NEWTON IN THE SCHOOL OF TIME: THE 
CHRONOLOGY OF ANCIENT KINGDOMS 
AMENDED AND THE CRISIS OF 
SEVENTEENTH-CENTURY HISTORIOGRAPHY 

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Sir Isaac Newton's posthumously published Chronology of Ancient Kingdoms Amended (1728) poses a dilemma for readers of his scientific works. In this "history," rather than approaching the scientist celebrated for unbraiding light, we discover a Newton who, at first glance, seems more like Velikovsky, searching ancient records for a cataclysm in the solar system, or a former astronaut digging on Mount Ararat for the remains of Noah's ark. Already in the eighteenth century, as Bishop Horsley's first complete edition of the collected works illustrates, Newton's historical puzzling were pushed aside by a public that had come to view Newton as a benevolent but stern scientific savior.  Although Frank Manuel prepared the first serious study of the Chronology more than twenty years ago, Newton's history remains an opaque oddity, a work approached as if it were written in a language that waits to be decoded either by occult divination or by recourse to the scattered Newtonian archive. For David Castillejo, the "surface texture is so thick and boring as to be almost impenetrable"—unless, along with Castillejo, one learns to interpret Newton's occult procedures. Richard Westfall translates his frustration with the Chronology into a challenge: "I am prepared to defy anyone who has not read the early manuscripts to find any point at all in the forlorn and aimless chronologies that constitute the published work." Westfall's reaction suggests that it might not be only Newton who appears as an eccentric wanderer among ancient ruins but also the modern reader who seeks to negotiate the Chronology's terrain.

Yet despite its seeming impenetrability, we are hardly without clues for understanding Newton's Chronology. The work belongs to an established scholarly genre of Renaissance historiography and mythography that demonstrated that the prehistory of the ancient world could be sorted through and arranged systematically through the skeptical hermeneutics provided by euhemerism. Newton's history fits into an ongoing tradition of
seventeenth-century reinterpretations of ancient myths that read these “tales” as far more than examples of moral allegory. While fables remained useful for pedagogical purposes, as early eighteenth-century classroom texts show, they were thought to hold rich possibilities for studying the origins of ancient civilizations. In a manner that anticipates our own proclivity to (re)construct psychological case histories, seventeenth-century historians were convinced that by analyzing the records of prehistory they could delineate patterns useful in comprehending actions in the present. Their problem, of course, was to demonstrate in a convincing manner that the patterns they discovered were neither the results of wishful thinking nor projections of their own fantasies. In Newton’s case, it was precisely the claim for scientific authority that he and some of his followers attached to the Chronology that brought such attention to the work.

Westfall’s claim that the Chronology is a watered-down and nearly incomprehensible version of Newton’s theological manuscripts of the 1670s and 1680s, while it can hardly be ignored, exaggerates the opacity of the published work. Newton’s contemporaries found considerable point in the treatise without knowing his voluminous manuscripts. The Chronology, while fragmentary and at times opaque, offers grounds for investigating the ways in which Newton’s mathematical work is both complemented and legitimated by his historiography. More specifically, it provides a means for asking questions about the relationship between the different conceptions of time that appear to be operating in his mathematics and historical chronology. In contrast to the infinite extension of time implicit in mathematics, Newton conceives of historical time as finite and therefore, within his work on prehistory, susceptible to being narrativized. His historiography responds to hermeneutic inquiry precisely because it is engaged in reformulating mythological and historical narratives, in recasting what we might call the semiotics of time. 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 then demythologizing prehistory, Newton’s reconfiguration marks the creation of a new myths that allows his successors to construct a new “historical” lineage for emerging views in the eighteenth century of scientific and cultural progress.

Newton’s emphasis on prehistory and Greek mythology suggests that, in his mind, just as theorems and axioms establish the basis for mathematical systems, mythographic narratives constitute the foundation for subsequent historiography. Precisely because mythology takes on such a foundational character during the Renaissance, it becomes the site of critical and political debates; this is particularly true, as Nancy Struve argues, during times of political uncertainty, like the late seventeenth century. As Lyotard notes, societies fight over mythological pantheons because they become one with the ruling code. In this regard, Newton’s response to mythology is historically and politically situated: the Chronology becomes a means for ordering the present and anticipating—even transforming—the future. It is, then, a document fraught with ideological as well as historical and scientific significance.

Newton’s work on chronology emerges from a well-established seventeenth-century research program. Since antiquity, the composition of chronologies had offered a means to discover synchronisms (simultaneous or related occurrences) among the myths and historical records of different cultures. In the Christian era, synchronisms allowed historians to realign the reported events of pagan myths and histories along a time-line formulated on biblical history. In their efforts to group narratives that would simultaneously order the history of multiple nations, these Christian historians followed the models of their pagan predecessors: Dionysius of Halicarnassus, Diodorus Siculus, and Polybius, among others. By the seventeenth century, the larger prose histories such as Sir Walter Raleigh’s History of the World (1611) were often supplemented by abbreviated chronologies arranged in tabular form. In part, their abbreviated form testifies to the growing amount of information with which the seventeenth century had to contend. Comprised of columns after column setting forth numerical figures and events, these chronologies convey an idea of rigorous but simplified order. In one respect, they represent a tabular encoding of Francis Bacon’s plea that science organize otherwise discrete information about the natural world in tables. In principle, the efforts of seventeenth-century chronologists anticipate the genealogical constructions of Lin-
necus, Darwin, and even Lévi-Strauss; the elaborate taxonomies we associate with natural history have their origins, at least in part, in the historical taxonomies of the late Renaissance. The relationships discovered in the synchronic order work very much like an *Ars combinatoria* which provoke discoveries by making hitherto unobserved connections.\textsuperscript{12}

