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The Louvain printers and the establishment of the Cartesian curriculum

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ABSTRACT

With regard to the public circulation of knowledge, universities are often regarded as privileged institutions where information and ideas are formally transmitted through regulated didactic experiences. University life, however, provided a more complex environment in which various parallel and perhaps contradictory processes of transmission were at work. In this paper, we analyse a set of 55 engravings with scientific images, which started to appear around 1670 in student notebooks at the University of Louvain. These engravings, produced and sold by the Louvain printers Michael Hayé and Lambert Blendeff, were related to the philosophy curriculum of the Faculty of Arts but did not correspond entirely to the actual topics or doctrine taught. In fact, the obvious Cartesian orientation of the images was not in line with the more prudent position of the Faculty. This paper offers a preliminary analysis of the set of engravings and their role in the Cartesian reforms at Louvain.

Keywords: cartesian philosophy; engravings; Louvain University

The role of images in the circulation of scientific knowledge has received much attention during the last decades. Following the work of Shapin and Schaffer on Boyle's visual technology and Ashworth's work on the persistent use of emblematic images in natural history, many scholars have attempted to make sense of the role of visual representations in the construction and transmission of knowledge.[1] The study of visual representations has opened many new vistas for research, exploring the relationship between science and art, the production processes of images, the knowledge 'content' as expressed in text and image, and the

1 S. Shapin and S. Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle, and the Experimental Life* (Princeton 1985); W.B. Ashworth, Jr., 'Emblematic natural history of the Renaissance', in: N. Jardine, J.A. Secord and E.C. Spary (eds.), *Cultures of Natural History* (Cambridge 1996) 17–37. For an overview of relevant literature, see: R. Baldasso, 'The Role of Visual Representation in the Scientific Revolution: A Historiographic Inquiry', *Centaurus* 48 (2006) 69–88.

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construction of readership.[2] Contrary to older interpretations in which Renaissance botanical and anatomical illustrations were considered to be faithful naturalistic representations of reality, scientific images are now understood to be theory laden, deeply informed by the theoretical context in which they are conceived and circulated.[3] In this respect, pictures are sometimes regarded as secondary additions to the meaning of the text. But although images can be studied as complementary to the text, to a certain extent, they are also quite independent from it. The choice of illustrations and the making of scientific pictures involves many actors with different approaches to the subject. Scholars, artisans and printers all have a hand in the final make up of images. Images reflect the social, cultural and intellectual debates surrounding the production of authoritative accounts. Sometimes the pictures may reveal specific persuasive strategies or tacit epistemological assumptions, which historians are only beginning to detect.[4]

In this paper, we will analyse a set of scientific images produced around 1670 by Louvain printers for a very well-defined market: the student population of the University of Louvain. Students bought the engravings and pasted them into their notebooks. Clearly the images were related to the philosophy curriculum of the Faculty of Arts. But, amazingly, many of them did not correspond to the actual topics or doctrine taught by the Faculty professors. The Louvain engravings constituted thus an alternative and independent source of knowledge for the students. It is not clear why or how the Louvain printers hit on the idea, but their commercial initiative worked very well. The engravings remained popular for many generations and can be found in hundreds of extant student notebooks until the middle of the eighteenth century. Most intriguing is the apparent tension between the knowledge represented in the engravings, and the scientific views taught in the official lectures. As yet, the engravings have not received much critical attention.[5] This paper will attempt to offer a preliminary analysis of the role of the engravings in the Cartesian reforms which characterized the philosophy curriculum in Louvain during the second half of the seventeenth century. A more systematic and complete inventory, as well as an iconographic classification of the engravings is currently undertaken at the University Archives of the University of Louvain.[6]

2 P. Smith, 'Art, Science, and Visual Culture in Early Modern Europe', *Isis* 97 (2006) 83–100; W. Lefèvre, J. Renn and U. Schoepflin (eds.), *The Power of Images in Early Modern Sciences* (Basel 2003). 'Visual representation' may also be extended towards the complete visual experience of reading, see: e.g. E. Tebeaux, 'Visual Language. The Development of Format and Page Design in English Renaissance Technical Writing', *Journal of Business and Technical Communication* 5 (1991) 246–274.

3 D. Topper, 'Towards an epistemology of scientific illustration', in B.S. Baigrie (ed.), *Picturing knowledge: historical and philosophical problems concerning the use of art in science* (Toronto 1996) 215–249.

4 As examples, see: M. Biagioli, 'Picturing Objects in the Making: Scheiner, Galileo and the Discovery of Sunspots', in W. Detel and C. Zittel (eds.), *Ideals and Cultures of Knowledge in early Modern Europe* (Berlin 2002) 39–95; C. Lüthy, 'Where logical necessity becomes visual persuasion: Descartes' clear and distinct illustrations', in: S. Kusukawa and I. Maclean (eds.), *Transmitting Knowledge: Words, Images, and Instruments in Early Modern Europe* (Oxford 2006) 97–133; S. Dupré, 'Newton's Telescope in Print: The Role of Images in the Reception of Newton's Instrument', *Perspectives on Science* 16 (2008) 328–359.

