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Organon 4, 119-126

1967

Artykuł umieszczony jest w kolekcji cyfrowej Bazhum, gromadzącej zawartość polskich czasopism humanistycznych i społecznych tworzonej przez Muzeum Historii Polski w ramach prac podejmowanych na rzecz zapewnienia otwartego, powszechnego i trwałego dostępu do polskiego dorobku naukowego i kulturalnego.

Artykuł został zdigitalizowany i opracowany do udostępnienia w internecie ze środków specjalnych MNiSW dzięki Wydziałowi Historycznemu Uniwersytetu Warszawskiego.

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ROBERT FLUDD AND THE CHEMICAL PHILOSOPHY OF THE RENAISSANCE

The influence of Galileo has perhaps proved greater than even he would have dared hope. Not only did his approach to the physical sciences prove to be the correct one, his interpretation of the scientific scene of his own day has remained relatively unchallenged until recently. Traditionally, basic courses in physics begin with a study of the problem of motion, and the font of this subject—if we rule out the medieval commentaries on the Aristotelian corpus—may be found in Galileo's now classic *Dialogue on the Great World Systems* (1932) and his *Discourses and Demonstrations Concerning Two New Sciences* (1638). Here the author in the guise of Salviati repeatedly overturns the arguments of his conservative adversary Simplicio. To the post-Newtonian scientist this would appear to be the herald of the forthcoming triumph of modern mechanics over moribund mysticism and antiquity—and it is understandable, I think, that these texts have profoundly colored recent interpretations of the rise of modern science. On the surface the issue seems clear, the scientific revolution may for the most part be pictured as the collapse of Aristotelian and medieval concepts under the onslaught of the evidence provided by the inspiration of a new mechanical and experimental approach to nature based upon a heliocentric view of the universe.

This interpretation is neat, relatively uncomplicated, and is given added weight by the convincing literary style of Galileo. Unfortunately it is only partially true. For while we may easily draw a series of steps leading onward and upward from Copernicus to Tycho, to Kepler, to Galileo and then to Newton, in so doing we ignore other significant aspects of Renaissance and early modern approaches to nature. Recent studies by a number of scholars indicate that many proponents of the

new mechanical philosophy felt threatened as much by the natural magicians and the Paracelsians as by the still lingering Aristotelians.

If we are to understand the Scientific Revolution it is important to ask why these occult strains of thought were considered a dangerous rival by those with a more modern approach to nature, and perhaps part of the answer may be found in the published aims of the natural magicians and the Paracelsians. Although their enemies might dispute the point with them, the natural magicians were not overly concerned with witchcraft and demonology. Henry Cornelius Agrippa stated that "Natural Magick is... the top and perfection of Natural Philosophy,"¹ and John Baptista Porta repeated these views when he wrote that "Magick is nothing else but the survey of the whole course of Nature."² This master science which was described as mathematical, experimental, and mechanical in approach has another aspect which we find in the works of the alchemists and the Paracelsians. To be sure, the average chemist of the period was primarily engrossed in the problems of transmutation or the preparation of medicines for the ills of mankind, but there was a more sweeping goal as well. Most theoretical chemists of the Renaissance placed a special emphasis on the traditional claim of the alchemists that their science was the "true Key of Nature."³ There is nothing equivocal in this position. Nicholas Le Fèvre, writing in 1660, stated bluntly that "Chymistry is nothing else but the Art and Knowledge of Nature it self."⁴ Authority for this position was found in the Hermetic approach to the Biblical story of Creation which was interpreted essentially as a divine and mystical chemical separation which resulted at an early stage in the elements from which all other substances derive.⁵ By man's examination of matter and these elements he might discover hidden secrets of nature and the Creator.

Part of the appeal of this chemical philosophy in the sixteenth and seventeenth centuries may be traced to this very fact—in an era when religion was predominant these men claimed that their science would aid man to understand his Creator.⁶ The Aristotelian and Galenic corpus was held to be inimical to Christianity and therefore rightly condemned by Church authorities in the past. In contrast, the valuable writings

¹ Henry Cornelius Agrippa, *The Vanity of Arts and Sciences*, London 1684, p. 110.

² John Baptista Porta, *Natural Magick*, New York 1957, p. 2.

³ Nicasius le Febure, *A Compleat Body of Chymistry*, trans. P. D. C. Esq., one of the Gentlemen of His Majesties Privy-Chamber, London 1670, p. 3.

⁴ *Ibid.*, p. 1.

⁵ A good example is Joseph Duchesne (Quercetanus), *The Practise of Chymicall, and Hermeticall Physicke*, trans. Thomas Tymme, Minister, London 1605, sig. Hi.

