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Antiquitas Non Fingo:
Newton, the Moderns and the Science of Ancient History

Alessio Mattana

Abstract: In his posthumous *The Chronology of the Ancient Kingdoms Amended* (1728), Isaac Newton re-dated a number of signfiicant events in ancient history, most importantly the Argonautic Expedition and the Fall of Troy. This article explores the eighteenth-century reception of the *Chronology* as a text contiguous with Newton's previous works on natural philosophy. In particular, the *Chronology* was considered as proof that the moderns had made history into a scientific discipline based on principles like those delineated in Newton's *Principia*.

Keywords: Newton, ancient chronology, prisca sapientia, moderns, antiquity,

Isaac Newton's *The Chronology of the Ancient Kingdoms Amended* was published in 1728, just one year after the death of its author. The work has a complex editorial history that has been recently reconstructed by Cornelis J. Schilt. Newton had initially written an abstract of his private chronological studies for Prince Caroline of Ansbach in 1717, which came to be known as the 'Short Chronicle'. After circulating in a pirated French translation (probably smuggled by Italian gentleman philosopher Antonio Conti), the 'Short Chronicle' was eventually published as the *Abregé de la Chronologie* in 1725 without Newton's approval.[1]

In the *Abstract* (as it was known in Britain), Newton re-dates a number of important events in ancient history. The Argonautic Expedition and the Fall of Troy were placed by Newton on 937 and 904 BC respectively, some three hundred years later than established by scholarly consensus. Since it was Newton who had made these claims, the *Abregé* attracted a great deal of attention. It also drew fierce criticism by highly-respected French experts of antiquity such as Jesuit father Etienne Souciet and, in particular, belletrist and antiquarian Nicolas Fréret. Piqued against what he saw as a summary dismissal of a pirated abstract, in the final years of his life Newton worked on the full text of the *Chronology* for publication. He did not live to see the results, for the *Chronology* was published posthumously thanks to the joint efforts of John Conduitt, who was Newton's executor, and, as Schilt has shown, antiquarian and experimental philosopher Martin Folkes.

As the final work of a scientific genius widely regarded as having led a revolution in philosophy, the anticipation for the *Chronology* was great. The book was expected to be of a piece with Newton's scientific output, and its opening statement that '[t]he Grecian Antiquities are full of Poetical Fictions' seemed to confirm this impression.[2] Much as the *Philosophiae Mathematica Principia Naturalis* (1687) and the *Opticks* (1704), eschewing hypotheses appeared to be the method deployed to produce knowledge in ancient chronology too. In this paper, I claim that Newton's *Chronology* was appropriated to make the philosopher into a champion of the moderns in contrast to the credulous ancients. Although contrary to both Newton's cautious approach to historical enquiries and his goal to restore the *prisca sapientia* of Greek heliocentrists, Newton's *Chronology* was understood as the proof that the moderns could make history scientific and thus know antiquity better than the ancients themselves.

Newton, the 'Hypotheses Non Fingo' and the Moderns

In the General Scholium to the second edition of *Principia* published in 1713, Newton famously wrote that 'hypotheses non fingo'. This succinct Latin motto is the precipitate of a lifelong project to drive fiction away from the study of natural philosophy. Dating back to his first official communications to the Royal Society, such as the 1672 'New Theory about Light and Colors' letter, Newton declared that he would never 'mingle conjectures with certainties' in physical investigations – a view that fellow experimental philosophers found controversial.[3] In *Principia* and *Opticks*, the two works which secured his public fame, Newton further denounced the use of hypotheses. The very first sentence of the *Opticks* states the purpose 'not to explain the Properties of Light by Hypotheses, but to propose and prove them by Reason and Experiments'.[4] The point made by Newton was that speculative hypotheses had no place in natural philosophy. Accordingly, in Query 28 – first added to the Latin translation *Optice* (1706) and translated back into English in the second edition of *Opticks* (1718) – Newton attacked unnamed 'philosophers' (most likely Descartes and his followers) who kept on 'feigning hypotheses for explaining all things mechanically', whereas the 'main Business of natural Philosophy is to argue from Phaenomena without feigning Hypotheses'.[5]

For various reasons – among which a certain reluctance to engage in public disputes and a studied reticence aimed at promoting his image as a solitary scholar – the repudiation of hypotheses is not a point Newton ever elaborated on at length other than in a few scattered

remarks.[6] One of them is found in the commentary to the third rule for the study of natural philosophy, which Newton added to the second edition of the *Principia* (1713):

> Certainly idle fancies ought not to be fabricated recklessly against the evidence of experiments, nor should we depart from the analogy of nature, since nature is always simple and ever consonant with itself.[7]

Newton considered hypotheses as unfaithful surrogates of nature. By creating conjectures, the faculty of imagination replaces the evidence of experiments and observations with fictions that, although verisimilar, are erroneous representations of reality.[8] Therefore, observers who wish to know natural phenomena must constrain their imagination. Newton synthetized this position in the 'hypotheses non fingo', an expression that, contrary to the translation offered by Andrew Motte in 1729, is best rendered as 'I do not feign hypotheses' (rather than 'I do not frame hypotheses'). The verb *fingere*, from which the noun *fictio* derives, is essential to Newton's point: the fictional hypotheses produced by the imagination are *the* distorting factor that hinders the attainment of truth about nature.[9]

As Alan Shapiro observes, Newton's pronouncements against hypotheses is not absolute. Newton's aim was to 'demarcate the conjectural from the certain', so the hypotheses he wished to eschew were what Shapiro calls 'conjectural causal explanations' – that is, hypothetical explanations of natural phenomena that are not put to the test of experiment.[10] This distinction between 'good' and 'bad' hypotheses helps explain why Newton used the word 'hypotheses' in the first edition of the *Principia* and devoted the final section of his *Opticks* to speculative 'Queries' (in which he postulated the existence of a subtle aether acting between bodies, for instance).[11] Only in the 1715 anonymous review of the *Commercium* (the Royal Society report on the calculus dispute between Leibniz and Newton himself) would this distinction be clearly stated. 'We are not to fill this Philosophy with Opinions which cannot be proved by Phænomena', Newton wrote, and 'Hypotheses have no place, unless as Conjectures or Questions proposed to be examined by Experiments'.[12]