5 M. Van Vaeck, 'Printed Emblem Picturae in Seventeenth- and Eighteenth-Century Leuven University College Notes', *Emblematica* 12 (2002) 285–326; E. van Gelder, 'Echo's van een revolutie? Wetenschappelijke gravures in Leuvense fysicadictaten' (unpublished master's thesis, Medieval and Renaissance Studies), (Louvain, s.d. [=2005]); F. Mirguet and F. Hiraux, *Collection de cours manuscrits de l'Université catholique de Louvain, 1425–1797. Catalogue analytique* (Louvain-la-Neuve 2003).

6 Information on the digitalization project of the Louvain student notebooks can be found at http://alum.kuleuven.be/bib2.html.

Philosophy teaching at Louvain

In the middle of the seventeenth century, the University of Louvain, founded in 1425, still retained many features of its original late medieval structure.[7] In particular, the Faculty of Arts continued to function as a preparatory school for the higher faculties. It was organized in four colleges (*pedagogium*), where students and professors lived together. The Arts curriculum lasted for two years, and was divided in logic, physics and metaphysics. The lectures were taught by two professors, called *primarius* and *secundarius*, who remained with the same student group throughout the whole period. For this reason every college had two *primarii* and two *secundarii*, bringing the total of philosophy professors in the Faculty to sixteen. The professors did not stay very long in the Faculty, typically between ten and fifteen years. The *secundarii* were appointed soon after their graduation in the Faculty, and were often themselves studying at one of the higher faculties. When a *primarius* left the Faculty, he was replaced by the oldest *secundarius* and a new *secundarius* was recruited. The intellectual involvement of the professors with the material they were teaching was on average quite low. From time to time, a more ambitious professor put a more personal mark on his teachings, but this was rather exceptional.[8]

The content of the courses was determined by the statutes or 1567–1568, stipulating strict adherence to the traditional Aristotelian *corpus* of treatises.[9] The statutes were renewed in 1639 without major changes. In the seventeenth century, the students did not actually read the books of Aristotle. The professor would dictate his course text, which was noted down *verbatim* by the students. These texts could differ somewhat among the colleges, but at the end of the curriculum all students wanting to graduate, had to participate in collective examinations. Professors had therefore only a limited measure of freedom to adapt the contents of their course to their personal views. In reality, most of the professors did not make an effort to do this: they simply read the text they had themselves noted down when they were students. The comparison of extant student notebooks illustrates that course texts indeed remained unaltered for many years.

During the second half of the seventeenth century, the philosophy curriculum underwent major changes. From around 1650, Cartesian doctrines were gradually introduced in public disputes, causing a firm reaction from the Faculties of Medicine and Theology.[10] However, the Faculty of Arts was not directly affected by this. As far as can be deduced from historical sources, the philosophy curriculum was formally rearranged in 1658, in particular giving more space to the treatises *De Anima* and *De Motu*. The reform was patently inspired by the new Cartesian doctrines, although there is no trace of any official new regulation summing up the content of the philosophy course. The result was confusion: some professors remained loyal to Aristotelian doctrine, others taught Cartesian (or other) theories. In 1670, the French Cartesian Jacques Rohault (1618–1672) observed that fourteen out of sixteen philosophy professors in Louvain taught the Cartesian doctrine of transubstantiation.[11]

7 The most complete history of the university can be found in E. Lamberts and J. Roegiers, *De universiteit te Leuven,* 1425–1985 (Leuven 1986). Engl. translation *Leuven University,* 1425–1985 (Louvain 1990).

8 Some examples are Libertus Fromondus (1587–1653) and Arnold Geulincx (1624–1669).

9 G. Vanpaemel, *Echo's van een wetenschappelijke revolutie. De mechanistische natuurwetenschap aan de Leuvense Artesfaculteit (*1650–1797*)* (Brussels 1986).

10 Vanpaemel, *Echo's* (n. 9) 43–53. See also: George Monchamp, *Histoire du cartésianisme en Belgique* (Brussels 1886).

11 J. Rohault, *Entretiens sur la philosophie* (Paris 1671) 76–77. Actually, the theory of transubstantiation would only be discussed by the *primarii*.

Whether or not this information is accurate, Rohault's statement reveals the lack of unity among the professors of the Faculty. An official visitation report stated in 1673 that 'nobody would admit of teaching Descartes […] but several professors indeed do teach his doctrine', concluding that 'nowhere in the Southern Netherlands philosophy is less well founded than in Louvain'.[12] The solution was found in the introduction of so-called *materiae promotionis*, the subject matter of the collective exams at the end of the two-year curriculum. As long as the students were well prepared to participate in the exams, the professors themselves were free to teach philosophy according to their own preference. Quite probably, this preference was less of an individual nature, but part of the tradition of each college.

In the middle of this ongoing reform, new engravings, which students used to embellish their notebooks, entered the market. These engravings were quite different from preceding illustrations. Typically, student notebooks were illustrated by emblematic pictures, artistic images of landscapes or exotic animals, or portraits of kings and rulers. The pictures had no relation to the content of the course, albeit that some emblematic pictures bore titles like *De motu* or *De impetu.* Emblematic pictures remained popular well into the eighteenth century. But the new pictures, which emerged around 1670, were of a completely different nature. Inspired by illustrations in mechanical or anatomical textbooks, the new engravings can be called 'scientific illustrations', showing mathematical diagrams, physical instruments, or natural objects to be studied. The obvious impression is that the engravings relate to the course text, but surprisingly, this is not always the case. At a time when the Faculty was experiencing a major reform of its curriculum, the introduction of these engravings reveal that other actors were catering for the attention of the students, who clearly were susceptible to this new offer. But who were these new actors and what was their motivation? Which sources did they use and what was the impact of their actions on the philosophy curriculum?