⁶ See the defence made by Thomas Tymme in his *A Dialogue Philosophicall*, London 1612, sig. A3. This is quoted by the present author in his *The English Paracelsians*, London, Oldbourne Press 1965, p. 89.

of Hermes Trismegistus and Plato were treasured because both of these sages were thought to have had knowledge of the truths of the *Old Testament*. Thus, like the mechanical philosophers, the chemical philosophers condemned the contemporary overreliance on the Aristotelian corpus, partially because they felt it was full of errors, and in addition because of religious considerations. For them man might obtain certain truth both through the Holy Scriptures or some mystical religious experience, and also through his diligent study of nature, God's book of Creation.

The appeal of the chemical philosophers may be attributed also to their stated method of investigating nature. The scholastic emphasis on logic with its endless and sterile philosophical disputations was to be replaced by an observational and experimental investigation of natural phenomena. The true natural philosopher and chemist was told to sell all of his belongings and spend his days wandering the earth so that he might examine every new phenomenon he might encounter. Above all, as chemists they were told to make their examinations in the traditional method of the alchemist. The true seeker of wisdom must "purchase coal, build furnaces, watch and operate with the fire without wearying. In this way and no other, you will arrive at a knowledge of things and their properties."⁷

Not only was the chemical philosophy promoted as a universal, observational and experimental investigation of nature, it was also spoken of as the true mathematical and mechanical approach to knowledge. Introducing Paracelsian thought to England in 1585, R. Bostocke insisted that this science was to be carried out by resort to "mathematicall and supernaturall precepts, the exercise whereof is Mechanicall, and to be accomplished with labor."⁸ The words may be the same, but the sense was far different from that of the Galileans. If the chemist thought of himself as a mechanical philosopher, it was because he thought the term should apply to anyone who personally carried out experiments in his investigations.⁹ If he thought that this was the proper mathematical investigation of nature it was because of his confidence in the truth of the mystical numerological relationships of the heavens and the earth which found practical expression in the computation of the astrologers. A mathematical investigation of motion such as that

⁷ Petrus Severinus, *Idea Medicinae Philosophicae*, 3rd ed., Hagae Comitibus 1660, p. 39.

⁸ R. B. Esq. (R. Bostocke), *The difference betwene the auncient Phisicke... and the latter Phisicke*, London 1585, sig. Bi(r).

⁹ Cf. *ibid.* In his *Lexicon Alchemiae* (1612), Martin Ruland states: "*Mechanicae artes, sind die Handwerck.*" *Lexicon Alchemiae*, Hildesheim, Georg Olms Verlagsbuchhandlung 1964, p. 327. Of interest is also John Dee's definition of the "speculatiue Mechanicien: which differeth nothyng from a Mechanicall Mathematicien." John Dee his *Mathematicall Preface in Euclid: The Elements*, London, John Daye 1570, fol. aiii (v).

conducted by Galileo would have been anathema to them. Geometry itself was suspect, for as van Helmont suggests, this subject is akin to logic and therefore is tainted with Aristotelianism.¹⁰

As the Paracelsians' concept of the value of mathematics and mechanics differs from ours, so too we find their philosophical thought based on an archaic substructure of Hermetic, Pythagorean and neo-Platonic mysticism. Yet even here we find a reason for the widespread popularity of chemistry, for the traditional macrocosmos-microcosmos analogy which was universally accepted by them placed a special emphasis on man, the microcosm. Macrocosmic phenomena should be investigated by scholars and the resultant information would have significance for man. The macrocosm-microcosm relationship thus formed a basis for medicine as well as magic and chemistry.

Here was an approach to nature which had a natural appeal for physicians interested in natural philosophy. The chemical philosophy was openly experimental in approach and it stressed medicine as its chief end. At the same time those who found chemical interpretations more appealing than mathematical abstractions were being offered a path to true knowledge—not of just one branch of science, but of all nature. With this background the sixteenth and seventeenth century interest in Paracelsism and chemistry is understandable. By the opening of the seventeenth century writings of the Paracelsians reflect an elation founded on their increasing numbers. Oswald Croll, writing in 1609, argued that the Paracelsian views had triumphed because of the success of their chemical hypotheses, because of the inherent progress of medical knowledge, and finally, because of the simplicity and truth of the macrocosm-microcosm analogy.”¹¹

This confidence of the Paracelsians was not so pleasing to other scholars. In Paris Father Mersenne was genuinely alarmed by the number of scholars who were turning to natural magic, alchemy and Paracelsism as an alternative to the works of the ancients. In his commentary on *Genesis* (1623) Mersenne specifically attacked the comparison of the Creation with a divine chemical separation, and two years later in his *La Vérité des Sciences* he devoted some four hundred pages to a refutation of the claims made by the alchemists that their subject was an exact science. Only then did he proceed to a description of mathematics which he felt should be the basis of man's new understanding of the universe—and for Mersenne mathematics did not mean the numerological studies of the alchemists. In his campaign against the alchemists he proceeded to enlist the support of his friends. Pierre

¹⁰ J. B. van Helmont, *Oriatrike or Physick Refined*, trans. John Chandler, London 1662, pp. 33f.

