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When the universe became infinite

Under the title *Universum Infinitum. From the German Philosopher Nicolaus Cusanus (1401–1464) to the Iberian Discoveries in the 15th Century: Ocean World in European Exploration,* between 17th and 18th June 2016, an international workshop was held in the Portuguese National Library (BNP), in Lisbon. The organizers, besides the very BNP, were the Interuniversity Center for the History of Science and Technology (CIUHCT), as well as the Academy for the Intellectual History of Europe (Akademie für Europäische Geistesgeschichte) and the Cusanus-Hochschule, both at Bernkastel-Kues, Germany. The initiator of the workshop was Thomas Horst (Postdoc at the CIUHCT), who had already organized with success, in November 2014, the workshop entitled *Renaissance Craftsmen and Humanistic Scholars: European Circulation of Knowledge between Portugal and Germany.*

In 16 interdisciplinary and diverse presentations the theme was widely referenced, covering areas from theology, mathematics, cosmography, cartography, (navigation) instruments and typography, till history of discoveries, sciences of translation and astrology.

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Since the 15th century, long-lasting Portuguese-German relations can be verified and are reliably documented, significantly promoting international scientific exchange and, thus, constituting an inseparable part of the project known as *Renaissance*. To what extent this pan-European project did depend on intellectual impulses of single individuals: this workshop demonstrated it in thought and person of Nikolaus von Kues (Latinised to Nicolaus Cusanus), highlighting along his own term *universum infinitum* the powerful consequences that ultimately led to the era of departure from Iberian Europe to the New World.

As a theologian, philosopher and mathematician, widely educated and tireless traveller – so appears Cusanus to us today, who, far from breaking with the scholastic theology transformed it in a quite original way by joining the knowledge of God with the mission of an exhaustive cognition of the world. To this end, the limited human reasoning would have to go out to *infinity*, for both: the cosmos and the pursuit of God-Creator of the World. However, the conception of an infinite universe was incompatible with the theory of the two worlds that existed since ancient times and was adopted by scholastic theology. (Just to remember: contradicting this theory had cost the life of the former Dominican monk Giordano Bruno, yet in the year 1600: he was burned at the stake!). Only a thinker of such as a Cusanus format was able to achieve this.

In his introductory lecture, Thomas Horst (Lisbon) showed clearly how an extensive network of personal contacts, that Cusanus kept with representatives of the authorities, scholars and friends from Germany, Italy, Spain and Portugal, ensured a continuous exchange of interests and knowledge, along of his life.

The following two keynotes endeavoured to work out how the core ideas of the philosophical and theological thought of Cusanus, as far as concerned with *universum infinitum,* differed from the mainstream of the scholastic thought.

Harald Schwaetzer (Bernkastel-Kues) presented, in an original interpretation of the Christmas Sermon (from 25th December 1444), how the description of the world in the intention of Cusanus meets a Christological phenomenology, in a saturated state of love and reason, that should lead to the birth of Christ: "tempus est, ut Maria pariat".

Matthias Vollet (Bernkastel-Kues) surprised with a reflection on the inevitable effect of *de-centrism* caused by the Cusanus' conception of a universe without a centre and, therefore, without any circumference. Thus, it would be essential to conceive another space, besides the physical cosmos and the theological space as the epitome of the divine creation: that would be a metaphysical space where the similarity may appear between man and God, as being creator, insofar

man experiences himself, at any time, as the center of the world. Cusanus' *universum* would be, therefore, anthropogenic in its spatial limited dimensions, but "theogenetic" in its absolute dimensions.

The first panel was about the closer relations between cosmology and cosmography in Cusanus' vision. In his presentation, Jean-Marie Nicolle (Rouen) questioned the thesis of Cusanus being a predecessor of our modern conception of an infinite universe. He argues that the concepts of "finite" and "infinite" represent, within the work of Cusanus, the only exception where the coincidence of contradictions (*coincidentia oppositorum*) is not applicable. Both constitute two different ontological states of being. The infinite, being beyond any proportion, can only be conceived as single, indivisible and immeasurable. Hence the question: is our modern view of the infinite anyhow related to this axiom?

For a better understanding of the cosmology of Cusanus and based on examples selected from mathematics, Gregor Nickel (Siegen) emphasized, that mathematical hypotheses are able to achieve credible assumptions about the real world, due to its accuracy and consistency. However, by conceiving the Absolute they inevitably fail. According to this, he quoted the example that Cusanus appointed himself: when adding one *point* to another point the result is nothing new, but simply – *nothing*. So, the God-created *point* and the *nothing* are to be considered equivalent. Here the question arises: how can the whole universe result from such unity? For Cusanus, the starting point for cosmological speculations; for a mathematician, nothing but mere nonsense – hence: "neither finite nor infinite".

