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**“THE TRIPLE ESSENCE OF THE VISUAL PROCESS”, OR THINKING WITH
DIAGRAMS IN THE MIDDLE AGES AND MODERNITY**
**“LA TRIPLE ESENCIA DEL PROCESO VISUAL” O PENSAR CON
DIAGRAMAS EN LA EDAD MEDIA Y LA MODERNIDAD**

JEFFREY F. HAMBURGER
Harvard University
jhamburg@fas.harvard.edu
ORCID ID: 0000-0002-1103-1692

ABSTRACT

Medieval diagrams, in particular, the medieval models for Robert Fludd’s celebrated diagrammatic man in his magnum opus, *Utriusque Cosmi* (1617–1621), offer a way to reconsider the role of the senses in human cognition and experience as they have been construed in recent scholarship on medieval images. Given that diagrams, medieval or modern, have the power to engender as well as merely mimic mental processes, current accounts of the senses in the Middle Ages should not underestimate the informing role of the intellect, at least as posited in the sources, which often resort to diagrammatic imagery, not simply as an emblem but also as an exemplification of the very process of thinking. To embodiment and experience must be added a coherent account of cognition, as medieval accounts, visual and verbal, themselves sought to provide.

KEYWORDS: Robert Fludd, diagrams, microcosm-macrocosm, Trinity, senses, logic, cognition, Johann Lindner of Mönchburg, Magnus Hundt, Peter Gerticz (Peter of Dresden), Gregor Reisch, intension-remission.

RESUMEN

Los diagramas medievales, y en particular los modelos medievales para el célebre hombre diagramado de Robert Fludd en su obra magna, *Utriusque Cosmi* (1617-1621), ofrecen una forma de reconsiderar el papel de los sentidos en la cognición y la experiencia humanas, tal como se ha interpretado en los estudios recientes sobre las imágenes medievales. Dado que los diagramas, medievales o modernos, tienen el poder de engendrar, además de imitar, los procesos mentales, los relatos actuales sobre los sentidos en la Edad Media no deberían subestimar el

papel informador del intelecto, al menos tal y como se plantea en las fuentes; estas a menudo recurren a la imaginería diagramática, no simplemente como un emblema, sino también como una ejemplificación del propio proceso de pensamiento. A la corporeidad y a la experiencia hay que añadir un relato coherente de la cognición, tal y como los propios relatos medievales, visuales y verbales, trataban de proporcionar.

PALABRAS CLAVE: Robert Fludd, diagramas, microcosmos-macrocosmos, Trinidad, sentidos, lógica, cognición, Johann Lindner de Mönchburg, Magnus Hundt, Peter Gerticz (Pedro de Dresde), Gregor Reisch, intensidad-remisión.

INTRODUCTION

We all know Herb as a man of many parts. An unrivalled exegete of medieval objects and images, over the course of his long career he has embraced an ever-changing constellation of materials and methodologies. Herb's ability not only to keep pace with the times but also to set scholarly agendas is perhaps best represented by his recent book, *Experiencing Medieval Art*, a reworking of *Seeing Medieval Art* (2004), which in turn originated as an article entitled "The State of Medieval Art History", published in the *The Art Bulletin* in 1989. *Experiencing Medieval Art* both reflects and embodies the desire on the part of historians of medieval art to address the manifold ways in which medieval works of art engage not simply with historical modes of vision, a subject on which Herb has published extensively, but the other senses as well. To all his work, Herb brings a combination of keen perception and penetrating intellect; this essay, therefore, addresses medieval understandings of the interaction of the two. Recent interest has focused less on the intellect than on embodiment. Without denying the importance of embodiment within discussions of perception, memory, and the imagination, this essay seeks to redress the balance on the basis of diagrammatic reasoning, which, in addition to having served as a means of mapping the topology of brain function, as it continues to do today, also operated in its own right as an epitome of the process of rational thought. Diagrams served in this capacity despite their constituting part of worldviews that strike modern observers as anything but rational.

FLUDD'S DIAGRAMMATIC MAN

I begin with a celebrated image from Robert Fludd's *Utriusque Cosmi*, which, in the words of the caption at the top of the page, represents "The Triple Essence of the Visual Process" (*De Triplici Anima in Corpore Visione*). Like everything else in Fludd's work, vision is threefold. What we have here is a crypto-portrait of Herb avant la lettre.¹ (Figs. 1 & 2) It is not the baldness of this gentleman that makes one think of Herb, but rather the workings of his

¹ On FLUDD'S image, see D. PERLER, "Robert Fludd: Die Welt im Kopf", in *Atlas der Weltbilder*, C. MARKSHIES et al. (eds.), Forschungsberichte Interdisziplinäre Arbeitsgruppen, Berlin-Brandenburgische Akademie der Wissenschaften 25, Berlin, 2011, pp. 220-229. See more generally M. BERGENBRUEN, "'Alles/Was hierniden ist/Das ist auch droben'. Zur Funktion graphischer Systemdarstellungen in Buch-Publikationen aus dem Bereich der *Magia naturalis* (Robert



Fig. 1. Herbert L. Kessler, 1995.

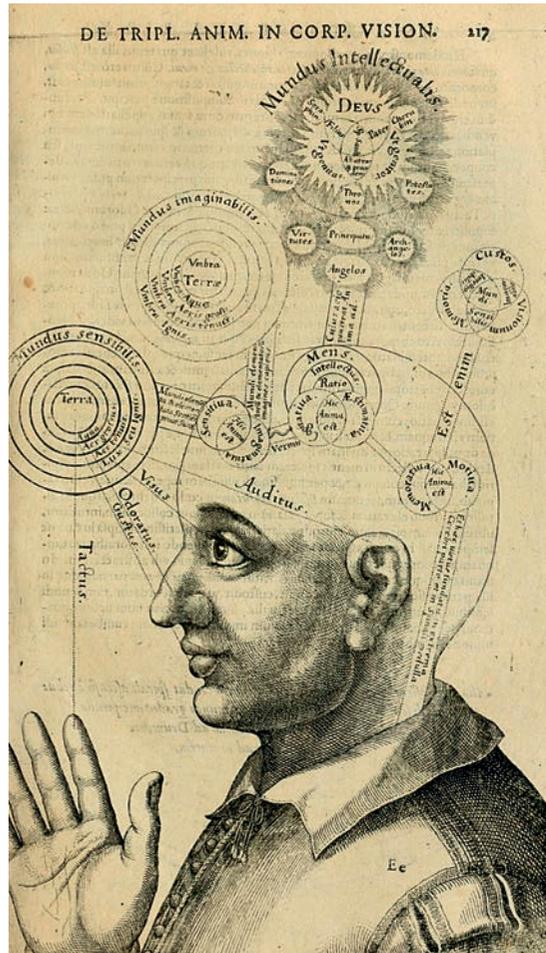


Fig. 2. Robert Fludd, *Utriusque cosmii*, Oppenheim: Johanne Theodori de Bry, 1617–1621, vol. 1, p. 217 (Photo: archive.org)

mind, which, like this image, explore links between visible and invisible worlds and do so, at least in part, through the mediation of diagrams. To quote from *Experiencing Medieval Art*, in many respects a summa of Herb's interests and insights, diagrams "enabled the embedding of universal principles in renderings of nature and the correlating of conceptual connections with theological concepts".²

Fludd, Oswald Croll)", in *Cognition and the Book: Typologies of Formal Organisation of Knowledge in the Printed Book of the Early Modern Period*, K. A. E. ENENKEL, W. NEUBER (eds.), Intersections 4, Leiden-Boston, 2005, pp. 433-454, and R. CHEN-MORRIS, "From Emblems to Diagrams: Kepler's New Pictorial Language of Scientific Representation", *Renaissance Quarterly*, 62 (2009), pp. 134-170, with substantial discussion of Fludd.

² H. L. KESSLER, *Experiencing Medieval Art*, Rethinking the Middle Ages 1, Toronto, 2019, p. 168.

Robert Fludd, who died in 1637, was, among other things, a physician, mathematician, cosmologist, and astrologer. This polymath would have appreciated Herb's understanding of the diagram's double potential as an instrument of clarification but also of mystification.³ First published by Theodore de Bry in Oppenheim between 1617 and 1621, his magnum opus in five parts spread over two volumes aspired, in the manner of a medieval encyclopedia (a tradition to which he was deeply indebted), to comprehend all that there was to be known within a world view that cast the visible and invisible worlds as intimately, indeed, systematically linked.⁴ The work's full title is *The metaphysical, physical, and technical history of the two worlds, namely the greater and the lesser*. The two worlds in question are the microcosm, namely, the earth, including mankind and its works and the macrocosm, that is, the universe, include the divine realm.⁵ The work consists of two parts, of which the first deals with the metaphysical, the second, which is more heavily illustrated, with the physical dimensions of the macrocosm as well as the "natural arts". In addition to some of the traditional liberal arts (arithmetic, music, and geometry), these include others that reflect the changing status of the mechanical arts, a development rooted in the twelfth-century turn to history, society, and nature, in short, the mundane as well as the divine.⁶ Among these arts is painting, to which Fludd adds perspective, of relevance to other fields such as surveying. Along the same lines, and reflecting a long tradition of such works appealing to the requirements of rulers, also included are the military arts. Other sections (on the sciences of time and motion, cosmography, astrology,

³ On FLUDD, see F. A. YATES, *Theatre of the World*, Chicago, 1969; J. GODWIN, *The Greater and Lesser Worlds of Robert Fludd: Macrocosm, Microcosm, and Medicine*, New York, 2019; W. H. HUFFMAN, *Robert Fludd and the End of the Renaissance*, London-New York, 1988; J. RÖSCHE, *Robert Fludd: Der Versuch einer hermetischen Alternative zur neuzeitlichen Naturwissenschaft*, Göttingen, 2008. For Yates' impact on the history of science, see B. P. COPENHAVER, "Natural Magic, Hermeticism and Occultism in Early Modern Science", in *Reappraisals of the Scientific Revolution*, D. C. LINDBERG, R. S. WESTMAN (eds.), Cambridge, 1990, pp. 261-303.

⁴ R. FLUDD, *Utriusque cosmi maioris scilicet et minoris metaphysica, physica atqve technica historia: in duo volumina secundum cosmi differentiam diuisa*, 2 vols., Oppenheim, 1617-1621. A third volume, *De fluctibus philosophia sacra & vere Christiana, seu, Meteorologia cosmica*, Frankfurt, 1626, is sometimes considered a continuation of *Utriusque cosmi*. A manuscript model, complete with preparatory drawings, for Part II, Tr. 1, Sect. 2, Port. 1-7 of *Utriusque cosmi* survives in Frankfurt, Universitätsbibliothek, Ms. lat. qu. 15; for a digitization, see < <https://sammlungen.ub.uni-frankfurt.de/msneuz/content/titleinfo/5091548> > (accessed 10.8.2021).

⁵ F. SAXL, "Macrocosm and Microcosm in Medieval Pictures", *Religionswissenschaftliche Gesellschaft*, 109 (1928), pp. 58-72, remains foundational. See further M.-T. D'ALVERNY, "L'homme comme symbole: le microcosme", in *Simboli e simbologia nell'alto medioevo*, 2 vols., Settimane di studio del Centro italiano di studi sull'alto medioevo 23, vol. 1, pp. 123-195; G. E. SOLLBACH, *Die mittelalterliche Lehre vom Mikrokosmos und Makrokosmos*, Studien zur Geschichtsforschung des Mittelalters 5, Hamburg, 1995; R. FINCKH, *Minor Mundus Homo: Studien zur Mikrokosmos-Idee in der mittelalterlichen Literatur*, Palaestra 306, Göttingen, 1999; H. G. THÜMMEL, "Makrokosmos und Mikrokosmos: Das Weltbild im Mittelalter", in *Natur und Geist: Von der Einheit der Wissenschaften im Mittelalter*, O. AUGÉ, M. MÜLLER (eds.), Ostfildern, 2008, pp. 157-170; and R. ZIOMKOWSKI, "Microcosm and Macrocosm", in *New Dictionary of the History of Ideas*, M. C. HOROWITZ (ed.), 6 vols., New York, 2005, vol. 4, pp. 1439-1443, with additional bibliography.

⁶ See P. SKUBISZEWSKI, "L'intellectuel et l'artiste face à l'oeuvre à l'époque romane", in *Le travail au Moyen Âge: Une approche interdisciplinaire. Actes du colloques internationales de Louvain-la-Neuve 21-23 mai 1987*, J. HAMESSE, C. MURAILLE-SAMARAN (eds.), Louvain-la-Neuve, 1990, pp. 263-321; G. O. OVITT, JR., "The Status of the Mechanical Arts in Medieval Classifications of Learning", *Viator*, 14 (1983), pp. 89-105; and E. WHITNEY, *Paradise Restored: The Mechanical Arts from Antiquity Through the Thirteenth Century*, Philadelphia, 1990.

and geomancy or divination) stem from Fludd's desire to integrate the scientific learning of his day with hermetic traditions rooted in Rosicrucianism, Kabbala, and alchemy.⁷

In light of Fludd's desire to find cosmic harmony expressed in the connection of just about everything to everything else, it should come as no surprise that diagrams play a central role in the exposition of his thought. Diagrams exhibit an uncanny ability not only to map the mind but to set it in motion, and it is precisely this combination of mapping and tracing the motions of the mind that Fludd's memorable image seeks to embody.⁸ Fludd's image of the mind's mechanisms serves not simply as an illustration but, more importantly, a demonstration of the intimate integration of the microcosm (that is, man, in particular, his inner life, understood in terms of the faculties of the intellect, reason, and the imagination) and the macrocosm (that is, the world outside it).⁹ The macrocosm, represented by the set of concentric circles in front of the man's forehead—labeled successively from the center outward Earth, Water, Heavy Air (*Aer grossus*), Thin Air (*Aer tenuus*), and Light or Fire (*Lux seu Ignis*)—impinges on the inner world of sense and cognition by means of the five senses, each embodied by one of the five lines leading, respectively, to his hand, lips, nose, eye, and ear. Together, the elements—expanded in number from four to five so as to correlate with the five senses—comprehend the sensible world (*Mundus sensibilis*).¹⁰ The sensible world is, in effect, duplicated by the second

⁷ See, inter alia, the essays by W. SCHMIDT-BIGGEMANN, "Kosmos und Kabbala: Robert Fludds Naturkonzeption", in *Der Naturbegriff in der Frühen Neuzeit: Semantische Perspektiven zwischen 1500 und 1700*, Th. LEINKAUF (ed.), with K. HARTBECKE, Tübingen, 2005, pp. 213-235, and "Robert Fludd's Kabbalistic Cosmos", in *Platonism at the Origins of Modernity: Studies on Platonism and Early Modern Philosophy*, D. HEDLEY, S. HUTTON (eds.), *Archives internationales d'histoire des idées* 196, Dordrecht, 2008, pp. 75-92, originally published as "Robert Fludds kabbalistischer Kosmos", in "Scientia poetica": *Literatur und Naturwissenschaft*, N. ELSNER, W. FRICK (eds.), Göttingen, 2004, pp. 77-97. As explained by C. H. JOSTEN, "Robert Fludd's Theory of Geomancy and His Experiences at Avignon in the Winter of 1601 to 1602", *Journal of the Warburg and Courtauld Institutes* 27 (1964), pp. 327-335, FLUDD's theory of geomancy is closely related to his theory of cognition.

⁸ For introductions and overviews focused on diagrams in the medieval West, see, J. E. MURDOCH, *Album of Science: Antiquity and the Middle Ages*, New York, 1984; M. E. EVANS, "The Geometry of the Mind", *Architectural Association Quarterly*, 12/4 (1980), pp. 32-55; K. MÜLLER, "Gott ist [k]leine Sphäre: Visualisierungen des göttlichen in geometrisch-abstrakten Diagrammen des Mittelalters", in *Handbuch der Bildtheologie*, R. HOEFS (ed.), vol. 3, *Zwischen Zeichen und Präsenz*, Paderborn, 2014, pp. 311-355; B. BÜTTNER, "Images, diagrammes et savoirs encyclopédiques", in *Les images dans l'Occident médiévale*, J. BASCHET, P.-O. DITTMAR (eds.), Turnhout, 2015, pp. 389-396; J.-C. SCHMITT, *Penser par figure: Du compas divin aux diagrammes magiques*, Paris, 2019; *The Visualization of Knowledge in Medieval and Early Modern Europe*, M. KUPFER, A. S. COHEN, J. H. CHAIJS (eds.), Turnhout, 2020; and J. F. HAMBURGER, "'He used small lines to find the greatest truths': Diagrams in the Latin West", in *The Diagram as Paradigm: Medieval Diagrams in a Cross-Cultural Perspective (Byzantine, Western European, and Islamicate)*, J. F. HAMBURGER, D. ROXBURGH, L. SAFRAN (eds.), Washington, D.C., 2022.

⁹ As noted by S. BERGER, Fludd's image may have been inspired by the considerably more complex thesis print of the *Ordo universi* by Andrea Bacci and Natale Bonifacio, dated 1581; see S. BERGER, *The Art of Philosophy: Visual Thinking in Europe from the Late Renaissance to the Early Enlightenment*, Princeton, 2017, p. 20 and figs. 10-11. See further H. D. SAFFREY, "L'homme-microcosme dans une estampe médico-philosophique du seizième siècle", *Journal of the Warburg and Courtauld Institutes*, 57 (1994), pp. 89-122, and S. SIEGEL, *Tabula: Figuren der Ordnung um 1600*, Berlin, 2009, pp. 23-27.

