

# A Scathing Reckoning with Newton's Revision of Chronology

Jean Hardouin's Critique of Isaac Newton's *Chronology of Ancient Kingdoms* (1728)

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## Abstract

*The article deals with the contemporary discussion of Isaac Newton's revision of chronology in the 18th century. Newton had tried to prove with the help of ancient writings and the astronomical interpretation of mythical events that the history known to us must be shortened by 534 years. A thesis that led to a fierce debate among scholars, including the famous astronomer Edmond Halley. The Jesuit Jean Hardouin's sarcastic reckoning with Newton's revised chronology, which he published only a few months before his death, managed on a few pages and free of astronomical calculations to sweep the ground from under Newton's convictions, which had been developed over decades.*

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Since the 16th century, humanists and natural scientists have been arguing about the correct sequence of historical events. But it was only after the Reformation that historians and philologists began to fruitfully interact with each other. At that time, the boundaries between the humanities and the natural sciences were still permeable, and we find nuanced, if not always conflict-free, interaction between philology and astronomy everywhere. Even in ancient times, astronomy was used to determine chronology. Thus, it was not at all unusual for the great scholar Joseph Scaliger<sup>1</sup> to correspond with both Johannes Kepler and Tycho Brahe to consult on how to effectively use astronomical instruments for his research. But a century after Scaliger, when Isaac Newton's calculations entered the realm of historiography and philology, transforming the informational content of ancient and biblical writings texts into concrete figures and manipulating others to fit his calculations, the relationship between the two disciplines became decidedly frosty.<sup>2</sup>

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<sup>1</sup> The French Protestant Joseph Juste Scaliger (1540-1609) is considered one of the greatest scholars of the second half of the 16th century. He considerably broadened the horizons of historical sciences and showed that ancient history is not limited to Greeks and Romans, but also includes the Persians, the Babylonians, Egyptians and Israelites. In his works on chronology, he tried to reconstruct and historically classify every relic serving chronology in Greek or Latin. The results of his by no means uncontroversial system of historical criticism have shaped our chronology to this day. Cf. Anthony GRAFTON, *From De Die Natali to De Emendatione Temporum: The Origins and Setting of Scaliger's Chronology*, in *Journal of the Warburg and Courtauld Institutes* 48, 1985, pp. 100-143; the same author, *Joseph Scaliger and Historical Chronology. The Rise and Fall of a Discipline*, in: *History and Theory* 14, 1975, pp. 156-85.

<sup>2</sup> Cf. Anthony GRAFTON, *Defenders of the Text. The Traditions of Scholarship in an Age of Science 1450-1800*, Cambridge 1991.

Newton lived in the age of skepticism, when a new generation of scholars wanted to use comparative methods of source criticism and the inclusion of findings and artifacts to provide history with more reliable knowledge; but neither was he part of this movement, nor did he want to be. Although Newton was firmly convinced that one could also expect certainty in the scientific sense from theological and comparative-mythological research results, he kept his distance from contemporary philological and epigraphical methods. Nevertheless, he refrained from the contemporary philological and epigraphical methods, although he knew the criticism of sources by the Jesuit Bollandists around Papebroch and the Benedictines of St. Maur (Jean Mabillon, Bernard de Montfaucon), especially Mabillon's seminal work *De re diplomatica*, which first appeared in 1681.<sup>3</sup>

But Newton strongly disapproved of the philosophical criticism and the widespread methodological skepticism of contemporary scholars. He had a considerable collection of church fathers and scholarly works; but he was far from subjecting them to text-critical analysis, since, apart from the newer methods of historiography, they provided him with firm convictions that he did not want to challenge.<sup>4</sup> „*The divine origin of the Bible is for Newton absolutely certain,*“ wrote Albert Einstein in September 1940 to Abraham Yahuda, „*a conviction that stands in curious contrast to the critical skepticism that characterizes his attitude toward the churches. From this confidence stems the firm conviction that the seemingly obscure parts of the Bible must contain important revelations, to illuminate which one need only decipher its symbolic language. Newton seeks this decipherment, or interpretation, by means of his sharp systematic thinking grounded on the careful use of all the sources at his disposal.*“<sup>5</sup>

In about 1700, no later than 1704, Isaac Newton - by then already Master of the Mint, a coveted and highly respected pension post - began to seriously engage in mathematical-exact chronology, complementing the historical studies he had been working on for the preceding decade and a half. In the process, he had taken extensive notes, ranging from excerpts from and commentaries on classical sources such as Herodotus, Clement of Alexandria, Diodorus and Eusebius, to material from the Bible, to detailed astronomical and genealogical calculations. The astronomical stuff came mainly from Pétau's *Uranologion*<sup>6</sup>, namely from a Latin translation of Hipparchus' critical

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<sup>3</sup> For more details, see the *introduction* to my annotated German translation of Jean HARDOUIN's *Ad Censuram Scriptorum Veterum Prolegomena* (= Prolegomena zu einer Kritik der antiken Schriften), Norderstedt 2021, p. 32ff.

<sup>4</sup> On Newton's religious beliefs, see, e.g., Stephen David SNOBELEN, Isaac Newton, Socinianism and „the One Supreme God,“ in Socinianism and Arinianism. Antitrinitarians, Calvinists and Cultural Exchange in Seventeenth-Century Europe, ed. by Martin Mulrow and Jan Rohls, Leiden 2005, pp. 241-298; Newton and Religion. Context, Nature, and Influence. International Archives of the History of Ideas, ed. by James E. Force and Richard H. Popkin, Dordrecht 1999.

<sup>5</sup> Cited in Jed Z. BUCHWALD and Mordechai FEINGOLD, Newton and the Origin of Civilization. Princeton 2013, p. 1) The bibliophile Zionist Abraham Yahuda (1877-1951) was professor of Semitic language at Jerusalem University.

<sup>6</sup> The French Jesuit Denis Pétau (Latinized Dionysius Petavius, 1583-1652), became professor of theology in Paris in 1621 and was considered one of the most brilliant scholars of his time. Continuing and improving the chronological works of Joseph Justus Scaliger he published in Paris in 1627 his work *Uranologion, sive Systema variorum authorum qui de*

commentary on Aratos of Soloi's third century B.C. doctrinal poem *Phainomena* (Celestial Phenomena), which describes the starry sky in 1154 hexameters.<sup>7</sup> Hipparchus was the first among the Greeks to observe a change in the constellations in relation to the equinoxes, or rather to adopt this from the Egyptians. He attributed this movement to the stars, because in his time a rotation of the earth was not imaginable, since it was considered immovable in every respect. For in the time of Hipparchus one assumed a sky in which various stars were fixed, and also assumed a certain movement of this starry sky by which it was shifted one degree to the east every hundred years, while all the stars seemed to make their daily revolution from east to west. Thus, it was assumed that the vernal equinox occurred at the time of such an observation in a certain sign of the zodiac and by a certain star. It followed that to clarify the chronology, it was only necessary to determine which star the equinox passes through and where it intersects the ecliptic at that point in the spring; and to find out if any ancient writer recorded at what point the ecliptic was intersected by the same equinox in his time. Hipparchus' commentary provided Newton with a whole series of clues that he believed could be converted into dates.

At the same time, Newton had become convinced that neither the Egyptian nor the Greek civilizations could have existed long before the reign of Solomon testified by the Bible. Therefore, his reasoning also turned away from the traditional historiography, which places the origin of the kingdoms shortly after the Deluge. Developed kingdoms and urban life had not emerged until the beginning of the first millennium BC.

However, although Newton had dealt frequently and extensively with theological questions for decades, his approach was quite erratic - much to the dismay of his students and contemporaries who, like Voltaire, no longer wanted to follow him.

For on the one hand he did fall back on older methods, e.g. chronology tables, to use astronomical findings for the determination of historical dates. But on the other hand - even if he criticized some things from the early 4th century - he used early and legendary ancient astronomical data as supposedly safe basis of his calculations. Especially the biblical statements he left untouched for his synchronization of the ancient kingdoms, because to question even one of them would probably have seemed like sacrilege to him. In cases where Newton used philological exegesis, he remained not only tied to his own time, but even anciently patristic. Apart from Latin, he did not even seem to have the necessary language skills to be able to read the ancient authors in the original, as his

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*sphaera, ac sideribus, Eorumque motibus graecè commentati sunt.* (2 vols.), which was frequently reprinted. Since Jean Hardouin's edition of 1703, a „*Doctrina temporum*“ was added as a third volume, which contained mainly the texts of ancient authors edited by Pétau on the subject.

<sup>7</sup> cf. Aratos, *Phainomena. Sternbilder und Wetterzeichen*, ed. by Manfred Erren, Düsseldorf 2009.

protégé Whiston already noted.<sup>8</sup> A few years after Newton's death, the Anglican clergyman Zachary Grey (1688-1766) pointed out in a dissertation on one of Newton's core topics, the prophecies of Daniel, with a multitude of examples that Newton often misrepresented or selectively reproduced the statements of the ancient authors he quoted.<sup>9</sup> Grey complained at various points that Newton's relied largely on outdated English or Latin translations for his theological and historical writings. Harrison's reconstruction of Newton's library, which had survived in its entirety until 1921, confirms that the relevant Greek works that were in it were bilingual editions that also contained the text in Latin, his preferred reading.<sup>10</sup> „*This tendency was even more marked with Newton's use of Hebrew works, where he quite shamelessly marked passages in the Latin parallel texts that later appeared as quotations in Hebrew in his own writings,*“ Mandelbrote notes, referring to Newton's copy of Maimonides.“ For „*what is less apparent is that their copious citations were often constructed largely out of the compilations of previous critics.*“<sup>11</sup>

Here, too, Newton proved to be typical of his time, a fact that has been misjudged until more recent times by trying to project our worldview onto the 17th century, such as Fritz Wagner: „*Seine Beschäftigung mit der im späten 17. Jahrhundert zur wissenschaftlichen Mode gewordenen Verifizierung der biblischen Chronologie zeigte den Zugriff des Naturwissenschaftlers.*“<sup>12</sup> After all, what distinguished the late humanist-Christian scholarly world from contemporary science was the firm conviction that there was a unified and consistent divine truth manifest in everything and everyone. It was considered indisputable that there was a God-given connection between everything that existed - cultures and civilizations, knowledge and facts, scientific observation and divine revelation could not fundamentally contradict each other, but positively related to each other. Particularly when it was not comprehensible at first glance how the individual findings joined together to form a great wholeness - precisely when contradictions did not resolve themselves, parts did not seem to

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<sup>8</sup> quoted in Zachary GREY, *An Examination of the Fourteenth Chapter of Sir Isaac Newton's Observations upon the Prophecies of Daniel*, London 1736, p. 19.

<sup>9</sup> Thus, the Greek term for *martyrs* in vol. 6 of Cyril's *Contra Julianum* became „*unhappy men*“ in Newton. Cf. GREY, *An Examination* (as note 8), p. 38; *ibid.* also pp. 17-19, 24, 72-85. Elsewhere, Grey remarks on a quotation from Jerome in Newton: „*What credit is due to a Latin version, perhaps not faithfully translated from the Greek, nor the Greek from the Syriac, but with various interpolations?*“ (*ibid.*, p. 137)

<sup>10</sup> cf. John HARRISON, *The Library of Isaac Newton*, Cambridge, New York 1978 (2008). Thus, in his edition of Gerardus Joannes VOSSIUS, *De theologia Gentili*, Amsterdam 1641 [Tr/NQ.8.462], Newton had mostly underlined Vossius' Latin paraphrases instead of the Greek original.