While this nuanced distinction between fictional and experimental hypotheses went mostly unnoticed to the general public, the invitation to avoid hypotheses was rapidly becoming a general precept used in the conversation of high society. According to Francis Hauksbee, an experimental philosopher close to Newton, the 'learned World' were then 'now almost generally convinced that instead of amusing themselves with Vain Hypothesis, which seem to

differ little from Romances', must ground their knowledge on 'Demonstrations and Conclusions founded upon Experiments judiciously and accurately made'.[13] The popularity of Newton's anathema against conjectures was due to at least two factors. One was the enormous social influence Newton had been accruing over the years. His soaring popularity, not unlike that of famous aristocrats, made his views very fashionable even among laypersons.[14] The other factor was the spread of Newton's ideas in society at large. Popularizations proved instrumental in divesting Newton's key ideas of the forbidding mathematics in which they were originally conveyed. In particular, the indictment of hypotheses was distilled into a more captivating language. In the preface to the second edition of the *Principia*, Roger Cotes, Newton's close assistant and Plumian Professor of Mathematics, explained that the 'true constitutions of things […] is obviously to be sought in vain from false conjectures'. Persevering in this habit is the same as 'drifting off into dreams' or, even worse, 'putting together a romance, elegant perhaps and charming, but nevertheless a romance'.[15] Prefacing the *Principia* with the analogy between hypotheses and the romance (a genre well known to the reading public for its unrealistic plots and fantastical notions) made the 'hypotheses non fingo' accessible to a wider audience.[16] This was no small feat, given the *Principia*'s reputation as a book 'for the Few' because of 'the Manner and Matter of it placing it out of the Reach of the Generality even of Learned Readers'.[17]

This is where a divide between Newton's own ideas and their public dissemination was formed. Second- and third-hand readings of the *Principia* and the *Opticks*, as well as public demonstrations, poems and letters, elaborated on the import of Newton's ideas for British society at large.[18] As this happened, Newton's ideas came to be separated from Newtonianism, a multifaceted cultural process which, following Betty Jo Teeter Dobbs and Margaret Jacob, may be loosely defined as the 'different and complex appropriations of Newton's work that occurred in the eighteenth century'.[19] A clarification is in order here. Earlier I implied that Newton's public figure and the diffusion of his ideas were two separate processes. In fact, popularisations, commentaries and celebratory material presented Newton as the hero who had true knowledge available to the many.[20] This process started with the publication of the first edition of the *Principia*, which was premised by a Latin poem written by astronomer Edmund Halley, the man who had persuaded Newton to publish the book.[21] Halley's *An Ode on This Splendid Ornament of Our Time and Our Nation* describes Newton as 'dear to the Muses' ('Musis charum', in the original), a status obtained thanks to his ability to open 'the treasure chest of Hidden Truth' ('clausi […] scrinia veri'). Newton thus marks a turning point in

history. Once the *Principia* unveiled the secrets of nature, Newton's readers were also lifted to the same level of penetration enjoyed by its author. As Halley put it, Newton '[e]xalted the human lot' ('humanam sortem […] extulit') by admitting everybody 'to the banquet of the gods' ('Superis convivae admittur').[22]

According to Henry Pemberton's widely-read *A View of Sir Isaac Newton's Philosophy* (1728), one of the merits of Newton lies with his having shown that the human mind has a penchant for 'the contemplation of truth' and the discovery of causes. Love for truth is not limited to the few brilliant minds who mastered the superior mathematics required to read the *Principia* in its entirety.[23] As Pemberton argues, 'all men are moved with a strong desire after knowledge, esteeming it honourable to excel therein; and holding it, on the contrary, disgraceful to mistake, err, or be in any way deceived'.[24] It was Newton who had shown that by avoiding hypotheses everybody could be bestowed with the power to know without being deceived – a power that nobody prior to Newton's coming had ever enjoyed. As a 1753 issue of *Adventurer* concluded with powerful imagery, '[w]e are now no longer to wander through the intricate mazes of hypothesis and conjecture', for Newton 'has dissolved the chaos, and separated the light from the darkness'.[25]

The darkness in question could be that of impious foreigners like Descartes and Spinoza, or that of countrymen like John Toland or Thomas Hobbes who were regularly accused of adopting heretical positions.[26] More often, however, it referred to the conjectures made by the ancients, over whom Newton had reportedly sanctioned the epistemological superiority of the moderns. A flavour of just how widespread this belief was may be gained from the words of George Gordon, one of Newton's staunchest critics. Gordon argued that Newton had failed to practice what he preached, inasmuch as concepts like universal gravitation were 'Instances of unintelligible Causes' which, notwithstanding their 'Mathematical Dress', were 'as monstrous as any of the Fictions of Antiquity'.[27] Although scathing about Newton, Gordon's attack is based on the transition from the credulity of the ancients to the penetration of the moderns which was commonly associated with Newton's advent. To understand what these 'Fictions of Antiquity' exactly referred to, we need to disentangle a few strands in the development of the image of Newton as a champion of the moderns.

In the English version of the *querelle* between the ancients and the moderns, Newton's name was often made to exemplify the breakthroughs of modern experimental philosophy. As Greg Lynall reminds us, this is what happened when the Royal Society asked one of his fellows, William Wotton, to write a survey of knowledge that celebrated modern learning in response

to William Temple's *Essay upon Ancient and Modern Learning* (1690).[28] In Wotton's *Reflections upon Ancient and Modern Learning* (1694), Newton was numbered (alongside the likes of Boyle, Descartes, Huygens and Leibniz) among the pinnacles of the modern spirit of science which had amended the fanciful theories of past philosophers. Wotton's category of the 'ancients' covers a rather long timeframe, from classical antiquity to the period prior to the publications by the first experimental philosophers. A few years earlier, Halley's *Ode* had similarly pitted the sagacity of those who had read the *Principia* against a heterogeneous group of 'ancients' that comprised classical philosophers (the 'veterum Sophorum', in the Latin original) and members of the 'Scholas' – that is, Scholastics such as Thomas Aquinas.[29]

After Newton's death, however, the category of the 'ancients' which he was set against began to be restricted to antiquity proper, especially that of the Greeks.[30] Voltaire's *Elements of the Philosophy of Newton*, written in French in 1738 and translated into English in the same year, presents Newton's 'hypotheses non fingo' as an attack to the fanciful theories of 'the *Greeks*'. As Voltaire contends, 'there is but one Way that leads to Truth', and that is that shown by Newton to shed light on the darkness that Greek philosophers had been engulfed in. The difference between the philosophy of the ancients and the 'new Philosophy' of Newton is precisely that in the latter no conjectures are feigned. This appears clearly from Voltaire's remark that the 'Name of new Philosophy would be no more than the Title of a new Romance, if it implied only the Conjectures of a Modern in opposition to the Notions of the Ancients'.[31]

