracting ("oscillating") universe. The Aristotelian belief in an everlasting and cyclical, monist world is in fact the perennial alternative to the Biblical Creation perspective, and it deliberately disregards today the first and second laws of thermodynamics.

Science and Metaphysics

Aristotle has been criticized for his extensive mingling of metaphysics with science strictly speaking. For example, he inferred the earth's spherical shape and its relatively small size in the cosmos from his metaphysical assumption that it was the heaviest of his alleged four "elements" and possessed an inherent "centripetal impulse." He also deduced this conclusion from moon eclipses, observation of the stars from various latitudes, and from mathematical calculations of the earth's circumference *(De Caelo,* II).

His failure to use scientific abstraction and with it laboratory investigation has also been ascribed to the lack of most elementary research equipment in his time. However, such explanations touch only the surface. For a monistic philosophy such as Aristotle's all nature is fundamentally one gigantic, organismic whole. To abstract individual parts from it is to falsify the description of their reality by this very method. The criticism of his commingling of metaphysics with physics misses this crucial point. It is true that Aristotle stressed the world's sensible, moving, "becoming" particulars (the subject of physics proper) rather than its conceptual, absolute, "being" universals or essences (the subject of metaphysics) in opposition to Plato (Copleston, 1962a, pp. 113-120). Yet in Aristotelian monism with its starting point of eternal matter and its inherent "forms," emphasis upon sensible particulars could only be relative.

Aristotle defined nature as a "principle of motion and change" which existed only in things, "for there is nothing over and above them" *(Physics,* III, 1). He defined motion as realizing potentiality:

> *The fulfillment of what exists potentially, in so far as it exists potentially, is motion* — namely, of what is alterable *qua* alterable, alteration: of what can be increased [or] decreased, *increase* and *decrease:* of what can come to be and can pass away, *coming to be* and *passing away:* of what can be carried along, *locomotion (Physics,* III, 1).

As Ross (p. 68) points out, Aristotle "habitually identifies nature as power of movement with nature as form." Aristotle believed that animals (including man, the "rational animal") do not really initiate movement

(Physics, VIII). Their change, growth, decay and locomotion were prompted by their immanent forms or souls as they actualized their potentialities, doing so through species rather than "numerically" through individuals *(De Generatione et Corruptione,* II). This concept shows Aristotle's determinism, as does his belief in the eternally fixed rotations of his heavenly spheres. Aristotle attributed coming-to-be and decay on earth to the motion of the sun *(De Caelo,* II). He denied that a vacuum could exist, in part because he thought that the speed of locomotion varied with the density of the medium and the weight of the moved body. This meant that in a vacuum a body would take no time at all to move from one place to another, and this was not observed to happen. Because he denied the existence of a vacuum, he denied that anything was outside the heavenly spheres *(De Caelo,* III, and *Physics,* IV). Thus the transcendent, supernatural God of the Bible and His Creation *ex nihilo* would have found no room in his cosmology.

Aristotle believed that all things are inherently impelled to seek their proper place or full potential in nature as they strive for its actualization. This metaphysical concept of teleology and what he called "privation" explained for him why acorns grow into oak trees, stones fall downward, and fire rises upward. Besides his unqualified "primary matter" as the essence of all things he postulated qualitatively different kinds of matter according to weight *(De Generatione et Corruptione,* I). Clark plausibly argues that Aristotle uses circular reasoning in defining motion by potentiality, is wrong in so defining it, and really has no explanation for what motion is (pp. 22-27).

Post-Aristotelian science has classified only locomotion as "motion," and analyzed it without reference to Aristotle's notions of form, primary matter, potentiality and privation. It did not ask, as Aristotle did, what causes motion, which was taken as simply "given" along with time, space and place, but what makes motion accelerate, slow down or change direction. It became the scientist's task to formulate answers to these questions in a manner as free from unrelated incidentals as possible. Hence Galileo rolled his marbles on a carefully polished incline in order to eliminate friction as best he could. Hence developed the modern method of "controlled experiments" in the laboratory, so fundamentally opposed to Aristotle's holistic, organismic way of studying objects as much as possible in their natural environment. Hence came also the development of the whole rich cornucopia of ingenious modern research tools and, finally, the reliance upon an increasingly complex mathematics to describe what could be observed or merely theorized.

