ARISTOTELIANISM AND THE LONGEVITY OF THE MEDIEVAL WORLD VIEW

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As the dominant intellectual system for the interpretation of the physical world, Aristotelianism endured for some 450 years, from the time of its reception in the Latin, West at the end of the twelfth century, to its general abandonment between 1600 and 1650. Why and how did it survive for so long? What was there about medieval Aristotelian scholasticism that won it the allegiance of so many generations of students and scholars? At first glance, it would appear that historians of medieval science, axed of medieval thought in general, would have placed the survival of Aristotelianism in the forefront of their speculations and analyses. . . .And yet the problem of the longevity of medieval Aristotelianism ought to form part of the legitimate concerns of the historian of medieval science, not only because the basic character of Latin Aristotelianism was formed in the late Middle Ages, between 1250 and 1400, but even more so because the factors that would make for its longevity were inherent in the very process which shaped it.

Before any reasons for the 'longevity of Aristotelianism are suggested, it will be well to explain briefly the two basic concepts of vital concern in this paper, namely 'Aristotelianism' and 'medieval world view'. In the context of medieval natural philosophy, the fundamental core of Aristotelianism was composed of the physical, logical, and biological works of Aristotle, along with the late Greek and Arabic commentaries thereon. Taken as a whole, these works provided the framework and much of the detail of the medieval world view, especially its physics and cosmology Aristotelianism in the narrow sense, then, comprised not only the core works mentioned
above, but the innumerable commentaries and *questiones* on those works composed by medieval Latin scholastics. Scholastic Aristotelianism, however, was much broader than the works of Aristotle and the Greek, Arabic, and Latin commentaries they generated. Already in the thirteenth century, much Aristotelian natural philosophy and metaphysics had been imported into theology, especially in the commentaries on the *Sentences* of Peter Lombard, that monumental twelfth century theological treatise on which all bachelors in theology had to comment. Conversely, and almost inevitably, Aristotelian thought was, in turn, influenced by the demands and requirements of theology.

In this way, Aristotelianism extended much beyond the works of Aristotle and became the dominant, and, for some centuries, the sole intellectual system in western Europe. It was . . .the basis of the curriculum of the medieval university, where it remained entrenched for centuries. From the time the works of Aristotle entered western Europe in the late twelfth century until perhaps 1600, or 1650, Aristotelianism provided not only the mechanisms of explanation for natural phenomena, but served as a gigantic filter through which the world was viewed and pictured.

As with all ‘world views’, the medieval version had two fundamental, but interrelated aspects. The first, often equated with the medieval world view to the exclusion of the second, concerns the overall structural framework of the world as it was popularly conceived in the late Middle Ages. Largely drawn from the physical works of Aristotle. . . but infiltrated at certain points with Christian ideas of the deity, angels, and soul, the structural frame of the world was, on the whole, remarkably simple. The cosmos was an enormous, finite, unique material sphere filled everywhere with matter. It was divided into two basic parts, celestial and terrestrial. Beginning with the lunar sphere and extending all the way to the Sphere of the fixed stars, and even beyond to the empyrean sphere, the celestial region was conceived as filled with a perfect, incorruptible ether which moved with a perfect, uniform circular motion and from which the celestial spheres were formed. In contrast with the heavens, where the only activity

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was the uniform, circular motion of the spheres, the terrestrial region, lying below the concavity of the lunar sphere and descending to the geometric centre of the universe, was characterized by incessant change as the bodies within it came into being and passed away. These terrestrial bodies were compounded of four elements, earth, water, air, and fire, each of which had its own natural place and the innate capacity for natural motion toward that place. The dominant element in any body determined the direction of its natural motion, which was always) toward the natural place of the dominant element. When unimpeded, earthy bodies always fell naturally toward the centre of the universe, and fiery bodies rose toward the lunar concavity. Watery bodies would rise in the natural place of earth and fall in the natural place of fire, while airy bodies rose in the natural places of earth and water and fell when located in the region of fire. Since the celestial region was judged more noble than the terrestrial, the former regularly influenced the behaviour of organic and inorganic bodies in the latter. Despite the contact of the convex surface of the sphere of fire, which was the outermost surface of the terrestrial region, with the concave surface of the lunar sphere, which was the innermost surface of the celestial region, the influences were all unidirectional, from the celestial to the terrestrial.

The basic, skeletal frame described here was probably instrumental in the longevity of the Aristotelian world view. In the judgment of C. S. Lewis, "The human imagination has seldom had before it an object so sublimely ordered as the medieval cosmos". By the magnificent simplicity of its fundamental structure, it satisfied the European mind, psychologically and intellectually, for some 450 years. It was this physical frame on which, and in which, the Christian God of the Middle Ages had exercised His wisdom and distributed angels and powers. Although additions to, and alterations of, the basic structure had occasionally been proposed and adopted in the course of the Middle Ages, they posed no serious challenge to the world view we have described. And while many hypothetical suggestions have been made as to how God might have structured the world differently, and even made other worlds, the passing centuries had seen the Aristotelian cosmos become ever more entrenched so that it seemed unthinkable, and even impious, to believe that he had actually made the basic
frame of the world other than as it had been traditionally described. As Copernicus knew, and his followers would learn, Aristotelian cosmologists would not suffer rivals gladly.