For the seventeenth-century chronologists, time tables provided both a visual scheme of metaphysical order and an incentive to conduct further research. According to a well-known table of the time, "The Mass of Historians would prove but a confused Huepe, and be like a Monster, if Chronology did not helpe to forme and frame them into fashion, by digesting them into a certaine of articulat Times. And lastly, it is termed the Soule of History giving life to it, as the Soule doth to the body."\textsuperscript{13} What compasses the "Soule" of history emerges as the plot discovered by the historian himself. Just what plot or narrative ordered the disparate parts "into fashion" depended very much on the ingenuity of the author. Henry Isaacs's *Saturni Epheemerides* (1633), from which I have just quoted, is an enormous table or chart in which the reader may have at a glance a synchronic view of world history and its relation to Biblical chronology. The rows of columns are not all filled and their large empty spaces seem to invite emendation and expansion. Several years earlier, George Sandys had noticed that the earliest periods of history were called obscure or even referred to as "the Empie times."\textsuperscript{14} The columns in Isaacs’s work quite literally frame such "Empie times." At the same time they allow one to see the room that the seventeenth-century historian had for invention. In *A Table from the Beginning of the World* (1593), John More reveals that the date 2513 is significant not only because it was the year that the law was given to Moses on Mount Sinai but also because this was when "Phaeton burnt."\textsuperscript{15} In *A Briefe Chronicle of the Success of Times from Creation* (1611), Anthony Munday notes that during the same year Joshua became the leader of the Jews, 2465, "Cadmus brought the Characters of letters into Greece."\textsuperscript{16} The tables depend on the construction of a plausible set of diachronic and synchronic relations and function as a narrative matrix that, at once, represents historical plots in an abbreviated form and offers a vehicle for the discovery or invention of others. Consequently, the blanks that occasionally appear between one year and the next are richly provocative. Every new relationship discovered within or among the accounts of various ancient nations becomes a means to elaborate additional narrative structures. The tabular form works as a developing bath from which images from the past take shape as narratives.

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.\textsuperscript{17} Such books were widespread in the seventeenth century and appealed to King and commoner alike.\textsuperscript{18} But beyond the divertiissement that the chronicles could offer, they also mark a serious preoccupation with locating individual experience in a universal, Christological context. As the chronologist plots a moment in time, he inserts himself into an already formulated historical narrative. His compilation of historical events allows him (and by implication his readers) to graph his own limited experience into the general narrative whose assurance for the future was a matter of faith. Certain chronologies invite the reader to situate himself or herself even more directly in time. Although the first edition of *Historical and Chronological Theatre* by Christian Huygens was published in 1699, it was augmented throughout the seventeenth century by subsequent editions to include the most recent events.\textsuperscript{19} References to the murder of Archbishop Laud and the martyrdom of Charles I in the English edition of 1687 suggest the interpretive force of the additions. The inclusion of not only recent monarchs but also of local administrators in other English chronicles offers another example of the integration of local into universal history.\textsuperscript{20} Munday concludes his work by tracing the provenance of London's mayors and by listing municipal London offices and the men who hold them. The most recent events thus become part of the narrative fabric that includes King David, the Trojan War, and the Death of Queen Mary.

As instruments for a totalizing vision, the chronologies legitimate a Christian, Eurocentric view of the world. In this regard, they are important for supplying a mechanism useful for the assimilation of other cultures into an authoritative master-narrative. Rather than relying on single texts, the tables indicate that their authors have surveyed all available sources and compiled a universal encyclopedia. The very act of sorting through various sources and representing their narratives in tabular form encourages the author to assume—or present the fiction of assuming—an omniscient vantage point. It is not a
coincidence that the expansion of such tables in the seventeenth century complements the growing popularity of cartographic collections which extend one's limited sense of space. In another sense the timetables acknowledge and supplement the limitations of the mechanical clock whose hands can tell time but are frozen in the present, ever unable to take one into time past or future.

The chronologies, then, provoke the expectation that a larger narrative pattern will emerge from the myriad details that have been collected. For millenarians of the seventeenth century, the tables supply a mechanism that permits them to plot the very end of the world. But even if the exact calculation of the world's destruction was not the issue (as it had been for the Bishop of Exeter who had calculated the exact moment of creation), there was profound belief that time had a narrative structure and could be read and understood. Milton's final books of *Paradise Lost* offer a vision of this belief. Watching the procession of historical events set before him, the reader, like Adam, finds ample encouragement to discover providential patterns of God's grand design and find his or her place among them.

The desire to formulate a scientific basis for determining when events in the past occurred occupied Newton throughout his adult life. Rather than face the interpretive complexity confronted by Milton's Adam before the historical panorama, or trust the authority of Milton's historicizing angel, Newton tried to develop his own configuration of the past. Formally, there are two parts to the *Chronology*. The first—similar to the tabular chronicles discussed above—comprises an abbreviated table that surveys the period from 1125 B.C. (the year Newton assigns to the Egyptian invasion of Greece) to Alexander the Great's conquest of Persia in 331 B.C. The second and larger part of the work corroboration the shorter chronology with six chapters devoted respectively to the Greeks, Egyptians, Assyrians, the Babylonians and Medes, The Temple of Solomon, and the Persians. Because they are central to the *Chronology*, aspects of Newton's representation of Egyptian, Hebraic, and Greek history will be my focus. We can approach Newton's historical configuration by turning to the methods implicit in his work.

