Chapter 1:

Time in Print

What does history look like? How do you draw time?

While historical texts have long been subject to critical analysis, the formal and historical problems posed by graphic representations of time have largely been ignored. This is no small matter: graphic representation is among our most important tools for organizing information.[1] Yet, little has been written about historical charts and diagrams. And, for all of the excellent work that has been recently published on the history and theory of cartography, we have few examples of critical work in the area of what Eviatar Zerubavel has called *time maps*.[2] This book is an attempt to address that gap.

In many ways, this work is a reflection on lines—straight and curved, branching and crossing, simple and embellished, technical and artistic—the basic components of historical diagrams. Our claim is that the line is a much more complex and colorful figure than is usually thought. Historians will probably appreciate this aspect of the book fairly easily. We all use simple line diagrams in our classrooms—what we usually call "timelines"—to great effect. We get them, our students get them, they translate wonderfully from weighty analytic history books to thrilling narrative ones.

But simple and intuitive as they seem, these timelines are not without a history themselves. They were not always here to help us in our lectures, and they have not always taken the forms that we unthinkingly give them. They are such a familiar part of our mental furniture that it is sometimes hard to remember that we ever acquired them in the first place. But we did. And the story of how is worth telling, because it helps us understand where our contemporary conceptions of history come from, how they work, and, especially, how they rely on visual forms. It is also worth telling because it's a good story, full of twists and turns and unexpected characters, soon to be revealed.

Another reason for the gap in our historical and theoretical understanding of timelines is the relatively low status that we generally grant to chronology as a kind of study. Though we use chronologies all the time, and could not do without them, we typically see them as only distillations of complex historical narratives and ideas. Chronologies work, and—as far as most people are concerned—that's enough. But, as we will show in this book, it wasn't always so: from the classical period to the Renaissance in Europe, chronology was among the most revered of scholarly pursuits. Indeed, in some respects, it held a status higher than the study of history itself. While history dealt in stories,

[1]

1932–1970 "calendar," Saul Steinberg, *Untitled*, 1970

Ink, collage, and colored pencil on paper, 14 ½ x 23 inches, Beinecke Rare Book and Manuscript Library, Yale University © The Saul Steinberg Foundation/Artists Rights Society (ARS), New York

chronology dealt in facts. Moreover, the facts of chronology had significant implications outside of the academic study of history. For Christians, getting chronology right was the key to many practical matters such as knowing when to celebrate Easter and weighty ones such as knowing when the Apocalypse was nigh.

Yet, as historian Hayden White has argued, despite the clear cultural importance of chronology, it has been difficult to induce Western historians to think of it as anything more than a rudimentary form of historiography. The traditional account of the birth of modern historical thinking traces a path from the enumerated (but not yet narrated) medieval date lists called annals, through the narrated (but not yet narrative) accounts called chronicles, to fully narrative forms of historiography that emerge with modernity itself.[3] According to this account, for something to qualify as historiography, it is not enough that it "deal in real, rather than merely imaginary, events; and it is not enough that [it represent] events in its order of discourse according to the chronological framework in which they originally occurred. The events must be . . . revealed as possessing a structure, an order of meaning, that they do not possess as mere sequence."[4] Long thought of as "mere sequences," in our histories of history, chronologies have usually been left out.

But, as White argues, there is nothing "mere" in the problem of assembling coherent chronologies nor their visual analogues. Like their modern successors, traditional chronographic forms performed both rote historical work and heavy conceptual lifting. They assembled, selected, and organized diverse bits of historical information in the form of dated lists. And the chronologies of a given period may tell us as much about its visions of past and future as do its historical narratives.

White gives the example of the famous medieval manuscript chronology called the *Annals of St. Gall*, which records events in the Frankish kingdoms during the eighth, ninth, and tenth centuries in chronological order with dates in a left hand column and events on the right. [*figs.* **2–3**] To a modern eye, annals such as these appear strange and antic, beginning and ending seemingly without reason, mashing up categories helter-skelter like the famous Chinese encyclopedia conjured by Jorge Luis Borges. Here, for example, is a section covering the years 709 to 734.