But if western Europe was largely agreed on the fundamental structure of the world as just described, it was by no means agreed on the second significant aspect of a world view, namely the details of cosmic operations. Aristotelian scholastics, who were the principal architects of the medieval world view, had no commonly shared conception of the manner in which the interrelationships between the basic components of the world were effected, and little consensus on the causes of a host of specific operations and activities that were deemed essential to cosmic efficacy and harmony. The operational aspect of the medieval world view was thus characterized by diversity of opinion and lack of agreement. If the fundamental structure of the medieval cosmos was psychologically and emotionally satisfying and, therefore, instrumental in perpetuating the system for centuries. . . .the secondary aspect of a world view, namely the details of cosmic operations, also played a significant role in the long life of the Aristotelian cosmos. The diverse, and often conflicting, operational details of the medieval world view were not, however, the cause of its longevity, but are the explicanda, for which a cause or causes must be assigned. With the cause, or causes, identified, we must then describe how it, or they, served to prolong the life of the Aristotelian cosmos. Before all this, however, it is essential to convey a sense of the diversity of operational details, the causes of which will then be suggested.

For convenience, let us begin with the celestial region and proceed toward the earth at the centre of the universe. We have seen that all were agreed that the celestial region, composed of a near-perfect fifth element, or ether, was conceived as a region of incorruptibility and tire ultimate source of all physical influence on that part of the world lying below the moon. It was the locale of the planets and fixed stars moving around the earth as centre. But what was that celestial region really like? Was it. . . a fluid mass, or was it subdivided into a series of solid, and perhaps hollow, spheres? . . . Those who decided on spheres had then to determine their number. Based on a variety of circumstances and requirements, estimates varied from eight to eleven, with some
accepting an outermost Empyrean sphere, and others denying its existence. And what of the relationship between these orbs? Were they contiguous—that is, distinct and separate, as indicated by their diverse and contrary motions. . . ; or did they form a continuous whole, sharing common surfaces by virtue of their identical, homogeneous composition? . . . What, or who, could be identified as the movers of celestial spheres? Angels, intelligences, souls, natural inclinations, and impressed forces were all suggested and partisans for each could be found. And what about relationships between celestial motions? Were they commensurable or incommensurable? Although all were agreed that no material body existed beyond the last mobile sphere to serve as its physical container or place, the question of the place of the last sphere was a persistent one. . . .

Multiple solutions were also proposed for a wide range of problems concerned with the terrestrial region of perpetual generation and corruption. For example, scholastics could not agree on the cause by which an element moved to its natural placers nor could they agree whether the cause of violent motion was external or internal, or whether a resistant medium was required for finite, temporal motion. They were in disagreement as to whether an element in a compound retained its elemental form. Some were of the opinion that, as geologic changes caused the earth’s centre of gravity to shift, the entire earth moved as its new centre of gravity sought to coincide with the geometric centre of the universe.

In fact, many if not most of the questions or problems that became part of the scholastic questiones literature on Aristotle’s physical treatise had a few major solutions which formed the basis of dispute. While in some instances a strong consensus for a particular opinion emerged, in many other problems, as, for example, those mentioned earlier, two or more interpretations were in serious contention. No resolution of most of these problems was really possible. How, for example, could one determine, with reasonable conclusiveness, whether the celestial region was a fluid mass or a system of hard spheres? Or what really moved the spheres? Or how many spheres really existed? . . . Whatever the unanimity on the macrostructure of the Aristotelian cosmos, it did not extend to its operational details.
What produced such a proliferation of theories and opinions about the details of cosmic operation? At least three reasons seem relevant and significant. First there were Aristotle's own obscurities and ambiguities which, in both large and small aspects of his thought, no amount of interpretation could resolve successfully with any large degree of unanimity. As with most cosmic system builders, there was often a maddening lack of detail in Aristotle's descriptions and arguments. In supplying those details, scholastic commentators, with varying degrees of subtlety, often altered Aristotle's arguments and apparent intent, thereby generating new opinions and interpretations. The multiplication of opinions was aided and abetted in no small measure by the Greek and Arabic commentator whose works accompanied the introduction of Aristotle into the West. Major commentators...frequently furnished a variety of interpretations for this or that concept principle, or argument. Scholastics would opt for one or another of them, or fashion new ones to compete with the old.

