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Clucas, Stephen (2017) The royal typographer and the alchemist: John Dee, Willem Silvius, and the diagrammatic alchemy of the Monas Hieroglyphica. *Ambix* 64 (2), pp. 140-156. ISSN ISSN: 1745-8234 (Online).

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## The Royal Typographer and the Alchemist: John Dee, Willem Silvius, and the Diagrammatic Alchemy of the *Monas Hieroglyphica*

Stephen Clucas  
Birkbeck, University of London, UK

Abstract: John Dee's *Monas Hieroglyphica* (1564) was a work which involved a close collaboration between its author and his 'singular friend' the Antwerp printer Willem Silvius, in whose house Dee was living whilst he composed the work and saw it through the press. This article considers the reasons why Dee chose to collaborate with Silvius, and the importance of the intellectual culture – and the print trade – of the Low Countries to the development of Dee's outlook. Dee's *Monas* was probably the first alchemical work which focused exclusively on the diagrammatic representation of the alchemical process, combining diagrams, cosmological schemes and various forms of tabular grid. It is argued that in the *Monas* the boundaries between typography and alchemy are blurred as the diagrams 'anatomizing' his hieroglyphic sign (the 'Monad') are seen as revealing truths about alchemical substances and processes.

Key words: diagram, print culture, typography, John Dee, Willem Silvius, alchemy.

Why did John Dee go to Antwerp in 1564 in order to publish his recondite alchemical work, the *Monas Hieroglyphica*? What was it that made the Antwerp printer Willem Silvius a suitable candidate for his role as the 'typographical parent' of Dee's work?<sup>1</sup> In this paper I look at the role that Silvius played in the evolution of Dee's most enigmatic work, and at the ways in which Silvius's expertise in the reproduction of printed diagrams enabled Dee to make the *Monas* one of the first alchemical works to make systematic use of the diagram as a way of presenting information about the alchemical process.

Despite the fact that John Dee's famous (and famously obscure)<sup>2</sup> work on alchemy, cabala and Trithemian natural magic, the *Monas Hieroglyphica*, proclaims its author on the title page to be a "Londoner," it was in fact a profoundly pan-European product. Written and printed in Antwerp in 1564, dedicated to the King of Bohemia and Hungary, Maximilian II, and making several references to lectures that Dee had given in Paris in the 1550s, the work was to be read (and defended) by Queen Elizabeth in the Royal Court at Greenwich shortly after its publication,<sup>3</sup> and was presented, via a Spanish ambassador, to Rudolf II at his court in Prague in 1584. But despite the pan-European destiny of Dee's work, its inception depended very much on the Low Countries, both for its intellectual inspiration and its physical production. Dee's years in the Low Countries after he graduated from Cambridge in the 1540s were formative, and his intellectual friendship with his printer was a vital component in bringing his work to fruition.

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<sup>1</sup> See C. H. Josten, "A Translation of John Dee's 'Monas Hieroglyphica' (Antwerp, 1564), with an Introduction and Annotations," *Ambix*, 12:2-3 (1964): 84-221 (150-151). *Monas*, 11r (*Parentem Typographicum*). This edition includes a facing page facsimile reproduction of the 1564 Antwerp edition. All citations will give the page reference of the 1564 edition and the relevant page number for Josten's translation.

<sup>2</sup> Brian Vickers described the *Monas* as "possibly the most obscure work ever written by an Englishman": Brian Vickers, "Frances Yates and the Writing of History," *Journal of Modern History* 51 (1979): 287-316 (308, n. 17); while Allen Debus described it as "largely unintelligible to Dee's growing band of twentieth-century commentators": Allen G. Debus, *The Chemical Philosophy*, 2 vols. (New York: Science History Publications, 1977, repr. New York: Dover and Newton Abbot: David & Charles, 2002), vol. 1, 44. For a different view see Peter J. Forshaw, 'The Early Alchemical Reception of John Dee's *Monas Hieroglyphica*', *Ambix*, 52:3 (2005): 247-269.

<sup>3</sup> See Josten, "A Translation", 88-9.

## Louvain and Dee's occult philosophy

After graduating from Cambridge in December 1546, Dee travelled to Louvain, and attended the university there from the summer of 1547 until July 1550, receiving his MA in 1548.<sup>4</sup> In the prefatory epistle of the *Propaedeumata aphoristica* (1558) addressed to Gerard Mercator (dated 20 July 1558), whom he addresses as “by far his dearest friend” (*amico suo longe charissimo*), Dee speaks fulsomely of his time spent at Louvain. Having “run through all the degrees of our [i.e. the English] schools in the seven arts called liberal,” Dee says, he “undertook to travel into regions across the sea” to meet the great scholars of the continent. He wished to live among scholars, he said “whose lightest single day of writing would have furnished matter enough to require the labor of a full year for comprehension while I formerly sat at home.”<sup>5</sup> Mercator, in particular is credited with having profoundly transformed Dee's outlook: “From your discussions with me my whole system of philosophizing in the foreign manner laid down its first and deepest roots.”<sup>6</sup>

Dee paints a glowing picture of their friendship, which consisted in a “sweetly protracted cooperation in philosophising” in which they “scarcely left off the investigation of difficult and useful problems for three minutes of an hour.”<sup>7</sup> Dee mentions a recent letter which Mercator had sent him, which had refreshed his memory about their “noble debate” and prompted the subject which he is about to discuss (that is, a new astrological theory based on optics), and it is clear that even after Dee had returned to England, he was still tied to Louvain by epistolary bonds.<sup>8</sup> Dee ends the dedicatory epistle by urging Mercator to publish his own works, thus (like Dee himself) participating in the “Republic of letters.”<sup>9</sup> In his letter to the reader “who is studious in the purer philosophy” (*Lectori Philosophiae sincerioris studioso*), Dee warns that anybody who turns to his book “from the usual and worn way of philosophizing” (*ex Communi, tritave philosophandi via*) will be alarmed, and condemn it as a “labyrinth of diverse things.”<sup>10</sup> This is not a philosophy for “unworthy and profane persons” (*indignis Profanisque*),<sup>11</sup> but (as he says to Mercator) is one which will be “barely credible to a few wise men, but known only to a very few.”<sup>12</sup> It is quite clear, then, that Dee's travels to Louvain in the 1540s were the motivating force behind his developing interest in alchemy, magic, and the occult philosophy. When Dee returned to the Continent in 1563 to oversee the publication of his *Monas Hieroglyphica* he wrote to his patron William Cecil, Lord Burghley comparing the scholarly atmosphere of the English universities unfavourably to that of the Low Countries. “Albeit that o[u]r vniuersities ... have Men in sundry knowledges right excellent,” he wrote,

as, in Diuinitie, the hebrue, greke and latin tung, &c. Yet ... the Wisdome Infinite of o<sup>r</sup> Creator, is branched into manifold mo sort of wunderfull Sciences, greatly ayding Dyuine Sights to the better Vew of his Powre and Goodnes ... [in which] o[u]r cuntry hath no man (that I ever yet could hereof) hable to set furth his fote, or shew his hand.<sup>13</sup>

<sup>4</sup> See Nicholas H. Clulee, *John Dee's Natural Philosophy: Between Science and Religion* (London and New York: Routledge, 1988), 26-30, and Steven van den Broecke, *The Limits of Influence: Pico, Louvain, and The Crisis of Renaissance Astrology* (Leiden: Brill, 2003), 168.

<sup>5</sup> *John Dee on Astronomy, 'Propaedeumata Aphoristica' (1558 and 1568), Latin and English*, ed. and trans. Wayne Shumaker (Los Angeles and Berkeley: University of California Press, 1978), 110-11. Hereafter referred to as *Propaedeumata*.

