# Owen Gingerich (1930-2023): astronomer, historian, metaphysician

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On May 28, astronomer and historian of astronomy Owen Gingerich passed away at the age of 93. He was born on March 24, 1930, in Washington, Iowa, into a Mennonite family. When the present writer found in a Dictionary of Anabaptism the surname Gingerich among the followers of this religious current in sixteenth-century Germany and first met Gingerich on the occasion of an international conference in Munich (2003),[1] he chanced to ask him – confident in the openness and familiarity with which Gingerich welcomed younger scholars – if that was the origin of his family, to which he answered in the affirmative.[2]

Gingerich's father, Melvin, was a professor of history, co-editor of *The Mennonite Encyclopedia*[3] and author of several books on Mennonite arguments. Owen started high school at Bethel College (North Newton, Kansas), where his father taught, and his college studies at Goshen College (Indiana), a Mennonite college to which his father transferred in 1947 as a professor of history. At that college Owen continued his studies, taking courses in chemistry, although he had not yet completed his basic studies at Bethel College. His vocation, however, was directed towards astronomy: at the age of nine, with the help of his father and following instructions he found in a book, he had built his own telescope, and could see the rings of Saturn; later, in Indiana, he built a new one, of eight inch aper-

1 Conference "Astronomy as a Model for the Sciences in Early Modern Times", 21-23 March 2003. See Gingerich, "The Invisible Astronomical Network, 1543-1600".
2 Gingerich, Melvin and Ruth Runion-Slear, "Gingerich (Gingrich, Guengerich, Gingery) family".
3 Krahn, Cornelius, Gingerich, Melvin, and Harms, Orlando, eds. *The Mennonite Encyclopedia*.

ture, with which he observed variable stars; he spent some summers at Harvard College Observatory[4] and collaborated with the magazine *Sky & Telescope,* founded in 1941 and aimed at astronomy amateurs.[5]

Gingerich finally decided to follow his astronomical vocation and study at Harvard College Observatory with the intention of becoming a science journalist. At Harvard he graduated with a Master of Arts in 1953, receiving his doctorate in 1962 with a thesis in astronomy entitled *The Study of Non-Gray Stellar Atmospheres*, under the direction of Charles Allen Withney. Earlier, having already married Miriam Sensenig in 1954, he taught for three years (1955-1958) at the American University of Beirut, where he moved on account of his status as a conscientious objector to military service, in accordance with his Mennonite faith. From there he continued to submit numerous articles to *Sky & Telescope*.

Gingerich pursued his academic career at Harvard from 1963, as an astronomer at the Astrophysical Observatory of the Smithsonian Institution and from 1967 he combined it with the teaching of the History of Astronomy in the History of Science Department, as an assistant to I. Bernard Cohen. He retired in 2000 but remained active as professor emeritus until shortly before his death. In this obituary we will focus only on his decisive contributions to the history of astronomy and to the astronomical and scientific revolution of the sixteenth and seventeenth centuries, among the various other fields to which he devoted his activity so brilliantly.[6] As he himself says in his most fortunate book – *The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus*, a book translated into a dozen languages, including Italian – his specialty was the calculation of the flow of photons through the outer layers of stars, but in his spare time he used a computer to recompute the medieval Alfonsine Tables and their Renaissance competitors, such as the *Prutenic Tables* of Erasmus Reinhold (1551, based on Copernicus' planetary models) and the *Almanach nova* of Johannes Stöffler and Jacobus Pflaum (1499). This allowed him to compare the predictive efficiency of Ptolemaic and Copernican astronomy in his first steps as a historian of astronomy in the 1960s, an interest that – as he again confesses in *The Book Nobody Read*, a largely autobiographical book – was awakened by reading Arthur Koestler's *The Sleepwalkers*: *A History of Man's Changing Vision of the Universe*, published in 1959.

Koestler's antagonistic presentation of Copernicus and Kepler (the hero of the story in that work) and the evaluation of Copernicus' work (*De revolutionibus*, 1543) as "the

[4] "While an undergraduate, I had the marvelous opportunity to go to Harvard College Observatory as summer assistant for Harlow Shapley, then the most famous astronomer in America", Gingerich, *God's Universe*, 2.

[5] DeVorkin, Interview of Owen Gingerich on 2005 October 18.

