Introduction: The Making of Copernicus

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1

> Doch unter allen Entdeckungen und Überzeugungen möchte nichts eine größere Wirkung auf den menschlichen Geist hervorgebracht haben, als die Lehre des Copernikus. Kaum war die Welt als rund anerkannt und in sich selbst abgeschlossen, so sollte sie auf das ungeheure Vorrecht Verzicht thun, der Mittelpunct des Weltalls zu sein. Vielleicht ist noch nie eine größere Forderung an die Menschheit geschehen: denn was ging nicht alles durch diese Anerkennung in Dunst und Rauch auf: ein zweites Paradies, eine Welt der Unschuld, Dichtkunst und Frömmigkeit, das Zeugniß der Sinne, die Überzeugung eines poetisch-religiösen Glaubens; kein Wunder, daß man dieß alles nicht wollte fahren lassen, daß man sich auf alle Weise einer solchen Lehre entgegensetzte, die denjenigen, der sie annahm, zu einer bisher unbekannten, ja ungeahneten Denkfreiheit und Großheit der Gesinnungen berechtigte und aufforderte.[1]

Goethe's eulogy, typical in its central propositions and clear-sighted with regard to the consequences, bears witness to Copernicus's enormous posthumous reputation.[2] As is always the case when myths and legends entwine the image of a thinker, its original contours are hard to recognise. The historical patina can, however, not be easily scratched off, it rather comes across like an acid

1 'Yet among all discoveries and convictions none may have produced a greater effect on the human spirit than the doctrine of Copernicus. Hardly had the world been acknowledged as spherical and closed in itself when it should abandon the enormous prerogative to be the centre of the universe. Perhaps never a greater challenge has been imposed on mankind; for what did not dissolve by this acknowledgement into vapour and smoke, a second paradise, a world of innocence, poetry and piety, the testimony of the senses, the conviction of a poetic-religious belief; no wonder that they did not want to let go of all this, that they opposed such a doctrine in all manners, which entitled and summoned him, who accepted it, to a hitherto unknown, yea unimagined freedom of thought and greatness of views.' Goethe Johann Wolfgang von, *Geschichte der Farbenlehre*, "Zwischenbetrachtung", in *Goethes Werke, Weimarer Ausgabe* (Weimar: 1893) vol. II.3, 213.

2 Cf. Rosen E., *Copernicus and his Successors* (London: 1995); Zinner E., *Entstehung und Ausbreitung der copernicanischen Lehre*, 2., revised and enlarged edition, ed. Nobis H.M. – F. Schmeidler (Munich: 1988).

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that corrodes its object. At the same time, it generates for ever new effects, in Goethe's case the insistent idea that until shortly before Copernicus everyone believed that the world was a disc. If one compares more recent Copernicus legends with those notions that people of earlier times had about him, grave differences become apparent.[3] One sees with astonishment that Copernicus's work, strongly indebted to older astrological discussions [Fig. 1],[4] was hardly known in the 16th and 17th centuries. Rather the names of Brahe, Kepler and Galileo were in the 17th century associated with a revolution of astronomy[5] and Copernicus only successively rose to the position of a hero of science[6]—a position due to that he became during the early Enlightment even the target of satyrical science criticism [Fig. 2], but allowed him also to lay a claim to the role as the protagonist of numerous novels even in the 20th century.[7] Copernicus the artist, clergyman, physician[8] and scholar from the provinces became a doer, an active designer of a new world image.

For Goethe—as for many of us today[9]—the focal point about Copernicus was that his revolution was not only one of astronomy but one of thought

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3 Cf. for example: Wolfschmidt G. (ed.), *Nicolaus Copernicus (1473–1543): Revolutionär wider Willen* (Stuttgart: 1994); Gingerich O., *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus* (New York: 2004).

4 Cf. Westman R., *The Copernican Question: Prognostication, Skepticism, and Celestial Order* (Berkeley, Calif.: 2011).

5 Cf. the article by C. Zittel in this volume.

6 Cf. Grant E., *In Defense of the Earth's Centrality and Immobility: Scholastic Reaction to Copernicanism in the Seventeenth Century* (Philadelphia: 1984); Rosen E., *Copernicus and the Scientific Revolution* (Malabar, Fla.: 1984).

7 Cf. the articles by W. Neuber and J. Jungmayr in this volume.

8 Cf. Buczkowski M., *Beitrag zum gegenwärtigen Stand der Forschung über die ärztliche Tätigkeit des Nicolaus Copernicus (1473–1543)* (Diss. Munich: 1989).