The Antiquarian Spirit of Newton's *Chronology*

Had Newton been able to read Voltaire's words, chances are he would have disagreed. As an undergraduate at Cambridge Newton was an avid student of Descartes' *La Géométrie* (1637), but over time he became persuaded that Pythagoras and Plato, as well as geometers like Euclid and Pappus were superior in their knowledge of nature to the Frenchman – indeed, superior to all philosophers past and present.[32] This remained a long-standing belief. The very *Principia* was meant as a restoration of the *prisca sapientia*, the knowledge of the ancients which, according to Newton, was corrupted once the philosophy of the Greek geometers had been popularised for the masses and idolatry had ensued.[33] Newton's allegiance to the ancients was clear to people within his inner circle, such as Swiss mathematician Fatio de Duillier, who reported that 'Monsieur Newton croit avoir decouvert assez clairement que les Anciens comme

Pythagore, Platon &c. avoient toutes les demonstrations qu'il donne du veritable Systeme du Monde', and David Gregory, who noted that when drafting the second edition of *Principia*, Newton sought to make parts of his philosophy agree more closely with those of the Greek heliocentrists.[34]

Newton's interests in the ancient Greeks is key to understanding his historiographical interests, and, in turn, the *Chronology.* His proposed reappraisal of ancient chronology is tied to theological studies, which led him to believe that ancient priests were geometers who 'possessed a perfect understanding of the true frame of nature'.[35] What Newton wanted to discover was how and why religion was corrupted, and such a question required to accurately reconstruct the chain of historical events that had made the rise of idolatry possible in the first place.[36] It was with this goal in mind that he did historical research for works intended for personal use or restricted circulation such as the *Theologiae Gentilis Origines Philosophicae* (probably began in 1672) and the *Original of Monarchies* (1687–93). Both studies were aimed at synchronizing important dates of antiquity from different annals with those mentioned in the Bible.

When Newton began his studies on antiquity early in his life, universal chronology was a hotly-debated topic, one that commentators as erudite as Scaliger, Petavius, Archbishop Ussher, John Marsham and Henry Dodwell had all engaged with at length. The 'really thorny problem', as Frank Manuel puts it, was to match the events and the names of biblical history with those that were reported in the records of the Egyptians, the Assyrians, the Babylonians, the Persians, the Greeks and the Romans.[37] In this respect, a particularly salient problem often raised by seventeenth-century chronologists was that of Greek texts, which were not always reliable. These made up the bulk of sources available, but their contents were often marred by fantastical reconstructions of real historical events. In the *Chronology*, Newton chose to tackle this problem by analyzing the Greek texts side by side with the annals of the Chaldeans, the Egyptians and the Persians. The historiographical method used in the *Chronology* may be described as comparative close reading, with sources collated together so as to identify the same events, places and historical characters and sort out any discrepancies in the names and dates.

By carefully comparing and analysing texts, post-Flood chronology 'could be written up with some degree of truth'.[38] As the relatively modest expression suggests, the careful scrutiny of textual evidence was hardly the same as the methodology of experiments, observations and mathematical verifications that was adopted in the *Principia* and the *Opticks*.[39] To be sure,

some of the strategies deployed by Newton to re-date ancient events were based on mathematical calculations. Historical records from different kingdoms are analyzed to infer that kings reigned for an average of 18 to 20 years. Postulating that Greek kings before the rise of the Persian empire reigned 35–40 years each, as was done by Greek chronologers Timaeus (c. 345–c. 250 BC) and Eratosthenes (c. 276–c. 195–194 BC), goes 'so much beyond the course of nature' that it must be fiction.[40] Moreover, astronomical data – the reconstruction of colures throughout ancient history and the calculation of axial precession – was also used to date events in ancient history, most famously the Argonautic expedition.[41]

But this is as close as Newton gets to the 'hypotheses non fingo'. The *Chronology* is mainly couched in the interpretations of ancient texts, an area in which Newton was as familiar as the most learned antiquarians. Even if arguments drawn from astronomy 'are accounted the surest', as Newton himself wrote, the data used to calculate the colures and re-date the Argonautic expedition was obtained through what Manuel calls 'a knotty chain of textual exegesis', particularly of a fragment of Hipparchus (which reported the description of colures made by the Greek astronomer Eudoxus); bits from *Phenomena*, the poem on constellation and celestial events by Greek poet Aratus; and parts of a later introduction to *Phenomena* written by Achilles Tatius.[42] This point did not escape highly-respected experts of antiquity, such as Jesuit father Etienne Souciet and, most importantly, the then leading scholar of antiquity Nicolas Fréret. Fréret, whose commentary to the *Abregé* was translated and annexed to the publication of *Abridged Chronology* in 1727, immediately noticed that Newton's re-datings were not mathematically objective but relied on the interpretation of past sources, some of which were highly controversial.[43]

That Newton made use of astronomy and mathematics to amend some of the disputed dates in antiquity does not entail that he 'imported into his historical work a version of the methodology informing his scientific research', as Mordechai Feingold has claimed.[44] Newton was no doubt aware that the evidence fostered in the *Chronology*, including the astronomical observations based on which Newton calculates the precession of the equinoxes, did not amount to the certainty of mathematics which he presented in his scientific works.[45] The evidence presented is rather speculative, and the *Chronology* lacks the lexicon of demonstration and certainty that populates the *Principia* and the *Opticks*. Perhaps Newton would not have been happy with Garry W. Trompf's assessment that his historiographical enterprise 'was agonized out of age-old theological premises about scriptural truth, untestable hypotheses about ancient events and apocalyptic symbology'.[46] But a similar point is made in the final

sentence of the introduction to the *Chronology*, where the 'amended' dates are said to depend on a combination of mathematical calculations, biblical and lay exegesis and the internal consistency of the *Chronology* itself.[47] Often, as Manuel notes, these criteria were used interchangeably, so much so that Newton might be said to treat 'mere literary tradition as empirical scientific reality'.[48]

This scatter-brained use of sources was typical of antiquaries, but the very use of mathematics to date chronological events was in a sense traditional to antiquarian studies, as Newton must have known from close friends like Halley and Folkes, who were both renowned antiquarians. Before joining the Society of Antiquaries in 1720, for example, Halley had used astronomical calculations in his 'Discourse Tending to Prove at what Time and Place, Julius Caesar Made his first Descent upon Britain'.[49] Halley himself referred back to a lineage of sixteenth- and seventeenth-century historians who had tried their hand at such feats, Joseph Scaliger and Petavius being the most important and influential precursors.[50] Significantly, however, Scaliger had given up using astronomical evidence to establish chronological dates because the sources on which it rested were not reliable enough. When Fréret chastises Newton for his naïve use of dubious sources (such as Plutarch), the implication is that he had behaved like the credulous antiquarians described by Rosemary Sweet: amateurish in their enterprise and ready to take at face value any sources that supported his prejudiced interpretation.[51]