[6] Of his contributions to the field of astronomy and astrophysics, we will mention only his edition, with Kenneth R. Lang, of *A Source Book in Astronomy and Astrophysics 1900-1975* and his edition of *Astrophysics and Twentieth-Century Astronomy, to 1950*.

book that nobody read", determined the territory to which Gingerich dedicated his historical research and the two figures on which he mainly concentrated his efforts. The territory had already been defined since the early 1960s and was finally delimited at the 1964 Hamburg symposium of the International Astronomical Union (IAU) and the International Union for the History and Philosophy of Science (IUHPS). There he met the also young Polish astronomer Jerzy Dobrzycki, similarly interested in the history of astronomy and Copernican studies. Appointed Vice-Chairman of the IAU Commission for the History of Astronomy, Gingerich was involved in the preparations for the commemoration of the 500th anniversary of Copernicus' birth (1973) in Poland, which was preceded by another important centenary: the fourth centenary of Kepler's birth (1971).

His first publications in this field, however, were about Kepler. In 1963 he presented to the History of Science Society "The Computer versus Kepler", in which he set forth the results of his comparison of Kepler's calculations (developed in his 'battle with Mars' in the *Astronomia nova*) on the 'vicarious hypothesis' with the results of the program he developed for the IBM-7094 computer at the Harvard Observatory.[7] In 1968 he presented at the XIIth International Congress of the History of Science (Paris) "The Mercury Theory from Antiquity to Kepler" and at the Keplerian centenary celebrations "The Computer versus Kepler Revisited" (at the conference held in Kepler's home town of Weil der Stadt in 1971), "Kepler as a Copernican" (published in *Johannes Kepler, Werk und Leistung*, Linz, 1971) and "Johannes Kepler and the New Astronomy", a lecture delivered in 1971 to the Royal Astronomical Society.[8]

In these works, Gingerich already demonstrated a complete technical knowledge of the *Astronomia nova* and of the philosophical, physical, and cosmological elements present in Kepler's adherence to heliocentrism. Although not with the same intensity as Copernicus, Kepler has been the subject of Gingerich's continued interest throughout his career, as shown by later articles collected in *The Eye of Heaven* (the present writer especially recommends "Kepler, Galilei, and the Harmony of the World", where the presentation of the Keplerian harmonic vision of the cosmos with its special attention to intellectual priesthood is recorded with a clear sympathy that reveals a deep spiritual affinity),[9] or the article "Johannes Kepler and the *Rudolphine Tables*" published in 1971 in *Sky & Telescope*.[10] Another very significant contribution of Gingerich to Kepler

7 The article was published in *American Scientist*, 52 (1964), 218-226, and is collected in Gingerich, *The Eye of Heaven*, 357-366.

8 Articles also collected, along with others, in *The Eye of Heaven*. To these may be added the entry "Kepler" in the *Dictionary of Scientific Biography*, vol. 7, 289-312.

9 Gingerich, *The Eye of Heaven*, 389-406.

10 Collected in Gingerich, *The Great Copernicus Chase,* 122-131. This work collects 36 articles published by Gingerich in popular science journals, most of them in *Sky & Telescope*.

studies lies in his supplement to the seminal biography of Kepler published in 1948 by Max Caspar, the editor of the *Gesammelte Werke*. In his biography, intended for a learned but non-specialist audience, Caspar had abundantly used and quoted both Kepler's correspondence and his manuscript legacy preserved in St. Petersburg, but had omitted to give the precise references so as not to encumber the reader (although one may think that the reason lay also in the absence of a modern critical edition of the sources).[11] Translated into English by C. Doris Hellman in 1959, this limitation of the biography was signalled by the translator and resolved in small measure. For several decades, Gingerich marked the references to the sources in the margins of his copy and finally, in 1993, with the collaboration of Alain Segonds, he republished the biography fully updated with the references to the sources, an index of subjects and places and bibliographical references.[12]

In 1970, the *Journal for the History of Astronomy* was launched under the editorship of Michael Hoskin. In this project, which built a bridge and inspired communication between astronomers and historians of astronomy and has established itself as the most important journal in its field, Gingerich served from the very beginning as Reviews Editor (so indicated in the first mention of the editorial board in 1973) and from 1975 as Associate Editor (Reviews) until his retirement in 2007, remaining as Associate Editor until 2022. In addition to the many articles published there, Gingerich took special care of the review section, a genre he personally cultivated throughout his career. The unpublished document *Owen Gingerich: Bibliography* (deposited in the Mennonite Historical Library, Goshen College, Goshen, Indiana) collects from an initial review of Max Born's *The Restless Universe* published in *Sky and Telescope* in 1951, 315 reviews published until 2011 across different journals.[13]

1970 was also the year in which the first volume of the *Dictionary of Scientific Biography* appeared, under the direction of Charles Gillespie. Gingerich collaborated on it from the first volume, contributing thirteen entries on historical[14] and contemporary astronomers,

[11] The correspondence was only collected in the *Gesammelte Werke* up to 1599, in vol. xiii published in 1945. Volumes xiv-xviii, which collected the later correspondence, were published between 1949 and 1959.