Johanna Hueck (Bernkastel-Kues) addressed, based on the cosmographer parable (chapter VIII from the late work of Cusanus *Compendium*), how the work of a cosmographer, including all five senses, can produce a real image that, however, will never be enough to describe the world. For that would be required more than sensorial and rational capacities: a creative *intuition* that able to recognize the analogy of the double relation (1) between manufactured maps and the real world and (2) the cartographer's relationship to his work. It would be a parable of a process in which God-the-Creator performs a previous plan.

After the "universum infinitum" had been *conceivable,* it becomes accessible to the senses, as an idea of a homogeneous and infinite space and, thus, *calculable* and *measurable*. Therefore, all the doors opened to "discover", conquer and dominate the world, not only in the intellectual and scientific sense but also in projects of political expansion. The following presentations address these aspects: Panel II based on texts and maps, Panel III in the narrative reconstruction about the "New World".

Jürgen Pohle (Lisbon) investigated the participation of Germans in Portuguese expeditions overseas, in the fifteenth century, in particular military, courtiers, artisans and adventurers, including names like Oswald von Wolkenstein († 1445), Georg von Ehingen (1428–1508) and specially Martin Behaim (1459–1507).

Harald Gropp (Heidelberg) demonstrated, from the Treaty of Tordesillas, the surprising effectiveness of combinatory mathematics in the production of structural patterns and narratives.

Robert King (Canberra) addressed the question of whether Portuguese navigators had discovered Australia at the end of 15th century still merited plausibility. He concluded that there was no evidence for such discovery. The Dieppe Maps, brought forward by those who argued for such a discovery, were – like Gerard Mercator's world map of 1538 – based on the 1531 world map of the royal cosmographer Oronce Finé (1494–1555).

By means of ingredient-lists for medicinal recipes, Karl Galle (Cairo) sought to reconstruct the influence of distance trade in the medical practice of 15th and 16th century. It turns out that the replacement of local and regional medicinal herbs by exotic and rare substitutes was in many cases rather a matter of money than of proven effects.

Cusanus was a deep connoisseur of the Koran, which he read in the Latin translation, discussed extensively with fellow scholars during the Council of Basel (1432–1437) and annotated with his comments, at the request of his friend, Pope Pius II (Eneas Silvio Piccolomini, period of papacy: 1458–1464). Through the comparison of the writing and the style, José Martínez Gázquez (Barcelona) succeeded in proving that there is another edition of the Koran, in the archives of the Vatican Library, which displays the same Cusanus handwriting, promising new discoveries by comparing the variants.

From the extensive corpus of the humanist Pietro Martyr d'Anghiera, who was born in Italy and lived in Spain (1457–1526), Davide Scotto (Tübingen) outlined the concept of "lawless people" based on two text sources, which could be likewise used on the Muslims living around the area (the conquest of Granada in 1490 was still fresh in the memory!), as well on the distant savage nations of the New World, that Spain was preparing to conquer. On the other side of the coin emerges the myth of a continuous rise of an European core of Christianity, ranging from Greco-Roman antiquity to the Iberian Reconquista: a genuine Eurocentric conception, suffering its deconstruction only nowadays.

How could one publish, by the year of 1580, a book related to Aristotle's *De Coelo* which would take into account the expansion of new geographical horizons, of the New World discoveries and its people? This question had to be raised and answered by the Jesuits from the School of Coimbra, who could never ignore the current knowledge of the world but, at the same time, who could not dare to clash with the ecclesiastical authority. Cristóvão S. Marinheiro (Luxembourg) demonstrated in his presentation, through abundant material, how those "conimbricenses" reconciled both positions and succeeded in constructing "The New World": by means of intelligent texts assemblies and erudite commentaries.

The last of the four panels shed light on Cusanus' influence on the History of Science, with special emphasis on astronomy and astrology in the Renaissance.

Thomas Horst (Lisbon) dedicated his presentation to Cusanus' late writings (*Compendium* and *Dialogus de ludo globi*, from 1462 to 1464), in which the imperfect shape of the globes, made by human head and hand, served as an allegory for creative subjectivity.

Samuel Gessner (Lisbon) showed by a specially made astrolabe model its practical use, and gave precise information about its importance, besides other astronomical instruments. He also based himself on documentary material for the analysis of the copper astrolabe preserved in Bernkastel-Kues (Cusanusstift), and its belonging to Cusanus.