Antiquitas Non Fingo: The Scientific History of Ancient Times

The points mentioned above make Newton's *Chronology* a relatively conventional work within the well-established tradition of universal chronology. In spite of this, the *Chronology* made waves both in its pirated abstract and its complete version. This was due to both the fame of its author and the radical claims he had made. As Fréret put it, 'The bare Name of an Author so famous as Sir *Isaac Newton*, is sufficient to raise the Curiosity of the Learned', a curiosity that is 'inhanced, by the singularity of the Opinions'.[52] The 'singularity' in question is that of the dates of Greek chronology Newton had drastically changed, especially those of the Argonautic Expedition and the Fall of Troy.[53] As Nikos Kokkinos explains, such dates were the 'universal reference points in antiquity' set by Eratosthenes, who in the seventeenth century was still widely regarded as having produced 'the standard chronology of the ancient world'.[54] Newton's alterations were momentous because they went opposite to the consensus of

chronologers past and present and because they were made by a thinker recognized as a genius across the whole of Europe. In France, however, Newton's name was not enough to shield him from criticism. Fréret was straightforward in pointing out that Newton had grossly misinterpreted past sources, especially those by the ancient astronomers Meton and Eudoxus and historian Plutarch. According to the French antiquarian, these mistakes were due to 'Prejudices' that persisted 'notwithstanding the Philosophical Light which at present shines in *Europe*' – an unmistakeable jab at Newton's reputation as the enlightened philosopher of the 'hypotheses non fingo'.[55]

The story was quite different in Britain. There, Newton's dual reputation as a great man and an infallible philosopher vouched for the scientific validity of the *Chronology*. In the dedication to Queen Caroline, John Conduitt stressed Newton's 'usual accuracy' is observable in his chronological enterprise, with 'his suggestions' being supported by 'all the authorities and proofs that the whole compass of Science can furnish'.[56] But the fact that Newton's are only 'suggestions' (and not 'principles') foreshadows that in this case accuracy was a refraction of Newton's public reputation rather than something found in the text. This impression is confirmed by the admission that chronology is 'in its nature incapable of the demonstration upon which his other writings are founded'.[57]

With admirable discursive acrobatics, Conduitt (who was familiar with Newton's thoughts from first-hand access to his conversation and private papers) manages to conceal the imperfections of Newton the Chronologist and give relevance to the infallible Newton of the moderns – the philosopher of the 'hypotheses non fingo' who could make all knowledge demonstratively certain, ancient history included. In this respect, Conduitt's invocation of astronomy as a means to 'illustrate Antiquity' was something of a bait for the enthusiastic British contemporaries who were familiar with Newton's name and were ready to trust everything that bore his imprint.[58] This strategy failed to persuade everybody, but critics delivered their remarks very carefully, lest the sacred memory of the late Newton be offended. In its comment on Newton's *Chronology*, the *Grub Street Journal* made a miracle of politeness when writing that the 'extraordinary fame and reputation of this great man in some arts and sciences, may probably induce persons to pay too great a deference to his opinion in others'.[59] Similarly, Arthur Bedford's *Animadversions upon Sir Isaac Newton's Chronology* (1728), a meticulous breakdown of the inconsistencies in Newton's work (and the shocking implications it had on biblical history), recognized that 'Most People, who have been acquainted with the superior Parts and Abilities of the Author, conclude, that the Work must be every Way

becoming so great a Man'.[60] As Bedford's carefully-worded sentence shows, to the vast majority of Britons it was enough that Newton had engaged in ancient chronology. For the 'God-like *Man*' who had described nature with exactness, who had guided his contemporaries 'Thro' ev'ry Maze' of knowledge, success was the only possible result.[61] As translator and writer Thomas Cooke put it, any mistakes Newton might have made were but mere 'spots on a refulgent Shield' which commentators should point out with 'all due Reverence to the Memory of our learned Author'.[62]

It was the same propaganda that had made Newton into the champion of the moderns which enforced the interpretation of the *Chronology* as the work that made ancient history certain. As the story went, the same exceptional penetration that had allowed Newton to determine the laws of nature and unveil the mysteries of light and colour had also enabled the philosopher to detect the fictions spread by the ancients. According to this view Newton's reappraisal of ancient history was based on an intimate knowledge of natural phenomena against which the validity of all past sources had been measured. The implication of this position was that Newton knew ancient history better than the ancients themselves, in that he had verified the sources against those phenomena of nature, such as astronomy, which have always been the same since the universe was created. By comparing written accounts with the 'analogy of nature', Newton could single out the historical events stemmed by the imagination of the ancient writers and amend them, bringing order to the confusion that reigned in our knowledge of antiquity.

This is the point developed by Andrew Reid's in his famous defence of the *Chronology*, which was first published in 1728 as an article in his periodical *The Present State of the Republick of Letters* and then expanded into a book-length publication dedicated to John Conduitt. In Reid's work, ancient history prior to Newton is described as 'a rude heap of confusion, without light, order, beauty or use'. Thanks to the philosopher's judgment and accuracy – the very same qualities at work in 'all his other performances' – a revolution in this field was eventually brought about. Newton's arguments, which are drawn from 'the whole Compass of Science', are so compelling that they transmuted the fickle 'Poets, Historians and Critics' of old into gold – that is, into certain knowledge.[63] At the end of his long defence, Reid offers a depiction of Newton as the philosopher who had reformed antiquity for the benefit of his contemporaries. The passage is so eloquent that it bears quoting at some length:

> The great events of Antiquity had long lain like the ruins of some mighty building, demolished by the injuries of time, and hid in rubbish, notwithstanding the many attempts

> made to repair it. But at last we see the noble structure rise, in all its original symmetry, strength, and beauty; every material being restored to its ancient and proper place by the masterly hand of Sir ISAAC NEWTON! a man born to be the honour of his country, and of human nature itself; the glory of his own age and the admiration of all succeeeding ones; born for the universal good and improvement of mankind, to instruct them in the most delightful and useful knowledge and to correct those errors that were in a manner consecrated by their antiquity, and established by the authority of great names; who alone has taught us more than all the Philosophers before him; who has so clearly explained the greatest mysteries of nature and obscurities of history, that he has hardly left us anything to wonder at but himself.[64]