[12] Caspar, *Kepler*. We may add to all this Gingerich's direction of James Voelkel's doctoral dissertation, *The Composition of Kepler's Astronomia nova*, one of the most important works on Kepler published in recent years.

[13] A lightly edited copy of this Bibliography has been included in the on-line edition of the *Journal for the History of Astronomy* 54 (3), 2023, as a complement of the Obituary written by Richard L. Kremer and James Evans.

[14] In addition to the aforementioned entry on Kepler, the one dedicated to Messier, whose Catalogue of Nebulae had been the subject of his first article, published in 1953 in *Sky and Telescope*, and the one dedicated to Erasmus Reinhold in vol. 11 (1975), 365-367, where he collected the results of his discovery of the copy of Copernicus' work annotated by the German astronomer,

among the latter one dedicated to Harlow Shapley, of whom Gingerich had been a disciple and assistant at Harvard.[15]

But the years immediately before and after 1970 were marked by Gingerich's participation in the preparation and celebration of the 500th anniversary of the birth of Copernicus, the highlight of which was to be an international conference in Poland. In this framework he met and established a lasting friendship, as mentioned above, with Jerzy Dobrzycki. As a member of the committee in charge of planning the international festivities, Gingerich had to decide on the theme of his contribution. On the occasion of his stay in Cambridge (England) in 1970 during a sabbatical leave, Gingerich – still influenced by the interpretation of Copernicus and the *De revolutionibus* given by Koestler in *The Sleepwalkers* – had a conversation with Jerry Ravetz, also a member of the Committee.[16] They discussed, under the shadow of Koestler's verdict that "nobody had read the *De revolutionibus*", the few readers in the second half of the sixteenth century who were able to assimilate "such a formidable technical book [ … ] beyond the opening cosmological chapters".[17] They concluded that this might be a good subject to investigate in view of the 1973 celebrations. The encounter with Ravetz had taken place on Gingerich's way to Edinburgh, where he planned to consult the rich collection of ancient books at the Royal Observatory.

It was there at the Royal Observatory that the unsuspected discovery took place. If it did not change Gingerich's life, it definitely determined his dedication to the history of astronomy, to Copernicus and to the study of his work, as well as providing him with subjects to contribute to the Centennial celebrations. Among the rare books in the collection that the 26th Earl of Crawford had bequeathed to the Observatory in 1888 was a copy of the first edition (Nuremberg, 1543) of the *De revolutionibus*. Once Gingerich examined it, he was able to verify that it was a copy that lacked annotations and comments on the preliminary pages and cosmological chapters of the first book but was profusely annotated in the remaining five technical books. The initials (ERS) on the spine of the binding prompted Gingerich to conclude that the owner and annotator of the work was none other than Erasmus Reinhold, a native of Saalfeld, professor of higher mathematics at the University of Wittenberg and author of the *Tabulae prutenicae* (1551) based on the models in Copernicus' work.[18]

which we will discuss later. To Kepler he also dedicated a fundamental article in *The General History of Astronomy*, vol. 2: *Planetary astronomy from the Renaissance to the rise of astrophysics, Part A: Tycho Brahe to Newton*, 54-78. Gingerich was on the Editorial board of this General History as Chairman for the International Astronomical Union.

15 *Dictionary of Scientific Biography*, xii, 345-352.

16 See Ravetz, *Astronomy and Cosmology in the Achievement of Nicolaus Copernicus*.

17 Gingerich, *The Book Nobody Read,* 21.

18 See the description in *ibid*., 22-25. See also the description of the annotations in Gingerich, *An*

Thus began a thirty-year investigation, in which Gingerich found the constant support of his wife, leading him through libraries all over the world to search for and inspect copies of Copernicus' work to establish the growing pool of possible readers and ascertain its impact and reception in the second half of the sixteenth century and the beginning of the seventeenth century. Reinhold's copy made it possible to establish that Koestler's verdict did not correspond to reality and that at least Reinhold had carefully read the technical parts of the book, although he had not taken Copernicus' cosmological approach into consideration. It remained to be seen what other copies of the first edition showed, but it soon became clear to Gingerich that the investigation should be extended, as Jerzy Dobrzycki pointed out to him, to the copies of the second edition (Basel, 1566) as well.[19]