The Louvain engravings

Very little is known about the actual introduction of scientific illustrations in the Louvain notebooks. Before 1650 students embellished their notebooks with pen drawings or engravings that were not specifically produced for the Louvain University. Only around the middle of the century did the first university printings appear as frontispieces or (probably not much earlier than 1670) emblematic pictures. As Van Vaeck has shown, these pictures were copied from emblem books with an added *motto* to forge a link with the topics in the course text.[13] The early images differ markedly from the new series which was introduced somewhere between 1674 and 1685.[14] These dates can only approximately be established, on the basis of the notebooks in which they are found. It is still impossible to make sure whether the whole series of engravings was made available at the same time, nor for how long particular engravings were on the market. Also it is not clear how many engravers and printers were involved. Some fifty five engravings, i.e. the large majority, bear a signature, either by Michael Hayé or by Lambert Blendeff (other engravings without signature may also be attributed to Hayé and Blendeff on the basis of artistic style and lettering). Both were

12 Quoted in E. Reusens, *Documents relatifs à l'histoire de l'université de Louvain*, 6 vols. (Louvain 1881–1903) I, 672–673.

13 Van Vaeck, 'Printed Emblem *Picturae*', (n. 5).

14 These dates are put forward by Van Gelder, 'Echo's' (n. 5) 7.

probably working as engravers, but in some cases it is mentioned that the engravings could be obtained *apud L. Blendeff* or *apud Michaëlem Hayé Lovany propè Predicatores Hybernos*, indicating that they acted as sellers of the printed sheets. This is corroborated by the sometimes added indication *cum privilegio*, suggesting that the engravers owned the rights to sell their work.

Michael Hayé and Lambert Blendeff were not official book printers of the University. Most probably, both had an artistic background. Hayé was admitted in 1661 to the Guild of Saint Luke in Antwerp, but moved in the following years to Louvain.[15] In 1665 he made a request to the Louvain University to be admitted as a member of the university, as was usual for book printers, bookbinders and booksellers. The request was denied. At that moment he was referred to as an *impressor imagium*, a printer of images. Several other engravings are known to be made by Hayé, mostly copies from paintings.[16] Hayé also produced a frontispiece used in Louvain notebooks, and according to Van Vaeck, he may have been the author of the anonymous emblematic images mentioned above. The Liège painter Lambert Blendeff (ca. 1650–1721) settled in Louvain around 1676, when he married Marie-Anne Mangan in the Louvain Jesuit church. A year later he was appointed city painter, responsible for the annual *Omgang*. In 1684 he was appointed 'iconograph' of the University. As a painter of religious scenes, Blendeff did fairly well. His biographer does not mention, however, his activities in the production of didactic engravings.[17]

Other artists may have been involved, but their names have not been recorded. In the early eighteenth century, some of the engravings were signed P. Denique (1683–1746), who apparently had bought the original engravings from his predecessors. Denique was the son of a well-known Louvain family of printers. He obtained a master's degree from the Faculty of Arts in 1705, and held an official administrative position in the Faculty.[18] He does not seem to have produced many new, original engravings, but his involvement indicates that the engravings had reached a semi-official position in the philosophy curriculum by the first decades of the eighteenth century.

If most if not all of the engravings were designed and produced by Hayé and Blendeff, this raises the question who decided on the topic of the illustration. As Hayé and Blendeff most probably did not have an education in natural philosophy, it would be very difficult for them to make a consistent and relevant choice. Even if we take into account that most pictures were simply copied from engravings in textbooks, there is no simple rationale to explain the series of prints made. As we will discuss later, many of the illustrations were taken from Cartesian textbooks, but neither the complete set of illustrations, nor the most telling or beautiful pictures were selected. Not all the original images used as models for the Louvain engravings have been found, but in some cases where this has been possible, it has only added mystery to the already clouded problem. One, rather obvious, illustration of the equilibrium of a pendulum was taken from *La Statique ou la science des forces mouvantes* (Paris 1673) by the Jesuit Ignace Gaston Pardies (1636–1673).

15 Some information on Hayé can be found in Pierre Delsaerdt, *Suam quisque bibliothecam. Boekhandel en particulier boekenbezit aan de oude Leuvense universiteit, 16e–18e eeuw* (Louvain 2001) 379–380.

16 The Louvain notebooks contain several other engravings by Hayé: *Salvator Mundi (Michael Haÿé excud. Antverpiae)* and *Memorare novissima tua, et in aeternum non peccabis.*

17 Ed Van Even, 'Blendeff (Lambert)', *Biographie Nationale* 2 (1868) col. 470–471.

18 Delsaerdt, *Suam quisque bibliothecam* (n. 15) 368.

Why this one picture was selected (whereas the book contains many more) can only be guessed. And what was the use of Pardies' book – if any – in the philosophy curriculum of Louvain? Two engravings related to hydrostatics, made by Blendeff, are copied from the *Ars Nova et Magna Gravitatis et Levitatis, sive Dialogorum Philosophicorum libri sex de aeris vera et reale gravitate* (Rotterdam 1669) by the Scottish philosopher George Sinclair (d. 1696). How the book by Sinclair came to the attention of the Louvain engravers is a complete mystery. Furthermore, the pictures are difficult to understand without any explanatory text. Were the engravings produced on explicit demand for some extracurricular course on hydrostatics? Were the engravings meant to be used in the course of mathematics, possibly even in the public course of mathematics offered by the Jesuits?[19] But why did they then end up in the notebooks of the philosophy course of the Faculty of Arts?