<sup>11</sup> *De idololatria liber*, Amsterdam 1641 [Tr/NQ.8.461]. cf. Scott MANDELBROTE, *Newton and eighteenth-century Christianity*, in: *The Cambridge Companion to Newton*, ed. by Rob Iliffe, Cambridge 2002, pp. 563 u. 582. Already Manuel noted that Newton rarely ever quotes more than one word of Hebrew, and concluded that Newton could only understand Hebrew with the help of a dictionary (Frank E. MANUEL, *Isaac Newton. Historian*, Cambridge (Mass.) 1963, p. 84).

<sup>12</sup> Fritz WAGNER: *Neue Diskussionen über Newton*. In: *Sitzungsberichte der Bayrischen Akademie der Wissenschaften. Historische Klasse*, 4 (1968), Munich: C.H.Beck (1969), p. 29.

harmonize - it was the noblest task of the scholars to decipher these connections and to create a coherent, universal view of the world.

Isaac Newton was not a »natural scientist« in the modern sense of that term - he was a »natural philosopher« whose primary goal must always have been to decipher the ciphers of eternal divine creative power in nature.<sup>13</sup> „In Newton’s understanding of the original religion of antiquity, he concluded that ancient temples were models of the cosmos and, more importantly, that ancient priests, like the Babylonian magicians, were both priests and philosophers of nature.“<sup>14</sup> „Newton,“ wrote John Maynard Keynes 75 years ago, „was not the first of the Age of Reason. He was the last of the magicians, the last of the Babylonians and Sumerians, the last great mind to look upon the visible and intellectual world with the same eyes as those who began to build our intellectual heritage barely 10,000 years ago. (...) Why do I call him a magician? Because he considered the whole universe and all that is in it as a riddle, as a mystery that can be read by applying pure thinking to certain evidences, to certain mystical clues that God has distributed in the world to allow the esoteric brotherhood a kind of treasure hunt of philosophers. (...) He considered the universe as a cryptogram created by the Almighty.“<sup>15</sup>

His own revolutionary physical discoveries must also be seen in this context: Newton’s famous concepts of absolute space and absolute time, for example, were based on his notion of God’s omnipresence and eternal duration.<sup>16</sup> Leaving aside certain anti-Trinitarian idiosyncrasies<sup>17</sup>, Newton always regarded the Holy Scriptures as the revealed testimony of God, with which every scientifically explored form of creation must at all times have been in natural harmony. Newton studied the Bible intensively for almost five decades, his theological writings comprise at least two and a half million words and form the largest single category in his manuscript corpus.<sup>18</sup>

Newton’s work belongs to a well-known scholarly genre of Renaissance historiography and mythography that sought to demonstrate that the prehistory of the ancient world could be

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<sup>13</sup> Cf. Rob ILIFFE, *Priest of Nature. The Religious Worlds of Isaac Newton*, Oxford 2017; Andrew JANIĄK, *Newton as Philosopher*, Cambridge 2008; Frank E. MANUEL, *Isaac Newton (as note 11) and his also somewhat older study on the Yahuda manuscripts in Jerusalem: The Religion of Isaac Newton*, Oxford 1974.

<sup>14</sup> Stephen D. SNOBELEN, *The Theology of Isaac Newton’s Principia Mathematica: A Preliminary Survey*, in *New Journal for Systematic Theology and Philosophy of Religion*, 52, 2010, p. 396.

<sup>15</sup> John Maynard KEYNES, *Newton, the Man*, in: ders., *Essays in Biography*, New York 2010, pp. 363-365 (Unabridged manuscript of a speech delivered on the occasion of the *Newton Tercentenary Celebrations* at Trinity College, Cambridge, on July 17, 1946. Since Keynes had died shortly before, his manuscript, which he had presumably written some years earlier, was read by his brother Geoffrey.

<sup>16</sup> SNOBELEN, *The Theology* (as note 14), p. 404.

<sup>17</sup> He rejected belief in the doctrine of the Trinity, „viewing it as a pagan and diabolical fiction that had been introduced early on in the history of the Church.“ (Rob ILIFFE, *The Religion of Isaac Newton*, in: *The Cambridge Companion* (as note 13), p. 487) Evidence for Newton’s anti-Trinitarianism can be found in his correspondence (e.g. with the similarly minded John Locke or Newton’s successor to the *Lucasian chair* at Cambridge, William Whiston, who later even lost his professorship because of accusations of heresy), but also in an extensive 550-page treatise on the Book of Revelation that Newton seems to have begun writing in the mid-1670s, even before writing his *Principia*. The manuscript is in the *National Library of Israel* [Yahuda MS 1]. Cf. SNOBELEN, *The Theology* (as note 14), p. 390.

<sup>18</sup> SNOBELEN, *ibid.*, p. 378

systematically sorted and ordered through the skeptical hermeneutics of euhemerism.<sup>19</sup> Thus, Newton's presentation joins a tradition of interpreting ancient myths that has persisted since the 17th century, viewing these »fables« as far more than mere examples of moral allegories.<sup>20</sup> This was certainly in vogue; other scholars at Oxford or Cambridge, in France or in Germany, also participated in disputes about the biblical creation story and eschatological prophecies. What distinguished Newton's approach from most others, however, was the focus on astronomy, developed in decades of in-depth study, which served him to support not only the biblical statements.

The linchpin of his new chronology was the dating of the migration of the Argonauts in search of the Golden Fleece. Newton found confirmation of his view in the Greek philosopher Clement of Alexandria, whom he held in high esteem, that the centaur Chiron and the Argonauts, about whom Homer had first written, had actually lived and had only subsequently become mythologized heroes of prehistory. Chiron had made the Argonaut expedition possible at all by his star lore.<sup>21</sup> Newton considered a mythological exaggeration of real events to be a completely normal process and began the first chapter of his book *The Chronology of Ancient Kingdoms Amended* with the sentence: „*All Nations, before they began to keep exact accounts of Time, have been prone to raise their Antiquities; and this humour has been promoted, by the Contentions between Nations about their Originals.*“<sup>22</sup> Hence, among all the ancient peoples, the Greeks, the Egyptians, the Assyrians, the Babylonians, the Medes, and the Persians, it was necessary to eliminate the additional years, which in some cases amounted to hundreds of thousands of years, and which they had only feigned in order to increase their age. „*Only one people escaped Newton's razor: the Israelites, whose written record, the oldest such extant in Newton's belief, gave their history a solidity by which the others' could be amended.*“<sup>23</sup>

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<sup>19</sup> The word goes back to the ancient Greek philosopher Euhemerus (4th century BC). *Euhemerism* is a rationalistic form of interpretation of mythology, in which it is assumed that mythological accounts are ultimately traceable to real historical events or persons.

<sup>20</sup> cf. Kenneth J. KNOESPEL, Newton in the School of Time. *The Chronology of Ancient Kingdoms Amended* and the Crisis of Seventeenth-Century Historiography, in: *The Eighteenth Century*, vol. 30, 3, 1989, pp. 19-41.

<sup>21</sup> „By attributing the invention of the astronomical sphere - an ancient measuring and navigational device - to Chiron, a mythic inventor commonly viewed as half-god, Newton shows the extent to which he is willing to translate myth euhemeristically into history and authorize his own historical visions as scientifically derived and objectively verifiable. Rather than demythologizing prehistory, Newton's reconfiguration marks the creation of a new myth that allows his successors to construct a new „historical“ lineage for emerging views in the eighteenth century of scientific and cultural progress.“ [By attributing the invention of the celestial sphere - an ancient system of measurement and navigation - to Chiron, a mythical creator commonly regarded as a demigod, Newton shows the extent to which he is willing to euhemeristically translate myth into history and authorize his own historical visions as scientifically derived and objectively verifiable. Rather than demythologizing prehistory, Newton's reconfiguration marks the creation of a new myth that allows his successors to construct a new „historical“ lineage for emerging eighteenth-century views of scientific and cultural progress]. (KNOESPEL, Newton (as note 20), p. 20f)

<sup>22</sup> Isaac NEWTON, *The Chronology of Ancient Kingdoms Amended*, London 1728, p. 43.

<sup>23</sup> Richard S. WESTFALL, *Never at Rest. A Biography of Isaac Newton*, New York 1980, p. 812.

This is far from the modern skepticism of the time and is probably more due to the contemporary vulgar scientific explanations of mythology. The ancient writers were understood just as literally as the Old Testament, except that now one believed to recognize in gods and heroes the legendary exaggeration of historical persons, founders of states, conquerors and political thinkers.

Revelation bearers like Moses played an extraordinary role in such explanatory approaches. Thoth, the ibis-headed Egyptian god of the moon, magic, science, scribes, wisdom and the calendar, whom Newton identified as a kind of secretary of the mythical ruler Sesostris ('God the Father') described in Herodotus, had invented the letters. Early on, he even believed that all Eastern languages - Hebrew, Chaldean and Syriac included - were merely dialects of the Egyptian language. No wonder, then, that Newton considered St. Stephen's statement about Moses as one who had been „*taught all the wisdom of the Egyptians*“<sup>24</sup>, sufficiently authoritative to conclude that writing and civilization existed in Lower Egypt before Moses was born. In 1694 Newton expressed to David Gregory<sup>25</sup> his belief that the Egyptians had a heliocentric view of the world, as „*their religion and hieroglyphics and images of gods*“ had made clear to him.<sup>26</sup> He even went so far as to impute this knowledge to Moses, too, which he, however, had concealed from the people of the Exodus who were not yet receptive for it!

And not just that! In an early version of his *Chronology of Ancient Kingdoms* Newton claimed, „*the religion wch Moses taught ye Jews was no other then ye religion of Noah urged from the corruptions of ye nations. For Dr Spencer has shewn yt Moses retained all ye religion of ye Egyptians concerning ye worship of ye true God, & rejected only what belonged to ye worship of their fals Gods the Sun Planets & Elements, Jupiter Hammon, Osyris, Isis, Orus & ye rest, & that ye Mosaical religion concerning ye true God conteins little else besides what was then in use amongst the Egyptians. And if so, then it's certain that ye old religion of the Egyptians was ye true religion tho corrupted before the age of Moses by the mixture of the worship of fals Gods wth that of ye true one: & by consequence ye religion of ye Jews was no other then that of Noah propagated down in Egypt till ye age of Moses.*“<sup>27</sup>

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<sup>24</sup> Acts 7:27

<sup>25</sup> David Gregory (1649-1708) was Professor of Mathematics at the University of Edinburgh and Professor of Astronomy at the University of Oxford. He was a commentator on Newton's *Philosophiae Naturalis Principia Mathematica*.

<sup>26</sup> Isaac Newton Correspondence, ed. by H. W. Turnbull et al., Cambridge 1959-1977, vol. 3, p. 384. Just the names Thoth gave to the planets, Newton told David Gregory in 1694, would be the proof „*that he was a believer in the Copernican system,*“ while Pythagoras and Plato „*observed the gravitation of all bodies towards all*“. Cited in Isaac Newton Correspondence, *ibid*, p. 338.