Reid's rapt words encapsulate the conversion of Newton into the philosopher who could dissolve all obscurities, though he was hardly the only commentator who carried out this project. In the 1728 *Elogium of Sir Isaac Newton*, whose French original was based on notes provided by John Conduitt, Fontenelle anchored Newton's authority in amending ancient chronology in his revolutionary scientific discoveries, emphasising that the 'main design of [the] System of Chronology' was the reformation of ancient chronology through the use of astronomy.[65] This was a rather inaccurate summary of Newton's work, but the point seemed to be less what the original contained than its cultural function. This is why, referring to the abridged version of the *Chronology*, Fontenelle argues that, notwithstanding the fact that Newton 'had no thoughts of publishing', his contemporaries were justified, compelled even, in seizing the work from him. In a passage that prominently displays how Newton's image was appropriated by his contemporaries, Fontenelle claims that:

> A curiosity excited by such a particular piece of Sir Isaac Newton could hardly be hindered from employing the utmost address to come as so great a treasure, and in truth they must have been very severe who would have condemned such a curiosity.[66]

Such a forceful 'curiosity' was the result of the great expectations in Newton's ability to revise sources by bringing the study of antiquity to a level of certainty akin to that achieved in the *Principia* and the *Opticks*. Fontenelle's contention that 'tho' it should happen that the strongest arguments were on one side, and only Sir Isaac's name on the other, perhaps the World would remain some time in suspence, and perhaps with reason' reveals that the real value of the

Chronology was something of a moot point compared to the expectations produced by its having been written by none other than Newton, the genius who had shed the light of demonstration on all knowledge.[67] As Manuel has claimed, mathematics in Newton's hands 'seemed a universal instrument capable of resolving all problems', including that of freeing history 'from its alloy of mythological fictions'.[68] Although the *Chronology* did not deliver on these expectations, the reputation of its author in Britain was such that the end result mattered less than the fact that Newton had engaged in the topic. Being the 'last production of that vast and creative Genius', the *Chronology* was ipso facto considered 'as containing as great and bold a discovery in Chronology, that branch of literature so essential to History, as any made by him in Astronomy, or Optics'.[69]

Conclusion: The Astronomical Principles of Scientific History

As Newton's figure was claimed by the moderns to sanction their epistemological superiority over the ancients, the actual merits of the *Chronology* were progressively disregarded in favour of the vague claim that Newton had detected the fictions of past sources and reformed ancient history for good. The complex nuances that animated the original text – Newton's allegiance to the ancient Greek geometers and heliocentrists, his initial reluctance to publish the text, the religious misgivings, the mix of mathematical calculation and textual evidence from dubious authorities, the criticism advanced by Fréret, and so forth – tended to be smoothed over by the prestige enjoyed by the image of Newton. It did not matter much that '*Truth'* had not been hit upon, for the *Chronology* was believed to be 'so consistent with the course of Nature' that the 'fabulous Stories of the Antients' were considered to have been amended.[70]

As the years went by, the role played by mathematics to reform the erroneous dates of antiquity was magnified, to the point that Newton was said to have identified 'principles' in ancient historiography in much the same fashion as he had done with the motion of heavenly bodies of the *Principia*. This development seems to be part of a wider trend of appropriation of Newton's lexicon of principles and axioms, which, as Paolo Casini has shown, was common in moral and political discussions from the 1740s.[71] Benjamin Martin's popular *Philosophia Britannica: or a new and comprehensive system of the Newtonian philosophy, astronomy and geography* (1747) went as far as to talk about 'Astronomical Principles of CHRONOLOGY' as the basis of Newton's reassessment of ancient events.[72] Newton's heavenly discoveries loomed large in the collective imagination, so the magnification of arguments from astronomy is not

surprising. But the idea of 'principles' in ancient chronology rested less on astronomy *per se* than on Newton's reported familiarity with the 'course of nature'. As a result, the calculation of the precession of the equinoxes was usually accompanied by another principle, that of the average estimate of the reign of each king in antiquity. In the anonymous comment that appeared in *The Monthly Review* in 1757, these two 'fundamental principles' prove Newton's knowledge that the principles of nature are immutable and universal. Historical events that had been 'dislocated and obscured by hypotheses, and by the intercalation of a fabulous antiquity' were restored by Newton 'to their proper places' by simply focusing on how nature behaves.[73]

Factoring in nature was what made people see Newton's *Chronology* as a crucial development in eighteenth-century historiography, especially the area that dealt with deep antiquity (XI–VIII centuries BC), the so-called 'dark age' of knowledge.[74] Samuel Musgrave, both a classical scholar, a physician and a Royal Society fellow, began his *Examination of Sir Isaac Newton's Objections to the Chronology of the Olympiads* by observing that Newton's use of 'mathematical knowledge' produced laws of nature which were serviceable not only in understanding natural phenomena but also in 'unravelling the difficulties of ancient history, and reconciling the discordant epochas of different nations'.[75] Similarly, Joseph Priestley devoted a section of his 1788 *Lectures on History* to 'the Use which Newton has made of Observations on the Precession of the Equinoxes in rectifying ancient Chronology'. Such a revolutionary feat, Priestley argues, was made possible because Newton applied 'principles' that are 'founded on nature, and independent of any arguments drawn from scripture' to ancient history.[76]

While history and chronology were traditionally considered as related, yet separate disciplines, the distinction disappears in these commentaries on Newton in favour of the more general concept of 'scientific history'. The antiquarian erudition typical of chronology gets sacrificed because studying 'history scientifically' means knowing the basic principles of human nature. It is significant that Priestley's first requirement for the scientific historian is philosophical knowledge. This, rather than great familiarity with historical facts, is what allows the historian to 'distinguish between the most absurd chimeras of eastern romance, and the most natural historical relations'.[77] In this respect, one could argue that Newton's *Chronology* represented a shift in the way antiquarian enquiries into the ancient past were made. When James Playfair, member of the Antiquarian Society of Scotland and geographer for the Prince of Wales, presented his *System of Chronology*, he was positive that 'Chronology is a science'. The method of this science rests not on the correct interpretation of historical sources but on

the apprehension of 'things in their natural order'. As Playfair explains, without the aid of a scientific chronology,

> The obscure labyrinths of antiquity could not be pervaded; nor could the materials of historical information, found in the records of time, be arranged and adjusted. The chain of causes and effects, that reaches from the creation of the world to the present moment, would lie disjointed and broken before us. […] All would be confusion and chaos. When chronology and history unite their efforts, in tracing the connection and dependence of events, and in distributing these into proper periods, light arises out of darkness, our knowledge of human life is improved.[78]

Driven by the aim to 'explain the principles of this science, to trace the great lines of history, to ascertain the dates of remarkable events', past chronological accounts are criticized because they fail to avoid feigning unverified hypotheses.[79] In a curious ironical twist, Playfair chastises Newton himself because he had founded his *Chronology* upon 'suppositions, which are admitted without proof'.[80] As George Gordon had done early in the century, Newton was once again accused of having failed to comply with his own 'hypotheses non fingo' – that is, of not measuring up to the standard he himself was believed to have set.