A brief account of Newton's historiographic principles can be found in William Whiston's *Astronomical Principles of Religion Natural and Revealed* (1717), dedicated to Newton and the Royal Society. According to Whiston, there are five suitable ways for knowing the "Derivation of the World" in addition to scriptural testimony: ancient histories, histories of the arts and sciences, accounts of colonial expansion, demographic computations and statistics, and a knowledge of astronomy. Although Whiston later broke with Newton, his account of the principles at work in the *Chronology* is generally accurate. For Newton, the problem posed by ancient histories is not determining which ones to use but deciding how to read them. Although they are never identified as such, several rules inform Newton's approach to his sources: he begins by reading virtually every one of the written records available; allows for exaggerations in the historical records; searches for evidence that single historical figures have been given many names; translates poetic accounts of gods and goddesses into historical events; and anticipates cause-and-effect relations within history, specifically expecting that a scientific or technological event in one culture will bring about change in another.

Although astronomical dating appears as the most innovative method in the *Chronology*—and consequently received the most attention by Newton's readers—it is by no means his sole interpretive or legitimating strategy. Newton acknowledges the importance of written records at the beginning of his treatise: "Before the use of letters, the names and actions of men could scarce be remembered above eighty or an hundred years after their deaths: and therefore I admit no chronology of things done in Europe, above eighty years before Cadmus brought letters into Europe; none, of things done in Germany, before the rise of the Roman empire" (6). The reference to Cadmus and the introduction of writing into Greece anticipates the attention Newton gives to inventions and technological innovations throughout the *Chronology*. Inventions are not treated as singular events but as a means of tracing the dissemination of science and technology in the ancient world. For Newton, Cadmus is not the inventor of writing, as he is sometimes portrayed, but part of a group that spreads literacy and Phoenician culture to other nations. "Many of the Phoenicians and Syrians, fleeing from Zidon and from David, come under the conduct of Cadmus, Citha, Phoenix, Membranutis, Nycetus, Thasus, Aremus, and other captives, into Asia Minor, Crete, Greece, and Libya; and introduce letters, music, poetry, the Octaeteris, metals and their fabrication, and other arts, sciences and customs of the Phoenicians" (106). Above all, Cadmus testifies to the importance of keeping accurate records.
Although writing is a precondition for history, it is not, for Newton, a guarantee of historical accuracy. At the same time that he stresses the importance of ancient written records, he emphasizes that their authors often amplify the antiquity of their origins in an effort to magnify their importance: “All Nations, before they began to keep exact accounts of time, have been prone to raise their Antiquities, and this humor has been promoted, by the Contentions between Nations about their Originals” (43). For Newton, the eighteenth-century Whig, the question of substantiating a nation’s antiquity was a matter of national—and nationalistic—pride. Probably the most audacious example known to Newton was the attempt by the Swedish scientist Olof Rudbeck to prove that the Swedes were the mother race and that the ancient Atlantis lay under middle Sweden. The polyvalence of terms and ambiguous signification in historical writing were additional problems that awaited resolution. According to Newton, the practice of attributing multiple names to the same individual arose from the early chroniclers’ desire to remove perceived inconsistencies in historical records and formulate synchronisms:

For reconciling such repugnancies, Chronologers have sometimes doubled the persons of men. So when the poets had changed Id to the daughter of Inachus into the Egyptian Isis, Chronologers made her husband Osiris or Bacchus, and his mistress Ariadne as old as Io, and so joined that there were two Ariadas, one the mistress of Bacchus and the other the mistress of Theseus, and two Minas’s their fathers, and a younger Io the daughter of Jesus, writing Jesus corruptly for Inachus. And so they have made two Pandion, and two Euchtho’s, giving the name of Ezechkion to the first; Homer calls the first, Ezechtho’s and by such corruptions, they have exceedingly perplexed Ancient History. (45)

By identifying extraneous names that have appeared in histories, Newton practices a form of factoring whereby a complex statement is reduced to a simpler one through the identification of equivalencies. Newton’s impulse to simplify history by cancelling unnecessary names recalls the Copernican simplification of the Ptolemaic system or, more immediately, the first two rules of Book Three of the Principia.

Newton finds another source of historical inaccuracy in the very genres employed in the early Greek records: “The Greek antiquities are full of poetical fictions; because the Greeks wrote nothing in prose, before the conquest of Asia by Cyrus the Parthian” (1). Writing about early Greek philosophy, Newton maintains that “Till those days the Greeks wrote only in Verse, and while they did so, there could be no chronology, nor any other History, than such as was mixed up with poetical Fancies” (45). To untangle the confusion of earliest Greek writing, Newton approaches the “fictions” of Greek mythology euheremically, or by reading them as if they are the record of historical personages celebrated for their accomplishments. Ceres is a good example. After coming into Attica from Sicily, she “teaches the Greeks to sow corn: for which Benefaction, she was Deified after her death” (15). As this example suggests, Newton’s euheremitic method does not stop at registering a single event but invites the formulation of a larger narrative sequence. Once she is identified as a historical figure, a range of other phenomena may also be explained: “Ceres being dead, Eumolpus institutes her Mysteries in Eleusis: the Mysteries of Rhea are instituted in Phrygia, in the City Cybale. About this time Temples begin to be built in Greece” (17). Newton’s linking of temples honoring Ceres to temples in general marks a further stage of interpretation. Without any overt comment, a euheremitic explanation of Ceres is used to account for a more widespread cultural phenomenon. Ceres, as it were, offers a narrative for an eighteenth-century version of geistesgeschichte.