Opinions and theories were also easily multiplied in Aristotelian natural philosophy because "Aristotle's was the most capacious of philosophies" because "in principle it explained everything". Aristotelian physical principles, such as potentiality-actuality, the four causes, matter and form, the constitution of the four elements, the doctrine of natural place, and others, were so broad and comprehensive that they were easily applied to competing theories and arguments. Principles such as potentiality-actuality, the four causes, matter and form, the constitution of the four elements the doctrine of natural place, and others were so broad and comprehensive that they were easily applied to competing theories and arguments. Not only were these basic principles never seriously challenged, but they found a range of application that would have surprised, if not shocked, Aristotle himself.

But even more significant than these in the multiplication of opinions, though largely ignored until now, is a third major reason, which will be central in the discussion to follow. Let us recall that the most common mode of expression in medieval natural philosophy was by means of a commentary on a traditionally recognized authoritative text. These commentaries often took the form of a series of questiones, or specific problems, which followed the order of the commented text and developed from it; or
they could take the form of a straightforward commentary in which the commented text was discussed systematically section by section. In the questiones, which furnished most of the interesting cosmological discussion, each questio was subjected to a reasonably thorough analysis by means of a series of pros and cons, followed by the commentator's solution. By its very nature the questio form encouraged differences of opinion. It was a vehicle par excellence for dispute and argumentation. Scholastic ingenuity was displayed by introducing new subtle distinctions, which, upon further development, would yield new opinions on a given question. It is thus hardly surprising that centuries of disputation within the questiones format should have produced a variety of opinions on a very large number of questions ranging over the full scope of Aristotelian physics and cosmology.

The ultimate consequence of this process must be viewed as of direct relevance to the longevity of the Aristotelian medieval world view. For what emerged was a series of distinct and often intensively considered problems that remained isolated from and independent of other related questiones, to which allusions and references were minimal. As the major form of scholastic literature in natural philosophy, the questiones produced an atomization of Aristotle's physical treatises into sequences of particular questions and problems which focused attention on the independent question and thus severed its connections and associations with other related issues treated in the same treatise or elsewhere in the Aristotelian corpus. Not only were related topics left unintegrated, but even single topics as, for example, the doctrine of place, were left in the form of a series of specific questions that were never organized into a larger, coherent whole, which might have drawn attention to glaring inconsistencies and weaknesses. It was the independent question that became the focal point of contention and with respect to which differing opinions were formulated.

But how did all this contribute to the longevity of the medieval Aristotelian world view? Primacy of the independent question in medieval physical thought prevented any larger synthesis that might have forced a major overhaul or reconstitution of Aristotelian cosmology. It served to protect the satisfying macrostructure from any truly penetrating,
critical inspection. The atomization of Aristotle’s physical treatises resulted in an intellectual flotsam and jetsam of unrelated questions which actually concealed grave inconsistencies and discrepancies. Serious attempts to reconcile these might have encouraged efforts at a new synthesis, or perhaps riveted attention on the inadequate operational substructure which underlay the well-ordered and generally accepted macrostructure. Instead, the extreme atomization of physical thought in the *questiones* literature prevented medieval scholastics from producing, or even attempting to produce, any comprehensive and systematic treatises on the scope and scale of a Cartesian or Newtonian *Principia*. No genuine effort was made to formulate a coherent and reasonably consistent cosmology within which the disparate elements scattered throughout the *questiones* could be brought together, evaluated, and assessed as part of a larger whole.

In the absence of any genuine rival system the Aristotelian world view with its well-ordered macrostructure and its richly diverse, but bewildering, inconsistent, and largely unexamined operational substructure, reigned unchallenged. By the time rival interpretations of any consequence appeared, as happened in the sixteenth century, Aristotelianism, despite its numerous inconsistencies and multiplicity of opinions on almost every major issue, had acquired a degree of acceptance approaching that of Euclidean geometry before Bolyai, Lobachevsky, and Riemann.²

Despite its sheltered and protected status in the conservative university environment. Aristotelianism was eventually faced with rival systems and modes of thought. The humanism that had generated a new interest in Greek antiquity Greek antiquity and the influx, beginning in the fifteenth century, of Byzantine Greeks into the Latin West touched off a new wave of translation, now directly from Greek manuscripts. Old works were retranslated and new ones not previously known to the Latins were made available. It was in this new wave of translation, the likes of which had not been seen in Europe since the twelfth and early thirteenth centuries, that new ways of looking at the world became familiar in the west. With translations of the works of Plato,
Proclus, Hero of Alexandria, and the Hermetic corpus, Atomism, Stoicism, Platonism, Neoplatonism, and Hermeticism emerged as flesh and blood doctrines. Lucretius's *De rerum natura*, the most complete account of atomism known, reappeared after centuries of obscurity to compete as a major cosmic system. The hostile view of atomism which Aristotle had presented could now be countered in detail. . . .