¹⁰ For the five senses in art, see C. NORDENFALK, "The Five Senses in Late Medieval and Renaissance Art", *Journal of the Warburg and Courtauld Institutes* 48 (1985), pp. 1-22, and *Immagini del sentire: I cinque sensi nell'arte*, ed. S. FERINO-PAGDEN, Milan, 1996.

such set of concentric circles, identified as the Imaginary World (*Mundus imaginabilis*), placed in an intermediary position immediately above the man's pate. In this case, the circles are constituted not by the elements themselves, but rather, in a Platonic construction, their likenesses or "shadows" (*umbræ*, as Fludd calls them), which reach from the earth to the heavens in the form of fire, in short, their forms as perceived by the soul.¹¹ Higher still stands the world of the intellect, placed more or less directly above the man's head, wherein dwells the highest reality, namely, the Trinity, which is connected to the mind by the hierarchy of the angels. The inscription, attached to mind (*Mens*), linking the visible and invisible realms, which itself is further subdivided into spheres of the intellect (*Intellectus*) and reason (*Ratio*), reads "whose point connects (literally, penetrates) the soul to the angels." In its threefold structure, this part of the overall image recalls without replicating the Augustinian conception that saw in the triune faculties of memory, understanding, and will a reflection of the three persons of the Trinity, then combines it with a neo-Platonic conception of creation as a ladder whose rungs permit the soul to ascend to God.¹²

NOT MODERN: MEDIEVAL ANTECEDENTS FOR FLUDD'S DIAGRAM OF THE FACULTIES

Fludd's image presents a fascinating combination of the medieval and the modern. Fludd was a physician, and, in permitting the viewer to penetrate the skull's surface, his diagrammatic man resembles a dissection diagram, such as that depicting the lobes and cavities of the brain, which opens the chapter "On the Head" in Magnus Hundt's *Anthropologium de hominis dignitate*. (Fig. 3) The title of Hundt's handbook, published in 1501, is notable for its humanist emphasis on the "dignity" of man and for being among the first recorded uses of the term "anthropology".¹³ Like Fludd's engraving, the woodcut crowns its depiction of the head with a schematic representation of the human faculties, *Sensus communis*, *Imaginativa*, *Cogitativa*, and *Memorativa*, each keyed by a letter to one of the three ventricles (of which the first is divided into two compartments), above which floats the disembodied term *Intellectus*. The threefold scheme, according to which common sense and the imagination occupy the first ventricle, cogitation the second, and memory the third, derives

¹¹ A construction similar to, but not identical with, that posited by the doctrine of the spiritual senses, for which see K. RAHNER, "Le début d'une doctrine des cinq sens spirituels chez Origène", *Revue d'Ascétique et de Mystique* 13 (1932), pp. 134-140 and 236-237; The Spiritual Senses: Perceiving God in Western Christianity, P. L. GAVRILOV and S. COAKLEY (eds.), Cambridge, 2012; and M. PLESTED, "The Spiritual Senses, Monastic and Theological", in *Knowing Bodies, Passionate Souls*, S. A. HARVEY, M. MULLEN (eds.), Washington, D.C., 2017, pp. 301-312.

¹² For the ladder in medieval art, see C. HECK, *L'échelle céleste dans l'art du Moyen Âge: une image de la quête du ciel*, Paris, 1997.

¹³ For Hundt, see F. J. WORSTBROCK, "Hundt (Hund, Hunt; Canis), Magnus, d. Ä. (Magnus Magdeburgensis, Parthenopolitanus)", in *Deutscher Humanismus 1480–1520: Verfasserlexikon*, F. J. WORSTBROCK (ed.), vol. 1, Berlin, 2008, col. 1176-1185, and C. SANTING, "Early Anthropological Interest: Magnus Hundt's and Galeazzo Capra's Quest for Humanity", *History and Anthropology* 31 (2020), pp. 462-490. On dissection, see K. PARK, *Gender, Generation, and the Origins of Human Dissection*, New York, 2006; S. KUSUKAWA, *Picturing the Book of Nature: Image, Text, and Argument in Sixteenth-Century Human Anatomy and Medical Botany*, Chicago, 2012; and R. A. SHOTWELL, "Dissection Techniques, Forensics and Anatomy in the 16th Century", in *The Body of Evidence: Corpses and Proofs in Early Modern European Medicine*, F. P. DE CEGLIA (ed.), Medieval and Early Modern Philosophy and Science 30, Leiden-Boston, 2020, pp. 107-118.

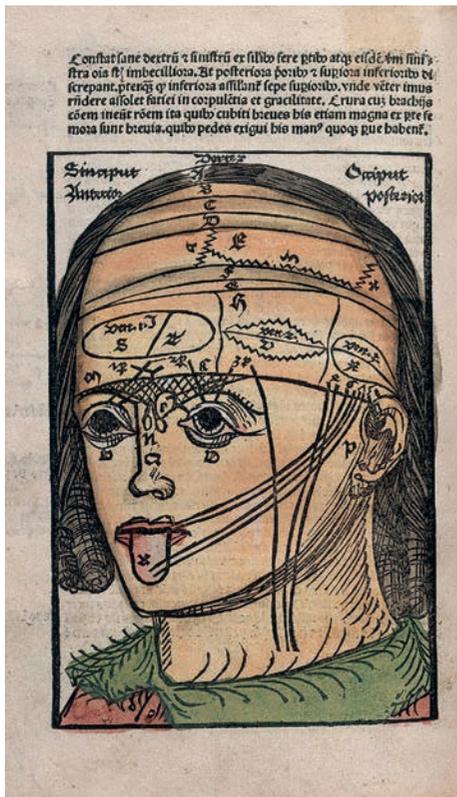


Fig. 3. *De capite humano*. Magnus Hundt, *Anthropologium de hominis dignitate*, Leipzig, 1501. London, The Wellcome Collection, 3362a (Photo: Wellcome Collection)

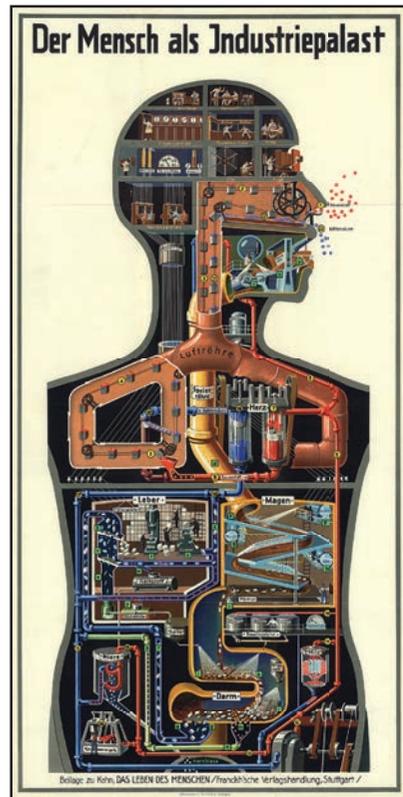


Fig. 4. Fritz Kahn, "Der Mensch als Industriepalast", in *Das Leben des Menschen*, Stuttgart: Franckh'sche Verlagsbuchhandlung, 1926 (Photo: Public Domain)

directly from Galen.¹⁴ The engraving's transition from subtle shading rendered with various forms of hatching to the abstraction of geometrical diagrams nicely simulates the shift from the senses to the intellect through the medium of the mind that the image seeks to convey. In short, in looking at these diagrammatic renditions of the mind, the mind of the viewer, working through the senses, recapitulates the very motions that are traced by the various elements within the illustrations.

¹⁴ See C. D. GREEN, "Where did the Ventricular Localization of Mental Faculties Come From?", *Journal of History of the Behavioral Sciences*, 39 (2003), pp. 131-142; M. U. FARUQUE, "The Internal Senses in Nemesius, Plotinus and Galen: The Beginning of an Idea", *Journal of Ancient Philosophy*, 10 (2016), pp. 119-139; and S. KEMP and G. J. O. FLETCHER, "The Medieval Theory of the Inner Senses", *American Journal of Psychology*, 106 (1993), pp. 559-576. For representations of the ventricles, see Y. V. O'NEILL, "Diagrams of the Medieval Brain: A Study in Cerebral Localization", in *Iconography at the Crossroads: Papers from the Colloquium Sponsored by the Index of Christian*

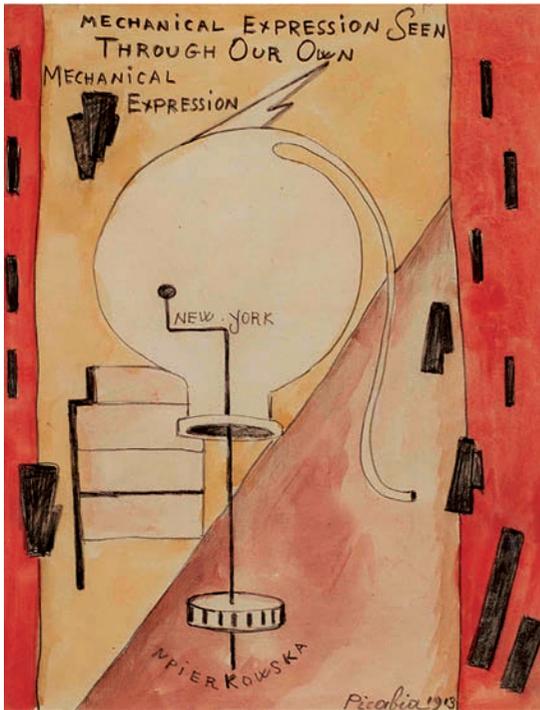


Fig. 5. Francis Picabia, *Mechanical Expression seen through our Mechanical Expression*. New York, 1913. Watercolor and graphite on paper. Christies, Paris, Auction 13965, lot 16B (Photo: Christies.com)

In Fludd's adaptation of this scheme, the image takes on the trappings of a fanciful Rube Goldberg device.¹⁵ It is superficially reminiscent of the illustrations to Fritz Kahn's *Das Leben des Menschen* (The Life of Human Beings), an atlas published between 1922 and 1931, which combine figurative realism with Bauhaus functionalism.¹⁶ (Fig. 4) It also brings to mind the mechanized bodies of Duchamp and Picabia, in which, however, the automatization of the body's inner operations deconstructs desire.¹⁷ (Fig. 5) Rather than imitating the body, the body imitates the machine. In effect we are presented with two radically different visions of the mind and its relationship to the world—the mind-body dualism that dominates western philosophy—of which Fludd's version embodies the idealist version, according to which physical states are really mental, and of which, to the contrary, its modern counterparts embody the materialist, according to which mental states are

Art, Princeton University, 23–24 March 1990, B. CASSIDY (ed.), *Index of Christian Art: Occasional Papers 2*, Princeton, NJ, 1993, pp. 91-105; and M. CAMILLE, "Before the Gaze: The Internal Senses and Late Medieval Practices of Seeing", in R. NELSON (ed.), *Visibility Before and Beyond the Renaissance: Seeing as Others Saw*, Cambridge, 2000, pp. 197-223. For a variant on the customary scheme, see M. J. CARRUTHERS, "Two Unusual Mind Diagrams in a Late Fifteenth-Century Manuscript (UPenn Schoenberg Collection, LJS 429)", *Manuscript Studies: A Journal of the Schoenberg Institute for Manuscript Studies*, 4/2 (2019), pp. 389-400. CARRUTHERS, *The Book of Memory: A Study of Memory in Medieval Culture*, Cambridge, 1990, pp. 46-79, offers a nuanced account of the theory and its implications as developed in medieval sources.

¹⁵ For analogies among the mind, body, and machine in the art of the modern period, see *Ghosts in the Machine*, M. GINOI, G. CARRION-MURAYARI (eds.), New York, 2012.

¹⁶ See U. VON DEBSCHITZ, *Fritz Kahn: Man Machine – Machine Mensch*, Vienna, 2009; and M. SAPPOL, *Body Motion: Fritz Kahn, Scientific Illustration and the Homuncular Subject*, Minneapolis, MN-London, 2017.

¹⁷ See W. A. CAMFIELD, "The Machinist Style of Francis Picabia", *The Art Bulletin*, 48 (1966), pp. 309-322; W. BOHN, "Picabia's 'Mechanical Expression' and the Demise of the Object", *The Art Bulletin*, 67 (1985), pp. 673-677; C. A. JONES, "The Sex of the Machine: Mechanomorphic Art, New Women, and Francis Picabia's Neurasthenic Cure", in *Picturing Science, Producing Art*, C. A. JONES, P. GALISON (eds.), with A. SLATON, New York, 1998, pp. 145-180; and P. KARMEI, "Francis Picabia, 1915: The Sex of a New Machine", in *Modern Art and America: Alfred Stieglitz and his New York Galleries*, S. GREENOUGH (ed.), Washington, D.C.-Boston, 2000, pp. 203-219 and 507-509.

really physical. What the two have in common, however, is a conception of the mind that is captured and conveyed through diagrams, a way of thinking that can be traced back to the Middle Ages and, beyond, to Antiquity. Fludd's diagram maps the workings of memory; it also makes them memorable.¹⁸ To that extent, it is remarkably self-referential in ways that make one think of one of the perpetual motion machines in whose invention Fludd invested so much energy.¹⁹ In acting on Fludd's diagram, our own minds set that of its subject in motion, just as the motions of his mind act in turn on ours. Diagrams possess this uncanny capacity to allow ourselves to see our minds at work.

As Herb would be the first to recognize, there is virtually no aspect of this image that is not anticipated by medieval precedents.²⁰ For all its apparent esotericism, informed by the Paracelsian doctrine of alchemical triads, Fludd's image, indeed, his worldview, remains rooted in the diagrammatic techniques common to the medieval classroom.²¹ Nothing, unfortunately, is known about Fludd's library. However, his intellectual inclinations and, not least, the illustrations to his work indicate that he was well-versed in medieval diagrammatic traditions. Fludd's image—in effect, a collection of inter-connected diagrams—testifies to his confidence in the ability of images in general and of diagrams in particular to convey and, no less important, create knowledge.

Fludd's image draws on the visual rhetoric of anatomical sections such as a well-known illustration from an English medical miscellany, which depicts the seven tunics and three humors of the eye and skull.²² (Fig. 6) Fludd, however, dissects the spiritual as opposed to the purely corporeal man. In like fashion, Fludd's diagram can be unpacked layer by layer so as to unfold a genealogy and typology of medieval diagrammatic method. In this context, more interesting than what the diagrams represent is how they work. In other words, while the content of diagrams is critical, more interesting is what makes them tick.

However ludicrous Fludd's ideas might seem, his diagrammatic man lays claim to our attention. For once again, we live in a diagrammatic age. Across numerous fields, from cognitive and computer science to mathematics and physics, diagrams enjoy a renaissance. Diagrams prove central in fields such as combinatorics as well as set, graph and network theory, all of which are used by neuroscientists to try to unlock the mysteries of the human mind. Scientists debate the extent to which computers can mimic or replicate brain and mind function (not the same thing), whether by means of algorithms—flowcharts that map step-by-step processes that incorporate feedback loops—or of neural networks, collections of interconnected nodes

¹⁸ See most recently M. J. CARRUTHERS, "Geometries for Thinking Creatively", in *The Visualization of Knowledge* (as in n. 8), pp. 33-44.

¹⁹ For FLUDD's machine, a water mill of a kind that he was the first to propose in 1618, see R. PISANO and P. BUS-SOTTI, "Historical and Epistemological Reflections on the Culture of Machines Around the Renaissance: Machines, Machineries and Perpetual Motion", *Acta Baltica Historiae et Philosophiae Scientiarum*, 3/1 (2015), pp. 69-87.

²⁰ PERLER, "Robert Fludd" (as in n. 1), pp. 227-228, discusses some of these antecedents.

²¹ For diagrams in the classroom, see K.-A. WIRTH, "Von mittelalterlichen Bildern und Lehrfiguren im Dienste der Schule und des Unterrichts", in *Studien zum städtischen Bildungswesen des späten Mittelalters und der frühen Neuzeit: Bericht über Kolloquien der Kommission zur Erforschung der Kultur des Spätmittelalters 1978 bis 1981*, B. MOELLER et al. (eds.), Göttingen, 1983, pp. 256-370.

²² For London, British Library, Sloane MS. 981, see MURDOCH, *Album of Science* (as in n. 8), no. 215, and P. M. JONES, *Medieval Medical Miniatures*, London, 1984, pp. 48-51.



Fig. 6. Medical Miscellany with 'Book of Macharias on the Eye, called Salaracer or Secret of Secrets, England, ca. 1400. BL Sloane MS 981, fol. 68r (Photo: © British Library Board)

capable of machine learning. In some respects, we are not so different from Fludd after all.

The utility of diagrams was not always accepted, even in such areas as Euclidean geometry, to which they might seem indispensable. In 1894, the mathematician David Hilbert famously declared in his *Foundations of Geometry* that “a theorem is only proved when the proof is completely independent of the diagram”.²³ Ever since the 1950s, however, Feynman diagrams have been accepted as, not just nifty representations of subatomic interactions, but mathematically precise and predictive tools that capture the nature of those interactions.²⁴ It is not simply that diagrams perform a critical role as instruments of explanation. Rather, diagrams have always provided and continue to provide compelling models for how both the mind and nature—Fludd’s two worlds—actually work.

At issue in all this is not just a critical chapter in the history of the diagrammatic method, but, further still, the nature of the diagram itself.²⁵ Are diagrams representations? If so, of what, precisely? To which a philosopher might add: and what exactly is a representation? Or rather, are diagrams instruments,

²³ Quoted by P. MANCOSU, “Visualization in Logic and Mathematics”, in *Visualization, Explanation and Reasoning Style in Mathematics*, P. MANCOSU (ed.), Basel, 2005, pp. 13-30, esp. 14, after the lectures, Niedersächsische Staats- und Universitätsbibliothek, Cod. Ms. Hilbert, 594, published in translation as HILBERT’s *Lectures on the Foundations of Geometry, 1891–1902*, M. HALLETT, U. MAJER (eds.), Berlin, 2004, p. 75 (p. 11, lines 6-15: “Der Beweis kann auch an der Hand einer geeigneten Figur geführt werden, doch ist die Zuziehung derselben durchaus nichts notwendiges, sie erleichtert die Auffassung und ist ein fruchtbares Mittel zur Entdeckung neuer Sätze. Doch Vorsicht da sie leicht irreleitet. Der Lehrsatz ist erst dann bewiesen, wenn der Beweis von der Figur vollkommen unabhängig ist. Der Beweis muss sich Schritt für Schritt auf die vorangegangnen Axiome berufen”. D. HILBERT, *Foundations of Geometry*, trans. E. J. TOWNSEND, Chicago, 1902, omits the passage in question.