Only in an exceptional case is it possible to trace with certainty the origin of the Louvain engravings. The illustration entitled 'Modus subintrandi aquas' concerns the invention of a new type of diving bell and shows a man standing upright on a circular platform under a bell-shaped dome. The invention was actually made and described by the same George Sinclair in his *Ars nova*, but without providing an illustration. The invention was subsequently mentioned by Johann Christoph Sturm (1635–1703) in his *Collegium Experimentale, Sive Curiosum* (Nuremberg 1676), but the illustration provided there does not match with the Louvain image. Sturm's book, however, was reviewed in 1678 in the January issue of the *Journal des Sçavans*, where the invention of the diving bell was singled out for discussion. The illustration provided in the *Journal* was clearly the model for the Louvain engraving.[20] Similarly, the image of the stomach appears to be an exact copy of the first stomach engraving in the *Pharmaceutice rationalis* (Oxford 1674) by Thomas Willis (1621–1675), retaining even the position and the sequence of the letters identifying the parts of the stomach. Of course, the same illustration also appears in later editions (1675, 1676, 1679), while quite similar images (copies?) may also be found in other books, for example, in Steven Blankaart's *Anatomia Reformata* (Leyden 1687). The picture by Willis may even itself be a copy of an older image… The same type of criticism can be applied to the (anonymous) image of an airpump (*vas pneumaticum*), which is taken from Edmonde Pourchot, *Institutio philosophica ad faciliorem veterum ac recentiorum lectionem comparata* (Paris 1695). In this case, the influence of Pourchot on the philosophy curriculum can also be seen in the text,[21] but it remains unclear whether the text has preceded the image, or vice versa. Tracing the origin of images may help to reconstruct the influence of books on the philosophy curriculum at the Louvain University and the perception of the new science by University members.

19 The Faculty of Arts had a royal chair in mathematics, but the students were not obliged to take this course. Until the end of the 1660s, the chair was occupied by the Cartesian Gerard van Gutschoven, who mainly lectured on practical geometry, surveying and military architecture. The Jesuit public 'school of mathematics' remained active until the 1680s, but the animosity between the Jesuits and the University make it unlikely that many university students would follow the Jesuit course. See: P. Bockstaele, 'De wiskunde', in R. Halleux, C. Opsomer, J. Vandersmissen (eds.), *Geschiedenis van de wetenschappen in België van de Oudheid tot* 1815 (Brussels 1998) 113–144; O. van de Vyver, 'L'école de mathématiques de la province flandro-belge', *Archivum historicum Societatis Iesu* 49 (1980) 265–278.

20 *Journal des Sçavans pour Lundy* 31. *Janvier M.DC.LXVIII*, 33–39, illustration on p. 35.

21 Vanpaemel, *Echo's* (n. 9) 108.

Fig. 1: L. Blendeff, Modus Subintrandi Aquas, copied from the *Journal des Sçavans* (1678) [Universiteitsbibliotheek Leuven].

An alternative curriculum?

At the present moment, the known set of didactic images signed by Hayé and Blendeff consists of fifty five engravings.[22] Twenty five engravings were signed by Hayé and thirty three by Blendeff.[23] Three engravings (the human heart, the eye and the explanation of the tides) have been found with either a signature by Hayé or Blendeff. Did the two engravers cooperate in producing these images? Their style was quite different, Hayé being the more accomplished engraver with fine, steady lettering. On the other hand, some engravings, dealing with the same topic are made by the two engravers in a different layout. This is in particular the case with the pictures dealing with lenses and visual perception, and with astronomical phenomena. These engravings constitute almost half of all the Blendeff pictures, and even 60% of the Hayé prints. Overall, their choices are curiously complementary. Blendeff offers an image

22 There may be more pictures, possibly not signed. It is e.g. strange to see that Hayé has a picture showing the effect of a convex lens, but not of a concave one. Some unsigned pictures have clear stylistic resemblance to the signed pictures of Hayé and Blendeff.

23 The list of the Hayé pictures was drawn by Esther van Gelder, 'Echo's' (n. 5).

of the optical rays in a microscope (and the eye), whereas Hayé makes a very similar picture for the telescope. Hayé copies an illustration from Rohault's *Traité de physique* (Paris 1671) on simple motion and the vacuum, whereas Blendeff uses the same book for his illustration on composite motion (and several other Rohault illustrations), and of course, both use the works of Descartes but select different images for reproduction.