9 As also earlier for Gryphius. See:

Vber Nicolai Copernici Bildt.
DV dreymall weiser geist / du mehr den grosser Mann
Dem nicht die nacht der zeit / dem nicht der blinde wahn
Dem nicht der herbe neidt die sinnen hatt gebunden:
Die sinnen die den lauff der schnellen erden funden.
Der du der alten träum vnd dünckel widerlegt
Vnd vns recht dargethan was lebt und was sich regt.
Schaw' itzund blüht dein rhumb / den als auff einem wagen
Der kreiß auf dem wir sind mus vmb die Sonnen tragen.
Wen dis was irdisch ist wird mit der zeit vergehn;
Sol vnbewegt dein lob mitt seinem himmel stehn.

Gryphius Andreas, *Gesamtausgabe der deutschsprachigen Werke, vol. II: Oden und Epigramme*, ed. M. Szyrocki – H. Powell, (Tübingen: 1964) 152. Cf. Kühlmann W.,

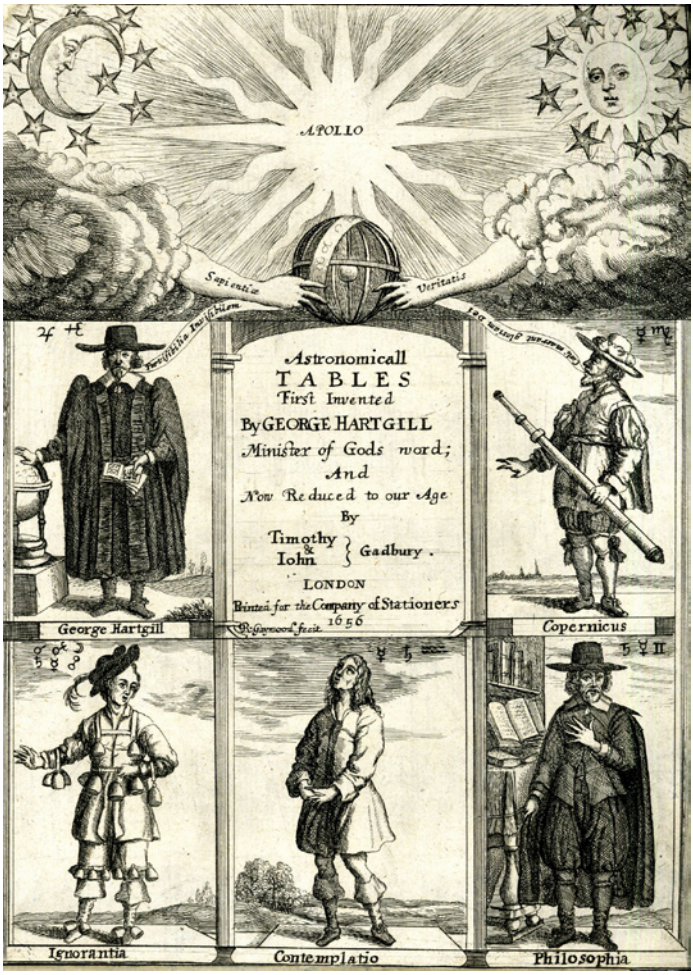

FIGURE 1 Title-page to the second edition of George Hartgill, *Astronomicall TABLES* (London, Company of Stationers: 1656, first edition 1594), Etching, © The Trustees of the British Museum. Hartgill was an Elizabethan astrologer and astronomer. An accompanying poem explains the frontispice: 'The Learned Artist works his brain / To make his Observation plain, / Hee, by his Instrument can tell / Thee where the *Stars* and *Planets* dwell. /*Philosophers*, do Knowledge gaine by books,/ *Astrologers*, by Heavens various looks.'

generally,[10] opening new possibilities also for the arts; this view, however, was disputed and even ignored by numerous anti-Copernicans amongst whom

"Neuzeitliche Wissenschaft in der Lyrik des 17. Jahrhunderts. Die Kopernikus-Gedichte des Andreas Gryphius und Caspar Barlaeus im Argumentationszusammenhang des frühbarocken Modernismus", *Jahrbuch der Deutschen Schillergesellschaft* 23 (1979), 124–153.