²⁴ For the development and dissemination of Feynman Diagrams in their historical context, see D. KAISER, *Drawing Theories Apart: The Dispersion of Feynman Diagram in Postwar Physics*, Chicago, 2005.

²⁵ Cf. F. JEDRZEJEWSKI, “Diagrammes et Catégories”, Ph.D. Dissertation, Université Paris-Diderot – Paris VII, 2007, p. 18: *Le diagramme donne penser plus qu’il ne représente: il actualise par construction des virtualités. Le diagramme n’est pas une démonstration. Inutile d’opposer le discursif à l’intuitif, ce qui se joue dans l’espace diagrammatique est un parcours de la raison par lequel s’opère une mise en coincidence avec l’objet à connaître et non le déroulement mécanique de procédures démonstratives. Il n’y a nulle méthode formelle démonstrative*

tools for thinking that generate knowledge?²⁶ If that is the case, does the manner in which they do so mimic the actual structure of cognition? Speaking of cognition, why, in keeping with theories of extended cognition, do we find such externalized devices so useful?²⁷ Are diagrams simply spatial metaphors? Or are they models? Either way, to what extent are their forms culturally specific? These are just a few of the questions that present themselves.²⁸

When it comes to the genealogy of Fludd's diagram, the diagrammatic traditions of the Middle Ages provide some answers. As can be seen from a page from an English astrological, medical, and magical compilation of the late fifteenth century, Fludd's diagram offers a medieval worldview in modern guise.²⁹ (Fig. 7) To suggest that such a book might have passed through Fludd's hands is simply to note that his sources need not have been as esoteric as they are sometimes made out to be. The compendium's constellation of diagrammatic images invites comparison to Fludd, who constructs his arguments visually as well as verbally. At the center of the large central circle is hell. Proceeding upward and outward, we progress from earth through the other elements, water, air, and fire, to the circuits of the moon, and the other planets. Mercury and Venus are located between the moon and the sun, an arrangement that originated with the late antique commentator on Cicero's *Dream of Scipio*, Macrobius. There follow the various firmaments, atop of which sits the *Sedes dei*, the throne of God. Joining the deity around the circumference of the circle are the nine orders of angels.³⁰ Filling out the page are a T-O map of the world, with Jerusalem at its center, at the upper right, and diagrams of eclipses.

In the English miscellany, the constellation of elements reflects a tradition of diagrams charting the hierarchy of the universe, such as that found in the De Lisle Psalter, illuminated in London before 1326.³¹ Accompanying an excerpt from John Pecham's commentary on John of Sacrobosco's *De Sphaera*, the diagram traces the motions of the stars and planets. As in the medical miscellany, the inclusion of hell at the center lends it a devotional as well as a didactic function.³² A second such diagram in the Howard Psalter (produced at Westminster

dans le diagramme, car l'application d'une telle méthode conduirait à rendre la connaissance indépendante de sa matière. Au contraire, le diagramme cherche l'union intime avec l'objet à connaître. Car le diagramme est ce point de passage.

²⁶ For the concept of "operativity", see S. KRÄMER, *Figuration, Anschauung, Erkenntnis: Grundlinien einer Diagrammatologie*, Berlin, 2016.

²⁷ The concept was introduced by A. CLARK and D. J. CHALMERS, "The Extended Mind", *Analysis*, 58 (1998), pp. 7-19; repr. in *The Extended Mind*, R. MENARY (ed.), Cambridge, MA, 2010, pp. 27-42.

²⁸ On these questions, see, e.g., the studies by B. TVERSKY, "Diagrams", in *Information Design: Research and Practice*, A. BLACK et al. (eds.), London, 2017, pp. 349-360; *Mind in Motion: How Action Shapes Thought*, New York, 2019; also J. V. NICKERSON, J. E. CORTER, B. TVERSKY, and Y. J. RHO, "Cognitive Tools Shape Thought: Diagrams in Design", *Cognitive Processing*, 14 (2013), pp. 255-272.

²⁹ For San Marino, Henry Huntington Library, MS. HM 64, see <<https://catalog.huntington.org/record=b1841462>> (accessed 27.5.2021).

³⁰ See B. BRUDERER-EICHBERG, *Les neuf choeurs angéliques: origine et évolution du thème dans l'art du Moyen Age*, Civilisation médiévale 6, Poitiers, 1998.

³¹ L. F. SANDLER, *The Psalter of Robert de Lisle in the British Library*, London-New York, 1983.

³² For London, British Library, Arundel MS 83 II, fol. 123v, see L. F. SANDLER, "Religious Instruction and Devotional Study: The Pictorial and the Textual in Gothic Diagrams", in *The Visualisation of Knowledge* (as in n. 8), pp. 429-448, esp. 432-435 and 441-444, and B. OBRIST, "The Physical and the Spiritual Universe: 'Infernus' and Paradise

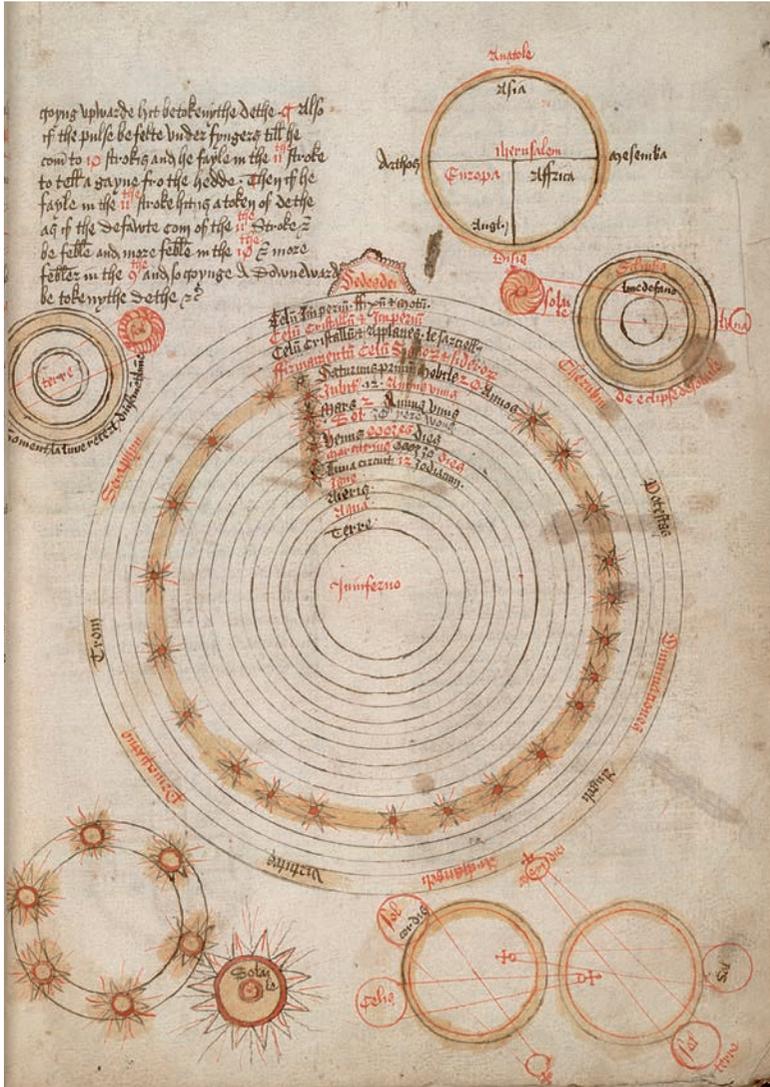


Fig. 7. Astrological and medical compilation, England, late 15th century. San Marino, Huntington Library, HM 64, fol. 17r (Photo: Huntington Library)

ca. 1310–30 and now bound together with the fragmentary De Lisle Psalter), integrates the angelic ladder into a tree-like structure to provide the viewer with a lattice for contemplative ascent. The eight rewards of heaven, which constitute the central spine, are paired somewhat awkwardly with the eight beatitudes, to the left, and the nine orders of angels (conformed to the pattern by combining the seraphim and cherubim in the uppermost roundel), to the right.

Fludd’s diagram lends the overall scheme a more pronounced philosophical, specifically neo-Platonic cast. The seat of God at the summit of a ladder of all creation, culminating in the



Fig. 8A. Treatise on destiny of soul, Italy, ca. 1200. Paris, BnF, ms. lat. 3236A, fol. 89r (Photo: BnF)

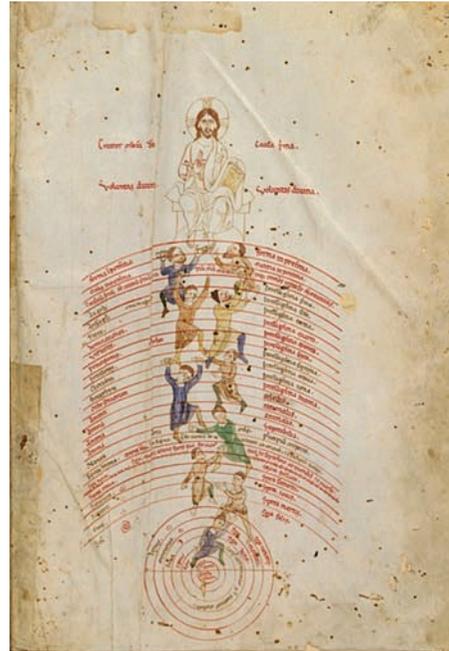


Fig. 8B. Treatise on destiny of soul, Italy, ca. 1200. Paris, BnF, ms. lat. 3236A, fol. 90r (Photo: BnF)

orders of angels up which one can climb, but down which one also can tumble, is rooted in the thought of the Pseudo-Dionysius, the sixth-century Syrian theologian whose writings in Latin translations transmitted neo-Platonism to the medieval West.³³ In a late-twelfth or early thirteenth-century miscellany of northern Italian origin, two such hierarchical schemes, each occupying a full-page and accompanying a short text on the destiny of the soul, outline the path of ascent. (Figs. 8A-8B) The text is based on the symbolism of the numbers three and ten, which also structure the accompanying images. Of these, the first (fol. 89r), constructed with complete circles, was abandoned when the designer recognized that he had not left himself enough space. In the second (fol. 90r), in which the outermost circles are reduced, *pars pro tota*, to arcs, souls set out from the earth and, having ascended through concentric circles representing the remaining elements (water, air and fire) plus the innermost planets

in Medieval Cosmography and its Visual Representations (Seventh-Fourteenth Century)", *Studies in Iconography*, 36 (2015), pp. 41-78, esp. p. 68.

³³ Although the influence of the pseudo-Dionysius' ideas on western art, specifically, on the patronage of Abbot Suger of Saint-Denis, has largely been discredited, specific instances of impact remain; see K. L. MARSENGILL, "Images of Holy Men in Late Antiquity in Light of Pseudo-Dionysius the Areopagite: Framing Spiritual Ascent and Visualising Spiritual Hierarchy", in *Pseudo-Dionysius and Christian Visual Culture, c. 500-900*, F. DELL'ACQUA, E. S. MAINOLDI (eds.), Cham, 2020, 133-176; for Paris, BnF, ms. lat. 3236A, fol. 90r, see BRUDERER-EICHBERG (as in n. 30), p. 215.

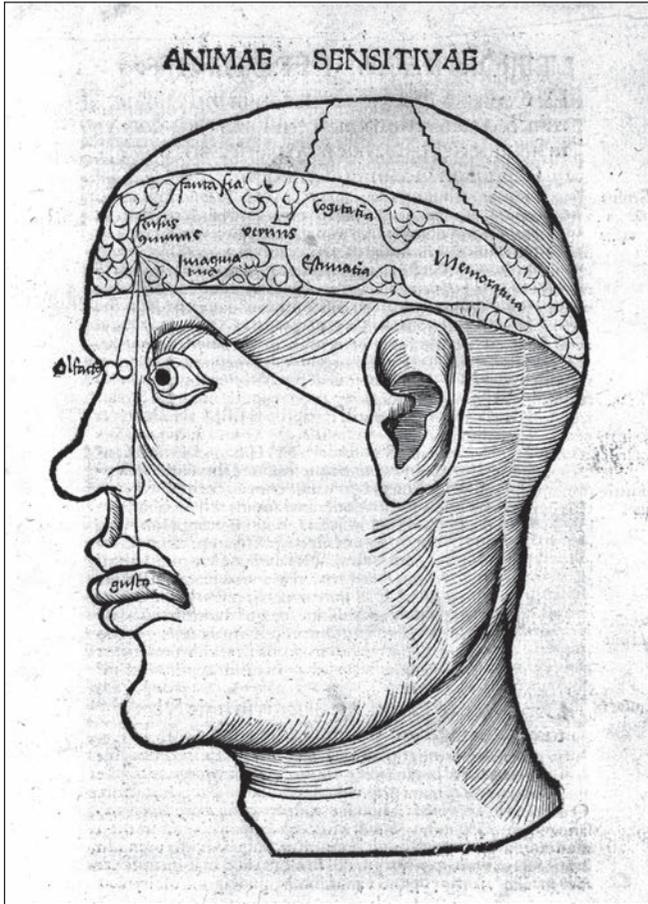


Fig. 9 Ventricles of Brain.
 Gregor Reisch, *Margarita
 philosophica*, Freiburg, 1503
 (Bk. X, Trac. II, ch. xxi).
 London, Wellcome Institute,
 b11488347 (Photo: Wellcome
 Collection)

(the moon, Mercury, and Venus), pass on to higher spheres, denoted by superimposed arcs. Following Ptolemy, these represent, first, the sun and three additional planets (Mars, Jupiter, and Saturn), followed by three spheres that account for the motion of the planets against the fixed stars (the first, denoted by hatching, of those stars, the other two, in motion, to account for the movements of the sun, moon, and planets from west to east or north to south). Having breached this boundary, ten climbers pass through a single sphere denoting physical nature (*natura principium corporis*), plus four more corresponding to progressively more ethereal parts of the world soul (vegetable, animal, rational, and celestial). The upper levels, identified with the Twenty-Four Elders of the Apocalypse and the nine orders of angels, correspond with Avicenna's ten celestial intelligences (*Metaphysica IX, 4*), but (presumably because of scribal error) in reverse order so that, rather than culminating with the cherubim and seraphim, it begins with them. The three circles immediately below the feet of Christ, corresponding to the Platonic conception of νοῦς or intellect, are labeled *causatum primum esse creatum primum*

principium omnium creaturarum continens intra se omnes creaturas, material in potentia, and forma in potentia. In lieu of the four evangelists, surrounding the Godhead stand four inscriptions: *Creator omnium deum*—words that define all that radiates below his footstool as a series of emanations—*Causa prima*, and, repeated at left and right, *voluntas divina*.³⁴

Despite Fludd's rejection of Aristotle, whom he identified as a second Satan, his diagram depends on a conception of the mind, senses, and, more particularly, psychological faculties, Aristotelian in origin (or at least believed to have been in the Middle Ages), that had been popularized in works such as the *Margarita philosophica* or Pearl of Philosophy by the Carthusian monk, Gregor Reisch, first published in 1503.³⁵ (Fig. 9) Reisch's treatise offers an introduction to the seven liberal arts, in short, a digest of the typical medieval curriculum, not unlike what one finds in Fludd's compendium. As in the illustration to Hundt's *Anthropologium*, its image of the human head encapsulates the cell doctrine of brain function, according to which a front ventricle serves as the seat of the *vis communis* or common sense—not what we think of it as being, but rather the place where, as in Fludd's diagram, sense impressions are gathered. To this are added the middle ventricle, that of the *vis cogitativa* (the imagination), and the *vis estimativa* (the faculty of estimative or rational thought), and the rear ventricle, that of the *vis memorativa* or memory. Combined with common sense in the foremost ventricle are the faculties of fantasy (*Fantasia*) and imagination (*Imaginativa*). The middle ventricle contains the *vis cogitativa* and the *vis estimativa*, which evaluates sensory perceptions; the rear ventricle, the *vis memorativa*. Although the linking of the five senses to five external faculties of the soul originated in Aristotle's *De anima* and in medieval commentaries on this widely circulated text, the distribution of five faculties over three ventricles is due to Avicenna.³⁶

In the now well-known early thirteenth-century diagram from an English manuscript of the pseudo-Augustinian tract *De spiritu et anima*, formerly attributed to Alcher of Clairvaux

³⁴ M.-T. D'ALVERNAY, "Les pérégrinations de l'âme dans l'autre monde d'après un anonyme de la fin du XII^e siècle", *Archives d'histoire doctrinale et littéraire du moyen âge*, 13 (1940–1942), pp. 239–299, summarized in part by MURDOCH (as in n. 8), pp. 333–335.