Newton’s representation of Ceres as a single historical figure who has multiple effects on different cultures is also indicative of his interest in scientific and technological invention. While euheremitism can be used to approach Ceres historically, the agricultural innovation she represents functions as a means for establishing synchronic relation among different cultures. In principle, any reference that Newton finds to sowing seeds implies the dissemination of knowledge originally associated with Ceres. Although this interpretive method may at first seem primitive, it offers Newton a way to transcend straightforward genealogical analysis. In one sense, his interest in commemorating technological progress is similar to Bacon’s in his New Atlantis. The Idaei Dactyls, Newton states, were the first to “find out Iron in mount Ida in Cret, and work it into armour and iron tools, and thereby give a beginning to the trades of smiths and armourers in Europe.” Their discovery of metallurgy then allows Newton to attest to the martial source of poetry and song: “And by singing and dancing in their armour, and keeping time: by striking upon another’s armour with their swords, they bring in musick and poetry” (14). Other inventions with transnational significance are also discussed: “Daedalus and his
nephew Talus invent the saw, the turning-lath, the wamble, the chip-and, and other instruments of Carpenters and Joiners, and thereby give a beginning to those Arts in Europe. Eucladius also invented the making of Statues with their feet auster, as they walked” (19). For Newton, studying the dissemination of technology offers a way of tracing the transmission of scientific culture, detecting international relationships, and shaping a coherent narrative account of ancient history. The Edomites or Phoenicians—for whom Cadmus is a spokesman—offer a good example:

These Edomites carry to all places their arts and sciences, amongst which were their navigation, astronomy, and letters; for in Edom there they had constellations and letters before the days of Job, who mentions them; and there Moses learnt to write the Law in a book. These Edomites, who fled to the Mediterranean, translating the word Edomyo into that of Phoenicia, give the name of Phoenicians to themselves, and that of Phoenicia to all the sea-coasts of Palestine from Azoth to Zidon. And hence came the tradition of the Persians, and of the Phoenicians themselves, mentioned by Herodotus, and the Phoenicians came originally from the Red Sea, and presently undertook long voyages on the Mediterranean. (12)

Newton’s accounts of ancient inventions not only converge with his euhemeristic methods and his desire to synchronize a range of national narratives, they also permit him (as his discussion of Ceres suggests) to illuminate the origins of ancient religion. Ammon’s Egyptian empire provokes an extended discussion of the advent of certain forms of worship:

[Ammon] was the first that built long and tall ships with sails, and had a fleet of such ships on the Red Sea, and another on the Mediterranean at Crea in Libya. Till then they used small and round vessels of burden, invented on the Red Sea, and kept within sight of the shore. For enabling them to cross the seas without seeing the shore, the Egyptians began in his days to observe the stars: and from the beginning, Astronomy and Sailing had their rise. Hitherto the Lunisolar year had been in use: but this year being of an uncertain length, and so, unfit for Astronomy, in his days and in the days of his sons and grandsons, by observing the Heliacal Raisings and Settings of the Stars, they found the length of the Solar year, and made it consist of five days more than the twelve calendar months of the old Lunisolar year. (14-15)

Ammon’s advances become especially important when Newton establishes a genealogical link between the Egyptian king and the Hebrew king Solomon: “Solomon reigns, and marries the daughter of Ammon, and by means of this affinity is supplied with horses from Egypt” (16). According to Newton, it is only several years after Solomon’s marriage with Ammon’s daughter that the Hebrew King establishes his own fleet on the Red Sea and founds the Temple of Solomon (16).

At this point Newton’s account of Ammon’s legacy becomes even more intriguing. After passing on their learning to the Hebrews, the Egyptians corrupt the rational foundation of their civilization by falling into the worship of the dead. Returning from his conquests in Arabia, Africa, and Spain (16-17), Sesac, the son of Ammon, causes his father to be worshipped as a god:

Sesae reigns in Egypt, and adorns Thebes, dedicating it to his father Ammon, by the name of No-Amon: whence the Greeks called it Diospolis, the city of Jupiter. Sesae also erected temples and oracles to his father in Thebes. Ammon, and Ethiopia; and thereby caused his father to be worshipped as a god in those countries, and I think also in Arabia Felix: and this was the original of the worship of Jupiter Ammon, and the first mention of oracles that I meet with in prophane history. (18)

Following the deification of his father Sesac sets off again, first invading India (20) and then conquering Thrace—where his “singing-women were celebrated... by the name of the Muses” (21). When he returns to Egypt, he institutes an elaborate religious administration to oversee thirty-six regional temples which “were the sepulchers of his great men; where they were to be buried and worshipped after death, each in his own temple, with ceremonies and festivals appointed by him” (22). Sesac and his Queen, in turn, at their deaths were to be worshipped “in all Egypt” (22) by the names of Osiris and Isis. Newton’s discussion of the name Osiris once again displays his interests in euhemerism and invention and his desire to reduce multiple terms to a single entity:

Sesac, from his making the river Nile useful, by cutting channels from it to all the cities of Egypt, was called by its names, Sinor or Siris, Niles and Egyptus. The Greeks hearing the Egyptians lament, Or Siris and Bos Siris, called him Osiris and Busiris. The Ambians from his great acts called him Bacchus; that is, the Great. The Phrygians called him Mefors, or Mavors, The Valiant; and, by contraction, Mars. Because he set up pillars in all his conquests, and his army in his father’s reign fought against the Africans with clubs, he is painted with pillars and a club. And this is that Hercules who according to Ciceron, was born upon the Nile; and, according to Eudoxus, was slain by Typhon; and, according to Diodorus, was an Egyptian; and went over a great part of the world. (22-24)

Besides supplying an extensive example of the narratives constructed by Newton, the account of Ammon and Sesac reveals his fascination with the expansion of empire. Considering Newton’s political position, his interest in colonialism is hardly surprising. His attraction to accounts of the four ancient empires, in which he could discover justification of his own imperialistic vision of Britain’s destiny, also coincides with a more general
idea of cultural development. Beginning from a rural and primitive state, a particular people congregates to form cities, confederates into a nation with a single political leader, makes alliances, and eventually seeks to extend its control over other nations. In the earliest periods scrutinized by Newton, the Egyptian model of civilization—empire and administration—is contrasted to the more animal-like existence of the Canaanites who “fed on flesh; and sacrificed men after the manner of the Phoenicians; and were called shepherds by the Egyptians” (9). Europeans exhibit a similar, uncivilized behavior: “Before those days Greece and all Europe was peopled by wandering Cimmerians, and Scythians from the backside of the Euxine Sea; who lived a rambling wild sort of life, like the Tartars in the northern parts of Asia” (10). As the Phoenician and Egyptian examples cited previously demonstrate, the extension of empire into such rural and undeveloped areas brings both administrative and technological development. Newton’s disparaging of poetry to celebrate the contrasting analytical capacity of prose shows that stages of development may also be accompanied by progressively more sophisticated modes of expression.

The analytical epistemology evident in Newton’s approach to myth finds fuller expression in this effort to quantify historical material and make use of statistical data. At times, this interest appears in this critical remarks about other, “non-scientific” historians. For example, Ephoros is useful but less precise than later authors who register information statistically. Ephoros “digested things by Generations, and the Reckonings by Olympiads was not yet in use, nor doth it appear that the Reigns of Kings were yet set down by Number of Years.” Whenever possible, Newton sets down his findings numerically so that his collection and scrutiny of ancient records make him seem a virtual human computer or a Midas-like figure whose touch turns all not to gold but to numbers. Genealogy ends up being a function of division—there are coordinate governments (189) and regions of countries grow into monarchies by degree (10, 69). Reading Newton’s Chronology, we understand why census-taking and map-making were regarded as political acts in the seventeenth and eighteenth centuries and why Newton’s public domain was the Mint.25

But the scientific regulation of chronology does not come from the skeptical analysis of historical writing or the quantification of historical data alone. Before its information can be correlated with that of other histories, the historical narrative itself must be verified or situated in time. Newton’s method of finding synchronisms by following the dissemination of inventions marks a preliminary effort to fine internal controls in historical writing. Astronomy, however, offers him a more accurate means of verifying the synchronic narratives he has identified. For Newton, calculating points of historical origin is made possible by his scientific knowledge that the stars function as a universal clock and that accurate records of the progression of time may be derived by coordinating astronomical evidence found in ancient documents and known changes in the equinox. By determining the earth’s position in the past through his knowledge of celestial mechanics and his reading of trustworthy sources in antiquity, Newton affirms the mutually legitimating relation between his physics and his history by simply positing the operation of the same physical laws in the past and in the present.

Yet no matter how exact mathematical calculations may be in regard to the present, they cannot be extended or applied to the past unless one accepts an event in the past as an accurate point of orientation. When applied to history, science cannot proceed without a text. From a description of equinoctial and solstitial colures attributed to Eudoxus, a Greek mathematician of the fourth century B.C., and preserved only in a fragment by Hipparchus of the second century B.C., Newton believed he was able to identify celestial configurations with accuracy.26 By interpreting the information supplied by Hipparchus and translating it to contemporary star-maps, he concluded that the primitive astronomical sphere was invented in 959 B.C. The repeated calculations undertaken by Newton—as well as his incessant notetaking—show that he was aware of the importance he placed on the accuracy of this date for his entire chronological scheme. Not surprisingly, then, the criticism directed at the Chronology by Whiston and others selects Newton’s representation of the Argonautica as its primary target.

Once Newton had determined a date for the invention of the sphere, he used it to construct a narrative about its invention and use; mathematical calculation supplies a departure point for historical and narrative elaboration. This connection between mathematical calculation and narrative is crucial for Newton. His calculations in the Chronology are never abstract; they invariably yield dates useful for configuring events and discerning historical patterns. Initially, in the seventeenth-century manuscripts which
were reworked into the *Chronology*, Newton attributes the invention of the sphere to Palamedes, who is frequently associated with the invention of writing and geometry—skills obviously essential for recording celestial observations. Later, however, probably after 1700, Newton credits the astronomical invention of Palamedes’s teacher, Chiron. Although this shift hints at Newton’s own concern with his authority over his “disciples” (like Whitson), his preoccupation with inventors cannot be attributed to personal psychology alone. Above all, it appears as another example of his interest in determining the origins of science and civilization.