709. Hard winter. Duke Gottfried died.
710. Hard year and deficient in crops.
711.
712. Flood everywhere.

[2–3]

Annals of St. Gall, Monastery of St. Gall, Switzerland, mid-eleventh century

713.
714. Pippin, mayor of the palace died.
715.
716.
717.
718. Charles devastated the Saxon with great destruction.
719.
720. Charles fought against the Saxons.
721. Theudo drove the Saracens out of Aquitaine.
722. Great crops.
723.
724.
725. Saracens came for the first time.
730.
731. Blessed Bede, the presbyter, died.
732. Charles fought against the Saracens at Poitiers on Saturday.
733.
734.[5]

From a historiographical point of view, the text seems to be missing a great deal. Though it meets a very minimal definition of narrative (it is referential, it represents temporality), it possesses few or none of the characteristics that we normally expect in a story, much less a history. The *Annals* make no distinction between natural occurrences and human acts; they give no indication of cause and effect; no entry is given more priority than another. Below the level of years, references to time are strangely gnomic: in the year 732, for example, the text indicates that Charles Martel "fought the Saracens on Saturday," but it does not specify *which* Saturday. Above the level of the year, there is no distinction among periods, and lists begin and end as nameless chroniclers pick up and put down their pens. But this should not be taken to suggest that the St. Gall manuscripts are without meaningful structure. To the contrary, White argues, in their very form, these annals breathe with the life of the Middle Ages. The *Annals of St. Gall*, White argues, vividly figure a world of scarcity and violence, a world in which "forces of disorder" occupy the forefront of attention, "in which things *happen to* people rather than one in which people *do* things."[6] As such, they represent a form closely calibrated to both the interests and the vision of their users.

Parallel observations have been made by scholars of non-Western historiography such as the great Indian historian Romila Thapar. Thapar has long emphasized that genealogy and chronicle are not primitive efforts to write what would become history in other hands, but powerful,

graphically dense ways of describing and interpreting the past.[7] And in recent years, historians of premodern Europe like Roberto Bizzocchi, Christiane Klapisch-Zuber, and Rosamond McKitterick have begun to pay due attention to the graphically sophisticated ways in which genealogical forms—especially the tree—have developed and been used in the historiography of both the premodern and the modern West.[8]

Addressing the problem of chronology, and especially the problem of visual chronology, means going back to the line, to understand its ubiquity, flexibility, and force. In representations of time, lines appear virtually everywhere, in texts and images and devices. Sometimes, as in the timelines found in history textbooks, the presence of the line couldn't be more obvious. But in other instances, it is more subtle. On an analog clock, for example, the hour and minute hands trace lines through space; though these lines are circular, they are lines nonetheless. As the linguist George Lakoff and the philosopher Mark Johnson have argued, the linear metaphor is even at work in the digital clock, though no line is actually visible. In this device, the line is present as an "intermediate metaphor": to understand the meaning of the numbers, the viewer translates them into imagined points on a line.[9]

Our idea of time is so wrapped up with the metaphor of the line that taking them apart seems virtually impossible. According to the literary critic W. J. T. Mitchell, "The fact is that spatial form is the perceptual basis of our notion of time, that we literally cannot 'tell time' without the mediation of space."[10] Mitchell argues that all temporal language is "contaminated" by spatial figures. "We speak of 'long' and 'short' times, of 'intervals' (literally, 'spaces between'), of 'before' and 'after'—all implicit metaphors which depend upon a mental picture of time as a linear continuum.... Continuity and sequentiality are spatial images based in the schema of the unbroken line or surface; the experience of simultaneity or discontinuity is simply based in different kinds of spatial images from those involved in continuous, sequential experiences of time."[11] And it may well be that Mitchell is right. But recognizing this can only be a beginning. In the field of temporal representation, the line can be everywhere because it is so flexible and its configurations so diverse.

The histories of literature and art furnish an abundant store of examples of the complex interdependence of temporal concepts and figures. And—as in the case of the digital clock—in many instances metaphors that appear to draw their force from a different source in fact contain an

[4]

The Parian Marble is the oldest surviving Greek chronological table: this piece of it, called the Marmor Purim, has been in Oxford since the late seventeenth century. The unknown author, working in 264/3 BCE, traced the central events in history since the accession of King Cecrops in Athens in, by his computation, 1581/0 BCE. The Marble offers dates for the Flood (that of Deucalion, not Noah), the introduction of agriculture by Demeter, and the fall of Troy, as well as many more recent events. Written tables which covered a similar period and range of topics were among the chief sources from which Eusebius drew his material for ancient Greek history.

implicit linear figure. This is the case even in the famous passage from Shakespeare where Macbeth compares time to an experience of language fragmented into meaningless bits:

> To-morrow, and to-morrow, and to-morrow,
> Creeps in this petty pace from day to day,
> To the last syllable of recorded time,
> And all our yesterdays have lighted fools
> The way to dusty death. Out, out, brief candle!
> Life's but a walking shadow, a poor player,
> That struts and frets his hour upon the stage,
> And then is heard no more: it is a tale
> Told by an idiot, full of sound and fury,
> Signifying nothing.[12]

As the critic J. Hillis Miller writes, "For Macbeth, time is a sequence of days that stretches out in a line leading to its cessation at death, figured as a series of syllables making a sentence or strings of sentences, for example a speech by an actor on the stage. Time, for Macbeth, exists only as it is recorded. It is a mad nonsensical tale, an incoherent narrative. Such a narrative is made of pieces that do not hang together, a series of syllables that do not cohere into words and sentences."[13] Yet even for Macbeth, though the past and the future have lost all meaning, the passage of time is orderly and linear, and each meaningless human life covers a precisely measurable segment of it, an "hour upon the stage."

In the graphic arts, the same holds true: from the most ancient images to the most modern, the line serves as a central figure in the representation of time. The linear metaphor is ubiquitous in everyday visual representations of time as well—in almanacs, calendars, charts, and graphs of all sorts. Genealogical and evolutionary trees—forms of representing temporal relationships that borrow both the visual and the verbal figure of "lineage"—are particularly prominent.[14] And, of course, similar observations may be made about our ways of representing history.

The timeline seems among the most inescapable metaphors we have. And yet, in its modern form, with a single axis and a regular, measured distribution of dates, it is a relatively recent invention. Understood in this strict sense, the timeline is not even 250 years old. How this could be possible, what alternatives existed before, and what competing possibilities for representing historical chronology are still with us, is the subject of this book.

It should be said from the beginning that the relative youth of the timeline has little to do with technological

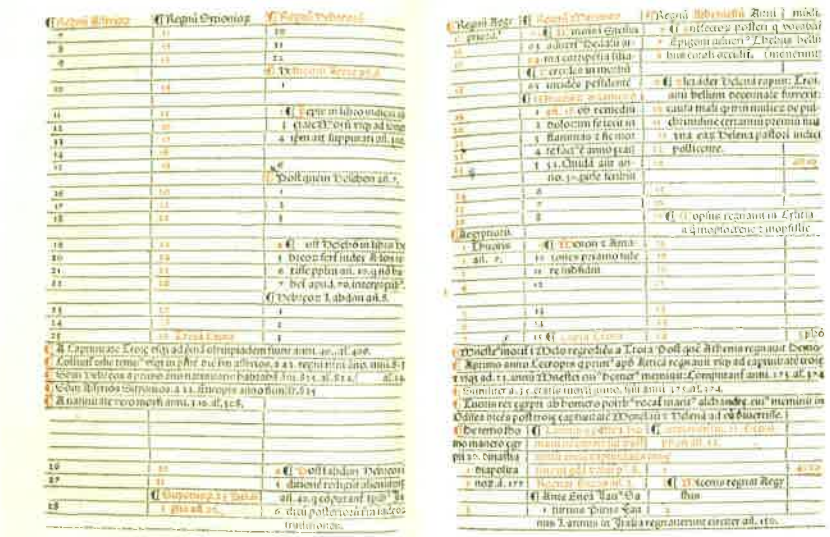
[5–6]

The Merton College copy of the *Chronicle* of Eusebius, as translated into Latin and adapted by Jerome; transcribed in the mid-fifth century in Italy in red, green, and black ink on 156 leaves. It is bound with the *Chronicle* of Marcellinus Comes.

constraints. Though technology plays an important role in our story, it doesn't drive it. The principal issues here are conceptual. In the late eighteenth century, when the timeline began to flourish in Europe, sophisticated technologies of printing and engraving had long been available, as had techniques for geometrical plotting and projection far more complex than were necessary for such simple diagrams.

What is more, by the eighteenth century the problem of giving visual form to chronological information had also been around for a very, very long time. [*fig.* **4**] From the ancient period to the modern, every historical culture has devised its own mechanisms for selecting and listing significant events. The Jews and Persians had their king lists; the Greeks, their tables of Olympiads; the Romans, their lists of consuls, and so forth. The oldest surviving Greek chronological table, a list of rulers, events, and inventions, was carved on marble in 264/3 BCE. The most elaborate Roman one, a set of lists of consuls and triumphs created under Augustus, stood in the Forum. And, just as Lakoff and Johnson would have us believe, among these many devices the line appears repeatedly as both a visual form and a verbal metaphor. And yet, in all of these cultures, amid all of these forms, the simple, regular, measured timeline that is so second nature today, remains in the background. As a norm, as an ideal standard of what history *looks like*, the timeline does not appear until modernity.