³⁵ For Fludd on Aristotle, see C. MARTIN, *Subverting Aristotle: Religion, History, and Philosophy in Early Modern Science*, Baltimore, 2014, pp. 153–154, and for Aristotle himself on the senses, see D. HELLER-ROAZEN, "Common Sense: Greek, Arabic, Latin", in *Rethinking the Medieval Senses: Heritage, Fascinations, Frames*, S. G. NICHOLS, A. KABLITZ, A. CALHOUN (eds.), Baltimore, 2008, pp. 30–50. From the extensive literature on Reisch's *Margarita philosophica*, I cite only K. PARK, "The Organic Soul", in *The Cambridge History of Renaissance Philosophy*, C. B. SCHMITT et al. (eds.), Cambridge, 1988, pp. 464–484; and C. DIETL, "Die Organisation neuen und alten Wissens in Memorialbildern: Gregor Reischs 'Margarita philosophica'", in *Wissenspaläste: Räume des Wissens in der Vormoderne*, G. MIERKE (ed.), Euros: Chemnitzer Arbeiten zur Literaturwissenschaft 2, Würzburg, 2013, pp. 78–100. For a challenge to the Aristotelian origin of the doctrine of the internal senses, see *The Internal Senses in the Aristotelian Tradition*, S. N. MOUSAVIAN, J. FINK (eds.), Studies in the History of the Philosophy of Mind 22, Cham, 2020.

³⁶ For Aristotle, see *Mind, Cognition and Representation: The Tradition of Commentaries on Aristotle's De anima*, J. J. M. P. BAKKER, J. M. M. H. THUISSEN (eds.), Aldershot, 2008, and A. M. MORA-MARQUEZ, "A List of Commentaries on Aristotle's *De anima* III (c. 1200–1400)", *Cahiers de l'Institut du Moyen Âge grec et latin*, 83 (2014), pp. 207–256; for Avicenna, D. L. BLACK, "Estimation (*Wahm*) in Avicenna: The Logical and Psychological Dimensions", *Dialogue: Canadian Philosophical Review/Revue canadienne de philosophie*, 32 (1993), pp. 219–258; BLACK, "Imagination and Estimation: Arabic Paradigms and Western Transformations", *Topoi*, 19 (2000), pp. 59–75, and A. IVERY, "Arabic and Islamic Psychology and Philosophy of Mind", *The Stanford Encyclopedia of Philosophy* (Summer 2012 Edition), ed. E. N. ZALTA, URL = <<https://plato.stanford.edu/archives/sum2012/entries/arabic-islamic-mind/>>.

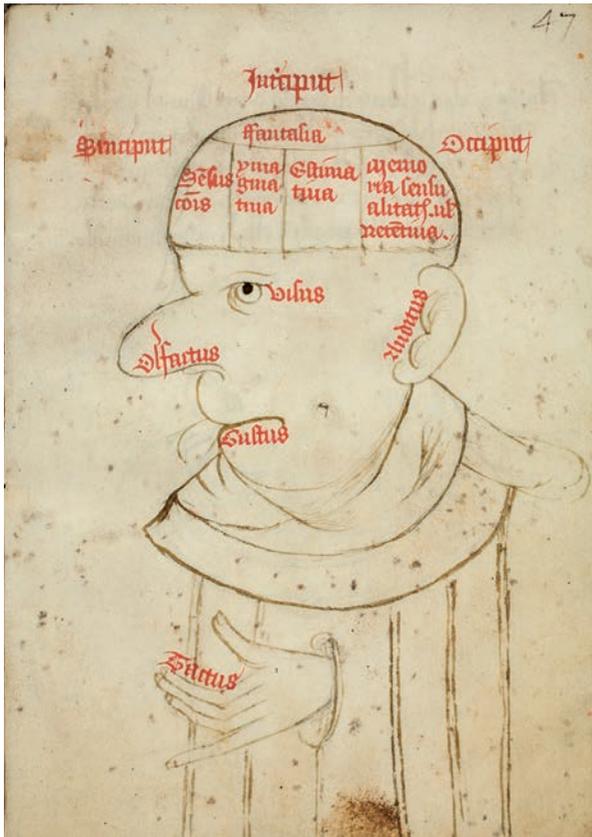


Fig. 10. Ventricles of Brain and the Five Senses, *De spiritu et anima*. Cambridge, Trinity College, MS O.7.16, fol. 47r (Photo: Fellows of Trinity College)

(d. ca. 1175), the number of ventricles or cells is expanded to a full five.³⁷ (Fig. 10) As Herb notes in *Experiencing Medieval Art*, the image faces a stemmatic text that “diagrams how the soul comprehends sense, spirit, intellect, mind, reason, and memory”.³⁸ Text and image complement one another perfectly, figuring the page, in Herb’s words, “as a kind of mirror that attests to the real things beyond it and hence as an intermediary between the intelligible and higher human understanding”.³⁹ Much the same could be said of Fludd’s figuration of the mind as an intermediary between the two worlds of his title. In the medieval manuscript, the five ventricles, labeled “common sense”, “imagination”, “fantasy”, “estimation”, and “memory”, correspond to the five familiar senses, making a total of ten, five inner and five outer.

³⁷ For Alcher, see C. J. MEWS, “The Diffusion of the *De spiritu et anima* and Cistercian Reflection on the Soul”, *Viator*, 49/3 (2018), pp. 297-330; and J. MARTINEZ PORCELL, “Introducción y traducción del *De Spiritu et Anima*, un opúsculo inédito atribuido a Alcher de Clairvaux”, *Espíritu*, 67 (2018), pp. 265-290.

³⁸ KESSLER, *Experiencing Medieval Art* (as in n. 2), p. 132

³⁹ *Ibidem*.

In Fludd's case, the reduced number of three ventricles or regions would have appealed in part because it permitted him to match the mind's three triads to that of the Trinity above and beyond the brain, represented at the apex of the entire composition, where Father, Son, and Holy Ghost converge, surrounded by the nine orders of angels, themselves three times three in number.

In its interlocking structure, Fludd's Trinitarian configuration brings to mind the "Shield of Faith" (*Scutum fidei*), which lent the Trinity the self-evident character of a logical demonstration.⁴⁰ To the underlying diagram, however, Fludd adds figural elements. In its combination of diagrammatic imagery as a means of representing the three-in-one triangle of inner-Trinitarian relations with sunbursts representing both the Trinity's ineffability and manifest glory, the imagery employed by Fludd finds ample antecedents in medieval art, as, for example, in the Trinitarian imagery of the *Rothschild Canticles* (Fig. 11), in which an image of the Trinity as triangle is accompanied by a passage from Augustine's *De Trinitate* VII.iv.7: "When, then, it is asked what the three are, or who the three are, we betake ourselves to the finding out of some special or general name under which we may embrace these three; and no such name occurs to the mind, because the super-eminence of the Godhead surpasses the power of customary speech. For God is more truly thought than He is altered, and exists more truly than He is thought".⁴¹ God is beyond predication. The man ringing a carillon in the upper left-hand corner of the miniature also resonates with Fludd's cosmos, whose order echos in the music of the spheres, the subject of Book III of his treatise.⁴²

⁴⁰ See M. EVANS, "An Illustrated Fragment of Peraldus's Summa of Vice: Harleian MS 3244", *Journal of the Warburg and Courtauld Institutes*, 45 (1982), pp. 14-68; F. ŠMAHEL, "Das 'Scutum fidei christianae magistri Hieronymi Pragensis' in der Entwicklung der mittelalterlichen trinitarischen Diagramme", in *Die Bildwelt der Diagramme Joachims von Fiore. Zur Medialität religiös-politischer Programme im Mittelalter*, A. PATSCHOVSKY (ed.), Ostfildern, 2003, pp. 186-214; O. PAVLÍČEK, "Scutum fidei christianae. The Depiction and Explanation of the Shield of Faith in the Realist Teaching of Jerome of Prague in the Context of His Interpretation of the Trinity", *Filosofický časopis*, special issue 1 (2014) = *The Bohemian Reformation and Religious Practice* 9, D. V. ZDENEK, D. R. HOLETON (eds.), pp. 72-97; and R. J. WILKINSON, *Tetragrammaton: Western Christians and the Hebrew Name of God. From the Beginnings to the Seventeenth Century*, Studies in the History of Christian Traditions 179, Leiden-Boston, 2015, 2, pp. 42-252. For logic applied to the Trinity *per se*, see S. L. UCKELMAN, "Reasoning about the Trinity: A Modern Formalization of a Medieval System of Trinitarian Logic", in *Logic in Religious Discourse*, A. SCHUMANN (ed.), Frankfurt, 2010, pp. 216-238.

⁴¹ Translation: *St. Augustine on the Holy Trinity, Doctrinal Treatises, Moral Treatises*, P. SCHAFF (ed.), A Select Library of the Nicene and Post-Nicene Fathers of the Christian Church 3, Buffalo, 1887, <<https://www.ccel.org/ccel/schaff/npnf103.iv.i.ix.iv.html>> (accessed 27.5.2021). See J. F. HAMBURGER, *The Rothschild Canticles: Art and Mysticism in Flanders and the Rhineland ca. 1300*, New Haven, 1990, pp. 118-142. On sunburst glories, see the studies by CHRISTIAN HECHT, *Die Glorie: Begriff, Thema, Bildelement in der europäischen Sakralkunst vom Mittelalter bis zum Ausgang des Barock*, Regensburg, 2003, and "Das Licht der sakralen Himmelsikonographie", in *Projektierte Himmel*, J. J. BERNS, T. RAHN (eds.), Wolfenbütteler Forschungen 154, Wiesbaden, 2019, pp. 317-331.

⁴² P. T. AMMANN, "The Musical Theory and Philosophy of Robert Fludd", *Journal of the Warburg and Courtauld Institutes*, 30 (1967), pp. 198-227; D. GUTKNECHT, "De templo musicae. Zur Deutung eines Kupferstichs aus Robert Fludd: 'Utriusque cosmi ... HISTORIA' (1617)", in *Form und Stil: Festschrift für Günther Binding zum 65. Geburtstag*, S. LIEB (ed.), Darmstadt, 2001, pp. 224-236; R. H. GILES, "The Inaudible Music of the Renaissance: From Marsilio Ficino to Robert Fludd", *Renaissance and Reformation / Renaissance et Réforme*, 39/2, Special Issue: *Polymaths and Erudites* (2016), pp. 129-166, esp. 135: Fludd's "reintroduction of Boethian principles as late as the seventeenth century in itself demonstrates Fludd's detachment from dominant trends in English music theory. His conceptualization of the universe is decidedly Aristotelian in its implacable distinction between mathematics and



Fig. 11. The Trinity. *Rothschild Canticles*, Diocese of Th rouanne, ca. 1300. New Haven, Beinecke Rare Book and Manuscript Library, Yale University MS 404, fol. 79r (Photo: Beinecke Rare Book and Manuscript Library)

As an account of the process of contemplative ascent, Fludd's diagram reads from the bottom up. In terms of its multiplication of threefold structures, however, it is determined from the top down. Each brain ventricle is defined by a three-part diagram with the soul (*Anima*) occupying the overlapping area at the center. The soul, therefore, is made up of three powers, each of which is itself threefold in nature. The first and foremost triad is constituted by perception (*Sensitiva*) and the imagination (*Imaginativa*). The second, linked to the first by a "worm"

physics, and Neoplatonic in its preoccupation with the soul's ascent from a state of imperfection towards the unity of God. This, in combination with Fludd's deliberate effort to connect music and the cosmos with the harmony and health of the human body, brings him closer to Renaissance philosophers". See also E. KNOBLOCH, "Harmonie und Kosmos: Mathematik im Dienste eines teleologischen Weltverst ndnisses", *Sudhoffs Archiv* 78 (1994), pp. 14-40; W. SCHMIDT-BIGGEMANN, "Der Streit um Kosmologie und Harmonie zwischen Robert Fludd und Johannes Kepler", *Buxtehude jenseits der Orgel*, M. ZYWIETZ (ed.), Graz, 2008, pp. 119-150; and J. NORTH, "Macrocosm, Microcosm, and Analogy", in *Imagination in the Later Middle Ages and Early Modern Times*, L. NAUTA, D. P TZOLD (eds.), Groningen Studies in Cultural Change 12, Leuven-Paris-Dudley, MA, 2004, pp. 135-151, esp. 144-147.

(*Vermis*) and subtended by three arcs representing mind (*Mens*), intellect (*Intellectus*), and reason (*Ratio*), is constituted by thought (*Cogitativa*) and estimation (*Estimativa*). The threefold elaboration of perception into sensible, imaginative, and intellectual spheres harks back to Augustine's hierarchy, elaborated in *De Genesi ad litteram*, of corporeal, spiritual, and intellectual vision.⁴³ The third ventricle, linked to the second, is in turn constituted by memory (*Memorativa*) and motion (*Motiva*) and communicates with the body through the medulla of the spine, as indicated by the long, near vertical column that descends beneath the man's collar. Although the inscription connecting the mind, intellect, and reason to the divine realm reads "by whose sharpness the soul penetrates towards", in the accompanying text Fludd, in keeping with tenets of apophatic theology, notes that "these secrets, such as the ineffable mystery of the three essences, have never been grasped by the senses. Nor can the imagination comprehend them, while reason itself, and the height of human intelligence, can scarcely ever obtain such grace, and only with a mighty illumination of mind. Thus it is that reason first ascends by divine speculation to the intellect, and then leaps up from the intellect into the sphere of the mind, so that in its light it sees spiritual things from afar, and by such a vision is transported with intense joy".⁴⁴

SYLLOGISMS AND THE SENSES

A diagram in a miscellany assembled in Leipzig in the 1470s by the historian Johann Lindner of Mönchburg brings one closer still to the patterns of thought that informed Fludd's own way of thinking.⁴⁵ (Fig. 12) By patterns of thought, I mean not only the content of his philosophy but also the diagrams that gave it shape and that in many respects come to stand for both the substance and processes of thought itself. The drawing prefaces the *Parvulus philosophiae naturalis* or Little Natural Philosophy, here attributed to Albertus Magnus but in fact by Peter Gerticz, also known as Peter of Dresden (1350–before 1425).⁴⁶ As Annemieke Verboon

⁴³ See T. FINAN, "Modes of Vision in St. Augustine: *De Genesi ad litteram* XII", in *The Relationship between Neoplatonism and Christianity: Proceedings of the First Patristic Conference at Maynooth 1990*, R. FINAN, V. TWOMEY (eds.), Dublin, 1992, pp. 141-154.

⁴⁴ FLUDD, *Utriusque cosmi* (as in n. 4), vol. 2, p. 218; translation from GODWIN, *Greater and Lesser Worlds* (as in n. 3), 4.12.2.

⁴⁵ Among the examples of the brain ventricle diagram adduced by A. VERBOON, "Brain Ventricle Diagrams: A Century after Walther Sudhoff: New Manuscript Sources from the xvth Century", *Sudhoffs Archiv*, 98 (2014), pp. 212-233, which draws on VERBOON, "Lines of Thought: Diagrammatic Representation and the Scientific Texts of the Arts Faculty, 12001500", Ph.D. Dissertation, Leiden University, 2010, available for download at <<https://scholarlypublications.universiteitleiden.nl/handle/1887/16029>> (accessed 7.6.2021). For a description of the manuscript, see S. A. J. MOORAT, *Catalogue of Western Manuscripts on Medicine and Science in the Wellcome Historical Medical Library I: Mss. Written before 1650 A.D.*, London, 1962, pp. 39-41; also search "MS. 55" at <<http://archives.wellcomelibrary.org>>, according to which "Johann Lindner, the historiographer, was born at Münchberg, and studied at Leipzig where he took his Master's Degree about 1474. He joined the Dominican Order at Pirna, and later became Chaplain to Prince George of Saxony. He wrote a large chronicle of universal history entitled 'Onomasticon' which is in the Leipzig Town Library, and has never been printed in full, though it was used by Pistorius as a continuation of the 'Nüremberg Chronicle' from 1480, in his 'Scriptores rerum Germanicarum 1582-1607'". See further R. HOFMANN, "Der Pirnische Mönch Johann Lindner, sein Onomasticum mundi generale und sein Geburtsort", *Neues Archiv für Sächsische Geschichte und Altertumskunde*, 25 (1904), pp. 152-160.