The presentation of Darin Hayton (Harverford, PA, USA) closed the workshop, in which he displayed the use and dissemination of astrological knowledge in the form of calendars and event forecasts as appropriate instruments of political influence. In the sceptical attitude of the Holy Roman Emperor of the German Nation Maximilian I against astrology, one can well recognize the attitude of a sovereign who does not intend to deceive his people, but offer it pragmatically these tools for a better understanding of their own world.

An exhibition of selected objects, photographs and text reproductions, carefully crafted from the Cusanusstift assets (Bernkastel-Kues), followed and closed the conference. During the coffee breaks, the participants could play and understand the "Globe Game" (*Globusspiel*), based on the reproduction of Cusanus ' own complex and sometimes also playful ideas.

An additional program offered a walking tour, using old maps, through the historic centre of Lisbon; as well as a day trip to Sintra, Ericeira and Mafra National Palace.

How could one make a concise judgment of this successful conference, without lowering the level of the reached knowledge? Well, maybe like this: retrospectively the key concept of *universum infinitum* proved to be a brilliant stratagem of the organizers, in which the interdisciplinary reference of the diversified scientific approaches was possible and highly fruitful. In such procedures, Cusanus could easily have recognized his intimate: the unfolding of the One, *complicatio* and *explicatio*, and certainly – he would have kindly agreed. The promised publication of the conference proceedings will surely arouse some curiosity.

More information (photos, abstacts) can be found on the conference website: http://www.ciuhct.org/pt/workshop_universum_infinitum.

Programme

Friday, June 17, 2016

Opening Session | Chair: Thomas Horst

Welcome speech | Henrique Leitão (CIUHCT, Portugal)

Introduction: The cosmographical network of Nicolaus Cusanus and German-Portuguese relations in the Humanism | Thomas Horst (CIUHCT, Portugal)

Cosmography as Christological Phenomenology | Harald Schwaetzer (Kueser Akademie für Europäische Geistesgeschichte; Cusanus-Hochschule, Germany)

Das Universum als metaphysische Größe bei Nicolaus Cusanus | Matthias Vollet (Kueser Akademie für Europäische Geistesgeschichte, Germany)

Panel I: «Universum Infinitum» – Cosmology and Cosmography in the 15th Century | Chair: Harald Schwaetzer

En quel sens l'univers est-il infini? | Jean-Marie Nicolle (Rouen/France)

Nec finitum – nec infinitum. Erwägungen zur Kosmologie des Nikolaus Cusanus | Gregor Nickel (Universität Siegen/Germany)

Nicholas of Cusa as Cosmographer | Johanna Hueck (Cusanus-Hochschule, Germany)

Panel II: Ocean World in European Exploration: Reflection of Iberian Discoveries on texts and maps | Chair: Samuel Gessner

Die deutsche Beteiligung an den überseeischen Expeditionen Portugals im 15. Jahrhundert: von Oswald von Wolkenstein bis Martin Behaim | Jürgen Pohle (CHAM, Portugal)

Writing meridians of water into the maps – from Tordesillas till Zaragoza | Harald Gropp (University of Heidelberg, Germany)

Magnus Sinus, Java and Locach from Martellus to Mercator, 1489–1569 | Robert King (National Library of Australia)

Spicing Up Natural Philosophy: Global Trade Footprints in Early Recipes and their Implications for the Exchange of Manuscripts and Ideas | Karl Galle (Linda Hall Library, Egypt/USA)

Saturday, June 18, 2016

Panel III: Constructing a new world | Chair: Matthias Vollet

Nuevas glosas de Nicolás de Cusa al Alchoranus Latinus en el ms Vat. Lat. 4071 de la BAV | José Martínez Gázquez (Spain)

Sifting Humanist Understandings of Islam. Peter Martyr d'Anghiera's Worldview from the Mediterranean to the New World | Davide Scotto (Tübingen University, Germany)

Mapping a new World with ancient authors. The reception of antique authors in the De coelo by the Conimbricenses and their role in the constructing a new imago mundi | Cristóvão S. Marinheiro (National Library of Luxembourg)

Panel IV: Intellectual practice in astronomy and astrology of the 15th Century: Cusanus and his influence on the History of Science | Chair: Henrique Leitão

The Cosmographer Nicolaus Cusanus (1401–1464) and his Philosophical Game with the Globe: The Dialogus de ludo globi | Thomas Horst (CIUHCT, Portugal)

Astronomical Instruments in the fifteenth century: the astrolabe in the Cusanusstift of Bernkastel-Kues revisited | Samuel Gessner (CIUHCT, Portugal)

Astrology as Science and Politics in Maximilian's Vienna | Darin Hayton (USA)