¹¹ O. Crollius, "Discovering the Great and Deep Mysteries of Nature," in *Philosophy Reformed and Improved*, trans. H. Pinnell, London 1657, pp. 142–147.

Gassendi was to become his chief ally in this crusade. In a sense this confrontation may be viewed as a major chapter in the rise of modern science for it has been suggested that Gassendi's search for an alternative to natural magic and alchemy convinced him that atomism might be adopted as a basis for a new mechanized science.¹²

The immediate focal point of the attack of Mersenne and Gassendi was centered on the volumes of the now nearly forgotten mystical alchemist, Robert Fludd (1574—1637), and for this reason Fludd's writings assume for us an importance which they would not have if we were interested only in anticipations of modern discoveries. It seems appropriate then to turn briefly to Fludd's work which he modestly called his "Fluddean Philosophy," but which is little more than an extreme example of the more general Hermetic-Paracelsian approach to nature.¹³ The amount of his printed work is impressive, but even more interesting is the fact that he was willing to debate in detail his views with almost anyone who disagreed with him. If on the one hand he disputed with giants such as Kepler, Mersenne and Gassendi, on the other hand he was willing to reply to authors as little known as Patrick Scot and William Foster. It is possible then through Fludd's works to study an important dialogue in seventeenth century science—not between Aristotelians and Galileans, but between Hermeticists or chemical philosophers and those who represent a more modern approach to nature. There is no time to discuss this debate in detail here, but I do think it is worthwhile to show some aspects of Fludd's work which justify his inclusion among the chemical cosmologists.

The "Fluddean" or Mosaic Philosophy is characterized by an implacable hatred of Aristotle even though Aristotelian influences are evident throughout. For Fludd, as with most alchemists, Aristotle and Galen represented the nadir of human knowledge and he insisted that the universities should be purged of their doctrines. Rather, he said, we should turn for instruction first to God's two books of revelation—one, His written book, the Holy Scriptures, and the other, nature, God's

¹² The details and consequences of this conflict are beyond the scope of the present study. The reader will find the most recent account in Frances A. Yates, *Giordano Bruno and the Hermetic Tradition*, Chicago, The University of Chicago Press, 1964, pp. 432—455. An older, but basic study is R. Lenoble, *Mersenne ou la naissance du mécanisme*, Paris 1943, and the Fludd—Kepler exchange has been discussed by W. Pauli in "The Influence of Archetypal Ideas on the Scientific Theories of Kepler," in C. G. Jung and W. Pauli, *The Interpretation of Nature and Psyche*, trans. Priscilla Silz, New York 1955. The present author has noted the significance of Fludd's controversies in his various works cited in this paper. In addition to these see his "Robert Fludd and the Use of Gilbert's *De Magnete* in the Weapon-Salve Controversy," *Journal of the History of Medicine and Allied Sciences*, 19, 1964, pp. 389—417.

¹³ On Fludd's work see Debus, *The English Paracelsians*, pp. 105—127. On Fludd's life see J. B. Craven, *Doctor Robert Fludd*, Kirkwall 1902; C. H. Josten, "Truth's Golden Harrow. An unpublished alchemical Treatise of Robert Fludd in the Bodleian Library," *Ambix*, 3, 1949, pp. 91—150.

book of Creation.¹⁴ There was no question in Fludd's mind that the first of these was the most important. For him the Holy Scriptures and the semi-divine Hermetic corpus carried far more weight than ocular demonstrations ever could. Yet though Fludd insisted that experience may be often misleading and that the scientist must begin his search with the proper philosophical framework, a study of his views on the structure of the heart shows that he was quite capable of defending himself with experimental evidence if an adversary attacked him in this fashion.¹⁵