<sup>6</sup> Dee, *Propaedeumata*

<sup>7</sup> Dee, *Propaedeumata*.

<sup>8</sup> Dee, *Propaedeumata*, 112-13. Dee refers to “nearly all your letters to me which I have at hand” (*litteris tuis ad me, fere omnibus, quid ipse prae manibus habeam*) which suggests that the correspondence was extensive.

<sup>9</sup> Dee, *Propaedeumata*, 118-119.

<sup>10</sup> Dee, *Propaedeumata*, 120-21. Shumaker's translation altered.

<sup>11</sup> Dee, *Propaedeumata*, 120-21,

<sup>12</sup> Dee, *Propaedeumata*, 112-113.

<sup>13</sup> John Dee to William Cecil, Lord Burghley, 16 February 1563, The National Archive, State Papers Domestic 12/27, item 63. See John E. Bailey, “Dee and Trithemius's ‘Steganography’,” *Notes and Queries*, fifth series, 11 (1879): 401-2, 422-3.

These “wunderfull” sciences were, in essence, concerned with the mystical understandings of number, weight, and measure.<sup>14</sup> According to Dee, scholars in these kinds of disciplines, and books not available to him in England, were plentiful in Antwerp, and he beseeched Cecil to allow him to remain longer and to continue to support his work.<sup>15</sup> Dee offered as an example of the importance of his remaining in Antwerp the fact that he had managed to obtain a copy of Johannes Trithemius’s *Steganographia*, “A boke for your honor, or a Prince, so meet, so nedefull and co[m]odious, as in humayne knowledg, none can be meeter.”<sup>16</sup> Given the dedication of the *Monas* and Dee’s subsequent pursuit of Eastern European sources of patronage, it is interesting to note that Dee had managed to find himself an unnamed Hungarian patron whilst in Antwerp. “I stand at the Curtesye of a noble of hungarie,” he said,

for writing furth the rest [of Trithemius’s book]: who hath promised me leave therto, after he shall perceyve that I may remayne by him longer (with the leave of my prince) to pleasure him also with such points of Science as at my hands he requireth.<sup>17</sup>

It would be interesting to speculate whether it was this Hungarian nobleman who had suggested that Dee dedicate his work to Maximilian, and whether he accompanied him to the coronation of Maximilian as King of Hungary at Pressburg, which he attended in September 1563.<sup>18</sup> We know, in any case, that Dee was in Zürich on the 23 April 1563, visiting the Swiss bibliographer and natural historian Conrad Gesner (1515-1565), as he wrote his name in Gesner’s *album amicorum*.<sup>19</sup> It is also possible that Dee had accompanied him to the Imperial court in Vienna to present the *Monas* to the Emperor’s son Maximilian, as he mentions his “return from the emperor’s court” in June 1564 in an autobiographical account of his life (the *Compendious Rehearsall*) written in 1592, although Josten has doubted whether Dee had time to make this journey.<sup>20</sup>

## Dee and Silvius

The letter which Dee wrote to Cecil, pleading for an extension of his stay in Antwerp was, significantly, written “in Antwerp, in the house of Willem Silvius, at the Golden Angel, on the street

<sup>14</sup> Dee to Cecil, 16 February 1563: “the Science *De Numeris formalibus*, the Science *De Ponderibus mysticis*, and ye Science *De Mensuris* Diuinis: (by which three, the huge frame of this world is fashioned, compact, rered, stablished & preserved) and in other Sciences, eyther w<sup>th</sup> these Collaterall, or from them derived, or to themwards, greatly us fordering.”

<sup>15</sup> Dee to Cecil, 16 February 1563: “syns my cumming ... by diligent serche and travaile (for so short a tyme) almost incredible, Such Men, and such bokes are com[m]e to my knowledge, where they are, As, to the former great sciences I hoped never to have had so good ayde, eyther by the one or the other.”

<sup>16</sup> Dee to Cecil, 16 February 1563. On Trithemius and his importance for sixteenth-century occult philosophy see Noel L. Brann, *Trithemius and Magical theology: A Chapter in the Controversy over Occult Studies in Early Modern Europe* (Albany: State University of New York Press, 1999). For copies of Trithemius’s works owned by Dee see Julian Roberts and Andrew G. Watson, *John Dee’s Library Catalogue* (London: The Bibliographical Society, 1990), items 218, 286, 359, 622, 646, 678, 897, 969, 1884, and DM 165. Roberts and Watson note that the copy Dee made of the *Steganographia* has not thus far been located (see 183).

<sup>17</sup> Dee to Cecil, 16 February 1563.

<sup>18</sup> See Josten, “A Translation”, 87, and Dee, *Monas Hieroglyphica*, 2r: “iam praeterito Septembri, in Hungarici vestri Regni Posenio, aliquam trahens moram.”

<sup>19</sup> See Josten, “A Translation”, 87 and William H. Sherman, *John Dee: The Politics of Reading and Writing in the English Renaissance* (Amherst: University of Massachusetts Press, 1995), 48.

<sup>20</sup> See “Compendious Rehearsall,” British Library, Cotton MS Vitellius, C VII, fol. 6v, and Josten, “A Translation,” 89. Interestingly, however, Dee did receive a letter from Vienna from Maximilian’s Paracelsian physician Bartholomaeus Carrichter, dated 24 December 1564, addressing him as “amico et familiari meo plurimum dilecto.” Oxford, Bodleian Library MS Ashmole 1788, fols. 134-5. See Evans, 222, n. 1. Glyn Parry presents a plausible version of Dee’s itinerary in 1563-4 in *The Arch-Conjuror of England. John Dee* (Newhaven and London: Yale University Press, 2011), 52-3. See also Clulee, *John Dee’s Natural Philosophy*, 123.

vulgarly known as Den Camer Straet.”<sup>21</sup> That is to say, Dee was living at the house of the printer, where (it seems) he both wrote and oversaw the printing of the *Monas Hieroglyphica*, as can be seen from his dedicatory epistle to Silvius dated 30 January 1564, one day after his lengthy dedicatory epistle to Maximilian. This letter to Silvius is signed “from our study in Antwerp” (*Ex Musaeo nostro Antwerpiensi*). Silvius is addressed by Dee as “his singular friend” (*Amico suo singulari*).<sup>22</sup>

Silvius was a relative newcomer to the Antwerp printing scene, but had swiftly (and some say dishonestly) risen to the prestigious post of “Royal Typographer” (*Regius Typographus*) as is indicated on both the title page and the colophon of the work.<sup>23</sup> According to the print historian Paul Blouw, Silvius had obtained his printer’s licence in May 1558 and printed the first works under his own name in 1560.<sup>24</sup> By 1564, thanks to the compulsory (albeit temporary) liquidation of Christoph Plantin’s *officina* in 1562 (which provided Silvius with much of his stock of types),<sup>25</sup> Silvius’s business was flourishing. Amongst some of the first publications to make his name was a collection of Antwerp pageant plays, the *Spelen van Sinne* (published in 1562), which was, according to Colin Clair and Paul Blouw, “notable for its excellent execution and its illustrations,”<sup>26</sup> a “spectacular book with fine woodcuts” including the blazons of civic bodies and allegorical representations taken from the plays.<sup>27</sup> Also in 1562, Silvius published his own Flemish translation of Claude Paradin’s *Devises héroïques*, which was adorned with 217 woodcuts.<sup>28</sup> The year 1562, according to Clair, was the year which “really saw the blossoming of Silvius’s establishment,”<sup>29</sup> so by the time that Dee arrived in Antwerp he was an obvious choice: a man of letters with a flourishing printing business, who was renowned for his typographic design and his expertise in illustration. This was just the man to undertake the engraving of the *Monas* with its many unusual diagrams, its elaborate symbolic frontispiece and final device.