If the printers cannot be held responsible for the choice of illustrations, is there any indication that the selection would have been decided inside the Faculty of Arts? As far as I have been able to verify, the student notebooks do not explicitly relate to the images, although some of the illustrated mechanical instruments (lever, inclined plane) are discussed. The illustrations are not meant as elucidations of particular points made in the text, and certainly the didactic aspects of the engravings (e.g. the use of letters to indicate certain parts of the objects shown) are not embedded in the lectures of the professors. Obviously, representations of the Ptolemaic, Tychonic and Copernican system may have been helpful for the students to remember the structure of the universe and the differences between these systems. The engravings on gravity show the equilibrium of different types of levers while several astronomical engravings explain the nature of eclipses, the phases of the moon or the concept of solar parallax. At the end of the seventeenth century, there was a tendency for the basic *materiae promotionis* to concentrate on these simple mathematical models, including, for example, questions on time differences on different locations of the earth. Students would prepare for their exams by exercising simple calculations for many hours with the professor *secundarius*. The engravings representing mathematical diagrams may certainly have been helpful and may have been suggested by the Faculty, or by some of the colleges. But other pictures are less obvious to integrate in the course. Even if Rohault could state in 1671 that fourteen of the Louvain professors were teaching Cartesian philosophy, the actual analysis of the notebooks proves that at least until the end of the seventeenth century Aristotelian and Cartesian doctrines were taught next to each other, and that the professor himself was free to comment on which doctrine seemed to him the best suited. Students probably had to be acquainted with both philosophical systems in order to be able to continue their education in the higher faculties. Furthermore, even those professors who declared that Cartesian philosophy was far superior to the Aristotelian explanations, still adhered to the scholastic habit of disputes, in which every problem was tackled with a plethora of definitions and distinctions, and consequently further developed through questions and objections, both in favour and against the proposed explanations. The Cartesian style of persuasive writing, where the acceptance of the whole system rested on the accumulation of empirical evidence by the successful explanation of many phenomena, was not yet suited for the didactic approach in an elementary course of philosophy, which in the end was aimed at improving the debating skills of the students. The Faculty appears thus to have found a middle road, in which all individual preferences of professors could be accommodated, under the condition that the students would be well prepared for taking the final exam. Still, open adhesion to Cartesianism would be severely punished, as was found out by Martin van Velden in 1691.[24] But the student notebooks reveal that more liberal views were tolerated within the walls of the colleges.

24 On the case of Van Velden, see: A. Stevart, *Procès de Martin-Etienne Van Velden, professeur à l'Université de Louvain* (Brussels 1871); G. Monchamp, *Galilée et la Belgique. Essai historique sur les vicissitudes du système de Copernic en Belgique* (St. Truiden 1892); Vanpaemel, *Echo's* (n. 9) 75–79. See also: C. Opsomer, 'La controverse entre George Monchamp et Armand Stévart', in C. Opsomer (ed.), *Copernic, Galilée et la Belgique. Leur reception et leurs historiens* (Brussels 1885) 31–45.

A considerable number of the new pictures was indeed connected to Cartesianism. This was most apparent in the engravings on the rainbow, on magnetism, and on the passage of light through a prism, all taken from either Descartes' *Essais* (1637) and his *Principia Philosophiae* (1644), or alternatively from Henricus Regius' *Philosophia Naturalis* (1654). Less conspicuous, but still undoubtedly Cartesian in origin are the 'medical' engravings of the human heart and of the nervous system in a man approaching a fire (from the Latin edition of *De Homine*, 1662) and the explanation of respiration (from the French edition of *L'homme*, 1664). The engraving on the explanation of the tides has no apparent model in the Cartesian textbooks, although there is some resemblance to the picture in Descartes' posthumous *Le Monde* (Paris 1664). Cartesian textbooks can be seen to be the obvious model for the engravings in at least twenty four cases, with no less than nine plates copied from Jacques Rohault's *Traité de physique* (1671). This parallels the great influence of Rohault on the Louvain curriculum.[25] In two instances, Rohault is explicitly mentioned: on an image illustrating the retrograde movements of the planets and on the image explaining the cause of the tides (together with Descartes and Regius).[26] Furthermore, the large emphasis on the optics of vision underscores the Cartesian approach to sensory perception by combining anatomy with geometrical analysis.

Several historians have drawn attention to the specific use of images by Descartes and his followers in order to articulate their new approach to natural science.[27] The model for this type of image comes from the pictorial tradition of astronomy and mechanics, rather than from botany and anatomy. Cartesian images are neither descriptive representations of natural objects nor purely mathematical diagrams. They are visual representations of processes which actually cannot be seen by the naked eye. The depiction of hidden mechanisms as if they were available for visual inspection sets the reader on his way to clear and distinct ideas about the real causes of phenomena. This aspect is certainly present in the Louvain engravings. Most of the engravings, in particular those connected to the new Cartesian curriculum, show mathematical deconstructions of physiological, mechanical or astronomical subjects. Yet, the most important or famous Cartesian pictures are absent. There is no engraving showing the vortex theory of the universe nor an image explaining the corpuscular nature of light, both very prominent topics in the *Principia philosophiae*. Although Cartesian 'subtle matter' was the hallmark of the new science, this matter only shows up in the engravings on magnetism and the tides. Emphasis was clearly on the explanation of phenomena, not on the ontological foundation of Cartesian doctrine. This agrees with the position of the Faculty of Arts, which was considered to be an elementary training school for young students, and not the place to discuss metaphysical theories. It was important for the students to be acquainted with basic natural phenomena in order to be able to enter the higher Faculties. It was not the pedagogical aim of the Faculty of Arts to make the students convinced adherents of Cartesian (or any other) philosophy. Metaphysics was therefore pushed to the background, while the study of natural phenomena received ever more attention.