With his emphasis on the Holy Scriptures, Fludd reechoed the Hermetic and Paracelsian belief that our most important source for the study of nature will be found in the opening chapters of *Genesis*. We see in Fludd's account once again that the divine Creation is singled out as a great *spagerich* act of separation and this becomes the basis of his whole philosophy.¹⁶ The origin of all things may be found in the primeval dark chaos from which arose the divine light. The latter then acting on the chaos brought forth the waters which are the passive matter of all other substances.¹⁷ For Fludd this is the true mosaic philosophy which is built upon the three primary elements of darkness, light, and the waters. From the primary element of water may be derived all "secondary" elements—and if for Fludd the Paracelsian principles could easily be explained also by this system, the significant secondary elements are the traditional Aristotelian elements, earth, water, air and fire.¹⁸ Having thus explained the chemical origin of the elements, he was free to apply his approach to more complex problems of the universe. Fundamental to an understanding of his writings is his emphasis on the primary element of light. Light and divinity are terms which are constantly related in the Fluddean writings. It was the light of the Lord informing the Chaos which resulted in the formation of the world—and it was this same divine light arising from the Spirit which on the fourth day was formed into the Sun and received into the aetherial heaven. The relation of the Sun to the Creator required that it be a perfect body and this in turn was reason enough for Fludd to insist on its centrality in the heavens—meaning thereby its position midway between the earth and the Lord on high rather than centrality in the Copernican sense.¹⁹ The univer-

¹⁴ Robert Fludd, *Mosaicall Philosophy*, London 1659, pp. 12—13.

¹⁵ On Fludd's use of observational techniques see the present author's: "Robert Fludd and the Circulation of the Blood," *J. Hist. Med.*, 16, 1961, pp. 374—393; "The English Paracelsians," pp. 105—127; and "The Sun in the Universe of Robert Fludd." *Le Soleil à la Renaissance—Sciences et Mythes. Colloque International tenu en Avril 1963 ...* Brussels 1965, pp. 259—278.

¹⁶ Fludd, *Mosaicall Philosophy*, p. 175.

¹⁷ *Ibid.*, p. 82.

¹⁸ Debus, *The English Paracelsians*, pp. 109—112.

¹⁹ See Debus, *The Sun in the Universe of Robert Fludd*, cited above in note 15.

sal spirit of life was also conveyed to man through the light of the Sun which passes through and forms part of the air around us. Here was a direct link between the macrocosm and the microcosm which Fludd utilized as a basis for a mystical alchemical account of the circulation of the blood in 1623.²⁰

Even on these few points we would seem to have strayed far from our topic of chemistry or alchemy—but actually we have not. Fludd demonstrates precisely what I wanted to show. First, his work includes enough of the general characteristics displayed by the theoretical chemical philosophers for him to be classified as one of them. Second, the notice taken of his work by Kepler, Mersenne, Gassendi and others means that the study of his work—and that of the other chemical philosophers should have more than an antiquarian value for us today. Their writings indicate that chemistry or alchemy had a meaning far different for them than it does for us. Topics which do not now fall within the province of chemistry were then considered at least by some to be a fundamental part of the discipline because the subject had a universal scope. For Fludd and many others the real meaning of chemistry was based on the divine and mystical chemical separation which resulted in the created universe. All things had been formed in a chemical fashion and all things could be explained in terms which might ultimately reduce to chemistry or chemical analogies. Before the widespread acceptance of corpuscular explanations of matter in the late seventeenth century, chemistry could be equated with the terms natural philosophy and medicine for this set. If Mersenne and Gassendi had reason to be wary of the natural magicians, they had special cause to distrust Fludd whose works presented this mystical alchemical universe in a more comprehensive fashion than had any other author up to their time.

I do not believe that it is sound to dismiss the work of these chemists or alchemists as valueless as has often been done simply because they were not right in our terms. As a whole these men spoke not narrowly of technical applications of chemistry, but of a true understanding of nature through the aid of chemical theories based on laboratory investigations. Like the mechanical philosophers, the Paracelsians and the Helmontians stood for an unyielding attack on the blind authority of the ancients, like the mechanical philosophers they insisted that the secrets of nature would only unfold through an unyielding observational and experimental approach—and like them, they claimed that their method would yield eventually the secrets of the universe. If Robert Fludd was somewhat atypical in placing a

²⁰ See Debus, *Robert Fludd and the Circulation of the Blood*, cited above in note 15.

greater emphasis on Biblical authority than experiment, this was not really unusual for the period, and there is evidence that he could argue effectively from experimental evidence when he wished to do so.

That the chemical philosophers were wrong is not the main issue here. It is important that they helped to formulate modern science by striving for the same goals as the mechanical philosophers—even though they were encouraged to do so by hypotheses and analogies which we today reject outright. In the mid-seventeenth century chemical physicians might well believe that their aims differed little from those of the Galileans. However, their fundamental beliefs and presuppositions were different, and it is to the credit of the rising mechanical philosophers that they recognized this. The resulting conflicts which form a major chapter in the intellectual history of the seventeenth century should be considered fully as significant for the rise of modern science as the eclipse of the classical Aristotelian heritage.