⁴⁶ PETRUS DRESDENSIS, *Parvulus philosophiae naturalis in Physicam Aristotelis introductorius*, Leipzig (ARNOLD VON KÖLN), c. 1495, ISTC ig00277600. See S. HOYER, "Peter von Dresden (Peter Gerticz), Rektor der Dresdner Kreuzschule,

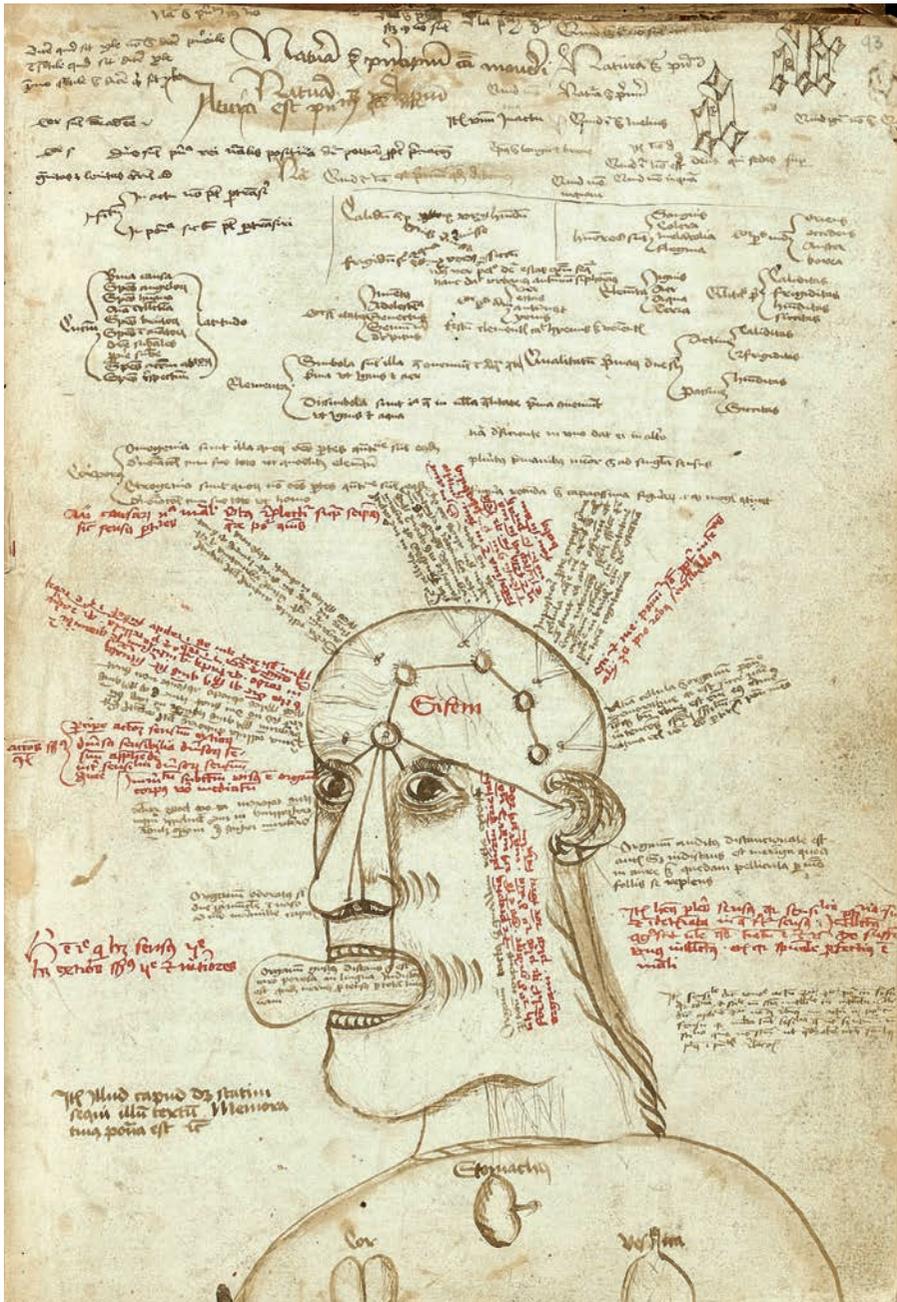


Fig. 12. Brain ventricles. Peter of Dresden, *Parvulus philosophiae naturalis* in Miscellany of Johann Lindner of Mönchburg, Leipzig, 1470s. London, Wellcome Institute, MS 55, fol. 93r (Photo: Wellcome Institute)

has demonstrated, this text or, more accurately, commentaries on it, while not the original locus of such diagrams, served as the principal vehicle of their development and dissemination.⁴⁷ While little more than a primer in Aristotelian natural philosophy or, better, precisely for this reason, the *Parvulus* served as a university text book.⁴⁸ Lindner's notations, which provide insight into what actually went on in the classroom, reflect the work's function as a teaching tool, activity only later codified in printed editions. First published in Leipzig by Arnold of Cologne ca. 1495, approximately twenty-five years after Lindner compiled his manuscript, Peter's work proved popular enough that it went through multiple editions, of which two were published by Wolfgang Stöckel.⁴⁹ The commentaries also found their way into print, among them Hundt's *Introductorium in Aristotelis physica*.⁵⁰ The manuscripts and printed commentaries served the students at the university in Leipzig, where Hundt first studied medicine, then theology, and later taught as part of the Faculty of Arts, of which he became the dean in 1497 and in whose illustrated register of doctoral recipients he appears together with his uncle Andreas, a jurist, and father, also named Magnus, also a theologian and physician and one-time rector, at the head of the list for the summer semester of 1521 (fol. 36v).⁵¹

Lindner's drawing shares many elements with Fludd's diagram: the five senses connected by lines, in this case, to the first ventricle of common sense, followed by the cells of imagination, fantasy, estimation, and, finally, memory.⁵² The phrase *Natura est principium et*

Sympathisant der Hussitenbewegung, † vor 1425 Prag", in *Sächsische Biografie*, Institut für Sächsische Geschichte und Volkskunde e.V. (ed.), <<http://www.isgv.de/saebi/>> (accessed 26.5.2021).

⁴⁷ VERBOON, "Brain Ventricle Diagrams" (as in n. 45), proposed that the diagrams were devised to accompany the *Parvulus*, of which she identified 80 manuscripts, 20 of them with the diagram, but more recently has argued that their original locus was in fact the commentaries on the handbook; see A. R. VERBOON, "Transmitting School-Philosophy: Thomistic Commitments Regarding Sense Perception in a Fifteenth-Century Cologne Student Manuscript", in *Bücher und Identitäten: Literarische Reproduktionskulturen der Vormoderne. Überstorfer Colloquium 2016*, N. EICHENBERGER, E. C. LUTZ, and C. PUTZO (eds.), Wiesbaden, 2020, pp. 169-200, esp. 178-180.

⁴⁸ See P. KÄRKÄINEN, "Psychology and the Soul in Late Medieval Erfurt", *Vivarium*, 47 (2009), pp. 421-443, esp. 425.

⁴⁹ ISTC ig00277650, ig00277655, ig00277700, ig00277750. For a digitization of Hundt's work, analyzed by content, see <<http://tudigit.ulb.tu-darmstadt.de/show/inc-ii-411>> (accessed 26.5.2021). An edition by VERBOON with the working title *Étudier l'âme aux facultés des arts à la fin du Moyen Âge: L'épitomé Parvulus philosophiae naturalis de Pierre de Dresde, avec texte édité et les diagrammes des étudiants*.

⁵⁰ For a partial list of extant commentaries, see VERBOON, "Transmitting School-Philosophy" (as in n. 45), p. 178, n.36.

⁵¹ For the register, otherwise known as the *Liber decanatum et promotorum in artibus* (Leipzig, Universitätsarchiv, UAL, Phil. Fak, Urkundliche Quellen B 002 (1514-1565), see G. ERLER, *Die Matrikel der Universität Leipzig*, 3 vols., Codex diplomaticus Saxoniae regiae 2; Hauptteil 16-18, Leipzig, 1895-1902. For context, see J. S. FREEDMAN, "Aristotle and the Content of Philosophy Instruction at Central European Schools and Universities during the Reformation Era (1500-1650)", *Proceedings of the American Philosophical Society*, 137/2 (1993), pp. 213-253, and *Der Humanismus an der Universität Leipzig: Akten des in Zusammenarbeit mit dem Lehrstuhl für Sächsische Landesgeschichte an der Universität Leipzig, Der Universitätsbibliothek Leipzig und dem Leipziger Geschichtsverein am 9./10. November 2007 in Leipzig veranstalteten Symposiums*, E. BÜNZ (ed.), Pirkheimer-Jahrbuch für Renaissance- und Humanismusforschung, 23, Wiesbaden, 2009; A. VERBOON, "La perception sensorielle et la physiologie du savoir: Manuel du fin xv siècle – MS Würzburg, UB, M. Ch. F. 118", discusses the use of comparable compendia illustrated with similar diagrams at the university; the article is available as a preprint at <<https://researchportal.helsinki.fi/en/publications/la-perception-sensorielle-et-la-physiologie-du-savoir-manuel-du-fin-xv>> (accessed 7.6.2021) but was not published as announced in the *Archives de sciences sociales des religions*, 182 (2018).

⁵² T. KLEMM, *Bildphysiologie: Wahrnehmung und Körper in Mittelalter und Renaissance*, Berlin, 2013, pp. 46-47, inaccurately states that the drawing introduces Aristotle's *De sensu et sensato*, which, however, only occurs on fols.

causa movendi scrawled repeatedly over the top of the page in the manner of a pen trial in fact reproduces the opening words of Gericz's "Little Philosophy", small not only in size but also originality. The heading provides a cue to the interpretation of the image below.⁵³ The abbreviation SIFEM, inscribed prominently at the center, makes it easier for the viewer to remember the sequence of its component parts, specifically, *S*<ensus>, *I*<maginatio>, *F*<antasia>, *E*<stimativa>, and *M*<emoria>.

Regarding the upper part of the page, Verboon suggests that it served as "scratch paper" and was "used for all kinds of diagrams and pen try-outs".⁵⁴ True: but there is more to be said. Standing at the center of the upper portion of the page is a configuration of words arranged in a square with diagonals connecting the corners: a diagram in disguise, and one, moreover, that is intimately connected, no less than the floating diagrams at the top of Fludd's image, to the head that stands beneath it. (Fig. 13) No medieval student with a training in the liberal arts, and hence, in the art of logic, would have failed to recognize this configuration as a variant of the square of opposition, a logic diagram included among the manuscript's illustrations as well as in printed editions of the work that served as the cornerstone of medieval syllogistic.⁵⁵ (Figs. 14A–14B) At the corners of the square stand, at top, from left to right, the terms *Calidus* (fiery) and *Humidus* (humid), at bottom, *Frigidus* (cold) and *Siccus* (dry), in short, not the four elements per se but rather qualities associated with them. In contrast to the classic square of opposition, which can be traced to the commentary on Aristotle's *Peri Hermeneias* (*De Interpretatione*) by Apuleius of Madaura, in which, just as fire would serve as the contrary

184r–198v and which remains unillustrated. The operation of the inner and outer senses constitutes one of the principal topics discussed in the *Parvulus philosophiae naturalis* (fols. 11r–14r). For a digitization analyzed by content, see <<https://www.deutsche-digitale-bibliothek.de/item/GLNW6C6516TMNUCMM5H6G4HEFNXP2RVY>> (accessed 26.5.2021).

⁵³ VERBOON, "Lines of Thought" (as in n. 45), pp. 207-210 and 257-258, provides a transcription of the inscription in the lower, but not the upper, part of the page. See also K. H. TACHAU, "Et maxime visus, cuius species venit ad stellas et ad quem species stellarum veniunt: *Perspectiva* and *Astrologia* in Late Medieval Thought", in *La visione e lo sguardo nel Medio Evo/View and Vision in the Middle Ages*, V. PASCHE, C. PARAVICINI BAGLIANI, C. CHÈNE (eds.), *Micrologus: Natura, scienze et società medievali* 5, 2 vols., Florence, 1997, pp. 201-224, esp. pp. 216-217, including 217, note 1, where, however, the tract is still assigned to Albertus Magnus: "This figure cannot be accepted uncritically as a mere illustration of Albertus' account, but as 'correcting him' – much as Bacon had 'corrected' Aristotle – with the aid of other authoritative discussions, among them Avicenna, the Franciscan Bartholomaeus Anglicus, who was Bacon's colleague at Paris, and, tacitly, Bacon himself", authorities whom, as TACHAU notes, are referenced in the inscriptions. JONES, *Medieval Medical Miniatures* (as in n. 22), p. 52, also reproduces the image, as do E. CLARKE and K. DEWHURST, with a new chapter by M. J. AMINOFF, *An Illustrated History of Brain Function: Imaging the Brain from Antiquity to the Present*, p. 34 (fig. 42), where it is linked to Avicenna's interpretation of brain cell doctrine.

⁵⁴ VERBOON, "Lines of Thought" (as in n. 45), p. 208, and VERBOON, "Brain Ventricle Diagrams" (as in n. 45), p. 219. VERBOON, "Znázorňování struktury a funkcí mozku: Vesalius v pozadí středověkých nákrešů mozku (1100–1550)", in: *Obrazy myslí – Mysl v obrazech* [Images of the Mind – The Mind in Images], L. KESNER, C. M. SCHMITZ (eds.), Brno, 2011, pp. 126-145, esp. 144 and 373 (catalogue), makes passing mention of Fludd's illustration.

⁵⁵ For the medieval square of opposition, with additional bibliography, see J. F. HAMBURGER, "Drawing Conclusions: Logical Diagrams as a Matrix for the Making and Meaning of Christian Images in the Middle Ages", in *The Diagram as Paradigm* (as in n. 8); also C. HECK, "Imitatio pietatis, quête du ciel et carré logique dans l'iconographie dominicaine (Toulouse, ms. 418)", in *La Bibliothèque des dominicains de Toulouse*, E. NADAL, M. VÈNE (eds.), Toulouse, 2020, pp. 90-105. Some of the pen trials at the top of the page reading *Quid in homo est primus quod debemus*, *Quid in homo est*, *Quid non in quam*, and *Quid igitur non est* could be related to the oppositional structure of the square.

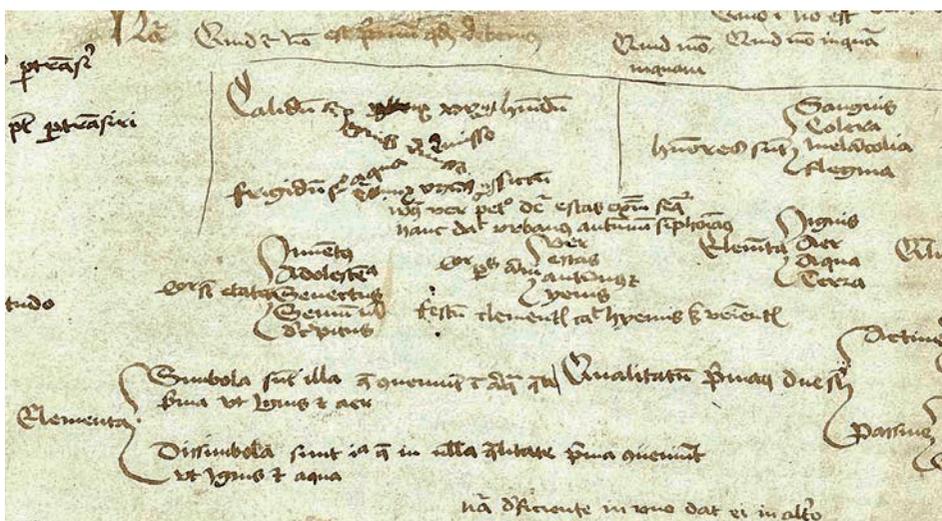


Fig. 13. Square of Opposition (detail of fig. 12) (Photo: Wellcome Collection)

of humidity, so too heat would stand as the contradiction of cold, the bottom two terms have been switched.⁵⁶ Instead, the diagonals link heat to dryness, and cold to humidity.⁵⁷ This variant, which links like terms rather than placing them in opposition to one another, appears for a reason, to which I will return.⁵⁸

Surrounding the square are other quaternities: immediately to the right, the four humors (*sanguis, colera, melancolia, flegma*) and, just below them, the four elements (*ignis, aer, aqua, terra*). Farther to the right, from top to bottom, appear the four winds, tied to the points of the compass (*oriens, occidens, auster, boreas*). Immediately below the square are listed, first, the four ages of man (*Iuventus, Adolescentia, Senectus, Senus*), omitting *Infantia* and *Pueritia* in favor of senility, and the four seasons (*Ver, Estas, Autumnus, Hiems*). At lower left, under the rubric of bodies (*Corpora*), we find homogeneity (*Omogenia*) and heterogeneity (*Eterogenia*), each accompanied by its own form of denomination (*Denominaciones*), a term appropriated

⁵⁶ For the oldest instance of the square (Vatican City, Biblioteca Apostolica Vaticana, Fondo Maristi, s.n., fol. 32v) in a manuscript of the text (fols. 28v–30r: *Apulei liber de interpretatione*), see P. RADICIOTTI, “Romania e Germania a confronto: un codice di Leidrat e le origini medievali della minuscola carolina”, *Scripta*, 1 (2008), pp. 121-144, fig. 1. See also D. LONDEY, C. JOHANSON, *The Logic of Apuleius, including a Complete Latin Text and English Translation of the Peri Hermeneias of Apuleius of Madaura*, Philosophia Antiqua 47, Leiden, 1987.

⁵⁷ Cf. the discussion in the *Parvulus philosophiae naturalis*, fol. 8v: *Et sunt quatuor scilicet ignis aer aqua terra que determinantur qualitatibus primis que sunt quatuor scilicet caliditas frigiditas humiditas et siccitas. Ignis est calidus et siccus, aer vero humidus et calidus. Aqua vero humida et frigida. Terra vero frigida et sicca. Quatuor predictae qualitates sex faciunt combinationes quarum quatuor sunt possibiles due vero impossibiles. Differunt autem ille qualitates prime quia non fluunt ab aliis sed alie fluunt ab ipsis*, etc.

⁵⁸ In J. F. HAMBURGER, *Color in Cusanus*, Stuttgart, 2021, pp. 97-98, I prematurely interpreted the reversal of terms within the square as an error; the error was in fact mine.