The early results of the research gave Gingerich fodder for his speeches at the Copernican celebrations: "'Crisis' versus Aesthetic in the Copernican Revolution" was read at a meeting of the American Association for the Advancement of Learning held in 1972 and published in 1975; at the Toruń congress he read "Erasmus Reinhold and the Dissemination of the Copernican Revolution" (published in 1973); "The Astronomy and Cosmology of Copernicus" was presented at the extraordinary session of the International Astronomical Union and published in 1975; "Heliocentrism as a Model and as a Reality" was offered in 1973, at a symposium of the American Philosophical Society and published in 1975.[20] These articles show the dual dimension of Copernicus' work: on the one hand a bold cosmological proposal (heliocentrism), not based on new observations or on a greater predictive capacity,[21] nor on a real simplification of the planetary models as a response to a presumed 'crisis' and 'collapse' of astronomy, but "like Einstein's revolution four centuries later, motivated by the passionate search for symmetries and an aesthetic structure of the universe";[22] on the other hand some models or *theoricae* of planetary motion with a predictive function. This reductive reception was the one proposed by Andreas Osiander in his famous *praefatiuncula* "Ad lectorem" and the one that was mostly adopted by the astronomers who annotated their copies of the *De revolutionibus*. With this, the revolutionary dimension of Copernicus' cosmological proposal, missing at that moment any physical validation and in contradiction to Sacred Scripture, was lost, but the technical assimilation of heliocentric astronomy was made possible.[23]

*Annotated Census of Copernicus' De Revolutionibus*, 268-278.

19 Gingerich, *The Book Nobody Read*, 32 f.

20 All of these are collected in *The Eye of Heaven*.

21 In "Remarks on Copernicus' Observations", 99-107, Gingerich showed that Copernicus' 16 new planetary observations, whose typical errors exceeded half a degree, were aimed more at confirming the already assumed heliocentric cosmology than at providing more correct astronomical predictions.

22 "'Crisis' versus Aesthetic in the Copernican Revolution", in *The Eye of Heaven*, 199 f.

23 Robert S. Westman had also reached this result in "The Melanchthon Circle, Rheticus and the

Examination of copies of the *De revolutionibus*, however, was producing unexpected and surprising results. The copy in the Beinecke Library at Yale revealed a profuse series of annotations, in the spirit of Reinhold, by Johannes Praetorius.[24] More important was the result of inspection of the first-edition copy in the Biblioteca Vaticana Ms. Ottoboniano lat. 1902, thought to be owned and annotated by Tycho Brahe, which showed many points in common with the second-edition Prague copy, also owned by Tycho Brahe. The handwriting of the annotations was the same, but there was one point that caused perplexity: a table of longitudes and latitudes of European cities, written on a flyleaf at the beginning of the Vatican copy, showed Wratislavia in Silesia at the top of the list, but Copenhagen and Uraniborg were missing. At the History of Science Society Annual Meeting in Norwalk in October 1974, Gingerich presented the results of the examination of the Praetorius and Brahe copies, but at the same session (titled "Evaluation of the New Research Resulting from the Copernicus Commemoration Year 1973") Robert Westman, who had already pointed out the importance of Michael Maestlin's annotations to his copy of the first edition (preserved in Schaffhausen),[25] showed that there was another copy with very rich annotations by the same hand in Liège. Westman questioned the attribution to Brahe of those three copies because of differences with Brahe's handwriting.[26]

These difficulties resulted in a collaboration between Gingerich and Westman that ultimately led to the important discovery that the author of the annotations to the Prague, Vatican and Liège copies (a fourth copy was soon added in Wrocław) was not Brahe, but the itinerant astronomer Paul Wittich (ca. 1546-1586), a native of Wratislavia (Breslau or Wrocław) –this explained the presence of that city in the table of longitudes and latitudes – who had visited and shown Brahe his copies and his notes on the occasion of his visit to Uraniborg in 1580. Upon Wittich's death in 1586, Brahe tried his best to obtain Wittich's copies until he eventually acquired them in 1600, only a year before his death. Gingerich and Westman presented the results of this research in their joint work *The Wittich Connection*.[27]

Wittenberg Interpretation of the Copernican Theory", 165-193.

24 See Gingerich, *Census*, 306-313.

25 Westman, "Michael Mästlin's Adoption of the Copernican Theory", 53-63.

26 See Gingerich, *The Book Nobody Read*, 81-83. In a personal communication on 16 May, Westman wrote to me: "When I gave my presentation at the History of Science Society in 1974 in which I showed a comparison of annotations from Liège, Prague and the Vatican, Edward Rosen (who was presiding over the session) tried to stop me from speaking (!) and Derek DeSolla Price passed me a note, after I sat down, which said: 'How can you doubt that the annotations are by Tycho Brahe?' To his great credit, Owen then proposed that we should collaborate in determining who actually composed the annotations".