Empirical Observations

Despite his frequent reliance upon metaphysics, Aristotle was not an armchair philosopher. For example, the present explanation of scientific revolutions as the rise of new "paradigms" (Kuhn, 1962) was already succinctly stated by Aristotle: "It is . . . wrong to remove the foundations of a science unless you can replace them with others more convincing" *(De Caelo,* III). Over and over again he used the results of empirical observations to falsify the theories of other thinkers, exactly as we do today. Long before William of Ockham gave us his "razor" of the simplest scientific theory accounting for the appearances being the best, Aristotle already proposed that "it is *possible* to derive reality from a finite number of principles, and a simple explanation, where it is possible, is better than a more complex one" (Ross, p. 64). Aristotle used the philosophies of Empedocles and Anaxagoras to demonstrate this principle *(Physics,* I). While postulating his "prime mover" in and virtually as his highest heavenly sphere, Aristotle yet insisted *(Metaphysics)* that universal causes do not exist (Ross, p. 176). This belief is also implicit in modern Einsteinian relativity. Finally, modern philosophy of science is *de facto* as monistic as Aristotle's because it excludes a transcendent God and anything supernatural in principle.

Aristotle vs. Creationism

The importance of the doctrine of Biblical Creation as the crucial dividing point between Aristotelianism and Christianity cannot be overemphasized. Aristotle reasoned exclusively from within this world as a monistic whole. For him "God" could not be ontologically different from or above the cosmos. His world was not created but eternal. Man was only a "reasoning animal," not uniquely created by the personal God of the Bible in His own image and likeness and charged with dominion (stewardship) over His handiwork on earth (Genesis 1:26, 28). For Aristotle all bodies had forms or souls, but only the forms of species were eternal. The Bible teaches that only people have souls, which begin in time and continue to exist forever in God's new heaven and earth, or in hell. Like all pagans Aristotle thought that cyclical processes determine history. Christians introduced the concept of linear and therefore profoundly meaningful history, beginning with creation and ending with the consummation of God's purpose for all things (Revelation 4:11). It is therefore greatly surprising that the zenith of Aristotelianism occurred in Western society in the Christian Middle Ages.

Aquinas and Aristotle

Despite his great acumen, prodigious erudition and doubtless sincerity of faith, Thomas Aquinas (1225?-1274) underestimated the depth of the gulf between Aristotle and the Christian, Biblical creation-based world view. His defenders and chroniclers reason that he

> lived in a day when Western Europe seemed to be in danger of departing from the Christian faith . . . In the University of Paris, the chief centre for the study of Christian theology, Averroism, with its contradictions of some of the central Christian convictions, was gaining in popularity. The Aristotelian vogue and the use being made by the Averroists of him whom the scholars of the day called the Philosopher was a further threat. By employing Aristotle and by doing so in such fashion as to make him a bulwark of the Christian faith, . . . Aquinas . . . provided Christianity with a firm intellectual foundation (Latourette, p. 513).

However, the synthesis Aquinas attempted between Aristotelianism and Christianity actually consisted in an uneasy coexistence between "Grace, the higher" (things known only by divine revelation) and "Nature,

the lower" (things man can allegedly know by himself through reasoning from within nature as did Aristotle) (cf. Schaeffer, p. 55). Creation *ex nihilo,* Aquinas said, could only be known by revelation (Van Steenberghen, p. 9). As for the "firm intellectual foundation" Aquinas was said to have provided for Christianity, it was extensively based upon Aristotle, especially with regard to natural science. Aquinas adopted Aristotle's cyclical cosmic features in his own cosmology. With Aristotle he

> firmly reasserted the efficient causality of a rotating sky on everything in the sublunary world. He found no fault with the generic return of physical patterns, including plants and animal species. He also went along with Aristotle on the point that the cosmos would of itself go on forever through endless begettings of individuals (Jaki, p. 225).