<sup>27</sup> Yahuda MS 41 Fol. 5. Newton's theological and alchemical papers were cataloged, but were kept hidden from the public by the family in Portsmouth until 1936. Only the natural science part of the estate had been given by the Earl to the Cambridge University Library in 1872. Many of the theological papers were acquired by the Jewish scholar Abraham Shalom Ezekiel Yahuda, who bequeathed them to the newly founded state of Israel, accessible since 1991 in the *Jewish National and University Library* in Jerusalem. A large part of the alchemical manuscripts was purchased at auction by the economist John Maynard Keynes, who gave them to King's College, Cambridge University, where he had taught since 1920. The rest is scattered in several libraries around the world, including the Dibner Collection, Babson College (Massachusetts), the Smithsonian Institution. Other portions of Newton manuscripts can be found in the archives of the Royal Society, the library of Trinity College, Cambridge, the Public Record Office (from Newton's

Furthermore, in 1694 he wrote to David Gregory that „*Religion is the same at all times, but religion which they received purely from Noah and the first men, the nations debased by their own inventions. Moses began a reformation but retained the indifferent elements of the Egyptians (it was the Egyptians who most of all debased religion with superstition and from them it spread to the other peoples). Christ reformed the religion of Moses.*“<sup>28</sup>

Newton’s emphasis on prehistory and Greek and Egyptian mythology makes clear that, in his view, like theorems and axioms form the basis for mathematical systems, mythographic narratives form the basis for later historiographies. The enormous effort Newton spent on the synchronization of the myths testifies to the fact that he, like Scaliger, believed that the Old Testament alone was not sufficient to establish an accurate chronology of the ancient world. Both therefore dealt primarily with the secular chronology and with the annals of pagan peoples - however embedded in the biblical chronology since creation. „*Thus it is,*“ wrote Newton, „*I have digested the following Chronology; which I have made agreeable to the Order of Nature, to Astronomy, and the Sacred History, and confident with itself; freeing it from all those Contradictions of which Plutarch complained.*“<sup>29</sup>

In the print version of his *Chronology*, however, „*whose structure and argumentation gave the impression that Newton intended to foreground and glorify the Jewish contribution to world civilization,*“ „*this decisive aspect*“ recedes into the background. This circumstance misleads historians and theologians to some extent up to the present time into wrong conclusions:

„*Newton sought to provide astronomically based evidence that God’s historical plan, beginning in the Old Covenant with the single chosen people and continuing to be foretold by the prophets, was true and formed the revealed counterpart to God’s rule over nature. This was very much more than a rationalization of Christianity, such as contemporary skepticism undertook; it was, in contrast to it, an attempt to save salvation history.*“<sup>30</sup>

In fact, events among the ancient Hebrews were of secondary importance for Newton, who had a much broader agenda. Since ancient times, the creation of chronologies has been a means of discovering synchronisms (simultaneous or related events) between the myths and historical records of different cultures. In the Christian era, chronologies allowed historians to align the reported events of pagan myths and stories along a timeline based on biblical history. To Newton, therefore, the history of the Hebrews was first and foremost a significant model for his real research

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work at the Mint), and the Bodleian Library, Oxford (there especially on Newton’s theological and chronological work). Detailed information is provided by the *Newton Project*: <http://www.newtonproject.ox.ac.uk/history-of-newtons-papers/1727-1872>

<sup>28</sup> Isaac Newton Correspondence (as note 26), p. 338

<sup>29</sup> Sir Isaac NEWTON’s *Chronology*, Abridged by Himself, London 1728, p. 9.

<sup>30</sup> WAGNER, *New Discussions* (as note 12), p. 36.

goal of developing a new universal history of the ancient world, as is „*made sufficiently clear in his working papers.*”<sup>31</sup>

The astronomical interpretation of the mythical events led Newton to the conviction that the historiography known to us had to be shortened by 534 years. He referred to the observation of the precession of the equinoxes to date the fixed point of his new chronology, the expedition of the Argonauts, forty-three or forty-four years after the death of Solomon or around 936 BC. In doing so, he contradicted the then-popular chronologies of Archbishop James Ussher and the Hebraist Reverend James Lightfoot, which became known as the *Ussher-Lightfoot calendar* because of the agreement of the two in „discovering“ the time of creation. This calendar was based on classical annalistics and in this way had determined a day in October 4004 BC as the beginning of creation. Depending on the printed edition, it was sometimes the 26th at nine in the morning, sometimes the 23rd at noon, but in either case, „*Ussher's judgment of the age of the earth was gospel for fully 200 years.*“ Meanwhile, Scaliger fell into oblivion.<sup>32</sup>

Newton relied on heterogeneous written material from Christian sources, but also on reports on Greek, Roman and Egyptian history and mythology, which he tried to reconcile chronologically by trying to arrange or assign the mostly undated events or sagas chronologically. To do this, he believed it was necessary to trace the origins of kingdoms and the Egyptian empire in particular. His new time line, combined with a theory for the origin of civilization, postulated an approximate simultaneity for the rise of the kingdom of Israel and the Egyptian empire, necessitating a synchronization of the new dating system with events from Jewish history.

As fixed dates served him beside the Argonaut's journey the death of the Egyptian ruler Akhenaton (Amenophis IV.) and the *Histories* of Hesiod. On such »facts« he based his astronomical calculations to the old chronology. Newton »calculated« that David became king of Israel in 1059 BC, 44 years before the construction of Solomon's temple (1015 BC) and 10 years after Lacedaemon built Sparta, whose daughter Eurydice married in 1047 BC. The marriage had been two years before the birth of the »astronomer« Chiron, son of Saturn and Philyra. This is supposed to have happened about 140 years before the end of the Trojan War reported by Hesiod. In the chronological overview, which was prefixed to his posthumously published work on chronology by the editors, he also notes for the year 939 BC:

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<sup>31</sup> BUCHWALD, FEINGOLD, Newton (as note 5), p. 425.

<sup>32</sup> cf. Stephen Jay GOULD, Fall in the House of Ussher, in: ders, Eight Little Piggies. Reflections in Natural History, London-New York 1993, pp. 181-196, quote p. 185.

*„Chiron, who was born in the Golden Age, distinguished the Constellations, to make Sailing, and the Observation of the Stars easy to the Argonauts. He fixed the Solstices, and Equinoxes in the 15th Degree of these Constellations; i. e. the former toward the Middle of Cancer and Capricorn, and the latter toward the middle of Aries and Scorpio. These Signs were many Constellations composed of a Number of Stars. In the 316th Year of Nabonassar, Meto<sup>33</sup> observ'd, that the Summer Solstice had gone 7 Degrees backward, since it was settled by Chiron. It goes back then 1 Degree in 72 Years, and 7 Degrees in about 504 Years; so that reckoning so many Years before the 316th of Nabonassar, or the 433d before J. C. the Expedition of the Argonauts will be in the 936th Year before Christ.“<sup>34</sup>*

According to Hipparchus' report, the earliest celestial globe recorded among the Greeks was that of Eudoxus, a well-known astronomer, who stated that his equinoctial points were located in the center of each of the constellations Cancer, Libra, and so on. Newton simply assumed that the celestial globe of Eudoxus was just the same as that of Chiron, since there was no reason for people of that time to assume a changing of the sky. <sup>35</sup>

According to Newton, Jason and his Argonauts, whom we know from Greek mythology, did not set out until 936 BC, about the same time that the later famous physician Hippocrates was growing up. A year before the expedition of the Argonauts, the 50-year-old Theseus is said to have kidnapped Helena, who was only seven years old - 22 years after Oedipus had killed his father Laius.<sup>36</sup> We also learn that Cheops became pharaoh in Egypt in 838 B.C. and had the famous pyramid named after him built during that time.<sup>37</sup> Newton was so confident of his cause that he believed he had to apply a tolerance of only five to a maximum of 20 years to his chronology.<sup>38</sup>

He achieved the sometimes bizarre results of his research in fulfillment of his religious zeal.<sup>39</sup> *„The heavenly Jerusalem, which is prefigured in Solomon's temple, remained for him the uniform goal of the world history and the artful handling of the correspondences of both biblical image concepts a main task of theology. (...) The great astronomer did not go along with the separation between the world on this side and the supranatural Godhead, which*

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<sup>33</sup> Meton is said to have lived in Athens in the fifth century BC and is considered one of the first astronomers in ancient Greece. The Meton cycle is considered in modern historical literature to be a period of 19 years or 6,940 days.

<sup>34</sup> Sir Isaac NEWTON's Chronology (as note 29), p. 29f. Incidentally, the figures do not match those in the *Abrégé* of 1716.

<sup>35</sup> BUCHWALD, FEINGOLD, Newton (as note 5), p. 247.

<sup>36</sup> Cf. NEWTON, The Chronology (as note 22), p. 26.

<sup>37</sup> *„838. Cheops Reigns in Egypt. He built the greatest Pyramid for his sepulchre, and forbad the worship of the former Kings; intending to have been worshipped himself.“* (NEWTON, The Chronology (as note 25), p. 33); in Newton's *Abrégé* this event is still assigned to the year 834 B.C. (*Abrégé de la chronologie de M. le Chevalier Isaac NEWTON. Fait par lui-même & traduit sur le Manuscrit Anglois. Paris 1725, p. 38*)

<sup>38</sup> *„... je ne prétens cependant pas être si exact, que je ne puisse me tromper. Il peut y avoir des erreurs de 5, de 10, ou même quelquefois de 20 ans; mais je ne croi pas que cela aille plus loin.“* (quoted in NEWTON, *Abrégé* (as note 37), p. 9)

<sup>39</sup> That also his scientific works are permeated by his certainties of faith has been shown by the research of the last decades. Cf. note 14

*in his lifetime already foreshadowed the complete autonomy of the human mind. His physical insights into the structures of the cosmos rather inspired his biblicism.*<sup>40</sup>

Both symbolic interpretation and mythological conception as well as the demythologization, which the deism spreading around the turn of the century undertook under the dictum of *recta ratio*, must have resembled blasphemy to a man like Newton. For to him, the *kingdom of God* was synonymous with the ongoing process of creation in nature and history in all its eschatological scope. Frank Manuel reports that one of the two drafts of the *Chronology* in the Cambridge University Library contains material toward the end that elevates the history of the Greek and Roman empires as contained in Daniel's prophecies above that of the Greek and Latin chroniclers.<sup>41</sup>

Not until one can measure the unshakable seriousness of his faith does one learn to understand why the prophetic testimonies and the eschatological visions of the Old and New Testaments were so important to him. „*In retrospect, the universal chronologies seem almost a game played with figures from antiquity- a scholarly game within a closed system in which all the pieces fit together according to the rules one chooses to follow. (...) But beyond the divertissement that the chronicles could offer, they also mark a serious preoccupation with locating individual experience in a universal, christological context.*“<sup>42</sup>

This background has to be taken into account, because his efforts - in this respect similar to the Jesuit Jean Hardouin - were not primarily aimed at a temporal reorganization of history, but always only at the circumstantial evidence for a (super)historical truth of the Holy Scriptures. Thereby not much would have been missing, and the results of Newton's decades-long studies would not have been published at all. Not even Newton's contemporaries were unanimous as to whether he himself had ever sought publication or would have preferred to refrain from doing so. A few years ago, the American historians of science Jed Buchwald and Mordechai Feingold explained in detail in their book *Newton and the Origins of Civilization* how Isaac Newton's chronological researches fit into his world of thought, and in doing so, following Richard Westfall's Newton biography, they also meticulously traced the history of the origin and impact of Newton's *Chronology of Ancient Kingdoms*.<sup>43</sup>

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<sup>40</sup> WAGNER (as note 12), p. 33; cf. also Tessa MORRISSON, Isaac Newton and the Architectural Models of Solomon's Temple, in: *Avello Publishing Journal*, vol. 3, 1, 2013. Chapter 5 on the Jerusalem Temple should by no means be understood as a clumsy insertion in a book on the history of the ancient kingdoms. Even if it were deleted, numerous other references to the temple and the heavenly Jerusalem would remain in *Chronology*, whose logical conclusion is the prophecies of the late Newton.