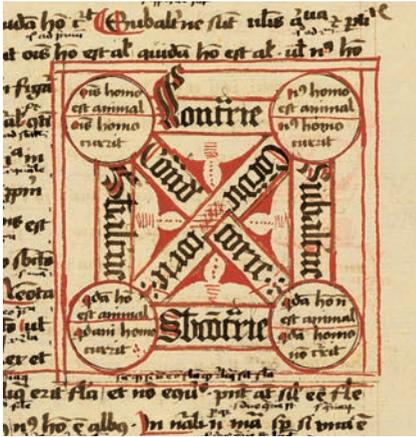


Fig. 14a. Square of Opposition. Peter of Spain, *Liber de sex principiis*. London, Wellcome Collection, MS 55, fol. 200r (Photo: Wellcome Collection)

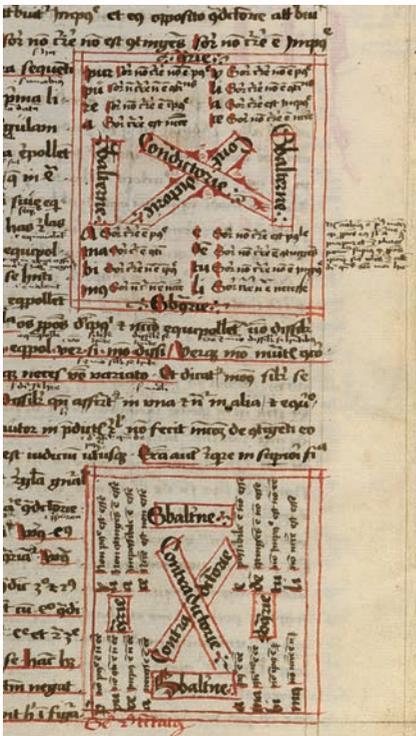


Fig. 14b. Squares of Opposition. Peter of Spain, *Liber de sex principiis*. London, Wellcome Collection, MS 55, fol. 201v (Photo: Wellcome Collection)

from Aristotle's discussion in the *Categories* of "ante-predicaments" (e.g., equivocals and univocals), material of special interest to Lindner in so far as the manuscript contains two texts that touch on the topic, the first an anonymous *De predicamentis* (fols. 59v–74r), the second, the opening of Peter of Spain's *Summulae logicales* (fols. 199r–203v), a vast and vastly influential work to which Magnus Hundt also wrote a commentary.⁵⁹ At the far left stands a stack of terms, bracketed by the phrase *Entium latitudo*, "latitude of being", a reference to the hierarchy of various species and their proximity to perfection, which here, reading from the top, begins *Prima causa, Species angelorum, Species humana*, etc. In short, the jottings constitute a *scala entium* within the great chain of being similar to that which accompanied the tract on the destiny of the soul. (cf. Figs. 8A–B)

The illustration to Lindner's compendium presents the equivalent of a medieval schoolroom scratchpad. Far, however, from random notations, his scribbles represent various sets of terms capable of manipulation within the square of opposition. Similar sets of information are more efficiently and elegantly integrated within a *rota* accompanying a collection of calendrical and astronomical treatises, English or French, from the second half of the thirteenth century.⁶⁰ (Fig. 15) Its petal-like forms look rather like those of a rose window, but in fact one should imagine the wheel more along the lines of a

⁵⁹ The *Compendium totius logice* (1493), in fact based on a summary of Peter's work, the *Parvulus antiquorum*. For Aristotle's *Categories* in the late Middle Ages, see G. PINI, "Reading Aristotle's *Categories* as an Introduction to Logic: Later Medieval Discussions about its Place in the Aristotelian Corpus", in *Medieval Commentaries on Aristotle's Categories*, Brill's Companions to the Christian Tradition 10, Leiden, 2008, pp. 145–181.

⁶⁰ For London, British Library, Harley MS. 3814, see *A Catalogue of the Harleian Manuscripts in the British Museum*, 4 vols., London, 1808–1812, vol. 2 (1808), no. 3814.

mechanism with rotating gears. As, if not more important than the individual terms attached to each part of the diagram, which, as we have seen, are interchangeable, are the rules that govern manipulation of the mechanism. The wheel invites the viewer to turn its various parts over in his mind so as to contemplate all the combinations it can generate and, no less important, the principles according to which it does so. In short, like all diagrams, it supplies a tool for thinking.

Many of the terms filling the upper part of Lindner's page (e.g., the four elements) as well as the relations that govern them (principally homo- and heterogeneity) derive from Aristotle's discussion of mixtures in *De generatione et corruptione*, which provided the foundation for the science of mereology, that is, the study of the relations of parts to whole and the relation of part to part within a whole.⁶¹ Beyond its basic utility as a philosophical

exercise, mereology played an important role in scholastic discussions of such metaphysical questions as identity and persistence, which is why Lindner, in keeping with his sources, might have been so interested in it.⁶² As was Fludd; indeed, the very last section of his work is entitled *De tertianis macro- et microcosmo principiis, hoc est, de causis meteorologicis [sic], & compositioni propinrioribus*. That his focus, at least in this context, is mereology, not meteorology is clear from the opening of his discussion, which, just like Lindner's notes, focuses on the relationship of heat, dryness, cold, and humidity.⁶³

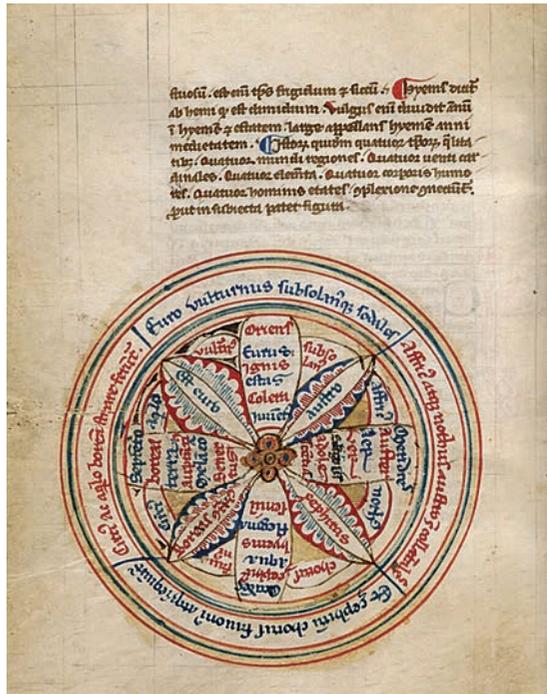


Fig. 15. Quaternities. Astrological and computistical treatises. England, 1250–1300. London, British Library, Harley MS 3814, fol. 58v (Photo: © British Library Board)

⁶¹ On medieval mereology, see *Lire Aristote au Moyen Âge et à la Renaissance: réception due traité "Sur la génération et la corruption"*, J. DUCOS and V. GIACOMOTTO-CHARRA (ed.), Colloques, congrès et conférences sur le Moyen Âge 2/10, Paris, 2010; also W. O. DUBA, "Franciscan Mixtures: William of Brienne on the Elements", in *Materia: nouvelles perspectives de recherche dans la pensée et la culture médiévales (XIF-XVF siècles)*, T. SUÁREZ-NANI, A. PARAVICINI BAGLIANI (eds.), Micrologus' Library 83, Florence, 2017, pp. 123-150.

⁶² See A. ARLIG, "Medieval Mereology", in *The Stanford Encyclopedia of Philosophy* (Fall 2019 Edition), ed. E. N. ZALTA, URL = <<https://plato.stanford.edu/archives/fall2019/entries/mereology-medieval/>>, and for the broader context of such debates, C. W. BYNUM, *Resurrection of the Body in Western Christianity, 200–1336*, New York, 2nd ed. 2019.

⁶³ FLUDD, *Utriusque cosmi* (as in n. 4) Vol. 2, section 1, portion 2, part 3, ch. 1, p. 177: "De principiis primariis seu metaphysicis atque increatis: Similiter de illis secundariis seu phisicis et creatis; ex quibus duae qualitates primare

No less than Lindner, university students would have required a basic introduction, not only to the terms of such arguments, but also to the relevant methodology. A certain Master Albert (not Albertus Magnus) obliged in a short tract by the name of *Termini physicales*.⁶⁴ The tract, which survives in only two manuscripts, almost certainly did not serve Lindner as his source. It nonetheless remains representative of the kind of introduction on which he would have drawn and of which his annotated diagram serves as a summary. The text draws the same twofold distinction of elements according to the categories *symbola* and *dissymbola* distinguished below the square of opposition, according to which elements that share a primary quality belong to the first category (*symbola*), those that do not, to the second (*dissymbola*).⁶⁵ Albert's discussion further accounts for the distinction, mapped out farther to the right, between those characteristics that are active (*caliditas*, *frigiditas*), i.e., those that are primary in that they generate other qualities, and those that are passive or secondary (*humiditas*, *siccitas*) in that they result from a mixture of primaries.⁶⁶

From all this, it should come as no surprise that Lindner's miscellany in fact is not medical or principally physiological in nature, but rather a collection of classic texts on logic by Aristotle (*Analytica priora* and *posteriora*), Porphyry (*Isagoge*) and Peter of Spain (*Dialectica*), the latter illustrated with array of logic diagrams, including variants on the square of opposition. (cf. Figs. 14A–14B) Also included is the *Liber de sex principiis* on categories of predication, often attributed, erroneously, as in this case, to the twelfth-century logician Gilbert de la Porrée. These texts are conjoined with works by Aristotle on the soul, the senses, and the heavens. In brief, Lindner's compendium represents precisely the kind of text book with which Fludd was likely schooled a little more than a century after its compilation.⁶⁷

No less than Fludd's, Lindner's annotated diagram maps out the correspondences between inner and outer worlds, on the one hand, the world of the senses, on the other, that of

nempe caliditas et frigiditas exurgunt, atque iterum mutua earum action, aliae duae qualitates magis passivae humiditas scilicet et siccitas producuntur, quarum actione et passione ad invicem illae quatuor substantiae procreantur in mundo, quae Elementa communiter dicuntur, etc.

⁶⁴ R. WOOD and M. WEISBERG, "Interpreting Aristotle on Mixture: Problems about Elemental Composition from Philoponus to Cooper", *Studies in History and Philosophy of Science*, 35 (2004), pp. 681-706.

⁶⁵ E. P. BOS, A. R. VERBOON, "Master Albert: Termini physicales", in *Portraits de maîtres offerts à Olga Weijers*, Textes et Études du Moyen Âge 65, Turnhout, 2012, pp. 335-360, esp. p. 356, ch. 14 (*De elementis symbolis et dissymbolis*), lines 295–305: *Quaedam sunt elementa symbola, et quaedam dissymbola. Illa sunt elementa symbola, quae conveniunt in aliqua qualitate prima, ut ignis et aer, aer et aqua, aqua et terra et ignis. Elementa dissymbola vocantur illa quae nulla qualitate prima conveniunt, ut ignis et aqua, aer et terra. Inter elementa symbola facilis est actio, ut patet in libro De generatione. Elementa sunt corpora homogenia. Corpora homogenia sunt illa, quorum omnespartes sunt eiusdem nature et eiusdem nominis cum suis totis, ut elementa, nam quelibetpars aque est aqua, et sic de aliis elementis. Alia corpora vocantur heterogenea quorumnon omnes partes sunt eiusdem nominis, sive rationis, cum suis totis, ut Sortes, homo, asinus, leo et sic de aliis, nam non quelibet pars hominis est homo etcetera.* The manuscript from which the authors take their edition, Paris, BnF, ms. n.a.l. 566, fols. 49r-58r, includes diagrams, among them a square of opposition, for which see pp. 343-344 and fig. 4.

⁶⁶ *Ibidem*, p. 356, lines 307-310: *De numero qualitatum primarum quaedam dicuntur active, sicut caliditas et frigiditas et quaedam passive sicut siccitas et humiditas et sic de elementis in quibus predominantur.* Cf. the *Parvulus philosophiae naturalis*, fol. 9v: *Similia quidem in materia, diversa vero sine contraria in formis. Quoniam agentia et patientia necesse est esse similia et diversa, etc.*

⁶⁷ *Liber de sex principiis* Gilberto Porretano ascriptus, A. HEYSSE (ed.), *Opuscula et textus: Series scholastica 7*, Münster, 1929.

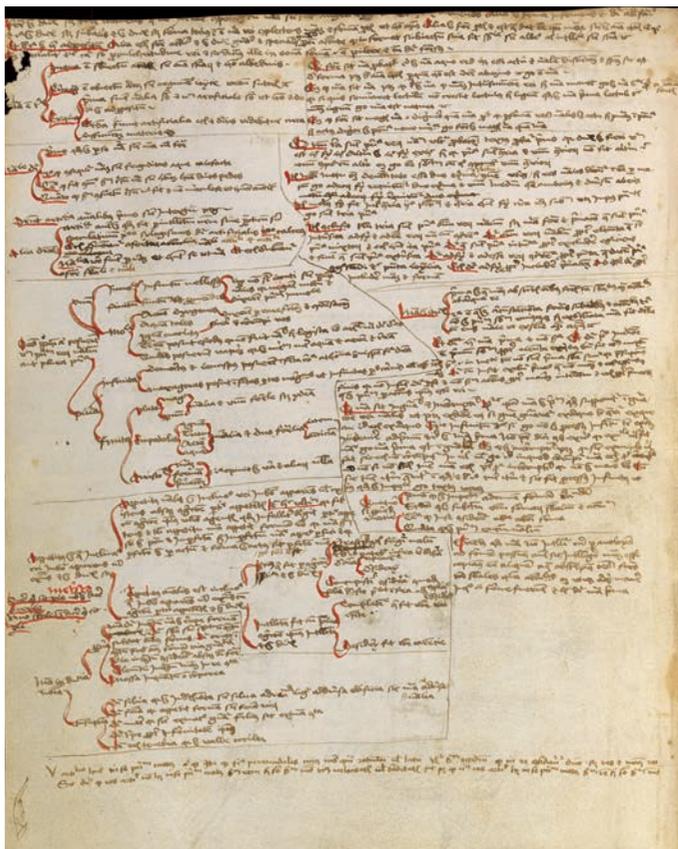


Fig. 16. Stematic Diagram. Peter of Dresden, *parvulus philosophiae naturalis* in Miscellany of Johann Lindner of Mönchburg, Leipzig, 1470s. London, Wellcome Institute, MS 55, fol. 93v (Photo: Wellcome Institute)

the intellect. Far from being incidental to the diagram beneath it, the upper part of Lindner's page is integral to its operations (as is the verso, which, as in the Cambridge copy of *De spiritu et anima*, complements the image with a stematic text, which in this case provides what appears to be outline of Thomas Aquinas' commentary on Aristotle's *Metaphysics*, including its consideration of the categories of signification and predication, as well as its listing of the views on the subject of various ancient philosophers, among them Diogenes, Democritus, Empedocles, Anaxagoras, Plato, and Aristotle. (Fig. 16) The recto as a whole conjoins presentations of how the minds works (the rules of reason, laid out in its upper half) and what it works on (sensory data, to whose collection the lower half is dedicated). In fact, both constituents—the inner and outer worlds to which the title of Fludd's *Utriusque cosmi* also refers—are present in the upper, purely textual part of the page. Whereas the diagrammatic square stands tout court for the power of reason, the terms that fill it stand for the world of sense impressions that constitute the stuff on which reason and, hence, memory, go to work. The terms that surround and extend the square could easily be substituted for those that already occupy it; in effect, they function like sets of punch cards that can be plugged into a simple computer,

which is how we might think of the square in the first place: a machine for thinking that operates according to the rules of reason.

It is in this context that the previously noted deviation from the square of opposition assumes relevance. The diagonals of the square are customarily framed in terms of contradiction. In Lindner's version, however, they are labeled, respectively, *Ignis inmisso* and *Aqua inmisso*. The word *inmisso* (apparently, an error for *inmissio*, the acting of sending in or of allowing to enter) substitutes for *intensio* (intension), based in part on its contrary term, *remissio* (remission). The two terms refer to the intension and remission of forms, a topic discussed at length in the *Parvulus philosophiae naturalis* and a staple of philosophical debate well into the modern period, but especially in the fourteenth century.⁶⁸ The debate revolved around the problem of how accidental forms change or intensify (by definition, substances, it was agreed, did not admit of more or less), including how accidental forms or qualities (such as hot and cold) transformed into their contraries according to the general principle articulated in the *Parvulus philosophiae naturalis*: *Alteratio est mutatio a qualitate contraria in qualitatem contrariam vel in mediam*.⁶⁹ Central across various disciplines from theology and philosophy to medicine and natural science, the concepts were critical to understanding processes of change and motion in terms of qualitative increase or decrease and played, it has been argued, an important role in the development of mathematical physics insofar as "the quality itself, not the degree of participation, was taken as the variable."⁷⁰ In Lindner's notes, the bracketed notation to the left of the square also references the problem of change. In terms established by Aristotle in the third book of the *Physics*, he distinguishes between *actus* (*energeia* or actuality) and *potentia* (*dunamis*, potentiality), a dynamic of which, as in his square, transformations from cold to hot and hot to cold serve as primary examples.⁷¹

⁶⁸ Fols. 5r–5v: *Motuum alius naturalis, et est cuius principium intra se est natura. Et talis est in principio remissus et in fine intensus*, etc. For a useful summary, see E. JUNG, "Intension and Remission of Forms", in *Encyclopedia of Medieval Philosophy: Philosophy Between 500 and 1500*, H. LAGERLUND (ed.), Dordrecht, 2020, pp. 848–853.

⁶⁹ *Parvulus philosophiae naturalis*, fol. 9r. Cf. PETER OF SPAIN, *Tractatus called afterwards Summule Logicales: First Critical Edition from the Manuscripts with an Introduction*, L. M. DE RIJK (ed.), Assen, 1972, II.17, p. 25, lines 7–9: *Differt etiam ab accidente, quia accidentia suscipiunt intensionem et remissionem, differentia vero non suscipit magis et minus*.

⁷⁰ E. GRANT, *The Foundations of Modern Science in the Middle Ages*, Cambridge, 1996, p. 99. For the historiography, see J. E. MURDOCH, "Pierre Duhem and the History of Late Medieval Science and Philosophy in the Latin West", in *Gli studi di filosofia medievale fra otto e novecento*, R. IMBACH, A. MAIERÜ (eds.), Rome, 1991, pp. 253–302. The degree to which medieval ideas regarding intension and remission anticipated modern scientific thinking has been hotly debated; see A. MAIER, *Zwei Grundprobleme der scholastischen Naturphilosophie: Das Problem der intensiven Größe*, 3rd ed., Studien zur Naturphilosophie der Spätscholastik 2, Rome, 1968, and, on its reception, J. E. MURDOCH, E. SYLLA, "A. Maier and the History of Medieval Science", in *Studi sul XIV secolo in memoria di Anneliese Maier*, A. MAIRÜ, A. PARAVICINI BAGLIANI (eds.), Rome, 1981, pp. 7–13. See also M. SCHEMEL, "Medieval Representations of Change and Their Early Modern Applications", *Foundations of Science*, 19 (2014), pp. 11–34, and, for the longue durée, J. E. MURDOCH, E. D. SYLLA, "The Science of Motion", in *Science in the Middle Ages*, D. C. LINDBERG (ed.), Chicago-London, 1978, pp. 206–264; and S. OLIVER, *Philosophy, God and Motion*, Abingdon, 2005.