But there were other reasons perhaps for Dee’s choice of printer and why he was living in his house in 1563-4. Like Dee, Silvius had been at the University of Louvain in the 1540s: Dee as a Masters student and Silvius as a writing master to the sons of the Prince of Orange.<sup>30</sup> It seems probable that Silvius has become Dee’s “singular friend” during the English mathematician’s influential period of study in the Low Countries, and given the emphasis on the mystical significance of various alphabetic systems in the *Monas*, it is worth noting that Silvius published a number of alphabetic works during his career as a printer – some of them relating to his work as a calligrapher and some of them being works of anti-Catholic religious polemic.<sup>31</sup>

It is fitting that Dee should have returned to the Low Countries where – according to his own testimony – he first developed his interest in the study of celestial influences and their connection to “inferior astronomy” (i.e., alchemy) in order to publish the doctrines that he merely hinted at in the

<sup>21</sup> TNA, SPD 12/27, item 63: “Antwerpiaae apud Guilielmum Siluium In Angelo aureo: in platea, vulgariter, Den Camer Straet, vocata.”

<sup>22</sup> Dee, *Monas Hieroglyphica*, 10v-11v.

<sup>23</sup> On Silvius’s early career see Colin Clair, “Willem Silvius,” *The Library* (1959): 192-205; Paul Valkema Blouw, “Willem Silvius’s Remarkable Start, 1559-62,” *Quaerendo*, 20:3 (1990): 167-206. On his subsequent career, including his work as printer to the States of Holland and the University of Leiden, see Blouw, “Willem Silvius, Christiaan Houweel and Anti-Spanish Propaganda, 1577 to 1579,” *Quaerendo*, 24:1 (1994): 3-29, and Blouw, “Geheime activiteiten van Plantin, 1555-1583,” *Gulden Passer*, 73 (1995): 5-36. On Silvius’s connections with William Cecil see Jan van Dorsten, “Mr. Secretary Cecil, Patron of Letters,” *English Studies*, 50:1 (1969): 545-53. For differing views on Silvius’s possibly devious dealings with Plantin see Clair, “Willem Silvius,” 192-3, and Blouw, “Silvius’s Remarkable Start,” 171-3 and 183 n. 58.

<sup>24</sup> Blouw, “Silvius’s Remarkable Start,” 170.

<sup>25</sup> Blouw, “Silvius’s Remarkable Start,” 194. Plantin’s shop reopened in September 1563 (Blouw, “Silvius’s Remarkable Start,” 198).

<sup>26</sup> Clair, “Willem Silvius,” 194.

<sup>27</sup> Blouw, “Silvius’s Remarkable Start,” 186.

<sup>28</sup> Clair, “Willem Silvius,” 193. The title of Silvius’s translation was *Princelijke Devijzen ofte wapenen van M. Claude Paradyn* (Antwerp, 1562).

<sup>29</sup> Clair, “Willem Silvius,” 193.

<sup>30</sup> Clair, “Willem Silvius,” 196.

<sup>31</sup> Clair, “Willem Silvius,” 194-6. In the same year that he published the *Monas*, Silvius published *Eetien gheestelycken A. B. C. ghetoohen uit den Psalmen van David*, a work which was later placed on the Index of Prohibited books (Clair, “Willem Silvius,” 196).

fifty-second aphorism of the *Propaedeumata* where he alludes to a secret of alchemy “enclosed in a certain Monad and taken from my theories.”<sup>32</sup> Another European dimension is represented by Dee’s repeated references to “the Parisians” in the *Monas*.<sup>33</sup> After Dee left the University of Louvain in 1550 he travelled through France, ending up in Paris where, according to his own account, he undertook “to rede, freely and publikly, Euclides Elements geometricall, *Mathematice Physice et pythagoricè*: (a thing never done publikly in any vniversite of Christendome).”<sup>34</sup> Given the Pythagorean complexities of the *Monas Hieroglyphica* (filtered through his reading of Johannes Trithemius’s letters to Joachim, Margrave of Brandenburg) and its occult re-reading of Euclidean propositions (which are “mathematically, magically, cabalistically and anagogically explained”), it is clear that these Parisian lectures were a vital part of the gestation of the work which he composed in Silvius’s house in Antwerp.<sup>35</sup>

### The dedication to Maximilian II of Habsburg

Some four months before returning to Antwerp to write and print the *Monas*, Dee was travelling: in April 1563 we know that he was in Zürich visiting Conrad Gesner,<sup>36</sup> and by September of that year he was an “eye witness” to the coronation of Maximilian in Pressburg. It was presumably this encounter with the Hungarian court which led Dee to present his work to the newly-crowned monarch, “by grace of God the most wise King of the Romans, of Bohemia and of Hungary” (*ad Maximilianum, Dei gratia Romanorum, Boiemiae et Hungariae regem sapientissimum*).<sup>37</sup> The works of Robert J. Evans on Rudolf II,<sup>38</sup> and Bruce T. Moran on Moritz of Hessen,<sup>39</sup> have done much to explain the importance

<sup>32</sup> Dee, *Propaedeumata*, 148-9: “Et est Arcanum hoc, non minoris multo dignitatis, quam ipsa augustissima philosophorum ASTRONOMIA, INFERIOR nuncupata: cuius Insignia, in quadam inclusa MONADE, ac ex nostris Theoris desumpta ....”

<sup>33</sup> See, for example, Dee *Monas Hieroglyphica*, 7r: “in nostris ad Parisienses Aphorismis,” where he apparently coined the term “real cabala” (*realis cabala*). On the same page he mentions that he also addressed an etymological interpretation of the word *Gamaaea* (talisman) “to the Parisians” (*Parisiensibus*). On 7v he also refers to a work addressed “to the Parisians” which was “their own monad” (*sua MONADE peculiari*), suggesting the existence of a manuscript work which was an intermediate stage of the work which would become the *Monas Hieroglyphica*. Josten, and others, have identified this with a lost manuscript work entitled *Cabbalae Hebraicae compendiosa tabella* which Dee dates to 1562, although given his sharp distinction between the Cabala of the Jews and his own “cabala of the real,” this seems unlikely. On Dee’s concept of a ‘real’ cabala see Clulee, *John Dee’s Natural Philosophy*, 83-4 and Jean-Marc Mandosio, ‘Beyond Pico della Mirandola: John Dee’s “formal numbers” and “real cabala”.’ *Studies in History and Philosophy of Science* 43 (2012) 489–497.

<sup>34</sup> John Dee, “The Compendious Rehearsall of Iohn Dee his Dutifull declaration and profe of the course of his Studious life ... exhibited to her most gracious Mat<sup>ie</sup> at Hampton Court, A[nn]o 1592 Novemb[er] 9,” British Library, MS Cotton Vitellius C. VII, fols. 1-13 (fol. 3v). Dee included amongst his list of his manuscript works, “Prolegomena et dictata Parisiensia in Euclidis Elementis Geometricum libru[m] primu[m] et secundu[m] in collegio Rheimensi – 4<sup>o</sup> 1550.” (see fol. 8r).