In fact, Aquinas "departed from Aristotle only in cases where the Christian creed allowed under no circumstances for a compromise" (Jaki, p. 225).

Aquinas did disagree with Aristotle about a supernatural heaven and earth. He argued against Aristotle that the world does not last forever on the ground that this would make the number of God's elect infinitely large (cf. Van Steenberghen, pp. 1-27). He said equinoxes should not be coupled with the cyclic theory of the world because this would allow the calculating of the moment of the world's end, and this contradicted the Gospel (Jaki, pp. 225-226). In a thoughtful analysis Copleston (1962b, pp. 144-155) shows the tension latent between Aristotelian and Christian elements in Thomism from the start. He also points out the part Thomism had in leading to the autonomy of philosophy apart from theology. No wonder Thomas Aquinas "was regarded by some zealous traditionalists as selling the pass to the enemy" (Copleston, p. 152).

The Thomistic synthesis did not long endure. Within a century a revolutionary development began in science, which originated in the minds of Christian philosophers reasoning from the starting point of Biblical Creation. John Buridan (fourteenth century A.D.) affirmed faith in the Creator as opposed to Aristotle who denied that the heavens could decay; Buridan held that the Creator could annihilate the world. Thus:

> Belief in a Creator whose powers were not limited to the features of the actually observed world contributed . . . most effectively to the liberation of critical thinking from the shackles of Aristotelian science (Jaki, pp. 232-233).

Buridan rejected Aristotle's postulate that a mover must be in continuous contact with the body moved, and proposed instead that the mover imparted "impetus" to that which was moved (Clark, p. 32). Buridan also scorned Aristotle's idea of a body's "attraction" to its "natural" place.

Buridan's pupil Nicole Oresme developed his teacher's concept of "impetus" further in explicit dependence upon the Biblical Christian idea of the Creator. He understood and proclaimed that:

> In contrast to the pantheistic and perennial contact of the Prime Mover with the uppermost heavens, the Christian idea of the Creator implied His transcendence over the world in connection with His actual influence on any created being. Clearly, this transcendence of an active Creator could readily be safeguarded by formulating the idea of an imparting by God of a given quantity of motion (impetus) to the world once and for all. . . . Further refinements in the concept of impetus led to the correct definition of momentum together with inertial motion on which rests the whole edifice of physics.
>
> It was this crucial conceptual development which was impossible to achieve within' the framework of the pantheistic necessitarianism of Aristotle's physics and cosmology . . . Set against the Aristotelian background the notion of impetus meant a miracle which, however, could be performed, assuming the existence of a personal, rational, omnipotent and transcendent Creator (Jaki, pp. 239-240).

Here, as so rarely in human history, men reasoned faithfully and consistently from the starting point of Him Who "in the beginning created the heavens and the earth" (Genesis 1:1), rather than from within the world itself. This fact made the beginning of modern science possible in the Christian West, and at no other time and place in history. Assuming the world to be monistic and cyclical from all eternity, Aristotle could only "explain form and order in the world and the intelligible process of development [but] did not explain the existence of the world" (Copleston, 1962b, p. 27). Aristotle also could not explain motion, and such explanations as he offered from within his pagan monistic cosmology and metaphysics were sterile for further inquiry. It was not the fault of the earliest pioneers of modern science that those coming after them built upon their foundations, yet increasingly forgot the key concept, Biblical Creation, to which they owed both the foundations and their own progress.

Conclusions

To sum up, Aristotle's monistic, pantheistic and cyclical philosophy of science is totally incompatible with the Biblical cosmology built upon creation *ex nihilo* by a personal, transcendent, omnipotent and provident God. Aristotelianism reached its zenith in the West in its twelfth-century synthesis with Christianity attempted by Thomas Aquinas. In the fourteenth century it began to be overthrown by the scientific revolution initiated by Christian thinkers (Buridan and Oresme) who reasoned faithfully and consistently from the Creator of Scripture. The whole magnificent edifice of physics today owes its development to this foundation, unique in history.