10 Cf. Kaulbach F., "Die Copernicanische Denkfigur bei Kant", *Kant-Studien* 64 (1973), 30–48.

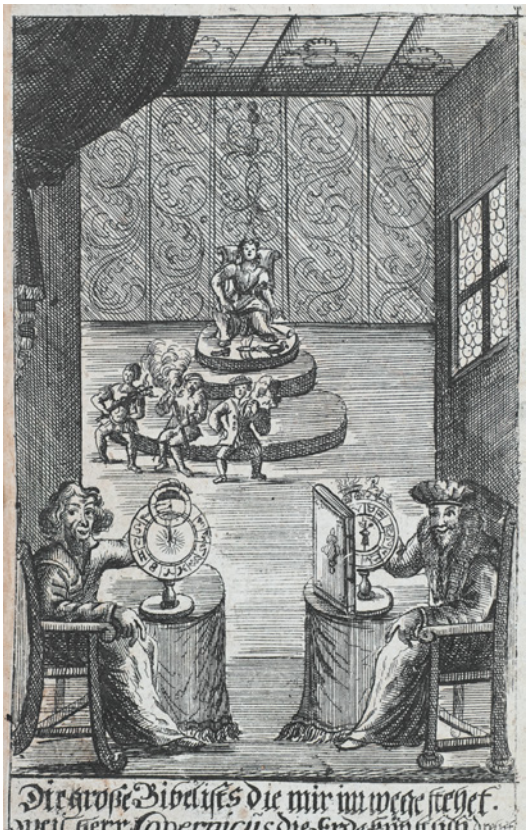

FIGURE 2 Frontispice to Johann Gottfried Zeidler, *Die Hoch-Edle/ Veste Hochgelahrte und Hocherfahrene PHYSICA, Oder Natur-Lehre/ Als Hoch-betraute Ehestands-Räthin/ Ober-Kindmutter/ Inspectorin Uteri, Urin und Milch-Kosterin/ wie auch General Bratenwenderin des Sonnenlauffs am Königl. Hofe der grossen lateinischen Kunst-Göttin MINERVEN. Allen deutschen Micheln zur Verwunderung und Anbetung aus der Lateinischen Grund-Sprache in unsere Hochdeutsche Fr. Mutter-Sprache getreulich übersetzet/ und in eine Kirsche/ nicht grösser als ein Sperlings-Ey gefasset. Mit einer Vorrede FACULTATIS PHILOSOPHICAE der hoch-löbl. uralten Unversteht zu Abel* (Abel, Griller: 1700). © Württembergische Landesbibliothek Stuttgart.

were not only representatives of the Vatican but also philosophers like Francis Bacon.[11] Some only adapted what they could use and concealed the rest,[12] for others the astronomical revolutions played a merely subordinate role.[13] E.g.,

11 Cf. the articles by D. Jalobeanu and G. Wolters in this volume.

12 Cf. the articles by S. Kodera, S. Schneider and S. Kirschner – A. Kühne in this volume.

13 Cf. Stimson D., *The Gradual Acceptance of the Copernican Theory of the Universe* (Gloucester, Mass.: 1972).

after Johann Gottfried Herder in an essay 'Something of Nicolaus Copernicus's Life, towards His Image'[14] had presented the astronomer as a Sarmatian, i.e. as Polish, a century-long bold dispute arose on the question if Copernicus had been a German or a Pole.[15] This dispute, by the way, is still of the utmost importance in Poland as we could see on the occasion of our workshop that we held in the Copernicus city of Olsztyn in preparation of this volume.

These findings prompted us to gather in a volume articles that should make it possible to understand exemplarily how some of the Copernicus myths came about and if they could hold their ground or have vanished again. Hence, how and why did the notions change about Copernicus and the revolution that was named after him? Are there links between a factual or postulated transformation of world images and the application of certain scientific metaphors, especially the metaphor of a revolution? Were there interactions and amalgamations of the literary and scientific enthronement[16] or outlawry[17] of Copernicus and if so, how did they take place? Are present-day notions in science theory of a change of paradigm the effect of a rhetorical stage-management in earlier centuries? On the other hand, are there repercussions of the scientific-historical reconstructions and hagiographies on the literary image of Copernicus as sketched by novelists even in the 20th century?

The essays gathered in this volume try to give an answer to these central questions.

2

The history of the reception of Copernicus in this volume shall not be dominantly dealt with from the point of view of a *factual* affirmation and rejection of the astronomer and his doctrine but rather as accomplishments of transformation respectively. We consciously chose the term 'transformation' because it

14 Herder Johann Gottfried, "Etwas von Nikolaus Kopernikus Leben, zu seinem Bilde", *Der Teutsche Merkur*, No. 4 (1776), 169–179, reprinted in Kühne A. – Kirschner S. (eds.), *Biographia Copernicana. Die Copernicus-Biographien des 16. bis 18. Jahrhunderts* (Berlin: 2004) 292–299. Cf. the article by W. Neuber in this volume esp. 301-303.

15 Cf. on this Schröder R. "War die copernicanische Reform der Astronomie ein Weltbildwandel?", in Markschies C. – Zachhuber, J. (eds.); *Die Welt als Bild. Interdisziplinäre Beiträge zur Visualität von Weltbildern*, Arbeiten zur Kirchengeschichte 107 (Berlin: 2008), 91–112.