<sup>35</sup> Dee, *Monas Hieroglyphica*, 12r: “Mathematicè, Magicè, Cabalisticè, Anagogiceque explicata.” Dee encountered Trithemius’s letters via a book he bought in Antwerp in January 1562: Jacques Gohorry, *De Vsu et Mysteriis Notarum Liber. In quo vetusta literarum & numerorum ac diuinorum ex Sibylla nominum ratio explicatur* (Paris, 1550). Cambridge University Library, shelfmark LE.19.8<sup>2</sup>. This volume is inscribed on the title page: “Ioannes Dee 1562. Antwerpiae Ianuarij Die 20.” The Trithemius letters are to be found in sigs. [Hiii]r-[Iiii]v.

<sup>36</sup> Josten, “A Translation,” 87.

<sup>37</sup> Dee, *Monas Hieroglyphica*, title page.

<sup>38</sup> See Robert J. W. Evans, *Rudolf II and his World. A Study in Intellectual History, 1576-1612* (Oxford: Clarendon Press, 1973), chap. 6, “Rudolf and the Occult Arts,” 196-242 and chap. 7, “Prague Mannerism and the Magic Universe,” 243-74. See also Tara E. Nummedal, *Alchemy and Authority in the Holy Roman Empire* (Chicago and London: University of Chicago Press, 2007).

<sup>39</sup> On court patronage and alchemy in late sixteenth-century and early seventeenth-century Europe, see Pamela H. Smith, *The Business of Alchemy: Science and Culture in the Holy Roman Empire* (Princeton: Princeton University Press, 1994), and Bruce T. Moran, *The Alchemical World of the German Court: Occult Philosophy and Chemical Medicine in the Circle of Moritz of Hessen (1572-1632)* (Stuttgart: Steiner, 1991). See also Moran’s essay, “Patronage and Institutions: Courts, Universities, and Academies in Germany; an Overview:

and significance of alchemy and occult philosophy in Central European court circles in the late sixteenth and seventeenth centuries, and Dee's dedication of the *Monas* to Maximilian and the rhetorical strategies of his dedicatory epistle and title-page confirm their emphasis on the ideological function of occult clientage.

In *Rudolf II and his World. A Study in Intellectual History*, Robert Evans noted the importance of alchemical patronage in the court of Maximilian's son, where there were "significant representatives of alchemy in its widest sense, and several of them lived as members of the Emperor's permanent establishment."<sup>40</sup> He attributes the success of such occult philosophy in the Rudolfine court to the fact that it offered "an occult representation of the mystique of absolutism by divine right."<sup>41</sup> Evans traces this intellectual patronage into the earlier Habsburg dynasty,<sup>42</sup> and particularly to the "collection of learned men" gathered by Maximilian II,<sup>43</sup> which included Michael Toxites the editor of Paracelsus and the astrologer Cyprian Leowicz.<sup>44</sup> Bruce Moran, writing on the role of alchemy and occult philosophy in the German court of Moritz of Hessen in Kassel, speaks of it as "a court mentality in which alchemy, Paracelsian medicine, and magic served to describe a political ideal."<sup>45</sup> The *philosophia hermetica*, Moran says, was an "official court philosophy" and this was "well understood by those seeking social and intellectual legitimacy within court circles."<sup>46</sup> Moran sees the ideological investment in occult philosophy as a response to the "dissolving and confused political and religious context" of the time.<sup>47</sup> It provided "a strong ideological basis from which to legitimise their own separatist politics" against the authority of the "Catholic *Imperium*."<sup>48</sup> The promotion of alchemy by Protestant German courts is seen as "an act of political desperation," in contrast with the occult patronage of the Habsburgs which, he argues, "manifested power not desired, but already achieved," and so became "the most ideal sort of propaganda for the universality of traditional imperial authority."<sup>49</sup>

Dee's overtures to the Habsburg princes (Maximilian II in 1564 and Rudolf II in 1584) bear out this view: in both cases he addressed himself to the stable imperial authority of the monarchs and sought to represent himself as a client concerned with the glorification, continuance and longevity of their dynasty. On both occasions Dee's approaches were coloured by apocalyptic pronouncements.<sup>50</sup>

Dee's dedication of the *Monas* to Maximilian could well have been in imitation of one of the earliest alchemical texts to reach Western readers, the *Liber de compositione alchimiae*, which was purportedly an epistle of the alchemist Morienus written to the Persian king, Khalid.<sup>51</sup> Not only does he treat a great deal of material in his extensive dedicatory epistle to Maximilian (which takes up a third of the printed book), but the King is constantly apostrophized throughout the text, as the assumed recipient of the theorems. The address to the King begins with the title page which announces its dedication to the "wisest King" (*regem sapientissimam*) in the title. This is paralleled by the motto surrounding the representation of the hieroglyphic monad on an ornamental scroll where Mercury (ΣΤΙΑΒΩΝ), whose traditional astrological and alchemical symbol forms the basis of the

1550-1750," *Patronage and Institutions: Science, Technology, and Medicine at the European Court, 1500-1750*, ed. Bruce T. Moran (Woodbridge: The Boydell Press, 1991), 169-83 (esp. 175-6).

<sup>40</sup> Evans, *Rudolf II*, 203.

<sup>41</sup> Evans, *Rudolf II*, 212.

<sup>42</sup> Evans, *Rudolf II*, chap. 4, "The Habsburgs, Bohemia and Humanist Culture," 116-61. See also Hugh Trevor-Roper, *Princes and Artists: Patronage and Ideology at four Habsburg Courts, 1517-1633* (London: Thames and Hudson, 1976).

<sup>43</sup> Evans, *Rudolf II*, 118-19.

<sup>44</sup> Evans, *Rudolf II*, 209, n. 3 and 221.

<sup>45</sup> Moran, *Alchemical. World*, 8.

<sup>46</sup> Moran, *Alchemical. World*, 9.

<sup>47</sup> Moran, *Alchemical. World*, 24.

<sup>48</sup> Moran, *Alchemical. World*, 25.

<sup>49</sup> Moran, "Patronage and Institutions," 175. Cf. Moran, *Alchemical World*, 174 where he makes virtually the same point.

<sup>50</sup> See Parry, *The Arch-Conjuror of England*, 52, 152, Clulee, *John Dee's Natural Philosophy*, 222-3 and Deborah E. Harkness, *John Dee's Conversations with Angels: Cabal, Alchemy, and the End of Nature* (Cambridge: Cambridge University Press, 1999), 55.

<sup>51</sup> See Julius Ruska, *Arabische Alchemisten*, 2 vols. (Heidelberg: C. Winter, 1924), vol. 1.

hieroglyph, is described as “the parent and the King of all planets” (*omnium planetarum parens, et Rex*). The dedication continues on the opening page of the dedication where the subtitle wishes Maximilian a “happy reign” (*Imperium optat Foelicissimum*) and with the very conventional expatiation on his dedicatee’s virtues, of which, Dee says, he was an “eye witness” (*oculatus ... Testis*) at Pressburg.<sup>52</sup> Maximilian is figured by Dee as a privileged reader, one who “abounds in the knowledge of the greatest arts and of very secret matters” (*qui Artium Maximarum, Rerumque Secretissimarum cognitione ... Abundas*).<sup>53</sup> Dee associates occult knowledge with political knowledge, as can be seen from what he calls a “hieroglyphic figure [or *typus*],” the “Tree of rarity” (*Arbor raritatis*), which depicts the “choice” (*optio*) confronting us at the threshold of adulthood. Dee speaks of adding something (*appingemus*) to the so-called Pythagorean letter.<sup>54</sup> Dee adapts the traditional iconographical motif of the Pythagorean Y into a schema representing “mysteries” concerned both with philosophical knowledge and with “cosmopolitical theories,” and he urges Maximilian to give it his close attention.<sup>55</sup> But what exactly does Dee mean by “cosmopolitical”?<sup>56</sup>