⁷¹ For applications of these concepts in late medieval and early modern thought, see D. DES CHENE, *Physiologia: Natural Philosophy in Late Aristotelian and Cartesian Thought*, Ithaca, NY, 2018. See also C. HUGHES, "Matter and Actuality in Aquinas", *Revue Internationale de Philosophie*, 52 (1998), pp. 269–286.

The notations on the left-hand side of the page prefacing the *Parvulus philosophiae naturalis* regarding the latitude of species also acquire specific resonance in this same context. Lindner employs the term "latitude" in a manner distinct from that which pertains in the debate over the *latitudinibus formarum*, part of the discussion over the extent to which properties (i.e., forms) can have degrees.⁷² Species—in Lindner's manuscript represented by the different levels on the scale of being—cannot be transformed substantially one into another through increase or decrease; they can only change through the intensification or remission of accidental qualities. Diverse species, even if incomparable per se, could, however, be compared on the basis of a third term that they possessed in common. In these ways problems in ontology are expressed in terms of logical categories and terminology.⁷³

The French natural philosopher Nicole Oresme (ca. 1320/1325–1382) had developed a sophisticated means, akin to graphs, to express change over time, which he called the "doctrine of the configuration of qualities and motions", but which now are simply named after him, Oresme-diagrams.⁷⁴ In contrast, Lindner resorts to old-fashioned Aristotelian ideas expressed in an equally antiquated manner: by using the Pythagorean tetrad within the matrix offered by the square of opposition to express relationships among the four elements and the means by which they can be converted one into the others.⁷⁵ Whereas in the canonical square of opposition, intersecting diagonals define the antagonism between, on the one hand, fire and water and, on the other hand, air and earth, which stand, simultaneously for the forces of corruption and degeneration that push the primordial elements apart from one another, in Lindner's diagram, the diagonals, rather than denoting contradiction, represent a consequent or entailment (the second half of a hypothetical proposition), a topic derived, at least indirectly, from Boethius' commentary on Aristotle's *Peri hermeneias* and that received extended

⁷² For this aspect of the debate over intension and remission, see J.-L. SOLÈRE, "Plus ou moins: le vocabulaire de la latitude des formes", in *L'Elaboration du vocabulaire philosophique au Moyen Age: Actes du Colloque International de Louvain-la-Neuve et Leuven, 12–14 Septembre 1998*, J. HAMESSÉ, C. STEEL (eds.), *Rencontres de philosophie médiévale/Société internationale pour l'étude de la philosophie médiévale* 8, Turnhout, 2000, pp. 437-488; E. D. SYLLA, *The Oxford Calculators and the Mathematics of Motion, 1320–1350: Physics and Measurement by Latitudes*, New York, 1991; D. A. DI LISCIA, "The 'Latitudines breves' and Late Medieval University Teaching", *SCIAMVS: Sources and Commentaries in the Exact Sciences*, 17 (2016), pp. 55-120, esp. 56-59; and for antique antecedents, R. SORABJI, "Latitude of Forms in Ancient Philosophy", in *The Dynamics of Aristotelian Natural Philosophy from Antiquity to the Seventeenth Century*, C. LEIJENHORST, C. LÜTHY, J. M. M. H. THIJSEN (eds.), *Medieval and Early Modern Science* 5, Leiden-Boston-Cologne, 2002, pp. 57-63. For the relationship between the latitudes of being and the intension and remission of forms, see E. P. MAHONEY ... see E. P. MAHONEY, "Lovejoy and the Hierarchy of Being", *Journal of the History of Ideas*, 48 (1987), pp. 211-230, esp. 224-225.

⁷³ See J. E. MURDOCH, "Mathesis in philosophiam scholasticam introducta: The Rise and Development of the Application of Mathematics in Fourteenth-century Philosophy and Theology", in *Arts libéraux et philosophie au Moyen Âge: ive Congrès international de philosophie médiévale*, (1969), pp. 215-265.

⁷⁴ See M. CLAGETT (ed.), *Nicole Oresme and the Medieval Geometry of Qualities and Motions: A Treatise on the Uniformity and Diffirmity of Intensities Known as 'Tratatus de configurationibus qualitatum et motuum*, Madison, 1968, pp. 14-37; and S. KIRSCHNER, "Oresme on Intension and Remission of Qualities in his Commentary on Aristotle's 'Physics'", *Vivarium*, 38 (2000), pp. 255-274.

⁷⁵ For the tetrad in various diagrams, including some from FLUDD, see S. K. HENINGER, JR., *The Cosmographical Glass: Renaissance Diagrams of the Universe*, San Marino, 1977, pp. 81-143.

treatment in medieval logic.⁷⁶ In this configuration, heat and cold as active qualities generate dryness and humidity respectively. The sides of the square, defined by the associated qualities of heat, humidity, dryness, and cold, conjoin the otherwise disparate elements in dynamic harmony and explain how each one, by a series of steps, can be transformed into the others.⁷⁷

These relationships received canonical expression in the *Protomathesis* (Paris: Gerard Morrhay, 1532, fol. 103r) by the French mathematician and cartographer Oronce Finé (1494–1555), of which *La sphere du monde, proprement dicte Cosmographie* (Paris: Michel Vascon, 1551, p. 2) represented an abbreviated translation of the *Protomathesis*, part III: *De cosmographia, sive mundi sphaera*, and of which the paper presentation copy (Cambridge, MA, Harvard University, Houghton Library, MS Typ 57), signed, painted, and illustrated (*escrite, paincte, et pourtraicte*) by Finé himself and dated 1549, is addressed to Henry II, king of France.⁷⁸ (Fig. 17) The central roundel contains an inscription, not included in the Latin original, that reads *La figure des elements et premieres qualitez, et de leur discord et convenance*. The terms *summa* and *remissa* are rendered as *forte* (strong) and *débile* (feeble).

⁷⁶ S. READ, “The Medieval Theory of Consequence”, *Synthese*, 187 (2012), pp. 899-912; C. DUTILH NOVAES, “Medieval Theories of Consequence”, *The Stanford Encyclopedia of Philosophy* (Fall 2020 Edition), E. N. ZALTA (ed.), URL = <<https://plato.stanford.edu/archives/fall2020/entries/consequence-medieval/>>; and, for a detailed account of Boethius’ distinctive use of the term, C. J. MARTIN, “The Logical Textbooks and Their Influence”, in *The Cambridge Companion to Boethius*, J. MARENBO (ed.), Cambridge, 2009, pp. 56-84, esp. 67. For one key passage, see BOETHIUS, *In librum Aristotelis Peri hermeneias commentarii (Editio secunda)*, C. MEISER (ed.), 2 vols., Bk. 2, ch. 13, p. 179, line 13: *Expeditis omnibus, quae de modorum oppositionibus disputabantur, ad consequentias venit. Hoc enim dicit, quae propositiones supra dictorum modorum quas propositiones consequuntur quibus que consentiunt. Nos autem ex his quattuor fecimus ordines et consequentias propositionum sub una serie disposuimus*, etc. For Leiden, University Library, MS BPL88/1, fols. 1v–2r, a manuscript of northern French origin, dated to the third quarter of the ninth century, with Carolingian additions that contains squares perhaps intended to serve as models for or derived from a copy of Boethius’ commentary on Aristotle’s *Peri Hermeneias*, some of which, matching Boethius’ examples, incorporate diagonals of consequence, see M. TEEUWEN, “Leiden, UB, BPL 88” and I. O’DALY, “Squares and Trees”, *The Art of Reasoning in Medieval Manuscripts* (Dec. 2020), <<https://art-of-reasoning.huygens.knaw.nl/bpl88>> and <<https://art-of-reasoning.huygens.knaw.nl/trees>> (accessed 5.26.2021).

⁷⁷ Syzygy diagrams offered another means of expressing the same series of transformations; for examples, see M. BAGNOLI, “Le fonti e i documenti per l’indagine iconografica”, in *Un universo di simboli: Gli affreschi della cripta nella cattedrale di Agnani*, G. GIAMMARIA (ed.), Rome, 2001, pp. 71-86; and B. OBRIST, *La cosmologie médiévale: textes et images*, I. *Les fondements antiques*, Micrologus’ Library 11. Florence, 2004, pp. 284-289. Syzygy diagrams also accompany William of Conches’ *Dragmaticon*, in which he refers to them as useful visual aids; see I. CAIAZZO, “The Four Elements in the Work of William of Conches”, in *Guillaume de Conches: philosophie et science au XIIe siècle*, B. OBRIST, I. CAIAZZO (eds.), Micrologus’ Library 42, Florence, 2011, pp. 3-66, and E. RAMIREX-WEAVER, “So that you can understand this better”: Art, Science, and Cosmology for Courtiers in William of Conches’ *Dragmaticon philosophiae*”, in *Diagramm und Text: Diagrammatische Strukturen und die Dynamisierung von Wissen und Erfahrung. Überstorfer Colloquium 2012*, E. C. LUTZ (ed.), Wiesbaden, 2014, pp. 319-348, esp. 333-339.

⁷⁸ See HENINGER, *The Cosmographical Glass*, p. 106; Id., “Some Renaissance Versions of the Pythagorean Tetrad”, *Studies in the Renaissance*, 8 (1961), pp. 7-35; OBRIST, *La cosmologie médiévale*, pp. 263-291; Z. RADMAN, “In Search for Substance and Structure: Tetradic Model as World-Metaphor”, in *Aria, terra, acqua, fuoco: I quattro elementi e le loro metafore =/ Luft, Erde, Wasser, Feuer: Die vier Elemente und ihre Metaphern*, F. RIGOTTI, P. SCHIERA (eds.), Bologna, 1996, pp. 43-53; and A. HICKS, *Composing the World: Harmony in the Medieval Platonic Cosmos*, Oxford, 2017, pp. 192-197. For Houghton Library, MS Typ 57, see A. MOSLEY, “Early Modern Cosmography: Fine’s *Sphaera mundi* in Content and Context,” in *The Worlds of Oronce Fine: Mathematics, Instruments and Print in Renaissance France*, ed. A. MARR, Donington, 2009, pp. 144-155. The manuscript receives passing mention in T. CONLEY, “‘There’s a New World Here’: *Pantagruel* via Oronce Finé”, in *French Global: A New Ap-*

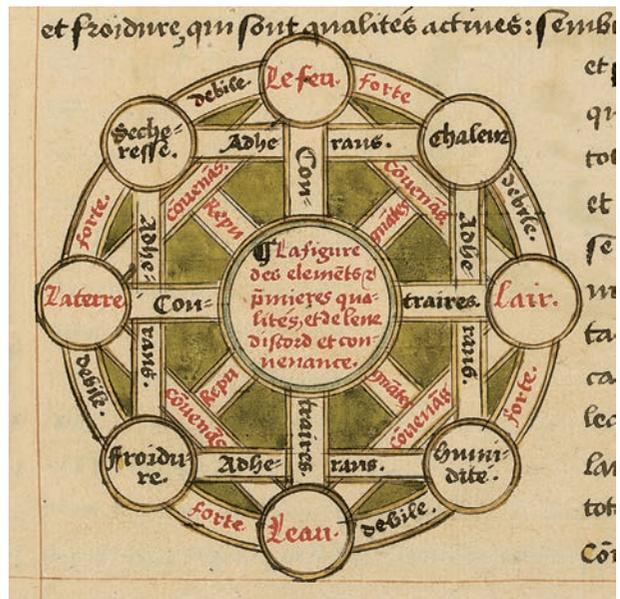


Fig. 17. Diagram of the Four Elements (Pythagorean Tetrad). Oronce Finé, *L'esphere du monde*, Paris, 1549. Cambridge, MA, Houghton Library, MS Typ 57, fol. 7r (Photo: Houghton Library, Harvard University)

Debates over the nature of change had significant applications in theological discourse, for example, in the controversy over the commensurability of charity as well as that over transubstantiation, according to which the substance, but not the accidents of the offering was transformed.⁷⁹ The discourse of intension and remission also had a bearing on Trinitarian theology insofar as the affiliations among the three persons of the Trinity and their distinctive qualities were framed in terms of relations, as was done by Dominicans, or emanations, the terminology preferred by Franciscans.⁸⁰ Each approach lent itself to its own form of logical expression. Trinitarian relations were expressed in terms of opposition, as in the classic square, but in this context, as in the *Scutum fidei*, adapted to a triangle.⁸¹ In the words of Russell Friedman,

proach to Literary History, C. McDONALD, S. R. SULEIMAN (eds.), New York, 2010, pp. 21-41, esp. 39, n. 3; and Id., "Bend of the Baroque: Toward a Literary Hydrography in France", in *Literature and Cartography: Theories, Histories, Genres*, A. ENGBERG-PEDERSEN (ed.), Cambridge, MA, 2017, pp. 219-252, esp. 221 and fig. 9.1, where, however, he mischaracterizes the diagram as "the quadrature of a circle."

⁷⁹ For eucharistic theology, see the brief discussion in J. F. WIPPEL, "Godfrey of Fontaines on Intension and Remission of Accidental Forms", *Franciscan Studies*, 39 (1979), pp. 316-355, esp. 349. For charity, see C. BALADIER, "Intensio de la charité et géometrie de l'infini chez Guillaume d'Auxerre", *Revue de l'histoire des religions*, 225 (2008), pp. 347-391, and S. KEMP, "Quantification of Virtue in Late Medieval Europe", *History of Psychology*, 21 (2018), pp. 33-46.

⁸⁰ See R. L. FRIEDMAN, "*In principio erat verbum*: The Incorporation of Philosophical Psychology into Trinitarian Theology, 1250-1325", Ph.D. Dissertation, University of Iowa, 1997, and FRIEDMAN, "Gabriel Biel and Later-Medieval Trinitarian theology", in *The Medieval Heritage in Early Modern Metaphysics and Modal Theory, 1400-1700*, R. L. FRIEDMAN, L. O. NIELSEN, R. SORABJI (eds.), New Synthese Historical Library 53, Dordrecht, 2003, pp. 99-120.

⁸¹ See n. 40.

“as the relational account of personal distinction developed over time, a stress came to be laid upon the fact that not only are these relations that constitute the persons real, they are also opposed”.⁸² In contrast, emanation lent itself to expression in terms of identity; in Friedman’s words: “On the emanation account of the distinction or constitution of the persons, the Father, the Son, and the Holy Spirit are the very same divine essence in three irreducibly distinct ways, these three different ways being how each one originates. ... Thus three irreducibly distinct emanational properties account for the fact that the three divine persons are emanationally distinct, yet essentially identical”.⁸³

Fludd’s image, which maps the workings of the mind, memory, and the senses, culminates in what might be called a Trinitarian Venn diagram which, employing the language of logic, reconciles the principles of opposition and identity.⁸⁴ In keeping with the Western doctrine of the *Filioque*, added to the Nicene Creed in the late sixth century, according to which the Holy Spirit proceeded from the Son as well as the Father, the image locates the Spirit between Father and Son, adding for emphasis immediately below the central zone of intersection: *Ab utroque procedens* (proceeding from both). As in a square of opposition, except now in approximately triangular form, Fludd’s construction diagrams the distinctions between the three persons along lines of intersection that converge at the center even as it simultaneously unites them along the curve of the circumference designated by three inscriptions: *DEVS* at the top, *Vt genitas* (like the begotten), connecting the Holy Spirit to the Son, and *Vt genitor* (like the father), connecting it to the Father.

FLUDD’S SYNCRETISM

Fludd’s fantastic image transforms traditional materials into something particular to his own vision of mankind’s place in between “two worlds, namely the greater and the lesser”, to quote from the prolix title of his *magnum opus*. Like the rest of his thought, his diagrammatic method is syncretic. To the extent he thought of cognition as capable of reflecting divine realities, he was a dyed-in-the-wool neo-Platonist. His faith in diagrams as a means of capturing not simply the products but also the very process of cognition, however, makes him no less an Aristotelian.

Fludd would have been familiar with this way of thinking about diagrams from Aristotle’s *De memoria et reminiscentia*. In a copy that belonged to another neo-Platonist, Nicholas of Cusa—part of a compendium of writings attributed to the Stagirite written in England during the period when his influence on the curriculum was at its height—Aristotle contemplates the figure of man, itself a representation of anthropology, mocked by the monkey in the margin, who both eats and clutches his posterior, a scatological motif that suggests that, rather than rational thought, it is capable only of bodily processes that generate excrement.⁸⁵ (Fig. 18) All

⁸² FRIEDMAN, “Gabriel Biel” (as in n. 80), p. 102.

⁸³ *Ibidem*.

⁸⁴ FLUDD, *Utriusque cosmi* (as in n. 4) includes other Trinitarian diagrams based on the triangle and circle, e.g., the *Demonstratio Caelum trinitatis*, vol. 1, tract 1, bk. 1, 20.