<sup>41</sup> What John Conduitt confirmed by a handwritten comment in the margin of the autograph: „*This is proof that he intended his prophecies as a sequel to His Chronology.*“ Details in Stephen SNOBELEN, Isaac Newton, historian: *redivivus*, in: *Isis*, vol. 106, 4, 2015, pp. 880-888.

<sup>42</sup> KNOESPEL, Newton (as note 20), p. 23.

<sup>43</sup> cf. for the following Jed Z. BUCHWALD & Mordechai FEINGOLD: *Newton and the Origin of Civilization*. Princeton: Princeton University Press (2013), pp. 246-308; WESTFALL, *Never at Rest* (as note 23), pp. 812-815); Dmitri LEVITIN and Scott MANDELBROTE, *Becoming Heterodox in Seventeenth-Century Cambridge: The Case*

In July 1754, the Oxford orientalist and astronomer George Costard (1710-1782) published an essay in the *Philosophical Transactions of the Royal Society* dealing with the solar eclipse that Thales is said to have predicted. In it Costard disputed, among other things, Newton's dating of the eclipse, but immediately added that he could not be blamed for the fact that his *Chronology of Ancient Kingdoms* „never had the finishing hand of its great author, and it is well known now in what manner it came abroad.“<sup>44</sup> With this statement, he ushered in a new round of controversy over Newton's chronological investigations, which had given rise to numerous publications dealing with Newton's theses since publication. After reading the article, Zachary Pearce (1690-1774), then vicar in London, contacted Costard through an intermediary to inquire about the reasoning behind this claim. He had been informed, Costard replied, that fifteen drafts of the *Chronology* were found in workrooms after Newton's death, „; of no one of which it could be affirmed that it was so perfect, as not to have received further corrections and improvements.“<sup>45</sup> Costard also wanted to know that Caroline, Princess of Wales<sup>46</sup>, had requested a copy from Newton shortly before his death, which she then lent to the French ambassador. The latter, in turn, had secretly arranged for a copy to be made and sent to Paris, „where it was immediately translated into French, and animadverted on by Souciet.“<sup>47</sup>

The mere fact that the critics of the learned world referred to an abridged version of his work that was never intended for publication had persuaded Newton's executors to publish an „authentic“ edition of the book, which Newton himself would probably not have released for publication during his lifetime. So much for the first version of the story.

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of Isaac Newton, in *Confessionalization and Erudition in Early Modern Europe: An Episode in the History of the Humanities*, ed. by Nicholas Hardy and Dmitri Levitin, Oxford 2020, pp. 301-94.

<sup>44</sup> cit. after: A letter from the Rev. Mr. George Costard, Fellow of Wadham-College, Oxford, to Dr. Bevis, concerning the year of the eclipse foretold by Thales (May 21, 1752), in *Philosophical Transactions*, vol. 48, part 1 (Dec. 31, 1753), pp. 17-26, quoting p. 19. Costard, who dated the eclipse with reference to Edmund Halley's calculations for 603 B.C., noted that in dating the event to 585 B.C. Newton „rather followed others, than adopted it after any examination of his own.“ (ibid.) Because already „*Father Hardouin*“, so he wrote further, in his *Chronologia Veteris Testamenti*, had dated the solar eclipse differently, in which also with slight modifications Petavius had followed him. (ibid., p. 21f) Costard apparently knew nothing of Newton's change of mind in this matter.

<sup>45</sup> Costard, the Oxford professor Hunt wrote to Pearce on August 1, 1754, had told him „the reason, why he imagined, that *Sir Isaac Newton's Chronology* had never received the finishing hand of its author, was, because he had been credibly informed, that, after *Sir Isaac's* death, fifteen copies of that work were found in his hand-writing; of no one of which it could be affirmed that it was so perfect, as not to have received further corrections and improvements.“ (Zachary PEARCE, *A Commentary, with Notes, on the Four Evangelists, and the Acts of the Apostles*. Vol. 1, London 1778, p. XL)

<sup>46</sup> Caroline Wilhelmina von Brandenburg-Ansbach (1683-1737), as wife of the British King George II (of Hanover) since 1714 Princess of Wales. Highly educated, with diverse scientific and artistic interests, she cultivated acquaintances with Leibniz, Newton and Voltaire.

<sup>47</sup> „This copy her Majesty happened to lend to the French Ambassador, who then resided here, and who privately employed a great number of hands, and in one night's time got it transcribed; and so lent it into his own Country, where it was immediately translated into French, and animadverted on by Souciet.“ (Costard in PEARCE, *A Commentary* (as note 45), p. XLI. This refers to the book by the Jesuit Etienne SOUCIET, *Recueil des dissertations ... contenant un abrégé de chronologie, cinq dissertations contre la chronologie de Newton, une dissertation sur une médaille singulière d'Auguste*. Paris 1727. On this controversy, in which Newton himself and also the astronomer Halley intervened, see BUCHWALD, FEINGOLD, *Newton* (as note 5), pp. 353-374.

For Pearce, by then a bishop, however, the facts presented themselves differently in retrospect. Costard's report therefore prompted him to write down his own recollections of the events in connection with the publication of the *Chronology*.<sup>48</sup> About five months before his death „*in March 1725*“ (but Newton died on March 20, 1726!), Pearce wrote, Newton had paid him a visit, during which their conversation revolved mainly around chronological issues. Newton related that the *Princess of Wales* wished to see his chronology, and he had written an abridged version for this purpose, thinking this the most suitable form for perusal.<sup>49</sup> Caroline, in turn, apparently lent this manuscript to Abbé Conti (1677-1749), who lived in Paris, made a copy, and had it published in France without Newton's knowledge or consent.<sup>50</sup> Newton had told him, Pearce, that he had been working for about three years on a comparative chronology of antiquity and had recently begun to arrange the material. He would have rewritten the manuscript some 16 times, though with only minor changes, to shorten it and to omit from each later copy some of the authorities and references on which he had based his views.<sup>51</sup>

Pearce now lamented such an editorial policy, for he feared that Newton had written the *Chronology* by the „*same method*“ that he had thought proper for the *Principia*, namely, „*concealing his proofs, and leaving it to the sagacity of others to discover them*.“<sup>52</sup> The result, Pearce said, was that a number of statements were phrased as if they were unproven assertions. The lack of supporting evidence had in turn led Martin Folkes and Thomas Pellet, the editors of the *Chronology*, to insert references in the margins of the published book that were in all likelihood „*not perhaps always referring to the very same places upon which he founded his assertions*.“<sup>53</sup> This matter is not insignificant, Pearce pointed out, because several supporting passages referred to in the margins of the work might, on closer examination, be considered irrelevant to the point for which they were cited. This is why Sir Isaac's<sup>54</sup> credibility has suffered with some people: he may well have had evidence that he chose to conceal, since what is now in the margin in these few places may have been added by another hand, and so is just not suitable for verifying what it purports to prove.

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<sup>48</sup> Contained in PEARCE, A Commentary (as note 45), pp. XL-XLV.

<sup>49</sup> „*as thinking it in that shape the properest for Her Perusal*“ (PEARCE, A Commentary (as note 45), p. XLI).

<sup>50</sup> Antonio Conti, an Italian oratorian priest who was a friend of Nicolas Malebranche and Leibniz, was a respected member of the learned world of his time, especially as a 'networker', where his studies in philosophy, mathematics, astronomy and medicine were also appreciated. He had known Newton personally since a visit to London in 1715 and had also acted as mediator in the controversy between the latter and Leibniz in the priority dispute over the development of the infinitesimal calculus.

<sup>51</sup> „*and that he had written it over several times (it appeared afterwards, I think, sixteen times) making few alterations in it, but which were for the sake of shortening it (as I gathered from his discourse) and leaving out in every later copy some of the authorities and references, upon which he had grounded his opinions*.“ (PEARCE, *ibid.*, p. XLII)

<sup>52</sup> *ibid.*

<sup>53</sup> *ibid.*

<sup>54</sup> He had been raised to the peerage in 1705.

Pearce claimed credit for persuading Newton to offset the pressure of the inadequate abridged version and the criticism it provoked by giving him permission to publish the full *chronology*. He had insisted on this even against Newton's protestations that he was too old to publish another book that would lead to fierce controversy - and had finally prevailed. Apparently John Conduitt had suggested to him that Newton himself had told him that his decision to publish the work was due to Pearce and his persistence.<sup>55</sup> When Pearce visited Newton a few days before his death, he met publisher John Innys there, who was taking his leave. Newton explained that „*he was preparing his chronology for the Press, and that he had written the greatest part of it over again for that purpose.*“<sup>56</sup>

Pearce's account is indicative of the confusion, still prevailing decades later, surrounding the precise events that had led to the writing and publication of both the *Short Chronology* and the *Long Chronology*. Newton himself does not seem to have been innocent of this either, although Costard may have thought so. Newton's accusation that the Abbé Conti had proved to be a false friend who had abused his trust by allowing his copy of the „*Short Chronology*“ to circulate freely in the first place and then participating in its publication is generally accepted to this day. De facto, however, Newton was neither fundamentally averse to publishing his chronology nor particularly concerned with keeping the nature and content of his research secret. Long before Conti's arrival in England, Newton routinely shared his evolving views on ancient history and theology with friends and acquaintances, and there is no indication that he insisted on secrecy in doing so.<sup>57</sup> Ever since his letter to John Locke of November 14, 1690, about two passages in Scripture added at a later time<sup>58</sup>, it was known that Newton considered some ancient writings to be partly forged and misdated. And he had also no problem to share his considerations with David Gregory. Such

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<sup>55</sup> PEARCE, A Commentary (as note 45), p. XLIII; John Conduitt, Earl of Portsmouth and husband of his niece Catherine Barton, was a Member of Parliament and confidant of Isaac Newton, who succeeded him to the post of Director of the Royal Mint. Conduitt also wrote an address of surrender to the Queen that preceded the publication of Newton's *Chronology* in 1728. (NEWTON, *The Chronology* (as note 22), pp. III - XIV). Niece and husband were later sole heirs of Newton's legacy.

<sup>56</sup> PEARCE, A Commentary (as note 50), p. XLIV. The hopes of the publisher John Innys, however, were probably in vain, for although he published Newton's *Philosophiae naturalis Principia Mathematica* in 1726 and also his *Opticks*, he did not publish his *Chronology* after Newton's death, even though the contents of the book were referred to in the April 1728 issue of the monthly periodical of the brothers John and William Innys on just under 100 pages. Cf. *The Present State of the Republick of Letters*, for April 1728, Vol. 1. London (1728), pp. 254-352.

<sup>57</sup> All this was not without danger in a time of religious wars. It was Newton's predecessor in the *Lucasian chair* of mathematics at Trinity College, Cambridge University, Isaac Barrow, who in 1676 succeeded in changing the statutes so that Newton did not have to take the religious vows that had been required until then. It probably would not have been easy for him either, since he, like Barrow, was of the conviction, persecuted as an „Arian“ heresy, that there was no Trinity of the Christian God.

<sup>58</sup> Newton's dissertation for Locke was not published until 27 years after his death under the title „*An Historical Account of Two Notable Corruptions of Scripture*“ (1754), and references his and Richard Simon's research to prove that the talk of the Trinity of God in 1Jn 5:7 and in 1Tim 3:16 were forgeries by later additions.

behavior was not only completely usual in educated circles of that time, but desired, if one wanted to belong to it - and that even beyond national and denominational borders.

With the rise of science in Europe since the Renaissance, scholars developed a new self-confidence that gave rise to a *république des lettres* among them, transcending all political and religious frontiers.<sup>59</sup> Knowledge was the »cement« that bound this „*communauté des savants*.“<sup>60</sup> The growth of government and commercial postal services created unprecedented opportunities for long-distance communication, which European scholars quickly exploited for their own purposes. From the 16th century onward, correspondence was considered a fundamental duty of all prospective members of this *communauté*, and the epistolary networks they formed were a major factor in the creation of an international community of scholars that was by no means the exclusive domain of academics in today's parlance.