16 Exemplarily in Blumenberg H., *Die kopernikanische Wende* (Frankfurt am Main: 1965); Idem, *Die Genesis der kopernikanischen Welt* (Frankfurt am Main: 1975).

17 Koestler A., *Die Nachtwandler. Das Bild des Universums im Wandel der Zeit* (Bern – Stuttgart – Wien: 1959).

signifies a modification by which something is still preserved *in another state*.[18] Thus, instead of contrasting (within the framework of a history of the reception of Copernicus) affirmation as the identical and continued existence of something with rejection as the total sublation of something, the articles in this volume investigate *transformations*: methodological, institutional, textual and visual transformations of the Copernican doctrine and the topical, rhetorical and literary transformations of the historical person of Copernicus respectively.

The first part of the volume is dedicated to methodological transformations. Stefan Kirschner and Andreas Kühne offer an explanatory approach to the fact that in the second half of the 16th century at Wittenberg university, where astronomy and astrology formed focal points, the empirical data from Copernicus's research were taken into consideration but his theory of a heliocentric world system was largely ignored; while the specific structure of debate, derived from the scholastic practice of disputation and the medieval commentation of Aristotle respectively, allowed for the discussion even of unorthodox doctrines like the rotation of the earth, the humanist reform of the university induced with its teaching orientation towards pragmatic questions and rhetorical skills an eclipse of the question of the claim for truth within the Copernican hypothesis. In the course of the decay of the textual genre 'questio disputata' and of the disputation system at Wittenberg since around 1520 an epistemological situation arose where the Copernican hypothesis could no longer be of relevance.

Gereon Wolters examines a related question: what caused the Inquisition to turn against Copernicus's cosmology, which it had ignored for decades? In order to give an answer, the article focuses on Cardinal Bellarmin's efforts to take seriously the older doctrine of the superiority of theology over all other forms of knowledge and to enforce the counter-reformationist monopolisation of biblical exegesis as it had been agreed upon at the Council of Trent. Thus, Copernicus's hypothesis as a deviation from biblical statements and as an 'unorthodox' position only became virulent when the Catholic Church occupied an epistemic monopoly (and it may well be said that thus only from then on the church exposed something as 'revolutionary' what had before lain in the shadow of a special discourse).

18 Cf. the considerations regarding the term 'transformation' in: Leinkauf T., "Überlegungen zur Transformation des antik-scholastischen Methoden- und Wissensbegriffs in der Frühen Neuzeit: Autopsie, Experiment, Induktion", in Toepfer G. – Böhme H. (eds.), *Transformationen antiker Wissenschaften*, Transformationen der Antike 15 (Berlin – New York: 2010), 215–241, here 215f.

While Kirschner/Kühne's and Wolters' contributions deal with methodological transformations within an institutional framework, i.e. with modes of the Copernicus reception that are conditioned by general didactical and epistemological changes of attitudes in churches and universities, the following two articles in this section focus on Bacon and Hume's *specific* examinations of Copernicus's method. Bacon's anti-Copernicanism must be located, as Dana Jalobeanu demonstrates, within the framework of a critique of 'idolatrous' projections of mathematical ideals of order into the sky, which Bacon criticises generally about the old and common astronomy. Bacon sees Copernicus's attempt to simplify astronomical theory as a part of this geometrical 'fictionalisation'. By contrast, designing the project of a 'natural history of the heavens', Bacon envisages the ideal of a renewed 'living astronomy' that asks for the physical causes of phenomena and accomplishes a continuous mutual control of the results of mathematical astronomy and natural philosophy.

Tamás Demeter investigates an *inter-discursive* transformation of methods in Hume between the astronomical research of Copernicus and the moral philosophy and science of man respectively. While the reception of Copernicus is generally related to the new world model in Scottish enlightenment, Hume refers to Copernicus's achievement as an early example of and model for an *explanatory reductionism* which was to be employed in the search for the principles of human nature and behaviour. Hume's example makes it clear that the Copernican revolution was also perceived as a *methodological revolution* of science.—Contrastingly, Jalobeanu and Demeter's contributions show how one and the same approach—the simplification of theory—can be assessed as a 'mathematical-neurotic' eschewing of the phenomena on the one hand or as a condition for the understanding of the phenomena on the other—according to the respective methodological perspective and goal.