In his *General and Rare Memorials* (published in 1576), Dee spoke of his involvement in “sundry affayres Philosophicall, and Cosmopoliticall, FOR VERITIE, IVSTICE, AND PEACE FVRDERING,”<sup>57</sup> which involved a kind of political activity subordinated to the glory of God which “incomparably surpasseth all Humayn Policie: though the same be most carefully vsed, for matters tending greatly and chiefly to ... [God’s] Glorie, and Honor.”<sup>58</sup> In reflecting on worldly government, Dee is led to think of himself as a “Cosmopolites A Citizen, and Member, of the whole and only one Mysticall City Vniuersall: And so, consequently, to meditate of the Cosmopoliticall Gouernment therof, vnder the King Almighty.”<sup>59</sup> Dee’s cosmopolitical thought then is part of an Augustinian tradition of political thought, which contrasts a worldly politics with a more spiritual one. In book fourteen of *De civitate dei*, Augustine describes the difference between the government of the two cities, earthly and heavenly:

We see then that the two cities were created by two kinds of love: the earthly city was created by self-love reaching the point of contempt for God, the Heavenly City by the love of God carried as far as contempt of self. In fact, the earthly city glories in itself, the Heavenly City glories in the Lord. The former looks for glory from men, the latter finds its highest glory in God, the witness of good conscience ... In the former the lust for domination lords it over princes as over the nations it subjugates; in the other both those put in authority and those subject to them serve one another in love ...<sup>60</sup>

The two paths to be taken by man are towards tyranny and spirituality respectively, one branch (dominated by the element of earth) leading to the “tyrannical” (τυραννος) and the other (governed by the element of water, leading upwards towards the heavenly fire) to the “spiritual” (πνευματικός).<sup>61</sup> Dee presents life as a series of “Pythagorean” critical years based on multiples of seven, with the moment of decision being the product of what Dee would call the quaternary and the septenary

<sup>52</sup> Dee, *Monas Hieroglyphica*, 2r.

<sup>53</sup> Dee, *Monas Hieroglyphica*, 5r. Josten’s translation slightly altered.

<sup>54</sup> Dee, *Monas Hieroglyphica*, 5r, “HIEROGLYPHICVM Typum, ad Pythagoricam (dictam) appingemus literam.” On the ‘Arbor Raritatis’ see Clulee, *John Dee’s Natural Philosophy*, 81-2.

<sup>55</sup> Dee, *Monas Hieroglyphica*, 5r.

<sup>56</sup> On Dee and ‘cosmopolitics’ see Graham Yewberry, ‘John Dee and the “Sidney Group”: Cosmopolitics and Protestant “Activism” in the 1570s’ (PhD Thesis, University of Hull, 1981). But see also the critical comments of Sherman in *John Dee: The Politics of Reading and Writing*, 141-4.

<sup>57</sup> John Dee, *General and Rare Memorials pertayning to the Perfect Arte of Nauigation: Annexed to the PARADOXAL Cumpas, in Playne: now first published: 24 yeres, after the first Inuention thereof* (London, 1576), sig. \*jr.

<sup>58</sup> Dee, *General and Rare Memorials*, 52-3.

<sup>59</sup> Dee, *General and Rare Memorials*, 54.

<sup>60</sup> Augustine, *De Civitate Dei*, XIV.28. *Concerning the City of God against the Pagans*, translated by Henry Bettenson (Harmondsworth: Penguin Books, 1972, repr. 1981), 593.

<sup>61</sup> Cf. Dee, *Monas Hieroglyphica*, 6v, where Dee claims that the *Monas* teaches how to “raise the element of earth through [the region of] water into [that of] fire” (*Terrae Elementum, Sursum, in Ignem, per Aquam ... exantlare possit*).

(seven multiplied by four equals twenty-eight).<sup>62</sup> After twenty-eight, the uneasy mind (*sollicitudo*) of the budding tyrant leads to deceit (*fraus*) and finally to force (*vis*) and the hellish “Abyssus” of the worldly. *Sollicitudo* and *fraus* had been identified by mediaeval thinkers as parts of imprudence (the vice corresponding to the political virtue of prudence). Scotists, for example, saw *sollicitudo* as “an excessive care on the part of the intellect to seek out, and provide the means to acquire or conserve worldly things.” Even though one’s intentions might be honest they tended to “distract the mind from the cure of spiritual goods and our eternal salvation.”<sup>63</sup> *Fraus* on the other hand is defined as “that intellectual device by which the intellect thinks, considers, and judges the means to deceive another.”<sup>64</sup> On the other side of Dee’s diagram, the path of the spiritual man leads him to become first a lover of wisdom (φιλοσοφος) and then a wise man (σοφος) before he finally attains the level of the “adept” (*adeptiuus*). The adept is a rare creature, “a unique and fortunate specimen” who is “one in a million of honest philosophers and ... one in a thousand millions of men of the honest sort.”<sup>65</sup> Dee leaves Maximilian to rank his own doctrines on this scale, but it is clear from his references to adeptship elsewhere in the work that this is where he considers his rightful place to be.<sup>66</sup> The key to understanding Dee’s reference to the “pneumatikos” is, I think, the New Testament, and especially the Pauline epistles where the “spiritual” (*pneumatikos*) is contrasted with the “carnal” (*sarkikos*).<sup>67</sup> In Galatians 6:1 Paul addresses his Christian congregation as “ye which are spiritual” (*hoi pneumatikoi*).

Given the avowedly “cosmopolitical” nature of the diagram, however, it should also perhaps be read as a *political* choice, as well as a spiritual one. Like Plato’s guardians in the *Republic*, who should be “godlike in so far as that is possible for humanity” (*Republic*, 383 C), Dee seems to be suggesting that wise rulers should be spiritual and philosophical beings.<sup>68</sup> Thus Dee also seems to be implying that Maximilian is a “spiritual” sovereign whose knowledge of “secret matters” is a guarantee of his political legitimacy. The purveyor of mysteries and his patron are thus figured together as part of a spiritual elite, far above the “common sort.” Dee’s work constantly flatters Maximilian by figuring him as one of the very few capable of understanding the work. Thus, for example, when discussing the mystical significance of alphabetic figures he says, “You, O famous King of the Romans, will not be astonished at my now mentioning in passing that the science of the alphabet contains great mysteries.”<sup>69</sup> As a monarch who is “famous by the honour of a three-fold crown” and a “singular ornament among Kings,” Maximilian is elevated as a judge of the rarity of his “theoretical gift” (*de Raritate nostri huiusce Muneris Theoretici*).<sup>70</sup> Maximilian is, Dee says, the ideal witness of the piety of his “lofty mysteries”:

<sup>62</sup> On the “Pythagorean” calculation of critical days in units of seven, see Galen, *Critical Days from Greek into Arabic: A Critical Edition, with Translation and Commentary, and Historical Introduction of Hunayn ibn Ishāq, Kitāb ‘ayyām al-buḥrān*, ed. Glen M. Cooper (Farnham: Ashgate, 2011), 12.

<sup>63</sup> Diego González Mateo, *Theologica Scotica in Tertium Sententiarum Magistri... Tomus Quintus* (Logroño, 1764), 88: “Sollicitudo ... est ... excessiva cura ex parte intellectus inquirendi, atque providendi media ad acquirenda, vel conservanda temporalia, etiamsi honesta sint. Haec enim Sollicitudo distrahit mentem à cura bonorum spiritualium, & aeterna salutis.”

<sup>64</sup> *Ibid*: “Est ergo fraus, dolus intellectualis ... qua intellectus cogitate, consulit, ac iudicat de mediis ad laterum decipiendum.”