⁸⁵ For London, British Library, Harley MS. 3487, see M. CAMILLE, “Illustrations in Harley MS 3487 and the Perception of Aristotle’s *Libri Naturales* in Thirteenth-Century England”, in *England in the Thirteenth Century: Proceed-*

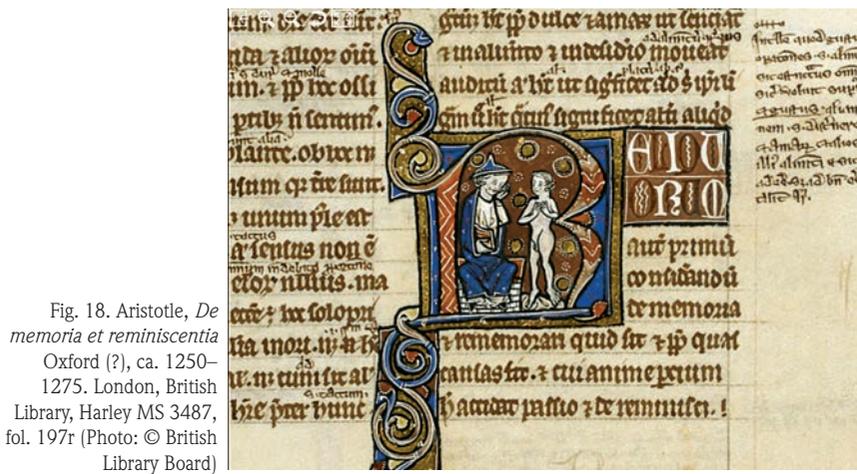


Fig. 18. Aristotle, *De memoria et reminiscencia* Oxford (?), ca. 1250–1275. London, British Library, Harley MS 3487, fol. 197r (Photo: © British Library Board)

the illuminator needed to paint this initial were the schematic prompts of which one can still see traces in the lower margin. The juxtaposition of man and beast, however, is more than just play. Aristotle distinguishes between memory, common to mankind and animals, and remembering, which, in his view, is uniquely human. Unlike memory, remembering involves the active recollection of the “unqualifiedly intelligible objects ... that form the objects of theoretical reason” and that “include mathematical objects, scientific theorems, and the immaterial essences of perceptible particulars”, all of which explains why the initial portrays him contemplating a naked man (effectively a representation not of any particular person but rather of the universal, mankind).⁸⁶ Aquinas draws the same distinction in his commentary on Aristotle’s text, doing so, moreover, in terms that have direct recourse to the language of syllogistic, the principal arena in which the square of opposition was applied.⁸⁷

The reason why recollecting belongs to man alone is that recollecting resembles a kind of reasoning. Hence, just as in a syllogism one arrives at a conclusion from some starting points, so in re-

ings of the 1984 Harlaxton Symposium, W. M. ORMROD (ed.), Woodbridge, Suffolk, 1985, pp. 31-44; N. MORGAN, *Early Gothic Manuscripts*, 2 vols., *A Survey of Manuscripts Illuminated in the British Isles* 4/2: 1250–1285, London, 1982-1988, no. 145; M. A. MICHAEL, “Urban Production of Manuscript Books and the Role of the University Towns”, in *The Cambridge History of the Book in Britain II: 1100–1400*, N. MORGAN, R. M. THOMSON (eds.), Cambridge, 2008, pp. 168-194, esp. 179; and H. WIMMER, *Illustrierte Aristotelescodices: Die medialen Konsequenzen universitärer Lehr- und Lernpraxis in Oxford und Paris*, Sensus: Studien zur mittelalterlichen Kunst 7, Vienna-Cologne-Weimar, 2018, pp. 83-144, esp. 89-91. In reading the initial and marginal imagery as a unity, my interpretation differs from those of both Camille and Wimmer.

⁸⁶ See R. G. PARSONS, “Aristotle on Remembering and Recollecting”, Ph.D. Dissertation, Princeton University, 2016, p. 9.

⁸⁷ THOMAS AQUINAS, “Commentary on Aristotle, *On Memory and Recollection*”, trans. J. BURCHILL, O.P., in *The Medieval Craft of Memory: An Anthology of Texts and Pictures*, M. CARRUTHERS, J. M. ZIOLKOWSKI (eds.), Philadelphia, 2002, pp. 153–188, esp. 185–186.

collecting one reasons by a certain procedure that he has seen, or heard, or perceived something in some way before, arriving at this conclusion from a certain starting point. ... This process of a person seeking to come upon something else is found only in those who have a natural power of deliberation, because deliberation is also achieved through a procedure of reasoning.

In fact, in making his case, Aquinas, following Aristotle, uses what he specifically designates as a demonstration “of varying proportion by means of a diagram through letters” to argue that the soul derives its knowledge of magnitudes of size and time from proportions extrapolated from sensory data.⁸⁸

For Aquinas as for Aristotle, diagrams prove critical, not only to the distinction he wishes to draw, in this case, between animals and humans, but also to understanding the very nature of thought itself. Having affirmed that “it is not possible to think without an image”, Aristotle adds: “For the same effect occurs in thinking as in drawing a diagram” (*De memoria et reminiscencia* 449b31–4501a). Thinking requires sensory perception, but in and of themselves, sense impressions are insufficient. The images have to be processed according to certain rules. It is in this context that the proportionality of diagrams comes in.⁸⁹ Aristotle does not claim that in order to think one has to draw. Nor does he maintain that drawing diagrams helps with thinking (although it does). Rather, to distinguish thought from imagination and memory (and humans from animals), he underscores the “effect” that thinking and generating a diagram have in common: the requirement to work things through step-by-step. In comparing cogitation to the process of drawing, Aristotle goes beyond asserting that a diagram represents the content of thought; rather, the procedure of producing the diagram resembles and even enables the process of thought. Both, in his view, involve a method of defining and drawing relationships that point towards particular conclusions. If drawing a diagram and the process of thinking represent two sides of the same equation, then it is not simply a matter of thought generating diagrams, but also of diagrams generating thought. Rather than a representation, the diagram structures the patterns according to which one thinks. More than a mere representation, the diagram assumes an active, operative role.⁹⁰

The long reach of Aristotle’s diagrammatic understanding of cognition shaped Lindner’s crude yet telling annotations, visual as well as verbal, to his compendium on logic. One would think from the modest literature on the image, not to mention the fact that it is housed at the Wellcome Collection, that it illustrated a treatise on physiology, medicine or the senses. Yet, as we have seen, Lindner’s interest lay less in any particular topic than in logic per se, in other

⁸⁸ AQUINAS, “*Commentary on Aristotle*” (as in n. 87), p. 183.

⁸⁹ D. L. SEPPER, “Aristotelian Proportioned Images and Descartes’s Dynamic Imagining”, in *Image, Imagination, and Cognition: Medieval and Early Modern Theory and Practice*, C. LÜTHY, C. SWAN, P. BAKKER, C. ZITTEL (eds.), *Intersections* 55, Leiden-Boston, 2018, pp. 275-299, esp. 281: “In sum, these passages make clear that thinking, which for Aristotle requires phantasms in order to occur, is not simply gaping at a present image. Thinking involves taking the phantasm in a certain way, against one background rather than another. ... Imagining requires not just an image, but identifying that image as representing something in an appropriate field or context of concerns. The ability to change that field or context of concern is something that reason does with images.”

⁹⁰ These observations echo those in J. F. HAMBURGER, *Diagramming Devotion: Berthold of Nuremberg’s Transformation of Hrabanus Maurus’ Poems in Praise of the Cross*, Chicago, 2020, p. 221.

words, in the rules of reasoning, which, while dependent on data provided by the senses, enabled the mind to process those sense impressions and draw correct inferences from them. The two halves of the page have to be read as a whole.

CONCLUSION

At stake in reading Fludd and Lindner's diagrammatic representations of the human faculties is how each construed the age-old philosophical question concerning the relationship of experience to knowledge. Current scholarship on medieval images emphasizes not just sight but the full sensorium as a framework informing medieval responses (and not just to works of art (and but to much else besides)).⁹¹ Medieval philosophers, especially of the High and later Middle Ages, also stressed the embodied dimensions of experience, but they never limited their accounts to sensory experience alone. The senses alone did not suffice, whether for memory or for judgment. Peter of Dresden finishes his work, which begins with the same issues of generation and corruption that had preoccupied Aristotle, with a summation of the Aristotelian perspective on these problems: whereas the divine intellect at the summit of the *scalum entis*, in comparison to whom nothing is simpler, "knows itself and things in themselves" (i.e., without the mediation of the senses), the human intellect knows things by abstracting their species from the particulars of sense impressions.⁹² In contrast, neo-Platonists assigned the mind a less passive role, seeing it as an active agent, sometimes informed by divine inspiration, that inquired into the world through the senses.⁹³

⁹¹ From the ever expanding literature on the senses in the Middle Ages, I cite only a few salient contributions: *Rethinking the Medieval Senses: Heritage, Fascinations, Frames*, S. G. NICHOLS, A. KABLITZ, A. CALHOUN (eds.), Baltimore, 2008, in particular, D. HELLER-ROAZEN, "Common Sense: Greek, Arabic, Latin", pp. 30-50; E. PALAZZO, *L'invention chrétienne des cinq sens dans la liturgie et l'art au Moyen Âge*, Paris, 2014; *Les cinq sens au Moyen Âge*, ed. E. PALAZZO, Paris, 2016; *A Cultural History of the Senses in the Middle Ages, 500-1450*, R. G. NEUHAUSER, C. CLASSEN (eds.), A Cultural History of the Senses, 2, London, 2014; *The Saturated Sensorium: Principles of Perception and Mediation in the Middle Ages*, H. H. L. JØRGENSEN, and L. K. SKINNEBACH (eds.), Aarhus, 2015; R. NEUHAUSER, "The Senses, the Medieval Sensorium, and Sensing (in) the Middle Ages", in *Handbook of Medieval Culture: Fundamental Aspects and Conditions of the Middle Ages*, A. CLASSEN (ed.), Berlin-Boston, 2015, vol. 3, pp. 1559-1575; *A Feast for the Senses: Art and Experience in Medieval Europe*, M. BAGNOLI (ed.), Baltimore, 2016; M. BAGNOLI, "The Materiality of Sensation in the Art of the Late Middle Ages", in *Knowing Bodies, Passionate Souls* (as in n. 11), pp. 31-63; and *Sensory Reflections: Traces of Experience in Medieval Artifacts*, F. GRIFFITHS and K. STARKEY (eds.), Sense, Matter, and Medium, 1, Berlin-Boston, 2020. Of critical importance for this turn to the senses was H. U. GUMBRECHT, *Production of Presence: What Meaning Cannot Convey*, Stanford, 2004.

⁹² *Parvulus philosophiae naturalis*, fol. 15r: *Intellectus autem diuinus se ipsum et se ipso res cognoscit, and Sed intellectus humanus res per species abstractas a rebus particularibus per sensum prius cognitis. Sed deum non cognoscit per species abstractas que similitudo abstracta simplicior est isto a quo sit abstractio. Deo autem nihil est simplicius.*

⁹³ On this dichotomy, see P. A. KÄRKKÄINEN, "The Senses in Philosophy and Science: Mechanics of the Body or Activity of the Soul", in *A Cultural History of the Senses in the Middle Ages* (as in n. 93), pp. 111-132. For neo-Platonic accounts of nature as a mirror of the divine, see J. F. HAMBURGER, *Speculations on Speculation: Vision and Perception in the Theory and Practice of Mystical Devotions*, in *Deutsche Mystik im abendländischen Zusammenhang: Neu erschlossene Texte, neue methodische Ansätze, neue theoretische Konzepte, Kolloquium Kloster Fischingen*, W. HAUG, W. SCHNEIDER-LASTIN (eds.), Tübingen, 2000, pp. 353-408.

Fludd's worldview, encapsulated by his diagrammatic rendition of the *anima sensitiva* scheme, amalgamates both points of view, embodied and disembodied alike.⁹⁴ Like its medieval antecedents, Fludd's figure grants equal importance to the exterior and interior senses, reason and, higher still, the intellect, illuminated by the divine. Filling the top half of the page, the disembodied rules of reason, expressed in language arrayed within a diagrammatic armature, complement the body, including the workings of the mind, below.

Kepler was among the first to dismiss Fludd's theories as so much hocus pocus or, to use his derisive term, "hermeticism".⁹⁵ His figure, however still carries some lessons. If Magnus Hundt, who introduced the word anthropology into the modern lexicon, meant by it the whole of the human person, not just the senses but also the intellect, then historical *Bildanthropologie* should enlarge its purview beyond the triad of image, medium, and body (as in Hans Belting's formulation of its terms) to include mind and memory and, further still, what Fludd and his predecessors would have called soul (for which we might substitute intellect).⁹⁶ In this context, diagrammatic procedures played a critical role: they not only emblemized, they also exemplified those patterns and procedures of critical thought that were believed to distinguish human beings from other animals without which the evidence of the senses would have remained unexamined.

A vast gulf separates various medieval from modern understandings of the mind, especially when it comes to issues of embodiment.⁹⁷ Kant, however, might have agreed with Fludd at least in so far as the categories as he conceived of them—a priori procedural rules (not images) derived from perception but independent of them, without which sense impressions could not be comprehended—indicated that the senses alone proved insufficient to account for the character of cognition.⁹⁸ In this context, one would do well to bear in mind the sophistication of medieval accounts of sensory experience in relation to cognition and mental repre-

⁹⁴ An amalgamation for which there are medieval precedents; see, e.g., M. KARNES, *Imagination, Meditation and Cognition in the Middle Ages*, Chicago, 2011, who argues that Bonaventure represents a synthesis of Aristotelian accounts of cognition with Augustine's Trinitarian psychology.

⁹⁵ See C. LÜTHY, "What Does a Diagram Prove that Other Images Do Not? Images and Imagination in the Kepler-Fludd Controversy", in *Image, Imagination, and Cognition* (as in n. 95), pp. 227-274.

⁹⁶ Considerations of space prohibits an extensive critical review of the literature. Most important is H. BELTING, *Bild-Anthropologie: Entwürfe für eine Bildwissenschaft*, Munich, 2002, translated by T. DUNLAP as *An Anthropology of Images: Picture, Medium, Body*, Princeton, 2011. For an appreciative critique, see C. S. WOOD's review in *The Art Bulletin* 86 (2004), pp. 370-373. See also K. SACHS-HOMBURG, B. KREMBERG, and J. R. J. SCHIRRA, "Bildanthropologie: Ein Forschungsprogramm", in *Aisthesis*, C. WAGNER, M. GREENLEE, J. R. J. SCHIRRA (eds.), Regensburger Studien zur Kunstgeschichte, 12, Regensburg, 2013, pp. 81-98. That multiple understandings of the senses, along with corresponding anthropologies, could coexist even in the writings of a single author who engaged with different discourses, see J. KÜPPER, "The Medical, the Philosophical, and the Theological Discourses on the Senses: Congruences and Divergences", in *Body and Spirit in the Middle Ages: Literature, Philosophy, Medicine*, G. GUBBINI (ed.), Berlin, 2020, pp. 111-124, a volume that addresses the complex relationship between body and spirit in the Middle Ages.

⁹⁷ See the recent, yet-to-be-archived article, L. SHAPIRO and S. SPAULDING, "Embodied Cognition", *The Stanford Encyclopedia of Philosophy* (Fall 2021 Edition), ed. E. N. ZALTA, forthcoming URL = <<https://plato.stanford.edu/archives/fall2021/entries/embodied-cognition/>>.

⁹⁸ What counts as evidence is itself a complicated question; see, in relation to the diagram, R. CAMPE, "Shapes and Figures: Geometry and Rhetoric in the Age of Evidence", *Monatshefte* 102 (2010), pp. 285-299. The Popperian view according to which in the pursuit of scientific laws conjectural hypotheses subject to empirical falsification prove

sensation.⁹⁹ Medieval philosophers debated such questions as “do the senses merely transmit information (moderns would say data) to the intellectual faculties?”, and “Are such rational operations as drawing inferences, syllogizing, recognizing patterns and purposes the purview of the intellect alone?”¹⁰⁰ Today, as in the Middle Ages, whether in whether logic and philosophy or computer and cognitive science, the cognitive and representational dimensions of diagrams remain central to the discussion of such questions. Their importance derives, in part, from their uncanny ability to engender as well as mimic mental processes, in other words, to create as well as merely replicate or reproduce knowledge.¹⁰¹ Herbert Kessler’s voracious appetite for images, combined with his piercing intellect, reminds us that, even as we look to the future, we should also, like Robert Fludd’s cosmic man, look back and, in so doing, reflect on the ways in which the history of diagrammatic modes of representation forces the question: what exactly do we mean when we speak of the image?

more important than inference from experience alone might be cited as a modern example of balancing the claims of intellect and experience; see K. R. POPPER, *Conjectures and Refutations: The Growth of Scientific Knowledge*, New York, 1962); also S. THORNTON, “Karl Popper”, *The Stanford Encyclopedia of Philosophy* (Spring 2021 Edition), ed. E. N. ZALTA, URL = <<https://plato.stanford.edu/archives/spr2021/entries/popper/>>.

⁹⁹ For a summary of some of the relevant literature, see H. LAGERLUND, “Mental Representation in Medieval Philosophy”, *The Stanford Encyclopedia of Philosophy* (as in n. 99), URL = <<https://plato.stanford.edu/archives/spr2021/entries/representation-medieval/>>.

¹⁰⁰ Questions posed by K. H. TACHAU, “What Senses and Intellect Do: Argument and Judgment in Late Medieval Theories of Knowledge”, in *Argumentationstheorie: scholastische Forschungen zu den logischen und semantischen Regeln korrekten Folgerns*, ed. K. JACOBI, Leiden, 1993, pp. 653–670. See also TACHAU, *Vision and Certitude in the Age of Ockham: Optics, Epistemology, and the Foundations of Semantics 1250–1345*, Leiden, 1988. On the same issues in Aquinas, see T. S. CORY, “Is there Anything in the Intellect that was not first in Sense? Empiricism and Knowledge of the Incorporeal in Aquinas”, *Oxford Studies in Medieval Philosophy* 6 (2018), pp. 100–143.

¹⁰¹ I discuss such debates as they relate to medieval diagrams in J. F. HAMBURGER, *Diagramming Devotion* (as in n. 90), esp. ch. 1 and 5. For contemporary cognitive theory applied to medieval sources, an approach of which I will admit to being rather skeptical, see A. L. CLARK, “Why All the Fuss About the Mind? A Medievalist’s Perspective on Cognitive Theory”, in *History in the Comic Mode: Medieval Communities and the Matter of Person*, RACHEL FULTON, B. W. HOLSINGER, (eds.), New York, 2007, pp. 170–181.