The second part of the volume assembles contributions on textual and graphical transformations of the Copernican doctrine. Here, the playful character of literature in its negotiations of knowledge is illuminated as well as the textual constitution of scientific and philosophical texts; it has become a commonplace even in the historiography of science to consider the rhetoricity of science[19] or even the 'poetic' modelling of scientific knowledge.[20]

Jonathan Schüz examines Jean Bodin's anti-Copernicanism predominantly on the level of rhetoric and modes of argumentation in Copernicus's *De Revolutionibus* and Bodin's *Universae naturae theatrum*. He demonstrates

19 Cf. Moss J.D., *Novelties in the Heavens. Rhetoric and Science in the Copernican Controversy* (Chicago – London: 1993).

20 Cf. Hallyn F., *The Poetic Structure of the World. Copernicus and Kepler* (New York: 1990).

the methodological and rhetorical contrast of both texts—logical vs. dialectical syllogism, mathematical argumentation vs. the topics of common sense, a focus on detail vs. a general view of reality—whereby the technical text appears to be in a defensive position (at least from the point of view of the 16th century). The rhetorical efficiency of the anti-Copernican argumentation is based upon the transformation of the topical frame within which theory is negotiated.

The link between epistemology and poetics is the focus of Steffen Schneider's article. Using the example of the *Ash Wednesday Supper*, the epistemological level of Giordano Bruno's Copernicus reception is addressed. Bruno's adherence to geocentric thinking can be explained on the one hand with the restrictions by the naked eye of celestial observations, on the other hand with a misguided imagination. The article exposes Bruno's epistemology and theory of reason and examines, combined with it, the dialogues' specific literary calculation: their aim is to oppose the imagination of a chimeric sky.

Another imaginary sky (also not completely free of chimeras) is employed in space-travel narratives of the 17th century in order to confirm Copernicus's world model. Thomas Rahn examines Kepler's *Somnium*, Godwin's *Man in the Moone* und Cyrano de Bergerac's *L'Autre Monde* with a thematic focus on the production of rhetorical evidence of the planetary movements and the transformation of methodological problems into games of inversion.

Lucia Ayala's contribution deals with the *media* transformation of a *cosmological* transformation. In the course of the replacement of the Copernican model of *one* world by the notion of a plurality of worlds, the graphical representation of the sky is changed—this iconographic change, predominantly explained by using the example of the illustrations of Fontenelle's *Entretiens sur la Pluralité des Mondes*, not only marginalises Copernicanism but also subverts the iconography of Louis XIV as the sovereign sun king.

The volume's third part turns to Copernicus the scientist himself but also to historical figures and novels' protagonists that appear as proxies of Copernicus. Sergius Kodera examines literary strategies of self-fashioning within the framework of Giordano Bruno's reception and assimilation of the Copernican theory. In his texts, Bruno stages himself as the more accomplished cosmologist than his paragon, i.e. not as an adept but as a prophet of the traditional doctrine who has assumed the role of a scientific leader.

Claus Zittel analyses, based upon texts and images of the life of Copernicus by Gassendi, the example of a scientist's vita that addresses with its doxographical emphasis first and foremost a professional astronomical audience. With its historical-genetical reconstruction of the theory construction, the *Vita* betrays a proximity to modern modes of the historiography of science. At the same

time, however, the text contains a subversive, ironical level that allows for a reading as a 'crypto-apologia' for Galileo.

The heroisation of Copernicus since the 18th century to be found in German literature stands in contrast to this. Wolfgang Neuber traces into the 20th century the topic of the science hero—be that as a philosopher (as in Gottsched) or as a 'man of power' (as in Herder), but always a lone hero. The Copernican turn as manifested in Kant, Nietzsche and Freud eventually evolves as the model per se for a theory construction that sees itself as a revolutionary fact-act (to use Fichte's term 'Tathandlung').

Jörg Jungmayr's contribution is dedicated to Max Brod's novel *Tycho Brahes Weg zu Gott* (1915). There, the controversy around Copernicanism is dramatised and psychologised as a pupil-teacher relationship between Brahe and Kepler which is eventually inverted. Copernicus is present as a relic and plot-ferment in the shape of a *Commentariolus* manuscript, which in the end changes from Brahe to Kepler. If Kepler, at the same time, according to Brod is modelled on Einstein (very much alive in 1915) then a transformative line can be drawn from the 16th into the 20th century.

To sum it all up: we find Bruno as a better Copernicus; Copernicus's life as a subject for a covert partisanship for Galileo; Kant, Nietzsche and Freud as Copernican revolutionaries; Copernicus as Kepler as Einstein—some of the biographical Copernicus transformations covered in the last part of this book are figures of *translatio*, however not only of the transfer of a certain knowledge that is considered to be true but also of the transfer of a scientific ethos aimed at unconditional cognition.

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