27 Gingerich and Westman, *The Wittich Connection: Conflict and Priority in Late Sixteenth-Century Cosmology*; on Brahe's protracted effort to acquire the copies, see *ibid.*, 20-23. See also Gingerich, *The Book Nobody Read*, 101-112.

The *Census* finally appeared in 2002 and the companion *The Book Nobody Read* in 2004. By 1973-74 Gingerich had located approximately 200 copies.[28] The *Census* collected and described a total of 601 copies (277 of the first and 324 of the second edition, of which Gingerich claims to have personally examined 95% of the total sum).[29] Assuming a print run for each edition of 500 copies and regardless of the number of copies destroyed, it is reasonable to assume that there were still a greater or lesser number of surviving copies to be located. When the present author was preparing, in collaboration with Félix Gómez Crespo, the edition of the unpublished translation of the *De revolutionibus* (the first three books) into Spanish, carried out at the beginning of the seventeeth century by the astronomer Juan Cedillo Díaz (ca. 1565–1625), we discovered the existence of several copies of the 1543 and 1566 editions in Spain not included in the *Census*, among them a copy of the second edition, which once belonged to Francisco Pérez de Cabrera, VI Marquis of Moya, to whom Cedillo was chaplain and secretary. Cedillo commissioned around 1592 the luxurious binding of the copy, which is now in the Archive and Library Zabálburu in Madrid. When I personally examined the copy, I noted that it has some marginal annotations and corrections in the first and second books, most likely in Cedillo's hand.[30] On Christmas 2017 I communicated to Gingerich this discovery and he replied:

> I thank you very much for the information about three more copies of De rev not in my Census, as well as other corrections. I have now learned of 50 more copies of the 1566 edition as well as a dozen more copies of the first edition. The publisher of the Census (Brill) said that they had printed 500 copies, which they anticipated would fill the need for 20 years. However, the book went out of print in about 2 years! I am not sure I will remain in sound mind long enough to produce a revised edition, as there are other projects also stirring, and everything these days takes at least twice as long. Since I personally typed all of the material for reproduction in the volume, it is rather formidable to even think about a second edition. Incidentally, another copy with Reinhold's notes (but in a student's hand) has been recovered.[31]

It is initially surprising, given Gingerich's interest in technical questions of astronomy

[28] Gingerich, "The Astronomy and Cosmology of Copernicus", 166.

[29] Gingerich, *Census*, VII, X. In 2016 he published a brief and brilliant synthesis of Copernicus' achievement, which is perhaps his last work on the Polish astronomer: *Copernicus: A Very Short Introduction*.

[30] Cedillo Díaz, *Ydea astronomica de la fabrica del mundo*, 125-127.

[31] Email dated 27.12.2017. I have subsequently acquired knowledge of several more copies in Spain. It would undoubtedly be of interest to carry out an update of the *Census*, perhaps in the form of a collective article in which scholars of different nationalities carry out, starting from the Gingerich archive, the indication of new copies with a more specific examination of those that present annotations of interest.

and observational records, that Tycho Brahe did not form a more integral part of his work as a historian. Moreover, Brahe, to whom the annotations to Wittich's copies were mistakenly attributed initially by Gingerich,[32] has been to some extent revised by Gingerich following the reattribution to Wittich and a certain positive reassessment of Ursus.[33]

Nevertheless, Gingerich continued to study Brahe's interventions on celestial novelties: in 1977 he published a popular article on the comet of 1577[34] and in 2004 he gave a lecture in Padua – in the very room at the university where Galileo delivered his three lectures on the nova of 1604 – on "Tycho Brahe and the Nova of 1572", on the occasion of the Conference *1604-2004: Supernovae as Cosmological Lighthouses*.[35] Very important and seminal was the article, in collaboration with James R. Voelkel, "Tycho Brahe's Copernican Campaign", *Journal for the History of Astronomy*, xxix (1998), whose suggestively oxymoronic title has inspired subsequent work by younger scholars.[36]

Nor has Galileo been the object of great interest from Gingerich. It is true that in 1974 he examined in Florence the second-edition copy of the *De revolutionibus* that had belonged to Galileo. He was surprised, however, by the absence of technical annotations, which led him to state that Galileo was "a scientist with little interest in technical mathematical astronomy".[37] Gingerich had known Maria Luisa Righini Bonelli, director of the Museo di Storia della Scienza (now Museo Galileo) in Florence, at least since 1964,[38] and in the museum's journal he published an article on the censorship of *De revolutionibus* in 1981.[39] Apart from an article on the trial, published in 1982,[40] and two others on the

[32] See, for example, "The Astronomy and Cosmology of Copernicus", in *The Eye of Heaven*, 177-181. The substance of the article was collected in a version published in 1973 for a more general audience in "Copernicus and Tycho".