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[1] Cornelis J. Schilt, 'Manuscripts and Men: The Editorial History of Newton's *Chronology* and *Observations*', *Notes and Records: The Royal Society Journal of the History of Science* (2019), p.1–4. See also Frank E. Manuel, *Isaac Newton, Historian* (Cambridge, MA: The Belknap Press of Harvard University Press, 1963), p.21–36.

[2] Isaac Newton, *The Chronology of Ancient Kingdoms Amended* (London, 1728), p.1.

[3] In 'New Theory', Newton argued that for knowledge about natural phenomena to be as certain as mathematics, it had to be 'evinced by the mediation of experiments concluding directly & without any suspicion of doubt'. Newton, *MS Add. 3970.3* (Cambridge: Cambridge University Library), f. 462v. Newton's attack to conjectural knowledge did not sit well with early Royal Society practitioners like Robert Hooke, according to whom Newton's assured language was too dogmatical. See Zev Bechler, 'Newton's 1672 Optical Controversies: A Study in the Grammar of Scientific Dissent', in Yehuna Elkana (ed.), *The Interaction Between Science and Philosophy* (Atlantic Highlands, N.J.: The Humanities Press, 1974), p.116–117.

[4] Isaac Newton, *Opticks, or, a Treatise of the Reflections, Refractions, Inflections & Colours of Light*, ed. I. Bernard Cohen (New York: Dover Publications, 1979), p.1.

[5] Newton, *Opticks*, p.369.

[6] Robert Iliffe, '"Is He Like Other Men?" The Meaning of the *Principia Mathematica*, and the Author as Idol', in Gerald Maclean (ed.), *Culture and Society in the Stuart Restoration: Literature, Drama, History* (Cambridge: Cambridge University Press, 1995), p.159–160, 175. On Newton's solitude as the cultivated pose of the man of genius, see Steven Shapin, '"The Mind Is Its Own Place": Science

and Solitude in Seventeenth-Century England', *Science in Context* 4:1 (2004), p.194, 205–206; Simon Schaffer, 'Newton on the Beach: The Information Order of Principia Mathematica', *History of Science* 47:3 (2009), p.243–247.

[7] Isaac Newton, *Philosophiae Naturalis Principia Mathematica,* I. Bernard Cohen and Anne Whitman, eds (Berkeley, Los Angeles, and London: University of California Press, 1999), p.795. The Latin original read: 'Certe contra experimentorum tenorem somnia temere confingenda non sunt, nec a Naturae analogia recedendum est, cum ea simplex esse soleat & sibi semper consona'. In Newton, *Philosophiæ naturalis principia mathematica* (Cambridge, 1713), p.357–358.

[8] Following eighteenth-century usage, I tend to use hypotheses and conjectures as synonyms unless otherwise specified.

[9] I. Bernard Cohen, 'The First English Version of Newton's Hypotheses Non Fingo', *Isis*, 53 (1962), p.381.

[10] Alan E. Shapiro, *Fits, Passions, and Paroxysms: Physics, Method, and Chemistry and Newton's Theories of Colored Bodies and Fits of Easy Reflection* (Minnesota: University of Minnesota Press, 2009), p.17.

[11] Newton designed the 'Queries' section to freely entertain, and comment on, suppositions on various subjects so that they did not interfere with the theory of colours and light presented in the main body of *Opticks*. For a philosophical discussion of whether Newton believed certainty was attainable in natural philosophy, see Kirsten Walsh, 'Newton: From Certainty to Probability?', *Philosophy of Science*, 84 (2017), p.866–867.

[12] *Philosophical Transaction of the Royal Society of London* (1 January 1714).

[13] Francis Hauksbee, *Physico-Mechanical Experiments* (London, 1709), 'Preface'. See also Larry Stewart, *The Rise of Public Science: Rhetoric, Technology, and Natural Philosophy in Newtonian Britain, 1660–1750* (Cambridge: Cambridge University Press, 1992).

[14] See Patricia Fara, *Newton. The Making of Genius* (London: Macmillan, 2003); Al Coppola, *The Theater of Experiment: Staging Natural Philosophy in Eighteenth-Century Britain* (Oxford: Oxford University Press 2016), p.19–22. Just to give some proportion on Newton's public fame, Milo Keynes counts an estimated 122 portraits and 109 sculptures of Newton. See Keynes, *The Iconography of Sir Isaac Newton to 1800* (Suffolk: Boydell Press, 2005).

[15] Roger Cotes, 'Editor's Preface to the Second Edition', Newton, *Principia*, p.386.

[16] See John Bender, 'Enlightenment Fiction and the Scientific Hypothesis', *Representations* 61 (1998), p.6–8.

[17] Benjamin Sarum, 'Preface', in Samuel Clarke, *Sermons* (London, 1730), p.iii.

[18] See Laura Miller, *Reading Popular Newtonianism: Print, the* Principia*, and the Dissemination of Newtonian Science* (Charlottesville: University of Virginia Press, 2018), p.37–70.

[19] Betty Jo Teeter Dobbs and Margaret C. Jacob, *Newton and the Culture of Newtonianism* (Atlantic Highlands, NJ: Humanities Press, 1995), p.66. According to Teeter Dobbs and Jacob. the transition to Newtonianism was first marked by Richard Bentley's natural theology and Desaguliers' public experiments. In some ways, the development to a wider use of Newton's ideas had been adumbrated by the philosopher himself, who, in the conclusion to Query 31 of the *Opticks*, suggested that if his method were extended beyond natural philosophy, 'the Bounds of Moral Philosophy will be also enlarged'. Newton, *Opticks*, p.405.

[20] The definition of Newton's 'apotheosis' is by Mordechai Feingold. See Feingold, *The Newtonian Moment: Isaac Newton and the Making of Modern Culture* (New York and Oxford: The New York Public Library and Oxford University Press, 2004), p.169–191.

[21] Far from being dispensable para-textual material, Stewart argues that Halley's panegyric was one of the very first steps in the creation of consensus over Newton's reputation in society. See Stewart, *Rise of Public Science*, p.xxix.