Unfortunately God was relegated to the background and finally rejected altogether as the new mechanistic model reached its own high point in the nineteenth century. Darwinian evolutionism, championed on the European continent by Ernst Haeckel, was part of the modern unbridled trust in materialistic science to usher in unlimited progress and to arrive at truth about reality. Many parallels can be drawn between Aristotle and Haeckel, though Aristotle was not a Darwinist evolutionist.

The Aristotelian teaching of an immanent teleology, or purposiveness, in natural processes is akin to modern vitalist or emergent evolutionist philosophies such as Hegel's or Teilhard de Chardin's.

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MINISYMPOSIUM ON OROGENY—PART I

MOUNTAIN MODERATED LIFE: A FOSSIL INTERPRETATION

GEORGE F. HOWE*

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Abstract

This paper and the five which follow make up a CRS symposium on orogeny which is the study of the origin of mountains. Because of their influence on local climate, mountains have helped to govern the associations of plants and animals which have survived in any particular region, as widely evidenced from the fossil record. Which species lived where after the Flood and during postFlood times has to some major extent been controlled by the formation of the worlds mountain ranges. It is extremely important that Flood geologists wishing to explain biogeography past and present, give deep thought to such questions as how and when mountains arose.

In the second paper of the symposium a creationist meteorologist has written how mountains modify climate and presently dictate patterns of vegetational distribution. Next, three earth scientists and one geologically-trained theologian have prepared four very different creationist interpretations of how the Creator synthesized mountains.

Fossil Plants Differ From Plants Today

Extensive catalogues or "floras" of fossil plants have been produced at many localities throughout the American West and elsewhere. The results of these studies have been summarized in several volumes of which the following are representative: Andrews (1947), Andrews (1961), Arnold (1947), Darrah (1960), and Taggert and Cross (1980). From these the fact emerges that there are distinct differences between the species found in the fossil strata and the plants living at those same sites today. Near Clarkia, Idaho, for example, there are abundant fossils of subtropical plants where today only conifer forests flourish—Clutter (1985). In the Green River fossil flora of southwestern Wyoming there are fossil palm leaves in situations which now support only sagebrush, grassland, and dwarf conifer life forms—Andrews (1947, p. 203). The Kenai fossil flora of Alaska contains such subtropical species as the magnolia and fig—Darrah (1960, p. 231). Fossil floras labeled Eocene from Oregon and California appear to contain tropical plant species which are very much unlike the forms currently growing in those areas. In regions of the western United States that presently support grassland, chaparral shrub, or desert vegetation, there are numerous fossil beds containing temperate, subtropical and even tropical plants.

Climatic Change

Uniformitarians assume that this shift in plant life reflected a gradual modification of the climate covering millions of years of Cenozoic (Paleocene, Eocene, Oligocene, Miocene, and Pliocene) time. Instead, catastrophists suggest that perhaps soon after the Flood the earth was repopulated with plants—Howe (1968) (1979, pp. 42-3) (1981, p. 224), and Golike and Howe (1975). During the decades and even centuries that followed the Flood, fossilization evidently continued while striking climatic changes transpired. Plants which were designed for cooler and drier climates at first flourished only in marginal habitats. When the climatic shifts took place, these species which were "preadapted" or "predesigned" perhaps began to invade larger and larger land areas at the same time that the original tropical and subtropical plants diminished and even disappeared. Catastrophists hold that this rapid appearance of drought-tolerating plants was not a rapid evolution, as many macroevolutionists imagine, but that it was rather an ecological selection favoring preexisting forms that were able to cover larger land areas than previously.

Involvement of Volcanoes

Both the uniformitarians and the catastrophists agree that the climate has changed since ancient times—becoming cooler and drier. A sizeable part of this shift is attributed to the uplift of mountains. Volcanoes themselves have played a two-fold role in that they first yielded gas and ash-fall that were directly responsible for wholesale fossilization of plant life and for erasing existing vegetational cover. This in itself would allow for migration and colonization by plants that had previously been of less overall importance in the vegetational cover.

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