[33] Gingerich, *The Book Nobody Read*, 115: "Ursus may well have been innocent of plagiarism". On Ursus, see also Gingerich and Westman, *The Wittich Connection*, 50-69.

[34] Gingerich, "Tycho Brahe and the Great Comet of 1577", *Sky & Telescope*, 54 (1977), 452-458, collected in *The Great Copernicus Chase*, 89-97.

[35] Gingerich, "Tycho Brahe and the Nova of 1572", 3-12. The present author recalls with emotion his second personal meeting with Gingerich at this conference and their conversations about his private library of rare books and how, at an auction, he had the good fortune of acquiring by chance a copy of Ursus' *De astronomicis hypothesibus* (Prague, 1596), bound unbeknownst to him in a copy of Michael Maestlin's *Ephemerides* (Tübingen, 1580).

[36] See Boner, "The New Star of 1604 and Kepler's Copernican Campaign", 93-114; Granada, "Tycho Brahe's Anti-Copernican Campaign", 185-207; Mehl, "Kepler's Second Copernican Campaign: The Search for an Annual Stellar Parallax After the Roman Decree (1616)", 191-209.

[37] Gingerich, *Census*, 122; Id., *The Book Nobody Read*, 143.

[38] Cf. his presentation to Jerzy Dobrzycki, *Selected Papers on Medieval and Renaissance Astronomy*, 7.

[39] Gingerich, "The Censorship of Copernicus' *De revolutionibus*", collected in *The Eye of Heaven*, 269-285.

[40] Gingerich, "The Galileo affair", *Scientific American,* 247/2 (1982), 132-143, collected in *The Great Copernicus Chase*, 105-122.

phases of Venus,[41] Gingerich concentrated his attention on the *Sidereus Nuncius* and to a large extent on very important contributions published in *Galilaeana*. In collaboration with Albert Van Helden, he published two pioneering articles on the relationship between telescopic observations and the rapid passage to printed work,[42]

But as early as 1975, in the collective volume *Reason, Experiment, and Mysticism in the Scientific Revolution,* which gathered the contributions to a symposium held in Capri in 1974, Gingerich – imitating Kepler's conversation with Galileo about the *Sidereus nuncius* – discussed Galileo's lunar observations with his astronomer colleague Guglielmo Righini.[43] Gingerich made two important points in his commentary on Righini's dating of Galileo's lunar observations: the first was that the observations are always "heavily theory-laden" and that after the first surprise at what the telescope showed of the lunar surface, Galileo interpreted what he saw in the light of his Copernican convictions (and his rejection of cosmological dualism); the second, which presented a position that was to preside over later articles, was that Galileo's lunar drawings were not intended to map the moon, that is, a precise description of the lunar relief, but to illustrate the conceptual results of his observations.

It always struck me as strange that Gingerich did not participate in the great international congress which, to commemorate the 350th anniversary of Galileo's *Dialogue* and under the initial impulse of Maria Luisa Righini Bonelli, took place in 1983 in Florence and other Italian cities on *Novità celesti e crisi del sapere.*[44] He chose, however, *Galilaeana* to publish two masterly articles on Galileo and the *Sidereus nuncius* that take up the conversation with Guglielmo Righini (and the subsequent 2003 article in collaboration with Albert Van Helden) in the context of the appearance of an alleged and exceptional copy of the Galilean *capolavoro.*

In 2007, Horst Bredekamp published *Galilei der Künstler,*[45] where he analyzed in detail a previously unknown first-edition copy of the *Sidereus Nuncius,* acquired in 2005 by the New York bookseller Richard Lan. The copy was characterized by showing, instead of the black-and-white engravings of the Moon present in the known copies, as many watercolors, in addition to presenting on the frontispiece an inscription by Galileo himself ("Io Galileo Galilei f".) and the stamp of the Library of Prince Cesi, founder of the Accademia

[41] Gingerich, "Galileo and the Phases of Venus", *Sky & Telescope,* 68 (1984), 520-522, collected in *The Great Copernicus Chase*, 98-104; "Phases of Venus in 1610", *Journal for the History of Astronomy,* xv (1984).

[42] Gingerich and Van Helden, "From *Occhiale* to Printed Page: The Making of Galileo's *Sidereus Nuncius*"; "How Galileo Constructed the Moons of Jupiter".

[43] Righini, "New Light on Galileo's Lunar Observations", in *Reason, Experiment, and Mysticism in the Scientific Revolution*; Gingerich, "Dissertatio cum Professore Righini et Sidereo Nuncio", *ibidem*.