[22] Edmond Halley, 'Ode on This Splendid Ornament of Our Time and Our Nation, the Mathematico-Physical Treatise by the Eminent Isaac Newton', in Newton, *Principia*, p.380. The Latin original was reprinted in W. R. Arbury, 'Halley's Ode on the Principia of Newton and the Epicurean Revival in England', *Journal of the History of Ideas* 39:1 (1978), p.26.
[23] Quoted in D. T. Whiteside, 'The Mathematical Principles Underlying Newton's *Principia Mathematica*', *Journal for the History of Astronomy* 1:2 (1970), p.116.
[24] Henry Pemberton, *A View of Sir Isaac Newton's Philosophy* (London, 1728), p.2–3.
[25] *Adventurer* (5 March 1754).
[26] Margaret C. Jacob, 'Newtonian Science and the Radical Enlightenment', *Vistas in Astronomy*, 22 (1979), p.546.
[27] George Gordon, *Remarks Upon the Newtonian Philosophy* (London, 1719), p.6.
[28] Gregory Lynall, *Swift and Science: The Satire, Politics, and Theology of Natural Knowledge, 1690–1730* (Basingstoke: Palgrave Macmillan, 2012), p.17.
[29] Halley, 'Ode', p.379. Albury, 'Halley's Ode', p.26.
[30] This is an issue made all the more complex by Newton's Enlightenment legacy, which in Britain tended to be conflated with that of John Locke. See Paolo Casini, 'Newton's "Principia" and the Philosophers of the Enlightenment', *Notes and Records of the Royal Society of London*, 42:1 (1988), p.41; John Henry, 'Introduction' in *Newtonianism in Eighteenth-Century Britain*, ed. William Sweet (Bristol: Thoemmes Continuum, 2004), p.v–xxxi. Some caution is needed when using 'Enlightenment' as an umbrella term. Margaret C. Jacob has shown that inquiries on the British Enlightenment must take into account that many thinkers championed Newton's name and natural philosophy in the name of an Enlightenment that was meant as an antidote for freethinking and rationalist positions. Margaret C. Jacob, 'Newtonianism and the Origins of the Enlightenment: A Reassessment', *Eighteenth-Century Studies*, 11:1 (1977), p.3–4. The British variety of the Enlightenment had less to do with continental materialism than with reason as that faculty by which we 'best understand ourselves and the world of nature through the use of our natural faculties', as John Gascoigne puts it. Gascoigne, *Joseph Banks and the English Enlightenment: Useful Knowledge and Polite Culture* (Cambridge, New York: Cambridge University Press, 1994), p.32. On the French-English dynamics in the early Enlightenment, see John Bennett Shank, *The Newton Wars and the Beginning of the French Enlightenment* (Chicago: Chicago University Press, 2008).
[31] François-Marie Arouet de Voltaire, *The Elements of Sir Isaac Newton's Philosophy*. *Translated from the French* (London, 1737), p.i, iii, 2, 4.
[32] See Niccolò Guicciardini, *Isaac Newton on Mathematical Certainty and Method* (Cambridge: Cambridge University Press, 2009), p.79–107.
[33] Rob Iliffe, *Priest of Nature: The Religious Worlds of Isaac Newton* (Oxford: Oxford University Press, 2017), p.199–203. See also Lynall, *Swift and Science*, p.58–59.
[34] See J. E. McGuire and P. M. Rattansi. 'Newton and the "Pipes of Pan", *Notes and Records of the Royal Society of London*, 21:2 (1966), p.109–110. Readers familiar with Newton's religious outlook could infer his preference for the ancients. Bishop Francis Attenbury, for example, was aware that Newton believed the ancients had been 'men of great genius and superior minds'. Quoted in Joseph M. Levine, *Battle of the Books: History and Literature in the Augustan Age* (Ithaca and London: Cornell University Press, 1991), p.40. It should also be added that Newton did not quite fit into the framework of the dispute between the ancients and the moderns. His allegiance to antiquity referred to ancient Greek heliocentrists and atomists such as Orpheus and Pythagoras, but he saw little difference between Aristotle and Descartes, for both had been prone to abandon empirical evidence in favour of conjectural explanations. See Iliffe, *Priest of Nature*, p.14–16, 204–206.
[35] Quoted in Tessa Morrison, *Isaac Newton's Temple of Solomon and his Reconstruction of Sacred Architecture* (Basel: Springer, 2011), p.36. See also Richard H. Popkin, 'Newton's Biblical Theology

and his Theological Physics', in Paul B. Scheurer and Guy Debrock (eds), *Newton's Scientific and Philosophical Legacy* (Dordrech, Boston and London: Kluwer Academic Publishers, p.81–97.

[36] Mordechai Feingold, 'Isaac Newton, Historian', in Rob Iliffe and George E. Smith (eds), *The Cambridge Companion to Newton* (Cambridge: Cambridge University Press, 2016), p.525.

[37] Manuel, *Isaac Newton, Historian*, p.37–38, 40.

[38] This quotation comes from one of Newton's manuscripts in the Yahuda collection. Quoted in Iliffe, *Priest of Nature*, p.209.

[39] This is obviously not to say that the methodologies of the *Principia* and the *Opticks* are the same. I concur with Thomas Kuhn's distinction between the *Principia* as the offshoot of the classical tradition of geometry and mathematics applied to natural phenomena (such as the movement of planets) and the *Opticks*, which displays elements of the mathematico-geometrical lineage but is mainly derived from a tradition that Kuhn calls 'experimental' and that has its founding father in Lord Bacon. See Thomas S. Kuhn, 'Mathematical vs. Experimental Traditions in the Development of Physical Science', *The Journal of Interdisciplinary History*, 7:1 (1976), 1–31.

[40] Newton, *Chronology*, p.52.

[41] Colures are the two circles which intersect each other at right angles at the poles. Each circle passes through the equinoctial points and the solstitial points of the sun's annual path across the heavens. Axial precession refers to the precession of the equinoxes at approximately one degree every seventy-two years.

[42] Feingold, 'Isaac Newton, Historian', p.544; Manuel, *Isaac Newton, Historian*, p.65–66.

[43] See Nicolas Fréret, 'Some Observations on the Foregoing Chronology', in Nicolas Fréret and Isaac Newton, *Some Observations on the Chronology of Sir Isaac Newton. To which is prefixed, his chronology; abridg'd by himself. Done from the French, by a gentleman* (London, 1728), p.51–103.

[44] Feingold, 'Isaac Newton, Historian', p.533.

[45] Newton, *Chronology*, p.174.

[46] Garry W. Trompf, 'On Newtonian History', in Stephen Gaukroger (ed.), *The Uses of Antiquity: The Scientific Revolution and the Classical Tradition* (Dordrecht: Springer, 1991), p.236.