25 G. Vanpaemel, 'Rohault's *Traité de Physique* and the teaching of Cartesian physics', *Janus* 71 (1984) 172–182. See also: Desmond M. Clarke, *Occult Powers and Hypotheses. Cartesian Philosophy under Louis XIV* (Oxford 1989).

26 Also the Jesuit astronomer Giovanni Battista Riccioli (1598–1671) is mentioned once on the engravings, and his lunar map is anonymously copied.

27 Lüthy, 'Descartes' illustrations' (n. 4); C. Zittel, 'Menschenbilder – Maschinenbilder. Ein Bilderstreit um Descartes' *De l'homme*', *Deutsche Zeitschrift für Philosophie,* 56 (2008) 709–744; R.M. Wilkin, 'Figuring the Dead Descartes: Claude Clerselier's *Homme de René Descartes* (1664)', *Representations* 83 (2003) 38–66.

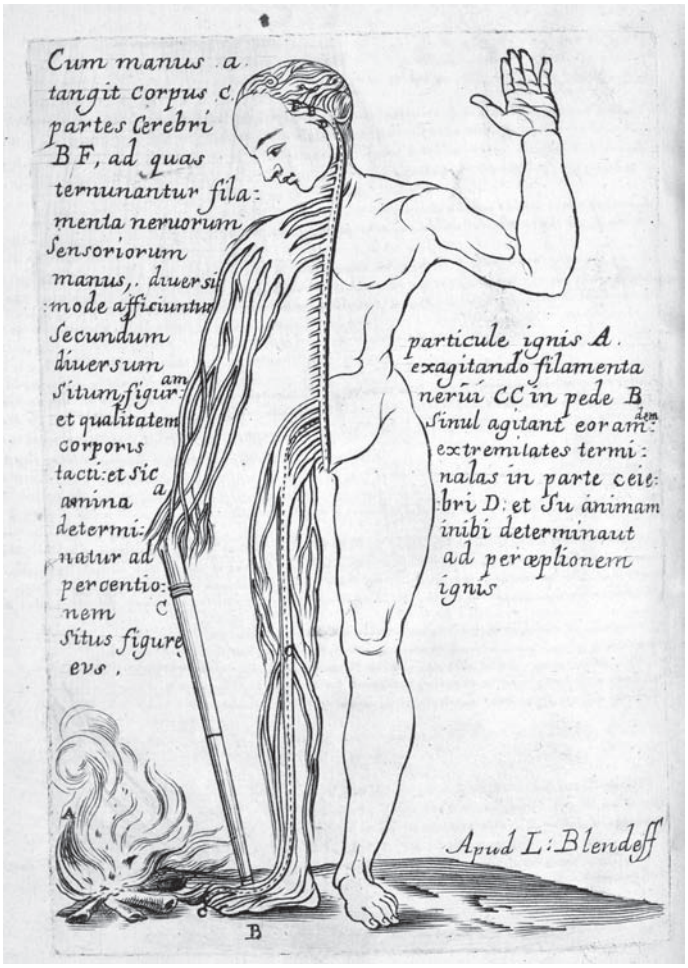

Fig. 2: L. Blendeff, Nervous System, copied from Descartes' *De Homine* (1662) [Universiteitsbibliotheek Leuven].

The engravings also reflect the ongoing shift in the philosophy curriculum. With the removal of the Aristotelian *corpus* in 1658, a new scheme of physical treatises had to be introduced. The *primarius* taught treatises on *De Causis*, *De Corpore Naturali* and *De Anima*. In particular the last treatise, dealing with the human body, sensory perceptions and the mind, became the centrepiece of the whole physics curriculum. Optics, in particular, took up a large part of the treatise. The *secundarius* lectured on *De Motu*, *De Sphaera*, *De Elementis* and *De Meteoris*. Here *De Sphaera*, with a discussion on the Ptolemaic, Tychonic and Copernican systems, was the most important topic. Gradually, the *primarius*, probably following the arrangement introduced in Rohault's textbook, would take over some of the topics taught by the *secundarius*, in order to better expound the basic arguments in favour of Cartesianism. In particular, the discussion of the Copernican system, and the explanation of the tides would be included in the treatise *De Corpore Naturali*. Two thirds of the