Newton gives special attention to Chiron’s invention of the astronomical sphere; he does not simply place the invention on a time line but uses it to locate events that occurred both before and after its advent. For example, according to Newton, Chiron’s invention appears shortly after Sesac is assassinated by his brother and Egyptian rule disintegrates. An extended narrative establishes the relation of the sphere to the *Argonautica*: “The great men of Greece, hearing of the civil wars and distractions of Egypt, resolve to send an embassy to the nations upon the Euxine and Mediterranean seas, subject to that empire; and for that end ordered the building of the ship Argo” (15). According to Newton, constellations described by Aratus one hundred years after the *Argonautica* are actually a starry record of Jason’s voyage. In an elaborate passage Newton assembles a miniature political history of Jason’s voyage and its significance. “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” (83). This passage gives us another glimpse of Newton’s narrative invention. Once again, the narrative privileges invention by suggesting that it gives rise to a sequence of social and political consequences, including exploration and the unification of the Greek states. Dating Jason’s expedition into the Black Sea also permits Newton to include the Trojan War in “known” historical time. With a specific point of origin defined, all else falls into place.

There is another reason that Newton ascribes such importance to the *Argonautica*. The *Chronology* attempts to demonstrate a synchronism between the influence of Solomon on the Jews and the Argonautica. At approximately the same time that the Greeks move toward political unification against the Egyptians, the Jews achieve unity under the leadership of Solomon: “From all these circumstances, grounded upon the course observations of the ancient Astronomers, we may reckon it certain that the Argonautic Expedition was not earlier than the reign of Solomon.” In fact, “we may safely conclude, that the Argonautic Expedition, was after the death of Solomon, and most probably that it was about 43 years after it” (94). Although Newton does not discover a direct link between the Greeks and the Hebrews during this early period, a relationship exists by virtue of their association through the Egyptian empire and its dissolution. There seems to be an implicit moral in Newton’s account of the Egyptian civil war, accompanied by the growing worship of the dead, and the genesis of Greek and Hebrew scientific enterprises in the *Argonautica* and the Temple of Solomon.

Newton’s historiographic philosophy may be illuminated further by briefly comparing its methodological principles to those set forth in his *Observations Upon the Prophecies of Daniel and the Apocalypse of St. John* (1733). The second chapter of this work comprises a key or code for reading the eschatological texts: “For understanding the Prophecies, we are, in the first place, to acquaint ourselves with the figurative language of the Prophets. This language is taken from the analogy between the world natural and an empire or kingdom considered as a world politic.” Just as he seeks to discover in the Bible’s elaborate prose a code that would render its message comprehensible, he believes that he can discover the rationale behind the historical configurations which he examines in the *Chronology*. In both cases much is at stake in the simplification of complex phenomena. By filtering out what appears as human motivation, Newton believes he can come close to revealing the divine pattern marked within human history. Unlike earlier historians who ascribe the efficacious presence of leaders to divine agency, Newton’s interest becomes directed at finding God’s hand in nature itself. History evolves not from human acts alone but from the way such acts are subject to universal laws.

Although, as his letters and manuscripts indicate, Newton firmly believed that he had scientifically established a useful distinction between “known” and “unknown” time, many
contemporaries had reservations when they read the Chronology and thought he had transgressed the border between science and fiction. Whiston shared Newton’s optimism that history could be analyzed quantitatively, but he distanced himself from Newton’s imaginative construction, noting that where Newton “wanted a sufficient Number of such authentick Records; as in very early Chronology . . . [he] ventured to furnish himself with new Materials from his own Sagacity.” He had quite simply been misled by “Poeticke Stories of Mythologists.” Ultimately, Whiston asks “whether the whole be not rather an Imaginary or Romantick Scheme.” Later he came to be so convinced of the critical force of his comments that he reported they would have killed Newton had they been published during the later’s life. There was other critical reaction as well. A translation of the French critique was included in later editions of the Chronology itself. In Two Dissertations on Græcian Mythology (1782) Samuel Musgrave argued that Newton had indulged himself in history and pushed mathematics beyond its domain: “That most eminent philosopher, after having investigated with success the laws of the material world, seems to have imagined, that the same mathematical knowledge, which enabled him to do this, would be equally serviceable to him in unravelling the difficulties of ancient history, and reconciling the discordant epochs of different nations.” French scholars such as Pierre Hardouin had a similar reaction. “This Great Man, this first Geometer and Mathematician of Europe, has in his last years constructed nothing but a frivolous system. Why did he not stick by the one that had earned him a reputation?” Hardouin’s comment reveals how precisely Newton’s contemporaries had come to define his scientific enterprise and articulate their interest in its maintenance. But response to the Chronology was by no means entirely negative. In 1757 Voltaire remained cautiously respectful of Newton’s work, noting that it directed “quelque lumière dans celui des fables anciennes conçues avec l’Histoire.” In his contribution to a series of works that sought to explain Newton’s work to an educated public, Benjamin Martin urged that even in matters of history ignorance was shown by not giving total trust to Newton’s genius: “Gentlemen should have the Modesty not to criticize the greatest man that ever lived, till they have convinced the World, at least, that they understand Him.”