<sup>65</sup> Dee, *Monas Hieroglyphica*, 5r.

<sup>66</sup> For the Platonic sources of Dee’s concept of the *adeptiuus* see his annotations concerning “mens adepta” in his copy of Plotini Divini illius Platonica familia philosophi, *de rebus philosophicis libri LIII. in enneadis sex distributi, a Marsilio Ficino Florentino e Graeca lingua in latinam versi, et ab eodem doctissimis commentarijs illustrati* (Apud Salingiacum IOANNES SOTER excudebat, Anno M.D.XL), xxii recto and xxvii verso (containing Ficino’s commentaries to *Enneads*, I.4. and I.5). Dee’s copy is located in London, Royal College of Physicians Library, Copy number 10704: Dorchester number D 124/5. On Dee’s notion of *mens adepta*, see Håkan Håkansson, *Seeing the Word: John Dee and Renaissance Occultism* (Lund: Lunds Universiteit, 2001), 234-5.

<sup>67</sup> 1 Corinthians 3:1. Cf. Romans 15:27. See John Painter, “Paul and the *Pneumatikoi* at Corinth,” in Paul and Paulinism: Essays in Honour of C. K. Barrett, ed. Morna D. Hooker and S. G. Wilson (London: Alden press, 1982), 237-250.

<sup>68</sup> *The Collected Dialogues of Plato*, ed. Edith Hamilton and Huntington Cairns (Princeton: Princeton University Press, 1961, repr. 1989), 630.

<sup>69</sup> Dee, *Monas Hieroglyphica*, 4v.

<sup>70</sup> Dee, *Monas Hieroglyphica*, 8r. Josten’s translation slightly adapted.

Only he who possesses a very full insight into [these mysteries] ... can clearly distinguish [them] ... in this matter nobody could adduce a witness of sharper judgement, more experienced by practice, or more powerful authority, or of more faithful sincerity, than him whom the Very High and Almighty King of Kings has made King Maximilian.<sup>71</sup>

In the theoretical section of the work, he makes much of revealing to the King (and, of course, all his readers) the cabalistic knowledge of the “more secret vessels” (*secretiora ... vasa*) of the “holy art,” which “may be revealed only to initiates.”<sup>72</sup>

In Theorem XXIII where he presents the “peculiar and mystical division and computation” (*peculiarem, Mysticamque ... partitionem, & rationem*) of the Pythagorean quaternary, Dee touches upon a combinatorial rule he has devised for the calculation of the greatest number of permutations of a given sequence of numbers (*Noster Metatheseos Canon*). He breaks off from his exposition to commend this technique (which he uses for cabalistic purposes) to the King as an “operation ... most useful in every investigation of Nature and in other affairs of the polity.”<sup>73</sup> Once again Dee represents his doctrines as politically useful as well as fraught with mystical significance.

Not content with flattering the King as an initiate of alchemical and cabalistic secrets, Dee also incorporated the Habsburg dynasty into the work’s apocalyptic scheme. In the midst of an obscure interpretation of the lines of the cross in the hieroglyphic monad considered as a “quaternary,” which Dee interprets as a secret concerning the “realm of the four elements” (QUATUOR ELEMENTORUM REGNO), he also hints at a spiritual significance (perhaps connected to the soul’s casting off of the elemental world):

O thrice and four times blessed are those who can reach that (as it were copulative) point of the ternary, and who can leave it to the prince of darkness. Thus we shall attain to the snow-white clarity and to the ornaments of the white garments, O Maximilian, whom God, to the honour of His tremendous name, in times to come may render very great (by this interpretation of mysteries, or [else] some [other] member of the house of Austria), (while I may be sleeping in Christ) in that abominable, nay, intolerable, darkness (of the point which is superfluous on earth).<sup>74</sup>

Josten, I think rightly, associates the “white garments” of this passage to the “white raiment” of the twenty-four elders in Revelation 4:4 (depicted as earthly Kings surrendering their crowns to Christ),<sup>75</sup> which Dee refers to explicitly in the final, (twenty-fourth) theorem of the book.<sup>76</sup> This prognostication seems to hint at a providential Habsburg destiny which would find fulfilment in the Last Days – an event which is tenuously connected to the “lofty mysteries” of the *Monas* itself. We know from a surviving copy of one of Dee’s books that he was quite preoccupied with predictions concerning the house of Habsburg in 1564. In Dee’s copy of Cyprian Leowitz’s *De coniunctionibus magnis*, published (like Dee’s *Monas*) in 1564 under the patronage of Maximilian, he has particularly underlined passages connected with the Habsburgs.<sup>77</sup> The book contains prophecies about events between 1564 and 1584, when a new trigon in the heavens promised a period of social transformation. It is small wonder then that twenty years later, in 1584, Dee should return to the Habsburgs – to

<sup>71</sup> Dee, *Monas Hieroglyphica*, 8v.

<sup>72</sup> Dee, *Monas Hieroglyphica*, 22r.

<sup>73</sup> Dee, *Monas Hieroglyphica*, 25v: “Hanc ... operationem, tibi (O REX) plurimum Commendo: tum in omni Naturae examinatione, tum in alijs Reipublicae Negotijs vtilissima[m].”

<sup>74</sup> Dee, *Monas Hieroglyphica*, 19v.

<sup>75</sup> Josten, “A Translation,” 185, n. 87.

<sup>76</sup> Dee, *Monas Hieroglyphica*, 27v- 28r.

<sup>77</sup> Cyprian Leowitz, *De coniunctionibus magnis insignioribus superiorum planetarum, solis defectionibus et cometis, in quarta Monarchia, cum eorundem effectuum historica expositione* (Lauingen, 1564), Cambridge University Library, shelfmark R\*5 21 (E), inscribed “Ioannes Dee 1564.” See Evans, *Rudolf II*, 221.

Maximilian's son Rudolf in his newly settled court in Prague – bringing with him a copy of the *Monas Hieroglyphica* to present to the Emperor.<sup>78</sup>

### Diagrammatic alchemy

The close relationship between Dee and his printer arises, in part, out of the typographical character of Dee's thought. What he wants from Silvius is *diligentia*, carefulness, in printing. What he fears is “the negligence of typography” (*Typographiae Negligentia*). He exhorts Silvius to “imitate ... my carefulness in [arranging] the variety of letters, the points, the lines, the diagrams, the schemata, the numbers and other things.”<sup>79</sup> This is because – setting aside the title page – Dee's work is profoundly *diagrammatic*. Dee is probably the first diagrammatic, rather than emblematic alchemist.<sup>80</sup> His “mysteries” are diagrammatic mysteries. His preference for the schema and the diagram make him an author well-adapted to the print medium, although the typesetting difficulties of inseting diagrammatic components in the setter's frame must have been considerable.