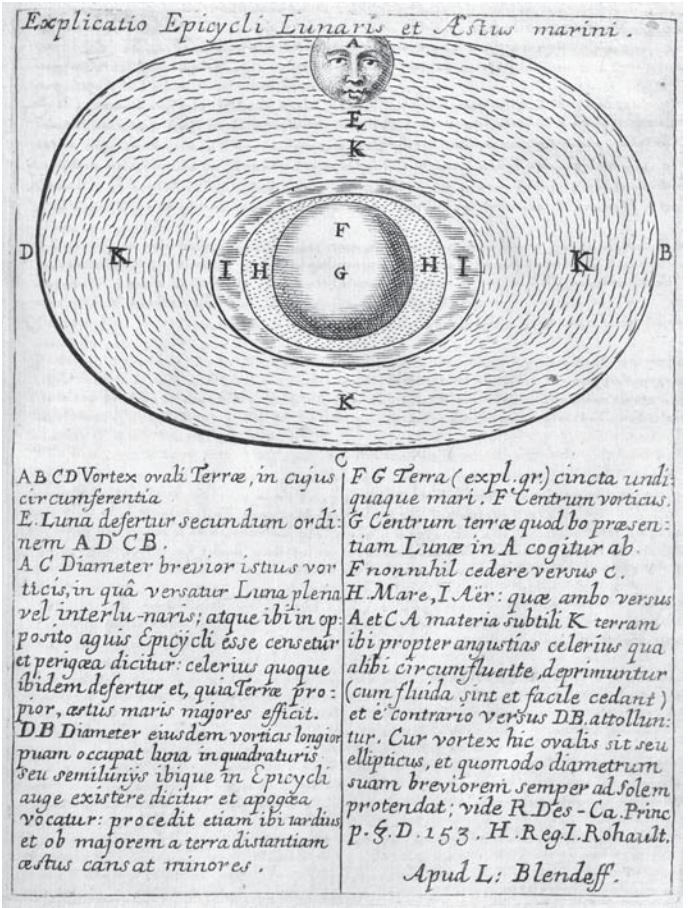

Fig. 3: L. Blendeff, Explanation of Marine Tides. This is one of the few engravings which may have been made to an original Louvain design. The accompanying text contains references to Descartes, Rohault and Regius [Universiteitsbibliotheek Leuven].

illustrations produced by Hayé and Blendeff refer to the treatises *De Anima* and *De Sphaera*, while others have to do with mechanics and movements, not exclusively according to Cartesian principles but in comparison to the Aristotelian treatment of movement, clearly to be labelled 'modern'. The Louvain engravings should therefore be considered as a vehicle for the introduction of the Cartesianism in the Faculty. Not a single illustration concerns Aristotelian theories or alternative explanations. Only in one engraving concerning the retrograde movement of the planets, some evidence of the accommodation of old and new philosophy has survived. There are actually two versions known of this engraving. The first version explains the retrograde movement in a heliocentric universe. In the second version, an extra paragraph is added to the text on the engraving, to point out that the retrograde movements can also be explained very well according to the Ptolemaic system. This adjustment testifies to the sensitive nature of the doctrines proclaimed by the engravings, but it remains unique. No other engraving makes any reference to Aristotelian or scholastic

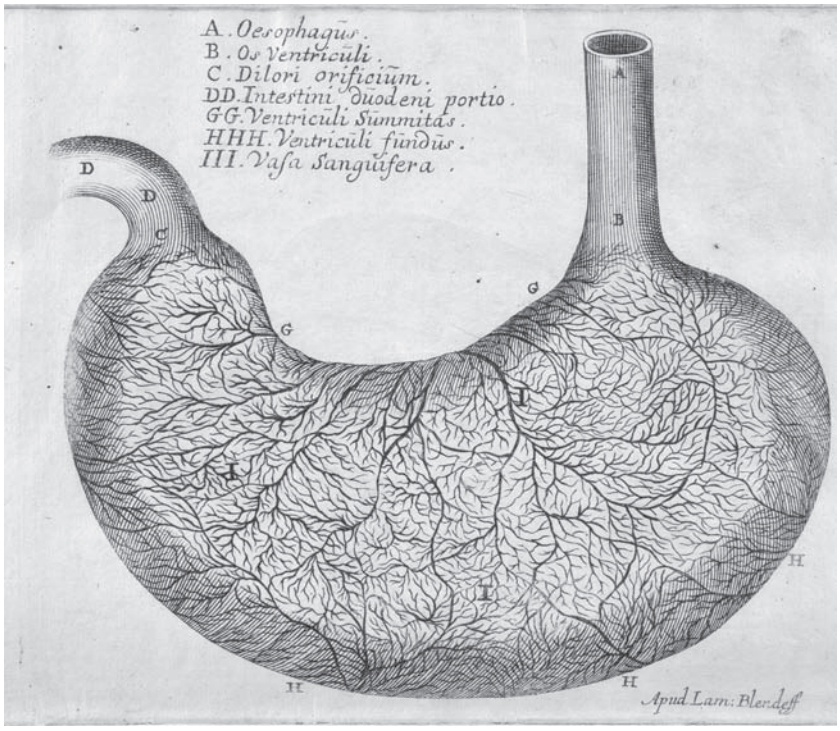

Fig. 4: L. Blendeff, Oesophagus, copied from Thomas Willis, *Pharmaceutice Rationalis* (1674) [Universiteitsbibliotheek Leuven].

philosophy. The message of the engravings is unambiguous. Even when some professors preferred to hold on to the traditional scholastic learning, their students would buy the popular engravings about the new science and include them in their manuscript notebooks.