The critical responses to Newton’s effort attest to more than differences between science and “Imaginative [and] Romantick Scheme[s].” Newton’s work is a very serious romance indeed because it creates a narrative that entails the legitimation of science “historically.” It does so by indicating the benefits that arise from technological improvements like the astronomical sphere (Jason’s voyage, treaties, the unification of Greek city-states) and by affirming the corroborating authority of the sacred history. The mini-epic or epiphany that Newton shapes takes the form of a narrative in which he himself is a character; it is a fictitious or mimetic emplotment of the kind that Hayden White has explored in historical writing. In his chronological account, Newton fills the “empty space” of unrecorded history with a synchronic elaboration of events calculated mathematically and exploited narratively. In a few sentences he is able to draw a relation among Egyptian civil discord, the occasion this strike gives to the unification of Greek city-states, and the effect that Greek unification has on an international treaty with the Scythians. But these local narrative emplotments also reveal more about the assumptions that accompany his quantification of history. Newton’s narrative is not simply an edited version of written history but a revealing simplification. Where a poet like Ovid credits Jason’s success to Medea’s sacrifice and perceives in the story the tragedy of an alien woman in the closed culture of the Greeks, Newton locates the success of the expedition in its exploitation of a mechanical invention by a male author. In other words, Newton leaves Medea out of his Argonautica because he features those aspects of the narrative which can legitimate his own work as well as his country’s imperial ambitions. As Newton makes narrative sense out of hitherto unrelated events, he displays his attraction to a progression of founding myths that we can imagine him applying to himself. Chiron’s invention does not simply fill in a local space but functions almost metonymically to authorize Newton’s effort to bring forth a systematic, synchronic account of all nature. To understand more fully the problem that comes into play in Newton’s configuration, we need to extend our discussion beyond White’s recognition that chronicles, with their arid collections of detail, are the “factual” bases for narrative. What is at stake in Newton’s “invention” of history is not simply narrative coherence but a method that could reconcile scientific and historical conceptions of time.

Initially we must identify the different ideas of time at play in the “two” systems. In a paper entitled “On the Motion of Bodies in Uniformly Yielding Media,” Newton gives definitions of absolute and relative time:
Absolute time is that which according to its own nature, unrelated to anything else, flows evenly. It is that whose equation astronomers investigate, and by another name is called duration. Time regarded as relative is that which is uniform in respect of the flux or variation of any sensible thing. Such is the time of days, months, and other periodic celestial phenomena as commonly received.  

Each definition provides a context for constancy and measurement. The first defines time within mathematics as well as astronomy; the second refers to our experiential sense of time. When viewed from the perspective of his work in natural philosophy, the perceived universal application of Newton's calculations are based on a notion of absolute time. This idea is emphasized in numerous eighteenth-century introductions to Newton's philosophy. In principle, Newton's Laws do not affect our personal experience of time at all. Yet Newton's historical work indicates that there is interplay between the formulation of natural law and history. To calculate the precession of the equinox, Newton engages both an idea of relative time—measurements drawn from antiquity—and an idea of absolute time—the assumption of constancy or duration implicit in his mathematics. His calculations are not simply abstractions because they can be spatially located in what Newton thinks of as history. In effect, history functions as a space in which numbers may be emplaced or given meaning. It is not the date 989 B.C. which retains significance in and of itself but its association with Chiron's astronomical sphere and its subsequent implications for the Argonautica. In this regard, the date functions not simply as a point in time but a causal agent for a series of events.

We may think of the problem in regard to the two straight lines implicit in our discussion. The first line represents mathematics:

\[ x \]

Although, as drawn, this diagram represents two points, the points actually signify infinity. The axioms and theorems of mathematics are established to define various orderly systems constructed on the line. Similar lines were used in various seventeenth-century arithmetic books to convey the idea of a sequence of numbers. The second line represents sacred history:

\[ \text{Origin} \] \[ \text{End} \]

In contrast to the mathematical line, the Biblical time line has an acknowledged beginning and end. Rather than being ordered mathematically, its order emerges through an affirmation that past and future events are joined through the present. Such time lines are conventional features of Renaissance chronologies. In Newton's works the lines are superimposed on each other. We are not given an either/or configuration but asked to think of them as being present at the same time.

Chronology, represented by the "line" of sacred history, therefore becomes a form of mapping. Here rather than in the artificial or ideal sphere of mathematics, the space defined by the Cartesian coordinates, Newton plots his calculations along the line of history. The cartographic element permits Newton to control his figures, to see them as expressing relations within a larger configuration. However, he does not move directly from reading a historical narrative to placing it on a time line. He first translates historical accounts into scientifically derived numbers; these statistics function as relays that then permit him to constitute his own history. In this regard, his calculations also invite the translation of time into narrative and tabular space. What has appeared quantifiable on one level becomes emplaced narratively on another.

In Time and Narrative, Ricoeur persuasively contrasts the complex perception of time in Augustine to the analytical description of narratives in Aristotle. Although Ricoeur has not yet extended his important work to science, his distinction is useful for our understanding of Newton's mathematical and historical projects. What we witness of Newton is an effort to draw together the analytical notion of time demonstrated in his mathematics and a more expansive idea of experienced time. It is not far fetched to think that Newton's historiography signals an awareness that even though mathematics may be analytically extended to describe nature, it has its limits. With his work on history, Newton embeds his idea of analytical time within the more extensive and personal idea of time offered by a sacred history that is assumed to proceed linearly and teleologically. For this reason, Newton's chronological system may be thought of as a metaphysical legitimation of his mathematical work. By looking into the past, he is also able to project patterns into the future.

Newton's historical work carries assumptions also present in his work on physics and chemistry. By identifying crucial nodal points which exert influences in history, Newton fashions an idea of influential bodies that is related to his work with gravity. History works as a matrix in which natural forces may be measured. In itself such an idea is hardly unusual. What is
significant here is the new force it obtains through association with natural philosophy. Whereas history has hitherto shown its order through divine revelation, with Newton it becomes a new science. Richard Glover’s laudatory poem on Newton in Henry Pemberton’s *A View of Sir Isaac Newton’s Philosophy* (1728) ends with a celebration of Newton’s work on history; it declares that in the theatre of time Newton has unveiled “all the wondrous scene, / The vast idea of the eternal King.” By demonstrating God’s presence in nature through calculation instead of through mystic revelation, Newton’s idea of historical time anticipates Hegel’s. Ironically, it was precisely his attempt to make chronology as exact a science as possible that intrigued some of his eighteenth-century readers and upset and baffled others.