The use of the term ‘diagram’ to describe the visual presentation of information in the Early Modern period is not without its difficulties.<sup>81</sup> Dee's use of the terms *schema* and *diagramma* should – in part at least – be related to the use of these terms by the German humanist scholars Valentinus Erythraeus and Johannes Sturm, who were joint Professors of Rhetoric at the Protestant Academy and Gymnasium at Strasbourg in the 1540s and 50s.<sup>82</sup> Dee owned several works by both these authors,<sup>83</sup> including editions of Erythraeus's works published in the early 1560s. Erythraeus and Sturm used the terms ‘schema’ and ‘diagramma’ to refer to the bracketed tables of information more often associated with Petrus Ramus.<sup>84</sup> Dee owned a 1560 edition of *ΣΧΗΜΑΤΙΣΜΟΙ, hoc est Tabulae quaedam partitionum oratoriarum M. T. Ciceronis* (Strasbourg, 1547) and a 1561 edition of *Epitome primi, et secundi libri dialecticarum partitionum Ioannis Sturmii Huic compendio additi sunt schematismi, seu diagrammata partitionum* (Strasbourg, 1555), where we can see that ‘schema’ or ‘schematismus’ are seen as equivalent to ‘diagramma’. Dee was certainly fond of this mode of presentation – as we can see in the famous ‘Groundplat’ of his *Mathematical Praeface* (1570).<sup>85</sup> There are certainly bracketed tables of this kind in the *Monas* (most notably in the table of heat, weight and time on 26v), but he also uses these terms to describe other kinds of graphic presentation as well. The book contains a number of distinct types of diagram, such as cosmological diagrams,<sup>86</sup> tabular grids,<sup>87</sup> and the ‘brace’ diagrams often used in the teaching of logic and dialectics.<sup>88</sup> It is worth taking a

<sup>78</sup> After Maximilian's death in 1576, Rudolf shifted his governmental base from Vienna to Prague (the move took until 1583). Evans, *Rudolf II*, 22.

<sup>79</sup> Dee, *Monas Hieroglyphica*, 10v.

<sup>80</sup> Dee was not, of course, the first to use diagrams in an alchemical text. On the use of diagrams in mediaeval alchemy see Barbara Obrist, ‘Visualization in Medieval Alchemy’, *Hyle* 9:2 (2003):131-170, and Jennifer M. Rampling, ‘Depicting the Mediaeval Cosmos,’ *Early Science and Medicine* 1y8:1-2 (2013): 45-86.

<sup>81</sup> On the problem of the use of the modern term ‘diagram’ when discussing early modern visual information see Ian Maclean, ‘Diagrams in the Defence of Galen: Medical Uses of Tables, Squares, Dichotomies, Wheels and Latitudes, 1480-1574’, in *Transmitting Knowledge: Words, Images, and Instruments in Early Modern Europe*, ed. Sachiko Kusukawa and Ian Maclean (Oxford: Oxford University Press, 2006), 136-150 (136, fn. 1).

<sup>82</sup> See Anton Schindling, *Humanistische Hochschule und freie Reichsstadt : Gymnasium und Akademie in Strassburg 1538-1621* (Wiesbaden : Steiner, 1977),

<sup>83</sup> See Roberts and Watson, *John Dee's Library Catalogue*, items 727, 1818, 1819 (for Erythraeus) and items 1005, 1187, 1818, 2092, B116, and B145 (for Sturm).

<sup>84</sup> See Walter J. Ong, *Ramus, Method and the Decay of Dialogue* (Chicago: Chicago UP, 1958) and ‘Ramist Method and the Commercial Mind’, *Studies in the Renaissance*, 8 (1961): 155-172.

<sup>85</sup> On the ‘Groundplat’ see Jennifer M. Rampling, ‘The Elizabethan mathematics of everything: John Dee's “Mathematicall praeface” to Euclid's Elements’, *BSHM Bulletin: Journal of the British Society for the History of Mathematics*, 26:3 (2011): 135-146; Stephen Johnston, ‘John Dee on geometry: texts, teaching and the Euclidean tradition’, *Studies in History and Philosophy of Science* 43 (2012): 470-479 (472 and 475).

<sup>86</sup> See *Monas*, 17r and 18r.

<sup>87</sup> See the ‘Garden of the Hesperides’ on 23r, or the ‘Monadic Anatomy of Inferior Astronomy’ on 14v.

<sup>88</sup> See his presentations of the ‘Pythagorean’ and ‘Artificial’ quaternaries on 25v and 26r. On these kinds of diagrams see Cesare Vasoli, *La dialettica e la retorica dell' Umaneismo: “Invenzione” e “Metodo” nella cultura del XV and XVI secolo* (Milan: Feltrinelli, 1968), 100-115.

further look at Dee's terminology here. We have already discussed his use of the terms *diagramma* and the *schema*, but even more important perhaps are the various uses he makes of the term *hieroglyph*. The vogue for Egyptian hieroglyphs began with the rediscovery of Horapollo's Ἱερογλυφικά in 1419, but reached a peak in the mid-sixteenth century with the *Hieroglyphica* of Piero Valeriano (1477-1558).<sup>89</sup> Dee's geometrically constructed hieroglyphic monad, however, is a far cry from the emblematic figures favoured by Valeriano, tending as it does to focus on the hieroglyph as a kind of secret writing, but also one with close affiliations to the traditional astrological (and alchemical) symbols for the planets and metals. Many of the diagrams contained in the *Monas* are concerned with permutations and variations of the Monas hieroglyph.<sup>90</sup> But what are we to make of the *arbor raritatis* which he describes as a "Hieroglyphicus Typus"? What is a *typus* exactly? In Classical Latin *typus* designated a bas relief, which sense could easily be applied to the process of printing and so designate any imprinted figure. But it also signified a builder's plan. Is Dee's image a plan? Another example of a *typus* can be found in an Antwerp work printed five years after Dee's *Monas*, in Cornelius Gemma's *De arte cyclognomica* printed by Christoph Plantin. Gemma uses a series of images which, as Martin Mulsow has shown, derived from his experience of globes in the instrument maker's workshop.<sup>91</sup> Gemma's *typus* shows the metaphysical divisions of the cosmos, as well as providing memory places for the users of Gemma's art. Like Dee, Gemma was a diagrammatic thinker, and his work bristles with tables and schemata. Was it this diagrammatic thinking that Dee had encountered in the print shops of Antwerp?

Anatomy also provides Dee with metaphors, so this diagram in Theorem XII is called a "Monadic anatomy of the whole of inferior astronomy," which is to say the "golden work" of alchemy or the *ars pyronomica*.<sup>92</sup> In Theorem XXI, however, we are presented with the "anatomical parts" of an inverted monad symbol, described as "a transposition [*Localem Commutationem*] of the mystical monad." This theorem is very useful for seeing why Dee was so insistent on typographical diligence, as he believes that the mutation of the diagrams actually represents chymical mutations. He notes that in the diagram the substance represented by B, which "cannot be easily recognised by all" can be transformed into substance E by closing the two semicircles at the head of B into the circle at the head of E. The substances D and C represent gold and silver respectively, and are "well known forms" which are "separate and different from B."<sup>93</sup> This denotes that substances B and E are artificial forms (a "philosophical" form in alchemical terminology), and this essential difference is expressed by the geometrical proportions of the diagram. "Let us remember," Dee says, "that the radius of these half circles [in B] is not equal to the radius of D and C (which are produced for us by nature and are well known to all), but much smaller, whence it is clear that B is not of such great bulk as D and C."<sup>94</sup> The properties of the diagram are therefore seen to be directly expressive of the properties of substances (in this case bulk). Dee calls these diagrammatic inferences "hieroglyphic syllogisms" (*Hieroglyphicis*

<sup>89</sup> On Piero Valeriano and the significance of his *Hieroglyphica*, sive, *De sacris Aegyptiorvm literis commentarii* (Basel, 1556), see Karl Giehlow, *The Humanist Interepretation of Hieroglyphs in the Allegorical Studies of the Renaissance. With a Focus on the Triumphal Arch of Maximilian I*, translated by Robin Raybould (Leiden: Brill, 2015), 208-235, and Charles Dempsey, 'Renaissance Hieroglyphic Studies: An Overview' in *Interpretation and Allegory: Antiquity to the Modern Period*, ed. Jon Whitman (Leiden: Brill, 2000), 365-381.