For this reason, word spread quickly in Europe from about 1716 that the famous English scholar Sir Isaac Newton was planning a work on chronology. A key role was played by the aforementioned Abbé Antonio Conti, whom Newton probably correctly considered to be the main culprit in this messy affair. Conti was a good networker, though certainly not an intellectual heavyweight in the learned circles of his time. When Newton, who could be very sensitive and vindictive, once again had a falling out with Conti, the latter tried to ingratiate himself with Newton by getting him royal attention. For this purpose, he probably informed Caroline, the Princess of Wales, about Newton's historical research. In any case, it is documented that sometime in the second half of 1717 Conti wrote to Newton about Caroline's wish to meet him to learn more about his chronology. During the subsequent meeting, the princess asked to see the work and Newton promised to prepare a summary of it, which he delivered within a few days. This seems to have been exactly Conti's intention. Not daring to address Newton directly, he had suggested to the princess that she ask Newton for a copy - and Newton agreed; but, he later affirmed, on the condition that it be kept secret.<sup>61</sup>

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<sup>59</sup> Hans Bots and Françoise Waquet have shown in a wealth of material that the tense development of the *République des lettres*, characterized by the contradiction between utopia and reality, not only existed until its dissolution at the end of the 18th century, but was also one of the most important phenomena in the intellectual history of the modern Occident. Cf. Hans BOTS and Françoise WAQUET: *La République des Lettres. XVIIe-XVIIIe siècles*, Paris 1997; see also Françoise WAQUET, *Histoire des relations intellectuelles dans la république des lettres*, in *Intellectual News*, 1, April 2012, pp. 9-11; Anthony GRAFTON., *A Sketch Map of a Lost Continent: The Republic of Letters*, in *Republics of Letters*. Vol. 1, 1, 2009

<sup>60</sup> „*le ciment qui lie leur communauté*“ (BOTS, WAQUET (as note 59), pp. 92 u. 143).

<sup>61</sup> BUCHWALD, FEINGOLD, *Newton* (as note 5), p. 312.

Newton claimed that there was only this one copy, but he seems to have circulated others himself. The rest was done by the network of scholars.<sup>62</sup> Conti, in any case, did not even deny Newton's accusation that he had revealed the contents of the „*Short Chronology*“ in Paris and even allowed copies to be made and shared with other interested parties. The Abbé was undoubtedly a great admirer of Newton. However, as a less respected member of the *République des lettres*, he often used such opportunities to make himself important, sometimes in an exaggerated way, by displaying an intimacy with the social and intellectual elite that did not correspond at all to his rather inferior position. Since he did not succeed in getting closer information from Newton about the basics of his chronology, he first tried to get the desired information through the French theologian, printer and translator Pierre Coste (1668-1747). But Coste would not let him push him into approaching Newton. So Conti contacted the Jesuit Etienne Souciet (1671-1744), who received a copy of the „*Short Chronology*“ from him in 1719, too. After reading the manuscript, Souciet contacted Newton through Oxford mathematics professor John Keill (also: Keil, 1671-1721), who had studied with David Gregory<sup>63</sup> and was in Paris at the time, to get some questions about it clarified. Although he thus indicated that he also knew the manuscript, Newton, without being disgruntled because of that, let him know that the treatise was „*only a short excerpt from a much longer work and he had not written down the proofs*“; but then nevertheless provided his intermediary with a short summary of the reasons for that, which the latter, according to Souciet, remembered as follows:

Newton „*found that the Ancients had recorded that at time of the Argonauts Chiron had found the equinoctial point to be in the middle or 15th degree of the constellation Aries. In Methon's time it was found to be in the 8th and in Hipparchus's time in the 4th degree of that constellation. Hipparchus counted the precession to be a degree in a hundred years, and they are generally founded their chronology upon that computation. But the equinoxes move a degree in 72 years, and by that means, if we compute, we shall find the time of the Argonautical expedition to have fallen out at the time Sir Is. Newton puts it.*“<sup>64</sup>

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<sup>62</sup> For more information on the history of the publication of the text, see: Renée SIMON, Nicolas Fréret, académicien, Geneva 1961, pp. 32-52; WESTFALL, *Never at Rest* (as note 23), pp. 806-812; following this also BUCHWALD, FEINGOLD, *Newton* (as note 5), pp. 307-18.

<sup>63</sup> Keill was well known to Newton, since he had already mediated in Newton's dispute with his competitor Leibniz, who had accused him and John Locke of spreading atheistic doctrines at the English royal court. For more details see the introduction by Ed Delian to Samuel CLARKE, *Der Briefwechsel mit G.W. Leibniz 1715/1716*, ed. by Ed Delian, Hamburg 1990, especially p. XIIIff.

<sup>64</sup> „*La Lettre de M. Keil explique encore un peu plus cecy. La veille de mon départ de Paris, dit M. Taylor, j'allois voir le Père Souciet. Il faut que je vous prie de lui faire mille compliment de ma part, & de lui communiquer l'extrait auivant d'une Lettre de M. Keil, que je lui ai promis. I copied that part of your letter about chronology, and Shewed it to Sir Is. Newton. He said that the treatise, which is in France, is but a short abstrait of a much longer work, and he did not wet down the proofs, but he said according to his best remembrance, he found that the Ancients had recorded that at time of the Argonauts Chiron had found the equinoctial point to be in the middle or 15th degree of the constellation Aries. In Methon's time it was found to be in the 8th and in Hipparchus's time in the 4th degree of that constellation. Hipparchus counted the precession to be a degree in a hundred years, and they are generally founded their chronology upon that computation. But the equinoxes move a degree in 72 years, and by that means, if we compute, we shall find the time of the Argonautical expedition to have fallen out at the time Sir Is. Newton puts it.*“ (SOUCIET, *Recueil des dissertations* (as note 47), p. 55.

Although, Souciet wrote in 1727, he had been dissatisfied with Newton's answer<sup>65</sup>, he had at the time kept to secrecy and refrained from pursuing the matter further.

Around the same time, Conti had sent a copy of Newton's *Abrégé* to another friend, Henry St. John, Lord Bolingbroke, who had fled to France in 1715, also at his request. In exile, Bolingbroke had immersed himself in the study of ancient history and chronology. Bolingbroke was impressed by Newton's knowledge but did not approve of his results. In a letter to a friend, he delivered a scathing verdict:

*„I'll tell you what I have very near done, for my whole life, with all enquiries into remote antiquity. My intention was to see the foundations of those historical and chronological systems, which have been erected with so much learned pains in our western world. I have seen them, these corner stones, and I think I have examined them enough to be sure, that he who cannot content himself to employ his time about consequences, drawn from principles evidently begged, ought not to employ it in this kind of erudition.“*<sup>66</sup>

*„I never intended to do more than explore, as best I could, a fin de savoir a quoi m'en tenir [to understand what I stand for], the basic assumptions of these systems of chronology and ancient history that hold sway in our Western world. This I have done; and beyond the expertise I have acquired in astronomy, I care nothing for pursuing these studies further. Who wants to build at great cost and trouble, when he finds that, however deep he digs, he finds nothing but loose sand?“*<sup>67</sup>

Conti, who soon once again fell out of favor with Newton, tried to obtain Newton's complete manuscript through third parties. This was a futile endeavor, however, since such a manuscript did not yet exist or at least had not yet been satisfactorily worked out. Newton was only forced into action when his „*Abrégé de Chronologie*“ was first published in France in 1725 and then also in London with a detailed (anonymous) commentary by a connoisseur of Greek history and mythology, the French historian Nicolas Fréret (1688-1749), and a year later Etienne Souciet also published his critique in Paris.

While the relevant journals until then had kept it at an occasionally curiously expressed expectation of the late work of the great Newton, now a lively debate started in the print media, in which both Newton himself and the astronomer Halley intervened with articles. In a review, the editor of the *Journal des Sçavans* praised Humphrey Prideaux's *Histoire des Juifs* of February 1726 for having made

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<sup>65</sup> Isaac NEWTON, Remarks upon the Observations Made upon a Chronological Index of Sir Isaac Newton. In: Philosophical Transactions (1683-1775), vol. 33 (1724-1725), pp. 315-321.

<sup>66</sup> Letter to Brooke Taylor, November 23, 1721, quoted in: The Works of Alexander POPE, Esq. In Verse and Prose. Vol. 8, London 1812, p. 108

<sup>67</sup> Letter to Brooke Taylor, 26 December 1723, quoted in POPE (as note. 66), S. 110

Newton's outline available to the public together with Fréret's annotations<sup>68</sup>, not without explicitly endorsing his conclusion that one should postpone a final judgment until the publication of the complete chronology. Were the work to provide evidence for the claims in the abstract, the reviewer argued, Newton would be honored for revolutionizing chronology as he had previously revolutionized mathematics. But contemporaries remained largely noncommittal, if not skeptical.<sup>69</sup>

During Newton's lifetime, his French opponents Etienne Souciet and Nicolas Fréret were by no means the only ones, but Souciet in particular was by far the main critic of Newton's hypotheses<sup>70</sup>. Someone who presumed to beat the famous physicist Newton on his own turf, so to speak, by attempting to invalidate the latter's astronomical arguments by his own excursions into astronomy. Souciet's argument was intended to defend historical chronology against an increasingly powerful intruder - geometry in alliance with natural philosophy. For if Newton were right, then the learned critics of texts and the proofs of coins, inscriptions, and medallions would have to cede first place to the calculators of past ages: to those who knew how to use the tools of astronomy. This was not acceptable, and so Souciet decided to refute Newton by using words against numbers, thus trying to disavow astronomy itself with ancient astronomical statements. Although he knew his research results only from second hand and at most from an *abrégé* never intended for publication, he tried to prove errors in the calculation of the equinoctial points to the great scholar Newton on the basis of the precession data known at that time. Souciet's main attack was thus directed to the exact position of the zodiacal points at the time of the (mythical) Chiron. If the calculation was correct, then a recourse to the precession velocity would be sufficient to find out when this should have taken place. The astronomy would refute itself. A clever move, to be sure, but one that required

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<sup>68</sup> PRIDEAUX *Histoire des Juifs et des peuples voisins*. Vol. 7, Paris 1726 [French parallel edition of Humphrey PRIDEAUX's *The Old and New Testament Connected: In the History of the Jews*]. In the appendix after p. 147 follows a reprint of the entire pamphlet with preface and postscript by Nicolas Fréret (92 pages in all), which had already appeared as a separate print in France a year earlier. Just like Souciet, the Paris printer Guillaume Cavelier had written to Newton beforehand, and here too Newton did not seem at all surprised, but did not want to comment further on the contents, since he did not know whether it would be a correct copy. He added, however, that he did not intend to change or add anything. (Newton's letter to Guillaume Cavelier, May 27, 1725, reprinted in PRIDEAUX, *Histoire*, *ibid*, Avertissement du Libraire, p. 2 [unpaginated] and originally in: Isaac NEWTON, *Remarks upon the Observations Made upon a Chronological Index of Sir Isaac Newton*, Translated into French by the Observator, and Publish'd at Paris, in: *Philosophical Transactions*, vol. 33 (1724-1725), London 1725, p. 315f - Newton uses the anglicized form *William Cavelier*).