Conclusion

The analysis of the early Louvain engravings has shown that the images were intentionally directed towards supporting the new Cartesian philosophy. As far as the original sources of the images can be retraced, a large portion of them were copied from Cartesian textbooks. The images focused on the explanation of physical phenomena, visualizing mechanical causes invisible to the eye. More descriptive images, e.g. showing scientific instruments, only appeared in the eighteenth century. The selection of the images reflected the major rearrangements of the philosophy curriculum in Louvain, although they did not form an integral part of the courses. Students were free to buy[28] and to use the engravings as embellishments or memorizing aids, but the course texts made no mention of them. In some cases, the Cartesian engravings went against the explanations discussed in the text. As they were used for several decades, they must, however, have played a widely accepted role in the curriculum, either in the preparation for the *materiae promotionis*, or in informal discussions going on in the

28 In some notebooks, the engravings have been replaced by ink drawings.

colleges outside the official lecture hours. The popularity of the engravings thus testify to the general spirit of reform among the philosophy students and their professors.

A number of questions remain. It is clear that the artist–engravers cannot be held responsible for the selection of the images. Certainly, someone inside the Faculty – or perhaps in the Faculty of Medicine? – must have played a role in the production of the illustrations. One obvious candidate is Gerard van Gutschoven (1615–1668), a former student of Descartes in Holland and a staunch proponent of Cartesianism in Louvain.[29] Van Gutschoven studied medicine in Louvain and became professor of mathematics in the Faculty of Arts.[30] In 1659 he was appointed professor of anatomy, surgery and botany at the Faculty of Medicine where he immediately collided with his anti-Cartesian colleague Vopiscus Fortunatus Plempius. In an appendix to Plempius' *Ophthalmographia* (Louvain 1659) Van Gutschoven defended the Cartesian approach to anatomy and physiology.[31] In 1660 he accepted the invitation of Claude Clerselier (1614–1684) to provide illustrations for Descartes' unpublished manuscript on *L'homme*. When this book was finally published in 1664, it contained images by Van Gutschoven and Louis de la Forge (1632–1666). Van Gutschoven's skill in designing illustrations and his knowledge of anatomy, in particular with regard to the eye, make him a likely candidate for having promoted the use of images in the philosophy courses. However, Van Gutschoven appears not to have used many illustrations in his own polemical writings. His remarks against Plempius contain only a few mathematical diagrams. Most importantly, Van Gutschoven died in 1668, before Hayé and Blendeff started to work on their engravings.

It must be left to further research to discover the actual circumstances of the introduction and the use of the Louvain engravings. By comparing many student notebooks, it may be possible to refine the chronological order of events, the use of illustrations in the different colleges and the various locations where the illustrations were integrated in the notebooks. The illustrations should also be compared to earlier emblematic images and later scientific plates to detect differences in style and use. For now, we can conclude that the engravings constituted an alternative channel of dissemination of knowledge. Living in a university town clearly provided many more ways to study than to take notes in lectures.

29 G. Vanpaemel, 'Gutschoven (Gutiscovius), Gerard van', *Nationaal Biografisch Woordenboek* 13 (1990) col. 347–354.

30 This royal chair was not connected to the philosophy course. Van Gutschoven, who was an accomplished mathematician, mainly taught practical mathematics for surveying and military architecture.

31 See his *Animadversiones in Ophthalmographiam* in: V.P. Plempius, *Ophthalmographia sive Tractatio de Oculo* (Louvain 1659) 247–299.

Appendix

Michael Hayé	Lambert Blendeff
Hominis Ventriculum	Oesophagus
Cor humanum	Cor Humanum
Oculi Humani sectio per axem	Oculi Humani sectio per axem
Modus quo fit Respiratio	Cum manus a tangit corpus c
Imagines objectorum	Modus varius quo reuniuntur radij missi ab
Speculum Angulatum	eodem puncto versus fundum oculi, pro variâ
Exemplum modi quo potest	distantia obiecti
specillum convexum	Explicatio Pyramidum visualium
Modus quo tubus opticus	Figura ad reflexionum … et refractionum …
repraesentat obiectum	rite percipiendam rationem utilissima
Modus quo radii licet a quolibet	Modus quo speculum planum representat
puncto obiecti ad totam latitudinem	Modi quibus speculum concavum representat
Modus quo candela accensa	Modus quo speculum convexum repraesentat
Series of 7 figures on matter, motion	Vitra diversae figurae
and vacuum	Exemplum modi quo Specillum convexum
Sphera mundi	adeoque etiam Microscopium obiecta
Systema Ptolemei	repraesentat
Excentrici et epycicli	Exemplum modi quo speculum concavum
Paralaxis	repraesentat objectum
Systema Copernici	Figura Prismatis
Systema Tychonicum	De Gravitate Experientia
Umbrae Lunae	De Gravitate
Eclypsis Solis	De Gravitate (four examples of equilibrium)
Explicatio epicycli lunaris et aestus	Vectis 1mus
marini	Vectis primus habens vertebram in medio
De apparitionibus Cometarum	De Motu centrifugo
De ventis	De Motu composito
De iride	Mensa tanto plus aquae continet quanto
Halo	centrum eius est centro terrae vicinus
Modus quo particulae striatae per	De Linea Directionis
terram et magnetem fluunt	Modus quo resilit arcus
	Umbra Columnalis
	Mutationes Lunae
	Umbra atmosphaerae terrestris eclipsans lunam
	Penumbra Lunae
	Paralaxis Solis respectu habitatoris x.
	Stationes & Retrogradation[es] planetarum
	Siphones
	Modus subintrandi aquas
	Explicatio Epicycli Lunaris et Aestus marini