<sup>90</sup> See diagrams on 13v, 14r, 14v, 15r, 20v, 22r and 23r. On the influence of the Cabbalistic exegetical mode known as *tsiruf* on these kinds of diagrams see Nicholas H. Clulee, "The *Monas Hieroglyphica* and the Alchemical Thread of John Dee's Career," *Ambix* 52:3 (2005): 197-215 (203); "John Dee and the Paracelsians," in *Reading the Book of Nature: the other side of the Scientific Revolution*, eds. Allen G. Debus and Michael T. Walton (Kirkville: Sixteenth Century Journal Publishers, 1998), 111- 132 (121-5), and Clulee, John Dee's Natural Philosophy, 92-4

<sup>91</sup> Martin Mulsow, "Seelenwagen und Ähnlichkeitsmaschine – Zur Reichweite der praktischen Geometrie in der *Ars Cyclognomica* von Cornelius Gemma (1569)," in *Seelenmaschinen: Gattungstraditionen, Funktionen und Leistungsgrenzen der Mnemotechniken vom späten Mittelalter bis zum Beginn der Moderne*, ed. Jochen J. Berns and Wolfgang Neuber (Vienna: Böhlau, 2000), 249-77

<sup>92</sup> Dee, *Monas Hieroglyphica*, 14v.

<sup>93</sup> Dee, *Monas Hieroglyphica*, 20v.

<sup>94</sup> Dee, *Monas Hieroglyphica*, 21r.

... *Syllogismis*),<sup>95</sup> and the manipulation of these “syllogisms” could be described as a diagrammatic logic.

In his study of ‘diagrammatic reasoning’ in early modern scientific texts James Franklin defines ‘diagrams’ as ‘pictures streamlined for inference by removal of irrelevancies’, or, more helpfully, as ‘a picture which is intended to perform inference about the thing pictured, by mentally following around the parts of the diagram.’<sup>96</sup> This concept would be very useful, I think, in understanding the structure of some of Dee’s diagrams, although it is isn’t always clear how the reader is meant to move through the diagram, and what kinds of ‘inference’ are involved. In the ‘monadic anatomy’ of the alchemical art in Theorem XIII (14v), we are guided through the tabular grid by a numbered sequence (the seven stages of the alchemical work), but in the ‘garden of the Hesperides’ in the ‘porism’ of Theorem XXII (23r) we can move through the grid vertically or horizontally, and the orientation of the diagram seems to be flipped round after the first three rows. Each horizontal column encourages the reader to make ‘inferences’ about the sequence of monadic parts (alpha, omega and cross, or ‘beginning’, ‘middle’ and ‘end’), so for example, we could read the first, third and fifth columns of the upper half of the diagram as referring to Christ, who exists ‘before the elements’, is subject to an elemental economy (in the incarnation) and will exist after the elements (i.e. after the dissolution of the elemental world in the Last Days). Christ has to be mortified on the cross (die) in order to live (*vivificans*), i.e. to be resurrected. He was born in the stable (*Natus in Stabulo*), becomes a sacrifice on the cross (*Holocaustum in Cruce*), and then becomes ‘King of Kings everywhere’ (*Rex Regum Vbique*). This finds parallels both in column two of the upper half of the diagram to the Adamic, the mortal and the glorious (i.e. resurrected body) of Man, and (in column two of the lower half of the diagram) in the alchemical process, where the material creation (*Creatio hyles*) must undergo an elemental purification (*Depuratio Elemental*) in order to be transmuted (*Transformatio*). The movement of the mind through this diagram is thus complex, and involves a specific kind of inference – one which finds analogies between Christ’s passion, the human body, and the material creation. Franklin’s idea of diagrams as mentally following the parts of diagrams in the imagination is thus a useful tool for tackling the dynamic nature of Dee’s diagrams.

What other properties do Dee’s diagrams possess? The *Monas Hieroglyphica* itself was clearly conceived by Dee as something with talismanic properties, as he insists that “those wishing to bear it on rings and seals, or to use it in other ways” must take care to preserve the proportions of the printed symbol. But what about the four “geogamic [or ‘earth marrying’] figures” in Theorem XII? These four symbols, or the fifth one which can stand in their stead, are said to be introduced or impressed into a “very pure and simple earth.” Does this mean that the figures are literally impressed or imprinted? Or does this mean that the substances represented by the symbols are mixed with the earth? The boundaries between typography and chymistry are blurred once again.

Finally the diagrams of the *Monas* are clearly designed for a kind of contemplation. Take the schema in Theorem XXIII which is sometimes called the “Horizon Aeternitatis.” Dee says that from this schema and the preceding Ramist diagram setting proportions of weights, times and degrees of heat, “many things can be elicited ... (if considered in a more inward manner) than it is proper to express openly in words.”<sup>97</sup> What does it mean to consider a diagram “in a more inward manner” (*penitius*)? One thing is certain, Dee clearly means us to read his diagrams syllogistically, and elements from the different diagrams need to be read across in order to supply additional meanings. For example, if we look at this section of the “Horizon Aeternitatis” against the “Arbor raritatis” we can see that they both display tenfold proportional progressions (which Dee says in the “Horizon” is an “enigma of the ancients”) and associate this with the movement from earth, through water and air to fire, the most refined of the elements. The metamorphic consummation promised in the “Horizon” could well be the spiritual elevation of the adept promised in the “Arbor,” but if we look at the diagram of the degrees of heat, weights, and times on the page before the “Arbor” we can see the four

<sup>95</sup> Dee, *Monas Hieroglyphica*, 21r-v.

<sup>96</sup> James Franklin, ‘Diagrammatic Reasoning and Modelling in the Imagination: the Secret Weapons of the Scientific Revolution’, in *1543 and all that: Image and Word, Change and Continuity in the Proto-Scientific Revolution*, ed. Guy Freeland and Anthony Coronos (Dordrecht: Kluwer, 2000), 53-115.

<sup>97</sup> Dee, *Monas Hieroglyphica*, 27r.

grades and the tenfold proportions occurring in the context of alchemical processes and the wisdom of Nature.

In a recent conference paper on early modern diagrams, Stephen Petrina, Yu-ling Lee and Franc Feng have suggested that diagrams were an important component of the “newfound collaboration between scholars and typesetters in the late fifteenth and sixteenth centuries.”<sup>98</sup> I certainly think that this is the case with Dee and Silvius. The *Monas*, in so far as it is an innovative typographical work relied heavily on the collaboration between author and printer, and Dee himself emphasised Silvius’s importance in the enterprise. Their collaboration on the diagrams was particularly important because the diagrams were not simply illustrations or adornments, but an integral part of Dee’s alchemical thinking. In order to elucidate Dee’s conception of the alchemical process in the *Monas Hieroglyphica* it is necessary to examine both the internal dynamics of his schemas and diagrams, and the relationship *between* diagrams. How were Dee’s readers supposed to navigate their way round these diagrams? What kinds of mental picturing or mental reasoning are implied by their graphic dispositions? What does he mean by ‘hieroglyphic syllogisms’? A further understanding of the *Monas*’s four hundred and fifty year old enigmas may require that we pay closer attention to its diagrammatic logic.

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<sup>98</sup> Stephen Petrina, Yu-ling Lee and Franc Feng, “On the Historiography of Curriculum: The Legend of Petrus Ramus,” paper presented at the annual meeting of the American Educational Research Association, Washington, DC, 8-12 April 2016, p. 9. <http://blogs.ubc.ca/edcp601a/files/2015/09/PetrinaLeeFeng2016-On-the-Historiography-of-Curriculum.pdf> (Accessed 1 July 2017).