Ancient and medieval historians had their own techniques of chronological notation. [*figs.* **5–6**] From the fourth century, in Europe, the most powerful and typical of these was the table. Though ancient chronologies were inscribed in many different forms, among scholars the table form had a normative quality much as the timeline does today. In part, the importance of the chronological table after the fourth century can be credited to the Roman Christian scholar Eusebius. Already in the fourth century Eusebius had developed a sophisticated table structure to organize and reconcile chronologies drawn from historical sources from all over the world. To clearly present the relations between Jewish, pagan, and Christian histories, Eusebius laid out their chronologies in parallel columns that began with the patriarch Abraham and the founding of Assyria. The reader who moved through Eusebius's history, page by page, saw empires and kingdoms rise and fall, until all of them—even the kingdom of the Jews—came under Rome's universal rule, just in time to make the Savior's message accessible to all of humanity. By comparing individual histories to one another and the uniform progress of the years, the reader could see the hand of providence at work.



[7]

Fall of Troy, *Chronicle* of Eusebius, fifteenth century

Eusebius created his visually lucid *Chronicle* just when he and other Christians were first adopting the codex, or bound book, in place of the scroll. Like other Christian innovations in book design, the parallel tables and lucid, year-by-year, decade-by-decade order of the *Chronicle* reflected the desire of early Christian scholars to make the Bible and the sources vital for understanding it available and readily accessible for quick reference. The *Chronicle* was widely read, copied, and imitated in the Middle Ages. And it catered to a desire for precision that other popular forms—like the genealogical tree—could not satisfy.

Eusebius's chronological tables proved remarkably durable, and as humanists in the fifteenth and sixteenth centuries took a new interest in establishing chronological intervals, they won renewed attention. [*fig.* 7] Modern editions of Eusebius were among the first printed books, and they were among the most important reference works in the collection of any early modern humanist scholar.[15] The fifteenth-century Florentine bookseller Vespasiano da Bisticci—a brilliant impresario of scribal book production—marketed a revised form of Eusebius's work with great success to scholars and general readers. Humanists like Petrarch became fascinated by the historical and cultural distances that separated them from ancient writers whom they admired and from their own posterity. Petrarch carefully indicated the present date in letters he addressed to the ancients Cicero and Virgil and to future readers to emphasize the length of the interval that separated him from them: "Written in the land of the living; on the right bank of the Adige, in Verona, a city of Transpadane Italy; on the 16th of June, and in the year of that God whom you never knew the 1345th." And, in setting these chronological distances, he found help in the ancient model given by Eusebius.[16]