<sup>69</sup> So, for example, also the ancient historian Nicolas FRÉRET in his book *Défense de la chronologie fondée sur les monumens de l'histoire ancienne, contre le système chronologique de M. Newton*, which circulated as a manuscript since 1728, but, like most of his writings, was published only after his death (Paris 1758). Cf. Frédéric CHARBONNEAU, *En l'absence de témoin : l'histoire des temps reculés à l'Académie des Inscriptions et Belles-Lettres*, in: *Études françaises*, 54, 3, 2018, p. 55.

<sup>70</sup> However, contrary to his own account, Souciet is said to have made extensive use of Fréret's manuscripts, most of which circulated as manuscripts. For details on Souciet's criticism of Newton, see Yaël NAZE, *Astronomie et chronologie chez Newton - arguments astronomiques à l'appui de la chronologie de Newton*, in: *Archives Internationales d'Histoire des Sciences*, vol. 62, 2012, pp. 717-765.

Souciet to actually master his opponent's tools as well! However, „*Souciet's ship failed because of the shallows of his inadequate knowledge of mathematics and astronomy.*“<sup>71</sup>

Newton's successor in the *Lucasian chair of mathematics*, the English theologian and physicist William Whiston (1667-1752), was much more knowledgeable in his criticism of Newton's chronology. Although he had already announced this to the learned world at the end of 1727, he did not publish it until September 1728.<sup>72</sup> Without questioning the borrowings from Greek mythology and the Hipparchus fragments cited in Clement of Alexandria, he went through in detail Newton's astronomical calculations to prove their irrelevance for a redefinition of chronology. He also did not shy away from presenting his mentor Newton - whom he held in high esteem as a mathematician and physicist - as someone who dabbled in a field he felt he knew too little about.<sup>73</sup>

The French Jesuit Jean Hardouin (1646-1729), however, was cut from a different cloth. He belonged to the „*learned dinosaurs*“ (Anthony Grafton), an extinct species<sup>74</sup> in the age of skepticism, for whom Arnaldo Momigliano somewhat stereotypically coined the term »antiquarian« in 1950. In their research work, antiquarians were characterized by their preference for genuine documents, their ability to detect even subtle forgeries, their skill in collecting and classifying sources, and, above all, by their unbounded love of science. They considered deeds and other official documents, coins, inscriptions and statues as more reliable evidence than purely literary sources, without therefore denying the importance of the latter. Most importantly, they simultaneously developed the inventory of methods for their research work, formulated firm rules for the evaluation of charters, inscriptions, and coins in terms of their authenticity and interpretation. The aforementioned Benedictines of St. Maur, above all Jean Mabillon and the Bollandists from the Jesuit order had methodized the critical analysis of such source types in the last quarter of the 17th century and thus raised it to a new level.

Jean Hardouin's biography had all the characteristics of above-average success typical of the time. After his studies and probation, the Jesuit taught *positive theology* at the *Collège Louis-le-Grand* in Paris from 1683 to 1718 and was then its librarian until his death in 1729. He presented his philological masterpiece in 1685 with his five-volume edition of Pliny's *Naturalis Historiae*. It took him just five years to complete this epoch-making work, which would probably have taken other scholars at least ten times as long. His Pliny edition was published forty years later in a second edition and was

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<sup>71</sup> „*Souciet's ship foundered on the shoals of his inadequate knowledge of mathematics and astronomy.*“ (BUCHWALD, FEINGOLD, Newton (as note 5), p. 356)

<sup>72</sup> An Abstract of The *Confutation of Sir Isaac Newton's Chronology* by William WHISTON (1728). In: The Present State of the Republick of Letters. For January 1729, vol. 3. London 1729, art. 29, pp. 247-286.

<sup>73</sup> cf. BUCHWALD, FEINGOLD, Newton (as note 5), ch. 10: The War on Newton in England, esp. pp. 345-349.

<sup>74</sup> cf. Anthony GRAFTON, A Sketch Map (as note 64), p. 2 („*One way to imagine the Republic [of letters], then, is as a sort of Pedantic Park: a world of wonders, many of them man-made, inhabited by scholarly dinosaurs.*“).

considered the reference text for this encyclopedia in the 18th century.<sup>75</sup> Between 1687 and 1704, Hardouin commissioned by the *Assemblée du clergé de France* and financed from the royal treasury, produced a nearly 22,000-page edition of the Council Acts which revolutionized editing principles, although it was far from uncontroversial.<sup>76</sup> As a knowledgeable commentator on the Old and New Testaments and as a passionate numismatist, Jean Hardouin was considered by his peers to be one of the most brilliant scholars of his time. Countless other works in Latin or French, not to mention a wealth of manuscripts unpublished to this day, testify to extraordinary erudition and wide-ranging interests, intimate familiarity with the historical and contemporary themes of the scholarly world, and a scholarly productivity that never flagged until old age.

Jean Hardouin died on September 3, 1729, two years after Newton, at the age of 82. That same month, the *Journal de Trévoux* published one of his last papers, a scathing critique of Newton's chronology, which he had written on March 18.<sup>77</sup>

In any case, age had not slowed Hardouin's critical verve, and the preceding discussion was apparently familiar to him: „*Will the disputes about the age of the world never cease?*“ he lamented. „*In our days some have tried to make it excessively old, and only recently an Englishman named M. Newton, by astronomical calculations, has shortened ancient Greece by some 534 years, which no annalist before him had dared to think of. He finds defenders, however, it is said, who are ready to support the foundation and the whole edifice of his system.*“

<sup>78</sup> In nineteen pages he dismantled the foundation of the chronology, seeming to refer to the long version published in London in 1728, preceded by the *Short History*. However, immediately on the second page there are quotations in English which, although identical in spirit to the printed version we know, their exact wording is not found in either the 1728 version published. Thus, there seems to have been an English edition published two years earlier, not documented in the literature, from which Hardouin quotes e.g. „*Newton, Chronologie, Londini 1726. Angl, pag. 25. de l'Abrégé*“, unless the year is wrong and Hardouin quotes literally inaccurate, or the text available in French was here translated back into English.<sup>79</sup>

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<sup>75</sup> C. Plinii Secundi Historiae Naturalis Libri XXXVII quos interpretatione et notis illustravit Joannes Harduinus, Soc. Jesu, jussu Regis christianissimi Ludovici Magni, in usum Serenissimi Delphini. 5 vols. Paris 1685; ed.: Editio altera emendatior et auctior. 3 vols. Paris 1723

<sup>76</sup> Acta Conciliorum et epistolae decretales ac constitutiones Summorum pontificum. 11 vols. [a twelfth has not appeared]. Paris 1714-1715

<sup>77</sup> Jean HARDOUIN, Le fondement de la Chronologie de M. Newton. Journal de Trévoux. September 1729, pp. 1567-86.

<sup>78</sup> „*Ne cessera-t-on les jamais de disputer sur l'âge du monde ?* „, déplora-t-il. „*De nos jours, quelques-uns l'ont voulu faire vieux à l'excès : & tout récemment un Anglois nommé M. Newton, tout au contraire, par des calculs Astronomiques, veut ôter aux Antiquitez Greques environ 534 années de durée : ce qu'aucun Annaliste avant lui n'avoit osé penser. Il trouve cependant des Défenseurs, dit-on , qui entreprennent de soutenir le fondement & tout l'édifice de son système.* „ (HARDOUIN, Le fondement (as note 77), p. 1567).

<sup>79</sup> The somewhat mutilated quotation in Hardouin: „*Chiron, who was born, the Golden Age, forms the Constellations for the use of the Argonauts*“ (op. cit., p. 1568) reads in the original: „*Chiron, who was born in the Golden Age, distinguish'd the Constellations*

He calls the famous author of the *Principia* and the *Opticks* simply an „Englishman named M. Newton“. Hardouin, however, might not only have followed closely the discussion in France in which his confrere Souciet and the secretary of the *Académie Royale des Inscriptions et Belles-Lettres*, Nicolas Fréret, had participated. He knew very well who Newton was<sup>80</sup>, and he set out to show not only that Newton was wrong, but also that he and others like him who chose to reckon with history were hugely mistaken.

Hardouin, who even at almost 83 years of age had not lost his ability to formulate ingenious hypotheses, got right to the point by focusing his criticism on the dating and interpretation of the expedition of the Argonauts, which was central to Newton's argumentation.<sup>81</sup> Newton himself had pointed out in his critique of the Paris publication of his *Short History* that the epoch of the Argonauts and the length of generations would form the two cornerstones of his new chronology.<sup>82</sup> For both Newton and his critics did not doubt that Chiron had designed the constellations and the cardinal points for the use of the Argonauts as they navigated to Colchis.<sup>83</sup> „I do not say that Chiron himself is a chimera,“ Hardouin objected, „[but] that the astronomer Chiron is a phantom: that these two [contending] parties build their systems on the false idea they have of Chiron, and that they base all their astronomical learning on a chimerical assumption.“<sup>84</sup> The mythical centaur Chiron himself might not have been a chimera, but he was undoubtedly not an astronomer either, even if Newton claimed so. For ancient historians, he was a healer who was especially knowledgeable about botany and the medical powers of herbs. As evidence for his point of view, Hardouin cited three of the ancient sources he believed

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to make Sailing and the Observation of the Stars easy to the Argonauts.“ (NEWTON, *The Chronology* (as note 22), p. 29). The following quotation, on the other hand, looks like a slightly failed attempt at a back translation of the *Abrégé* into English: „And places the solstitial and equinoctial points in the fiftieth degrees or midles of the constellations of Cancer, Chelae, Capricorn, and Aries.“ („Il plaça les points des Solstices & des Equinoxes au quinzième degré de ses constellations ; c'est-à-dire, vers le milieu des signes du Cancer, du Capricorne, d'Aries & de Scorpius.“) .“ (ibid., p. 29f) - In the original one reads: „He fixed the Solstices, and Equinoxes in the 15th Degree of these Constellations; i. e. the former toward the Middle of Cancer and Capricorn, and the latter toward the middle of Aries and Scorpio.“ (ibid.)

<sup>80</sup> BUCHWALD, FEINGOLD (Newton (as note 5), p. 307) misunderstand the use of the usual form of address in disputes among scholars (M[r]. Newton) as Hardouin's attempt to pretend that he did not know this Englishman at all. No reader would have believed him anyway, after all, everyone in the learned world knew the famous Newton. The form of address M. or Mr. was so common in articles, books or letters of the European scholars, if they used the lingua franca French. Incidentally, Hardouin uses in his criticism predominantly - and at least if one reads his text in the original, also unmistakably - the noble address *Le sieur* Newton; the first time even on the same page.

<sup>81</sup> Also Knoespel (Newton (as note 23), p. 31f) uses the same arguments as Hardouin, without giving at this point his review of Newton's *Chronology* as source, although he quotes Hardouin's concluding remark from it some pages later (KNOESPEL, Newton (as note 23), p. 34, cf. here note. 105 and 114)

<sup>82</sup> „I believe that I have said enough concerning the Epocha of the Argonauts, and the Length of Generations to make People cautious about the rest. For these are the two Foundations of all this new System of Chronology.“ (Isaac NEWTON, *Remarks upon the Observations Made upon a Chronological Index of Sir Isaac Newton*, in: *Philosophical Transactions* (1683-1775), vol. 33, 1725, p. 317f).