[44] *Novità celesti e crisi del sapere,* ed. by Paolo Galluzzi.

[45] Bredekamp, *Galilei der Künstler: Der Mond. Die Sonne. Die Hand*.

dei Lincei. In his careful examination of the copy,[46] Bredekamp certified its authenticity, the Galilean authorship of the watercolors and maintained that they had been painted by Galileo on a "proof copy" provided by the printer in the course of the edition, in which Galileo had made the watercolors in the blank spaces destined for the engravings of the Moon. Consequently, the drawings of the Moon in Ms. Gal. 48 at the Biblioteca Nazionale of Florence, hitherto considered as the basis for the engravings, came to be seen as independent of the 1610 edition and as a later work for a second edition that was never realized. The authenticity of the copy was announced in Padua in April 2007 at a press conference by Horst Bredekamp and William R. Shea, who also wrote a very positive review of *Galileo der Künstler* in *Isis*.[47]

Gingerich had examined the copy in 2005, when it was presented to him by Richard Lan, while he was negotiating the purchase with the Italian book dealer Marino Massimo De Caro. Gingerich did not deny the authenticity of the frontispiece, nor in general of the copy, but was suspicious of the drawings. The copy was finally acquired that same year by R. Lan for the sum of 400000 dollars and subjected to a new and meticulous inspection in Berlin in 2008 by a team of experts from fourteen institutions with all possible technical means. That team confirmed Bredekamp's initial findings and under his direction conducted an exhaustive study of the copy published in 2011.[48]

However, Gingerich had published an article in *Galilaeana* in 2009 in which, through Sherlock Holmes-like detective work – based on his knowledge of the tight chronology of production of the *Sidereus nuncius* in just six weeks, the chronology of the lunar phases in January and February and the comparative examination of watercolors, engravings of the printed edition and drawings of the Galilean manuscript in the Biblioteca Nazionale of Florence – he concluded that "Bredekamp's claims for the priority of the M-L [Martayan-Lan] drawings compared to Galileo's Florentine sheets cannot be sustained. *I now turn to evidence that strongly suggests that the M-L drawings are in fact forgeries*".[49]

The reader can examine the evidence adduced by Gingerich in William Shea's exposition of it in an article published in *Galilaeana* the following year, in which Shea rejects it, referring to the anticipated rejoinder that Bredekamp would have given in *Galilei der*

[46] *Ibid*., 101-216.

[47] *Isis,* 99 (2008), 402-403.

[48] *Galileo's O*, vol. I: *Galileo's Sidereus Nuncius: A Comparison of the Proof Copy (New York) with Other Paradigmatic Copies*; vol. 2: Needham, *Galileo Makes a Book: The First Edition of* Sidereus Nuncius, *Venice 1610*.

[49] Gingerich, "The Curious Case of the M-L *Sidereus Nuncius*", 162; emphasis by Gingerich; Bredekamp waived a reply. In a successive article ("The Mystery of the Missing 2") Gingerich established, by cross-checking with the autograph manuscript of the *Sidereus Nuncius* (published by Favaro in OG, III, 1) that "the Florentine bifolium sheet is Galileo's source for the reworked lunar diagrams in *Sidereus nuncius*".

*Künstler*.[50] However, in a review of *Galileo's O* published in the first issue of *Renaissance Quarterly* 2012, Nick Wilding, who had exchanged opinions with Gingerich, pointed out that the Cesi library stamp was not authentic (in addition to the copy not appearing in the extant inventories of the prince's library) and that "Bredekamp's attribution of the images to Galileo is, sadly, unconvincing".[51] Meanwhile, in 2012, M. De Caro, who had offered the copy to Lan and in his company had visited Gingerich in 2005 to show him the copy and request his expert opinion, had been arrested as a plunderer of the Biblioteca dei Girolamini in Naples, of which he had been appointed director in 2011. In May 2012 Wilding reported to Paul Needham, author of the second volume of *Galileo's O*, the existence on the frontispiece of the M-L of the mistaken word *pepiodis* instead of the correct *periodis* credited on all authentic copies and on June 11 he announced his findings on ExLibris (an online discussion forum of New York rare books dealers). The next day, in the same forum, Paul Needham acknowledged, "I was wrong". [52]