At the dawn of the sixteenth century, entrenched though it was, Aristotelianism had declined in vigour. At that point, one might well have pondered whether it could survive for long the influx of new ideas and philosophies that had already begun to enter Europe in the fifteenth century. The new non-Aristotelian intellectual options available to scholars of the sixteenth century caused some to abandon Aristotelianism and to attack it. . . . Medieval disagreements with Aristotle, numerous though they were, were never regarded as a means of destroying the system, as was the case in the sixteenth century.

But the system was not destroyed. Paradoxically, the very influx of Greek texts and new translations that threatened the existence of Aristotelianism, also served to impart new strength to it. The Aristotelian corpus was not only re-translated from the Greek, but the Greek texts were made available in printed editions. From the fifteenth century onward, the humanistic revival had encouraged the teaching of Greek, a trend which gained strength through the sixteenth century. And, as if to accentuate the new interest in Aristotle, the Greek texts and Latin translations of Aristotle’s Greek commentators, such as Alexander, Philoponus, Simplicius, and Themistius, which accompanied the new Aristotle, were read with as much interest as was Aristotle himself. Their interpretations, especially of the *Physics*, contained some new arguments and insights that were of fundamental importance. Thus a whole new dimension was added to Aristotelianism which served to revive and refresh it. Sixteenth century natural philosophers were now face to face with the real Aristotle and the more pristine interpretations of his thought. No longer were they dependent on translations from the Arabic. If it pleased them, they could now even abandon their old Arab guide, Averroes, for the Greek commentators. And, finally, they could also ignore the medieval

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[2] *This is a reference to three nineteenth century mathematicians, Janos Bolyai, Nicholai Lobachewsky, and.*
Aristotelian tradition that was built primarily on translations from the Arabic and overreliance on Averroes and Avicenna. In the end, however, they followed many paths.

If the new Greek texts and Latin translations had merely generated an interest in comprehending and establishing the meanings of the pristine Aristotle purged of medieval accretion and distortion, the new Aristotelianism would have qualified as the beginnings of the history of Aristotelian scholarship, but would have been an intellectual dead-end. The reinvigoration of Aristotelianism after the bleak period of the fifteenth century derived not from a narrow philological approach in quest of the real Aristotle, but rather from its continued capacity to absorb the ‘new’ into the old, where ‘new’ is understood in terms of the recently introduced Greek authors and commentators whose works and ideas had not been part of medieval Aristotelianism. The disparities and disharmonies of the Middle Ages, which we emphasized earlier, were thus merely expanded and multiplied, as the new opinions, from whatever source, were assigned appropriate places in the traditional division of Aristotelian problems. The revitalized Aristotelianism was now so truly capacious that there was something for everybody and it managed to sustain itself as long as efforts to synthesize it into a coherent whole were avoided. From this standpoint, Aristotelianism acquired new strength and was able to perpetuate itself as much, if not more, on the basis of intellectual vigor than from its entrenched and traditionally privileged position.

The Aristotelian system was never reformed from within. It was destroyed from without on the basis of ideas developed by Copernicus, who attacked the macrostructure, and by Galileo, who not only upheld Copernicus, but also destroyed fundamental operational principles in the Aristotelian substructure. In challenging Aristotle and his followers, Galileo left an almost indelible historical impression that his Aristotelian opponents were inflexible, slavish partisans incapable of adopting, or even considering, new ideas. By ‘new’, Galileo, of course, understood the Copernican heliocentric system and such of his own ideas as involved the abandonment of the concept of absolute heaviness and lightness. From this standpoint, he is undoubtedly

Bernhardt Riemann, who were seminal to the development of so-called “non-Euclidean geometry.” JLR
correct, since these concepts were totally incompatible with the Aristotelian world view. But if we count as 'new' ideas and concepts developed in medieval scholasticism as well as those introduced by the Greek authors and commentators . . . and made available in the late fifteenth and sixteenth centuries, then the problem of Aristotelianism is not inflexibility, but rather too much flexibility, too great a readiness to accept ideas and concepts that did not fit well, if at all, into Aristotle's natural philosophy. In the process of multiplying and absorbing new ideas from whatever sources, Aristotelians failed to notice the growing incoherence of the substructure. The capacity of Aristotelianism to absorb so much that was incompatible was possible only because of an absence of critical integration of the many disparate, conflicting, and unreconciled explanations, which formed its complicated operational substructure. Produced primarily by the atomization of Aristotelian scholastic literature, that fragmented and confused operational substructure served inadvertently to protect the well-ordered macrostructure from critical scrutiny and enabled the medieval cosmos to retain its firm hold on the European mind. Thus did Aristotelianism live on until it fell under the onslaught that began with Copernicus and Galileo, who together provided not only the beginnings of a new cosmic macrostructure, but also laid the solid foundation of a new operational substructure on which the whole could appropriately rest.