<sup>83</sup> „... for Chiron was a practical astronomer (...) made a Sphere, and is reputed the first among the Greeks who made one: and the Sphere it self shews that it was delineated in the time of the Argonautic expedition; for that expedition is delineated in the Asterisms, together with several other ancient Histories of the Greeks, and without any thing later.“ (NEWTON, *The Chronology* (as note 22), p. 83f)

<sup>84</sup> HARDOUIN, *Le fondement* (as note 77), pp. 1569f.

to be genuine, namely Homer's *Iliad*, Virgil's *Georgica*, and Pliny's *Natural History*.<sup>85</sup> The *Iliad* says of the army surgeon Machaon, who tended Menelaus' wound: „wiped off the blood and applied some soothing remedies that Chiron had given to Aesculapius out of benevolence.“ (*Iliad*, Book IV, 218) Further, Euryplus said to Patroclus, „Cut the arrow from my thigh; wash off the black blood with warm water and apply to it those benign herbs which, it is said, were shown to you by Achilles, who himself was shown them by Chiron, the most righteous of centaurs“ (*Iliad*, Book 11, 830) and in the *Georgica* Chiron is mentioned in the same breath as the healer Melampus.<sup>86</sup> Pliny noted that Chiron had instructed Achilles and Aesculapius in herbalism (*Naturalis historiae*, book XXVI, chap. 19). Hardouin cited „two or three other witnesses who should not be doubted, though I place them much lower than the former.“<sup>87</sup> Diodorus Siculus wrote that Hercules was unfortunate to have killed Chiron of all people, who after all was famous for his medical knowledge. Plutarch also noted in his *Symposium* that the people of Magnesia revered Chiron as the first to teach healing to the people. Even the lexicographer Suidas<sup>88</sup> „nowhere asserted that Chiron practiced any other science than that of medicine; & that this so-called horse doctor was an astronomer. This did not occur to him, though he invented many other fables.“<sup>89</sup>

Newton, on the other hand, had relied entirely on the *Τιτανομαχία* cited by Clement of Alexandria<sup>90</sup>: „Now Chiron σχήματα ὀλνυμπον designed the asterisms, as the ancient author of the *Gigantomachia*, quoted by Clement Alexandrinus, informs us: for Chiron was a practical astronomer ...“<sup>91</sup> - a source, Hardouin explained, that only „reported fables“.<sup>92</sup>

<sup>85</sup> „Ni Virgile, ni Pline, n'ont appris d'Homere, ou d'aucun autre, que Chiron ait eu la moindre teinture d'Astronomie.“ (ibid., p. 1572)

<sup>86</sup> „Quaesitaeque nocent artes, cessere magistri Philyrides Chiron, Amythaoniusque Melampus [And by diligence art becomes harmful; there died the masters Chiron, the Philyra son, and the son of Amythaon Melampus]“ (VERGIL *Georgica*/On Agriculture, 3rd canto, verse 549-550)

<sup>87</sup> „J'ajoute encore ici deux ou trois autres témoins, qu'on n'oseroit récuser; quoique je les metre bien au-dessous des premiers.“ (HARDOUIN, ibid.)

<sup>88</sup> a legendary Greek lexicographer who is said to have lived in Byzantium in the second half of the 10th century.

<sup>89</sup> Ibid, pp. 1572-73; *Iliad*: on the physician Machaon, book 4, verse 218; on Euryplus, book 11, verse 830. *Georgica*: book 3, verse 549, *Natural History*: book 26, section 19 as well as book 11, section 57; Diodorus: book 4, p. 221. Concerning Suidas, it says: „Quoiqu'il en soit, le Collecteur Suidas n'a lu nulle part que Chiron ait eu d'autre science que la médecine par les simples : & que-ce prétendu Médecin de chevaux ait été Astronome ; c'est ce qui ne lui est pas venu dans l'esprit de seindre , quoi qu'il ait inventé beaucoup d'autres fables.“ (ibid., p. 1574)

Hardouin further remarked, „J'ai lu même quelque part, peut-être que c'est dans le Dictionnaire dit de Moreri, & que je n'ai pas le loisir de le chercher ailleurs; que Chiron apprit à Jason lui-même, le chef des Argonautes : quoi ! l'Astronomie ? Non : mais la Médecine.“ (ibid., p. 1571) That he had „read somewhere“ that „Chiron himself taught Jason, the leader of the Argonauts. What Astronomy? No: Medicine.“ was true, because in Father Louis Morery's *Grand Dictionnaire*, 1711 it is indeed written: „On dit qu'il avoit appris de Chiron la medecine“ and this had also given Jason his name. (Le Grand Dictionnaire Historique, vol. 1 A-, keyword: Argonautes, Paris 1707, p. 342).

<sup>90</sup> The church father Clemens is credited with a 7-volume work, the „*Carpets*“ (gr. *Stromateis*), which has survived only in fragments, and which aims at the fundamental compatibility of Greek philosophy and Christian faith and at proving the epistemological superiority of the latter.

<sup>91</sup> „Now Chiron delineated σχήματα ὀλνυμπον the Asterisms, as the ancient Author of *Gigantomachia*, cited by Clemens Alexandrinus, informs us: for Chiron was a practical Astronomer ...“ (NEWTON, *The Chronology* (as note 22), p. 83, cited in HARDOUIN, *Le fondement* (as note 77), p. 1574)

<sup>92</sup> Moreover, Clemens was mistaken, because the grammarian Hermippos of Berytus (Beirut), who is said to have lived in the 2nd century AD and whom we know only from some quotations in Clemens and Stephanus of Byzantium, was

Clemens mentions no author for this work, which provided a good opportunity for Hardouin's sarcasm. „Where,“ he wondered, „did he get what he ascribes here to an author whose name he dare not speak, that Chiron opened the eyes of men to the constellations of the heavens? The whole antiquity knew nothing about it. Did the unknown author he quotes, or he himself, think of this when he wrote that Chiron showed men three things equally important to living righteously; oaths, sacrifices, constellations?<sup>93</sup> Aren't these three perfectly aligned to make a good person? Is this a wisdom of life that earns its author the title of sage from Greece?<sup>94</sup> Constellations have nothing to do with righteous behavior, and even if Chiron (or whoever it may have been) was the first to design constellations, „is it a significant discovery to leave it at that? Is it sufficient to make Chiron a practical astronomer, as Sir Newton calls him?<sup>95</sup>

In a particularly astute remark, Hardouin came to the same conclusion as, 200 years after him, the French archaeologist Jean-Antoine Letronne, a connoisseur of ancient Greek literature, in questioning the meaning Newton had ascribed to the expression *σχηματα ολυμπου*: „Σχήματα Ολύμπου, do the figures of the heavens include exclusively the constellations of the zodiac? Is this expression different from others? Can Clemens Alexandrinus conclude from these two words that Chiron was the first to establish the cardinal points of the equinoxes and solstices, when two lines after n. 16 he says that the Egyptians and Chaldeans first taught astrology to men?<sup>96</sup>

„Newton's antipoetic, literally prosaic attitude of mind is also evident in his remark that „Chiron described constellations with *σχηματα ολυμπου*“.<sup>97</sup> In the Greek expression he did not like to recognize anything but a pictorial representation of the sky, such as an astronomer mapping the heavens would make. Citing Herodotus and Xenophon, confirmed by Euripides and Varro, Letronne proved that this

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Hermippus of Smyrna. So Gottfried KINKEL, who published the *Titanomachia* in 1877. Cf. Des CLEMENS von Alexandria ausgewählten Schriften: Teppiche wissenschaftliche Darlegungen entsprechend der wahren Philosophie (Stromateis), ed. by Otto Stählin (= Bibliothek der Kirchenväter, 2. Reihe, vol. 17), Munich 1936, p. 68, note 393.

<sup>93</sup> Hardouin refers to Clement's *Stromateis*, Book I, chap. XV, 73,3, where it says: „and of him also the author of the *Titanomachy* says that he was the first to „lead the mortal race towards righteousness and to teach them oaths and joyful sacrifices as well as the figures of Olympus“.. (CLEMENS, *Carpets* (as note 93), p. 69)

<sup>94</sup> „Clément Alexandrin, dans cet Ouvrage, rapporte des Fables, & il y en a, dont il ne cite point allez l'Auteur.“ [Clemens Alexandrinus reports fables in this work, and there are some where he does not name the author]. (HARDOUIN, *ibid.*, p. 1575)

<sup>95</sup> „est-ce une découverte fort considérable, si l'on en demeure là : Suffit-t'elle pour faire de Chiron un Astronome de pratique, comme l'appelle le Sieur Newton ?“ (*ibid.*, p. 1575f)

<sup>96</sup> „Σχήματα Ολύμπου, les figures du Ciel ne comprennent elles que les constellations du Zodiaque ? Cette expression distingue-t-elle celle-ci des autres ? Clément Alexandrin a-t'il pu inferer de ces deux mots que Chiron a placé le premier les points cardinaux des équinoxes & des solstices; lui qui dit, deux lignes après, n. 16, que les Egyptiens & les Chaldéens ont les premiers appris l'Astrologie aux hommes ?“ (*ibid.*, p. 1576f) The Greek expression attributed to Clemens by Newton on p. 83f comes from vol. 1, ch. XV, p. 360 of the *Stromateis*, as Hardouin notes on p. 1574.

<sup>97</sup> „Newton's anti-poetic, literally prosaic turn of mind shows itself as well in his remark that „Chiron delineated *σχηματα ολυμπου* the Asterisms.“ (BUCHWALD, FEINGOLD, Newton (as note 5), p. 298)

assumption<sup>98</sup> was not very likely, since the word *χῆματα* in antiquity referred to the dance-like movement of the firmament, but not to a constellation.<sup>99</sup>

Hardouin did not establish this connection, but doubts as well that the passage in question had anything at all to do with the equinoctial points. At best, according to Hardouin, it had inspired Newton as well as his critic to completely inappropriate calculations: „*It is no less astonishing that highly educated people should recognize and agree on the basis of these two words alone that Chiron had made the arrangement of the constellations of the zodiac for the benefit of the Argonauts: And that a sudden joy would overtake them, because such a beautiful opportunity would be afforded them to display their learning in astronomy & in calculations for the usefulness of their navigation: on the one hand, to make the Greek antiquities reach quite far back; on the other, to bring them nearer to us.*“<sup>100</sup>

According to Hardouin, why should the celestial directions be of any use at all if the Argonauts, who certainly had not invented the astrolabe for determining latitude from the altitude of the stars, always sailed along the coast on their voyage from Thessaly to Colchis anyway?<sup>101</sup> Why, Hardouin suspected, did Newton, when referring to Clement, change his mention of *Titanomachia* to *Gigantomachia*? Surely this referred to different facts, since Gaia had brought forth the giants to challenge the gods after her previous victory over the Titans. Or was this done, as Hardouin insinuated, perhaps „*because the Titans suggest a fable?*“ Was „*Newton afraid that this idea might invalidate the evidence of the poem about Chiron. He would thus have called his own cause into question.*“<sup>102</sup> Although he did not openly say it, Hardouin seemed to have taken Newton for an inveterate euhemerist. Probably not wrongly, he imputed to him the assumption that Hercules (or Newton's various Hercules candidates) was based on a real person, unlike the potentially legendary inhabitants of *Titanomachia*. In any case, Clement himself, Newton's source, was not interested in the equinoctial

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<sup>98</sup> „*comme il tirait, d'un vers isolé de l'ancien poëme sur la Titanomachie un indice que cette sphère avait été inventée par Chiron pour l'usage des Argonautes, il se crut autorisé à rabaisser d'environ cinq siècles l'époque de cette fameuse expédition maritime.*“ [since he drew from a single verse of the ancient poem about the Titanomachia a hint that this sphere had been invented by Chiron for the use of the Argonauts, he considered himself justified in lowering the time of this famous maritime voyage by about five centuries] (Jean-Antoine LETRONNE, *Analyse critique des Représentations Zodiacales de Dendéra et d'Esné*, Paris 1845, p. 2).