Gingerich once referred to himself as "a professional scientist and a historian of science, but also an amateur theologian".[53] Evidently, this dimension of theologian is tied to his Christian faith of Mennonite confession, but also to his epistemological position, contrary to a 'debased positivism' that places the origin of scientific theories in the observational record and based instead on the conviction that what we choose to look at is already 'heavily theory laden'. These initial presuppositions, expectations or convictions were called "Metaphysics" by Gingerich in the William Belden Noble Lectures on Christian religion and the issues of the day, delivered at Harvard in 2005 and published the following year under the title *God's Universe*. "Metaphysics" were, for Gingerich, the initial assumptions that led Copernicus to develop his cosmological proposal of a heliocentric universe and Kepler to assume it as a reality. It is also the conviction, associated with a teleological perspective and the complete acceptance of the scientific results of astrophysics and biology, that the origin and evolution of the universe responds to the intention and purpose of a creator and curator: "I believe in intelligent design, lower case *i* and lower case *d*",[54] not to be confused with the political ideology of Intelligent Design as an alternative to the theory of evolution. In sum, Gingerich proposes a the-

[50] Shea, "Owen Gingerich's Curious Case", 102-106.

[51] *Renaissance Quarterly*, 65, no. 1 (2012), 217-218. Wilding was even harsher in his assessment of the M-L copy as a forgery in the *Letter to the Editor* that appeared in *Isis*, 103 (2012), 760.

[52] Schmidle, "A Very Rare Book: The mystery surrounding a copy of Galileo's pivotal treatise". In 2014, Bredekamp and his collaborators published a not initially foreseen vol. 3 of *Galileo's O: A Galileo Forgery: Unmasking the New York SN*. A reconstruction of the unmasking process can be found in Nick Wilding, "Forging the Moon". For a presentation of the figure of M. De Caro, see Luzzatto, *Max Fox o le relazioni pericolose*.

[53] Gingerich, *God's Universe*, 13.

[54] *Ibid*., 68.

istic 'metaphysics' as opposed to atheistic, by him designated as a "persuasion, but not proof", "a perspective for viewing God's universe, a universe where God can play an interactive role unnoticed by science, but not excluded by science".[55]

The interplay of scientific work and historical research provided Gingerich with fuel for this metaphysical and teleological perspective in the person and work of Johannes Kepler, with whom Gingerich strongly (it seems to us) identified.[56] It is not surprising that he concludes his book with the words with which Kepler ended his *Harmonice mundi* of 1619.[57]

In the Epilogue to *God's Universe*, Gingerich pointed out that the powerful transcendence that had created and sustained the universe with a purpose and intention that includes us as contemplative surveyors of the universe is not only "a *something* but can take on the mask of a *someone*; a *which* that can connect with us as a *who*, in a profound I-Thou relation", a God in sum *persona*.[58] Gingerich knew that these were meta-physical considerations or reasons, not physical, i.e., not scientific; reasons, in short, of the heart "that reason does not know".[59]

Owen Gingerich was a member of important academies and societies, including the American Astronomical Society, the American Philosophical Society, the American Academy of Arts and Sciences, and the International Academy of the History of Science. He had received the Order of Merit of the Republic of Poland for his research on Copernicus, the Jules Janssen Award of the French Astronomical Society and had been named doctor *honoris causa* of the University of Zielona Gora in Poland. With his death, a giant of science, of its history and of the philosophical dimension or presuppositions

[55] *Ibid*., 78, 111. Gingerich contemplates only the Atheism/Theism dichotomy and does not consider the possibility (of Brunian and to some extent Spinozian matrix) of an immanent causality associated with an ontological monism. Four years earlier, at a Conference on "Cosmic Questions" of the American Association for the Advancement of Science, Gingerich contributed "Scientific Cosmology Meets Western Theology: A Historical Perspective". There, on the question of a 'creator' of the Big Bang universe, he cited the position taken by Stephen Hawking in *A Brief History of Time*, which evokes a universe as a totality and to which Gingerich opposed the theistic perspective: "If the universe – Hawking said – is really completely self-contained, having no boundary or edge, it would have neither beginning nor end: *it would simply be*. What place, then, for a creator?", 37; emphasis added.

[56] *God's Universe*, 77: "Kepler's life and works provide central evidence that an individual can be both a creative scientist and a believer in divine design in the universe, and that indeed the very motivation for the scientific research can stem from a desire to trace God's handiwork".

[57] *Ibid*., 112 f., 121.

[58] *Ibid*., 120.

[59] *Ibid*., 121, with reference to Pascal, *Pensées*, 423 in the edition Lafuma. In 2013, Gingerich delivered the Hermann Lectures on Faith and Science at Gordon College in Massachusetts. The lectures, on a similar argument, were published the following year under the title *God's Planet* by Harvard University Press.

of science, disappears. It is to be expected that at least a significant part of his rare books collection will go to the Houghton Library at Harvard University.

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