Both the positive and negative reactions to the *Chronology* testify to the ways in which Newton himself was mythologized after his death. The positive reaction uses his historical work not to diminish his efforts in natural philosophy but to display what a genius could do in his spare time:

The Author has himself acquainted the Publick, that the following Treatise was the fruit of his vacant hours, and the relief he sometimes had recourse to, when tired with his other studies. What an Idea does it rise of the abilities, to find a work of such labour and learning, as would have been sufficient employment; and glory for the whole life of another was to him diversion only, and amusement [vii]

The negative response distinguishes this kind of “amusement” from Newton’s contributions to natural philosophy. By the time the *Chronology* was published in 1728, Newton’s public image as the god-like scientist had been so thoroughly accepted that no real means existed to assimilate another image—Newton the antiquarian—into it. Paradoxically, both the positive and negative responses to Newton’s history reflect the intense desire of educated men for a complete and self-coherent system to replace the old broken-down peripatetic canon. Newton either is celebrated by his contemporaries, much as he celebrated Chiron, as an authority figure who could—or indeed had—created at least the foundation for such a system or derided for having let his attention wander from the certainties of mathematics to the fictions of romance. The Preface to the *Chronology*, written by John Conduit and revised by Pope, turns Newton’s history into a kind of quasi-religious embodiment of Shaftesburian sentiment:

Nor will Your Majesty be displeased to find his sentiments so agreeable to your own, whilst he recommends all oppression and every kind of cruelty, even to brute beasts and, with so much warmth inculcates mercy, charity, and the indispensable duty of doing good, and promorting the general welfare of mankind: those great ends, for which Government was first instituted, and to which alone it is administered in this happy Nation. [vii]

This kind of praise of Newton enacts in a modern setting his veneration of Chiron. As exemplars of the cultural and political significance of science, both are written into a larger social—and ideological—romance: Chiron’s invention permits an embassy to the barbarians and the unification of Greek city-states; Newton’s work becomes assimilated into a political mythos in which he is celebrated as one who “condemns all oppression” and who is even kind to “brute beasts.”

The study of Newton’s *Chronology* finally leads to the intersections of science and myth. At a time when the moral applications of ancient mythology were undergoing revision, Newton demonstrated the value of concentrating not on the single fable but on the historical “laws” that may be derived from mythographic research. In this regard, Newton’s *Chronology* moves toward the articulation of evolving periods within history and intimates the even more expansive historiographic discourse undertaken by Vico in the *Scienza Nuova* (1744). Newton’s work, however, cannot be directly compared to Vico’s synthetic vision. Instead it stands as a monument to the transformation of classical allegorical theory and the emergence of eighteenth-century discussions on the meaning of history and the definition of the discipline we think of as anthropology. Above all, in his attempt to formulate a scientific ground for historiography, we discover how Newton narrativizes his own visions of science.

**Notes**

THE EIGHTEENTH CENTURY

7. See Jean-François Lyotard and Jean-Louis Thibaud, Just Gaming (Minneapolis, 1989).
8. For general background, see F. J. Levis, Tudor Historical Thought (San Marino, Calif., 1967); and Heschel Baker, The Rise of Time (Toronto, 1967); and Paolo Rossi, The Dark Abyss of Time (Chicago, 1984).
11. See Bacon, Thoughts and Conclusions, in Benjamin Farrington, The Philosophy of Francis Bacon (Chicago, 1984), 88: [T]he material collected should be sorted into orderly Tables, so that the understanding may work upon it and thus accomplish its appropriate task.
12. The chronologies "discovery" of relationships may be compared to the encyclopedic memory theater described by Francis Yates in The Art of Memory (Chicago, 1986).
17. In referring to chronology as a form of gaming, I have in mind the idea of sociological play discussed in Lyotard's and Thibaud's Just Gaming, cited above.
18. Isaacson's Saturni Ephemerides, elaborately printed in elephant folio and dedicated to Charles I, was prepared for readers at court. Other works, including More's Table from the Beginning of the World, Mundy's Briefe Chronicle, and Loudon's Lloyd's The Consent of Time (London, 1690), were prepared for educated merchants.
20. Mundy, Briefe Chronologie, 393.
21. Manuel, 3. All references to the Chronology are from the London edition of 1728 and will be cited in the text.
22. See particularly 142-43: "Now the best ways of knowing this Derivation of the World, abstracctly from Scripture, seem to be these five following: (1.) By Ancienni Postane Histories, directly relating to such Matters; (2.) By the Histories of the Beginnings and Progress of Arts and Sciences; (3.) By the Accounts of the Origin and Spreading of the several Colonies of Nations at; the over the world; (4.) By the present Numbers of Mankind upon the Face of the Earth, compared with the best Computations we have of the Time necessary for their Increase and Dwindling; (5.) By the present State of Celestial Motions, and Terrestrial Appearances, and the Length of Time necessary for any such irregularities arising thereon, as would be sensible to us." On Whiston see James E. Force, William Whiston, Honest Newtonian (Cambridge, Eng., 1988).