<sup>99</sup> „*Newton a entendu par le mot σχήματα les constellations figurées; mais ce mot signifie les danses, les évolutions, comme nous disons les figures.* Ainsi, Hérodote (n,129): ὀρχήσαι/λολακωνικά σχήματα; Xénophon : *σι ὀρχοῖντιο σχήματα* (Sympos. vii, 5. Cf. h, 15; xvi, 22). Euripide suit la même image, lorsqu'il parle des chœurs des astres : ἀστέρων τ'αἰθέριοι χοροί (Electr. v. 467); Varron a dit de même: *caeli astrica chorea* (ap. Non. c. vi, n' 16). Il est clair que σχήματ ὀλύμπου n'est qu'une expression poétique pour désigner les mouvements, et non les configurations des astérismes, ou groupes d'étoiles, dans le ciel.“ (LETRONNE, *Analyse critique* (as note 98), *ibid.*)

<sup>100</sup> „*Il n'est pas moins surprenant que des personnes fort éclairées puissent établir & convenir entr'eux sur ces deux mots là seuls, que Chiron fit l'arrangement du Zodiaque, en faveur des Argonautes: & pour l'utilité de leur navigation n'a pu leur persuader qu'une joye précipitée qui les a saisis, de trouver une belle occasion d'étaler leur érudition en Astronomie & en calculs : l'un, pour faire remonter bien haut les Antiquitez Grecques; l'autre, pour les rapprocher de nous.*“ (HARDOUIN, *Le fondement* (as note 77), p. 1577)

<sup>101</sup> This may pass as an aperçu, but Hardouin may also have read what Newton detailed: „*Hitherto they had used round vessels of burden and kept within sight of the shore; and now, upon an embassy to several Princes, upon the coasts of the Euxine and Mediterranean Seas, by the dictates of the oracle, and consent of the Princes of Greece, the Flower of Greece were to sail with expedition through the deep, in a long ship with Sails, and guide their ship by the Stars.* (NEWTON, *The Chronology* (as note 25), p. 85).

<sup>102</sup> „*Est-ce que les Titans ressentent plus la Fable ? Il a eu peur que cette idée n'affoiblît le témoignage pris de ce Poëme, dans ce qu'il rapporte de Chiron. Il se seroit donc défié lui-même de sa cause.*“ (HARDOUIN, *Le fondement* (as note 77), p. 1579)

points; he mentioned the rises of the constellations only because of their importance in determining the seasons. In fact, Hardouin argued, Clement's main concern was to show that the philosophy of the most ancient sages of paganism and Greece used quite ordinary knowledge of their time, and that only the philosophy of Moses was truly profound. After all, „*Clement of Alexandria was not one of those holy fathers who were incapable or unable to invent pious fictions just to support their claims.*“<sup>103</sup>

And so the whole scheme was based on a fallacy, which was sufficiently proved by the ancient sources that Hardouin considered reliable. The Chiron of the mythological tale was not an astronomer but a herbalist. „*Newton's system,*“ he concludes, „*is imaginary and chimerical: it is a phantom that is either accepted or fiercely opposed. How many calculations, how many disputes, how many useless considerations, all destroyed by a single historical argument!*“<sup>104</sup> How unfortunate, he concludes his article, that „*this great man, this first geometer and mathematician of Europe, in the end build nothing but a bungling system. Why did he not stick to that by which he had gained reputation?*“<sup>105</sup>

Hardouin had certainly studied Souciet's criticism of Newton's system of chronology conscientiously as he always did. And therefore he did not miss the crucial aspect in Newton's argumentation - the reference to Clement of Alexandria.<sup>106</sup> In order to unhinge Newton's system of chronology, Hardouin did not need to argue with him, as Souciet did, about detailed questions of astronomical calculations. This was also never his field of expertise. Methodologically, he approached the subject in much the same way as in his posthumously published *Ad Censuram Scriptorum Veterum Prolegomena*.<sup>107</sup> His radical criticism in the theological disputes with Benedictines, Jansenists and other „*atheï detecti*“ (unmasked atheists)<sup>108</sup> was there to „*remove the basis of the subversion potential of philological biblical criticism*“ by exposing its „*tradition-based legitimation system*“<sup>109</sup> itself as forgeries. In his demolition of Newton's work it was even much easier for him to bring down the new version of chronology, simply by exposing the all-decisive source Clement of Alexandria

<sup>103</sup> „*Clément Alexandrin n'est un des Saint Pères incapables ou éscemts de pieuses fictions, pour établir ceux qu'ils avancent.*“ (ibid., p. 1581, for the Hercules candidates he refers to NEWTON, The Chronology (as note 22), p. 233f).

<sup>104</sup> „*Que par consequent tout le système de Newton est imaginaire & chimérique : que c'est un fantôme que l'on embrasse, ou contre lequel on s'escrime avec chaleur. Que de calculs, que de disputes, que de questions, que de raisonnemens inutiles, tous détruits par ce seul principe historique.*“ (HARDOUIN, ibid., p. 1582)

<sup>105</sup> „*ce Grand Homme, ce premier Géomètre Mathématicien de l'Europe, n'a bâti sur la fin de ses jours qu'un système frivole. Que ne s'en tenoit - il à ce qu'il avoit acquis de réputation ?*“ (ibid., p. 1586)

<sup>106</sup> cf. SOUCIET, Recueil des dissertations (as note 47), p. 55f.

<sup>107</sup> cf. pars pro toto HARDOUIN, Prolegomena (as note. 3), ch. XIX, p. 277ff.

<sup>108</sup> In a posthumously published work, Hardouin attempted to include just about all the protagonists of French philosophical thought in the 17th century - including Pascal and Descartes, Malebranche and Jansenius, as well as the logicians of Port-Royal, Antoine Arnauld and Pierre Nicole - as atheists. (Jean Hardouin: Atheï detecti. in: ders., Opera varia, Amsterdam 1733, pp. 1-258). He saw no reason for differentiation: „*Ils disent tous le mesme.*“ (Jean HARDOUIN, Reflexions importantes, Qui doivent se mettre à la fin du Traité intitulé Atheï detecti, in: ders., Opera varia, pp. 259-273, quote on p. 260)

<sup>109</sup> Stephan KAMMER: Überlieferung. Das philologisch-antiquarische Wissen im frühen 18. Jahrhundert. Berlin 2017, p. 68

himself as untrustworthy, so that he reached the same conclusion as Lord Bolingbroke in a different way: Such buildings are built on sand.

An anonymous article from 1743 in the journal of the *Académie* referred to a defense of the study of ancient writings by the Jesuit Jean François Du Bellay Du Resnel, which was by no means aimed at devaluing modern scientific methods, but sought to save the enormous importance of comparative textual analysis by listing the special merits of this research subject.<sup>110</sup> Similarly, Nicolas Fréret, a connoisseur of Greek history and mythology had defended the study of ancient history against the intrusion of computational methods as early as March 1724, the same year that Newton had rebuked the publication in France of his abridged Chronology, which in turn had provoked Fréret's own undrawn criticism in the first place. Fréret wrote at the time:

*„Ancient history has its merit, its study has its advantages; and I have difficulty in understanding how clever people do not see that all the efforts they make to discredit the subject serve only to arm ignorance with new weapons. The charm of antiquity has been much weakened by recent controversies, in which those who attack the ancients may not be those who have dealt them the most dangerous blows: to destroy this charm, it is necessary that those who combine erudition with the exact knowledge of geometry and [natural] philosophy should speak out against the study of antiquity.“*<sup>111</sup>

While Newton had by no means opposed the study of antiquity, he had subjected it to the rigorous and, in Fréret's view, impermissible demands of calculating quasi-scientific certainty:

*„The study of geometry & mathematics is today the favorite & almost the only study of a very large number of clever minds. These sciences seem today to be given the first rank, & those who cultivate them speak only with contempt of the other sciences which are the object of study of people of high education [...]. But the sciences most important to men - ethics, politics, economics, medicine, criticism, jurisprudence - cannot reach the same certainty as the demonstrations of geometry; they each have their own dialectic, as Mr. Leibniz has remarked, and their demonstrations can only ever reach the greatest probability.“*<sup>112</sup>

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<sup>110</sup> Reflexions generales sur l'utilite des belles-lettres; et sur les inconveniens du gout exclusif, quit paroit s'établir en faveur des Mathematiques & de la Physique. Histoire de l'Académie Royale des Inscriptions et Belles-Lettres 16 (1743), pp. 11-37.

<sup>111</sup> „L'ancienne histoire a son mérite, l'étude que l'on en fait, a ses avantages; et j'ai peine à comprendre comment de bons esprits ne voyent pas que tous les efforts qu'ils font pour en dégoûter, ne serviront qu'à prêter de nouvelles armes à l'ignorance. Le goût de l'antiquité n'a été que trop affoibli par les dernières disputes dans lesquelles ceux qui attaquoient les anciens, ne sont peut-être pas ceux qui leur ont porté les coups les plus dangereux : faut-il que pour achever de détruire ce goût, ceux qui réunissent l'érudition avec les connoissances exactes de la géométrie et de la philosophie, se déclarent contre l'étude de l'antiquité.“ (Nicolas FRERET, Reflexions sur l'étude des anciennes histoires, & sur le degré de certitude de leurs preuves (1724), in: Oeuvre complètes de Fréret, vol. 1, Paris 1796, p. 155; reprinted in: ders, Mémoires académiques, ed. by Catherine Volpilhac-Augier, Paris 1996, pp. 73-126).

<sup>112</sup> „L'étude de la Géométrie & des Mathématiques est aujourd'hui l'étude favorite, & presque l'unique d'un très-grand nombre de bons esprits, ces sciences même semblent tenir aujourd'hui le premier rang, & ceux qui les cultivent, affectent de ne parler qu'avec mépris des autres sciences qui sont l'objet de l'application des gens de lettres cependant les sciences les plus importantes à l'homme, la morale, la politique,

Hardouin's sarcastic reckoning with Newton's revised chronology makes clear that he disapproved of the intrusion of geometers and mathematicians into the field of history, which was accompanied by controversy and claimed expertise. There may have been other reasons for his sharp tone, for even in the last years of his life the stupendous erudition of antiquarians, whether based on the study of texts or coins or other artifacts, threatened to pale in comparison to the growing prestige of natural philosophy and especially the „*sciences exactes*“. The most literate members of the *Académie des Inscriptions et Belles-Lettres*<sup>113</sup>, were well aware that their discipline was becoming increasingly marginalized.

Hardouin's writings also met this fate, so that to this very day he is stigmatized as a skeptical conspiracy theorist far beyond what is justifiable, but has not been read for a long time.<sup>114</sup>

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*l'économie, la médecine, la critique, la jurisprudence sont incapables de cette certitude identique des démonstrations de Géométrie, elles ont chacune leur dialectique à part, comme la remarque M. Leibnitz, & leurs démonstrations ne vont jamais qu'à la plus grande probabilité.*“ (FRERET, *Reflexions* (as note 111), p. 144)

<sup>113</sup> The *Académie des inscriptions et belles-lettres*, a learned society that still exists today, was actually originally a French society for the promotion of French epigraphy, hence the name.

<sup>114</sup> Or deliberately not named as a serious critic, as e.g. Kenneth Knoespel, who also states the pivot of Newton's new chronology in his idiosyncratic interpretation of the Argonaut saga, without pointing out that this criticism goes back to Hardouin - nevertheless he quotes elsewhere in the same article from just this last publication of Hardouin, thus showing that he has read it! But he cannot bring himself to a more precise citation than „*Whiston and others*“, although Whiston used astronomical arguments different from Hardouin. (cf. KNOESPEL, *Newton* (as note 20), p. 31).