[47] Newton, *Chronology*, p.8.

[48] Manuel, *Isaac Newton, Historian*, p.49. On p.51 Manuel adds that Newton 'drew upon satirical, even licentious, passages in writers such as Lucian for historical examples with the same dead seriousness […] with which he quoted a Church Father. Ovid's description of early Rome in the *Fasti* was for him of equal weight with Dionysius of Halicarnassus' *Roman Antiquities*'.

[49] See David Boyd Haycock, *William Stukeley: Science, Religion, and Archaeology in Eighteenth-Century England* (Woodbridge: Boydell & Brewer, 2002), p.125.

[50] Scaliger was so important that the young Isaac Barrow (mathematician, theologian and, later, Newton's tutor at Cambridge) embarked in the study of Euclid's *Elements* after reading Scaliger's astronomical commentary on the *Chronicon*, a fourth-century work on chronology by historian of Christianity Eusebius of Caesarea. See Jed Z. Buchwald and Mordechai Feingold, *Newton and the Origin of Civilization* (Princeton and Oxford: Princeton University Press, 2013), p.111. On Scaliger's legacy, see Anthony Grafton, *Joseph Scaliger: A Study in the History of Classical Scholarship* (Oxford: Oxford University Press, 1993). See also Anna Marie Roos, 'Taking Newton on Tour: The Scientific Travels of Martin Folkes, 1733–1735', *The British Journal for the History of Science*, 50:4 (2017), p.574.

[51] This position seems manifest from Fréret's argument that Plutarch, a major source for Newton's argument, is unreliable because he failed to make use of 'those Remains of Antiquity which have reach'd us, wherewithal to supply several of those Dates'. Fréret, *Some Observations*, p.54. On the stereotypes surrounding eighteenth-century antiquarians, see Rosemary Sweet, *Antiquaries: The*

Discovery of the Past in Eighteenth-Century Britain (London and New York: Hambledon and London, 2004), especially introduction and chapter 1.

[52] Fréret, *Some Observations*, p.52.

[53] Feingold, 'Isaac Newton, Historian', p.536.

[54] Nikos Kokkinos, 'Ancient Chronography, Eratosthenes and the Dating of the Fall of Troy', *Ancient West and East* 8 (2009), p.37–38.

[55] See, for example, Fréret, *Some Observations*, p.71.

[56] John Conduitt, 'To the Queen', in Newton, *Chronology*, p.vi.

[57] Conduitt, 'To the Queen', p.viii.

[58] Conduitt, 'To the Queen', p.viii.

[59] *Grub Street Journal* (3 May 1733).

[60] Bedford, *Animadversions upon Sir Isaac Newton's Chronology* (London, 1728), p.4.

[61] Allan Ramsay, *An ode. To the memory of Sir Isaac Newton; inscrib'd to the Royal Society of London, for the improving of natural knowledge* (London, 1727), p.2–3.

[62] *London Journal* (26 July 1729). Republished in Thomas Cooke, *The Letters of Atticus, As printed in the London Journal, in the years 1729 and 1730, on Various Subjects* (London, 1731), p.56.

[63] Andrew Reid, *An Abstract of Sir Isaac Newton's Chronology of Ancient Kingdoms* (London, 1732), p.2.

[64] Reid, *Abstract*, p.99–100.

[65] Bernard Le Bovier de Fontenelle, *The Elogium of Sir Isaac Newton* (London, 1728), p.25. See also Simon Schaffer, 'Fontenelle's Newton and the Uses of Genius', *Esprit Créateur* 55: 2 (2015), p.58.

[66] Fontenelle, *Elogium*, p.25

[67] Fontenelle, *Elogium*, p.26.

[68] Manuel, *Isaac Newton, Historian*, p.21.

[69] *The Monthly Review*, 108 vols (London and Edinburgh, 1757), vol. XVII.252–254. The *Chronology* was not Newton's last published work. His *Observations upon the Prophecies of Daniel and the Apocalypse of St John* and *An Historical account of two Notable Corruptions of Scripture* were published in London respectively in 1733 and 1754 (though the latter was anonymous and unauthorized). See Schilt, 'Manuscripts and Men', p.5–17, 19.

[70] Arthur Ashley Sykes, *An Examination of Mr. Warburton's Account of the Conduct of the Antient Legislators* (London, 1744), p.223. Sykes, a religious controversialist and friend to Samuel Clarke, would later possess part of Newton's theological papers. See Schilt, 'Manuscripts and Men', p.18–20.

[71] Paolo Casini, 'Newton's "Principia" and the Philosophers of the Enlightenment', *Notes and Records of the Royal Society of London*, 42:1 (1988), p.45. Richard Striner makes a similar point about politics. See Striner, 'Political Newtonianism: The Cosmic Models of Politics in Europe and America', *The William and Mary Quarterly*, 52:4 (1995), p.583–608.

[72] Benjamin Martin, *Philosophia Britannica: or a new and comprehensive system of the Newtonian philosophy, astronomy and geography* (London, 1747), p.431. Martin's book would count four editions by the end of the century.

[73] In *The Monthly Review*, 108 vols (London and Edinburgh, 1757), vol. XVII.254.

[74] Anthony Snodgrass, *The Dark Age of Greece: An Archaeological Survey of the Eleventh to the Eighth Centuries BC* (New York: Routledge, 2000).

[75] Samuel Musgrave, *Two dissertations. I. On the Græcian mythology. II. An examination of Sir Isaac Newton's objections to the chronology of the Olympiads* (London, 1782), p.121–122.

[76] Joseph Priestley, *Lectures on History, and General Policy* (Birmingham, 1788), p.100.

[77] Priestley, *Lectures on History*, p.103–105. One wonders if Priestley was also inspired by David Hume's *History of England*, especially the two volumes on Anglo-Saxon England published in 1761. Hume's own words at the beginning of the second volume conceived of ancient history as a science that

must abridge the ‘collection of facts’ through the deduction of ‘general theorems’ and ‘a few propositions’. David Hume, *The History of England from the Invasion of Julius Caesar to the Revolution in 1688*, 6 vols, ed. William B. Todd (Indianapolis: Liberty Fund, 1983), vol. II.4. On Hume as a scientific historian, see Duncan Forbes, *Hume’s Philosophical Politics* (Cambridge: Cambridge University Press, 1975), p.285–286.

[78] James Playfair, *A System of Chronology* (Edinburgh, 1784), p.1.

[79] Playfair, *A System of Chronology*, p.1.

[80] Playfair, *A System of Chronology*, p.35.