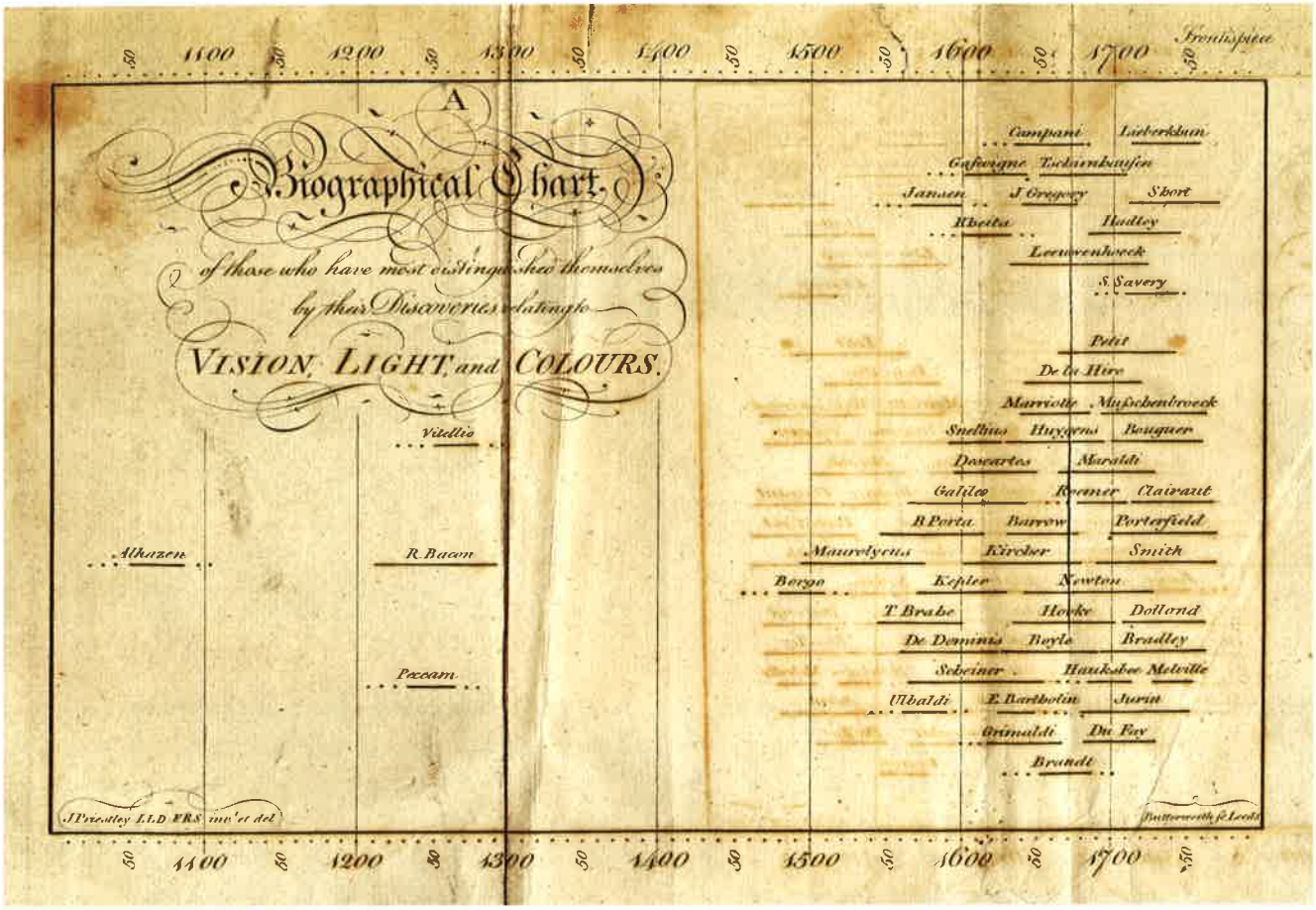
During the Renaissance, scholars developed new kinds of visual organization, and adapted old forms, sometimes long neglected, for the format of the printed book. But until the mid-eighteenth century, the Eusebian model—a simple matrix with kingdoms listed across the top of the page and years listed down the left- or right-hand columns—was dominant. This visual structure suited the concerns of Renaissance scholars well. It facilitated the organization and coordination of chronological data from a wide variety of sources. It provided a single structure capable of absorbing nearly any kind of data and negotiating the difficulties inevitable when different civilizations' histories, with their different assumptions about time, were fused. It was easy to produce and correct and allowed for quick access to data—which the printers improved by adding alphabetized

indices and other aids. Above all, it still served as a detailed diagram of providential time. From a graphic point of view, it was a chronological *Wunderkammer*, presenting Christian world history in many small drawers.

Still, experiments continued. Some were graphic, like the effort to lay out all the main historical events on a calendar that stretched not from the Creation or Abraham to the present but from January 1 to December 31, with important events in the past stacked up day by day, through the year. Some were technical. In antiquity and the Middle Ages, chronologers accepted older lists of rulers and events and did their best to integrate them into larger wholes. In the Renaissance, historians became more ambitious and critical. Teachers and theorists claimed, over and over again, that chronology and geography were the two eyes of history: sources of precise, unquestionable information, which introduced order to the apparent chaos of events.

In geography, the visual metaphor fit beautifully. Armed with new knowledge about the Earth's surface, Renaissance mapmakers updated the ancient maps created by Ptolemy in the second century to include the Americas, the Indian Ocean, and much else. At the same time, techniques of mapping made advances, with striking results for both science and politics. By the seventeenth century, the map had become a key symbol not only of the power of monarchs but of the power of knowledge itself. Cartography was a model of the new applied sciences; at once complex and precise, it also gave an impression of immediacy and realism.

At the level of detail, chronology followed a similar path. In the same period, astronomers and historians—such as Gerardus Mercator, now famous as a cartographer—began collecting astronomical evidence—records of dated eclipses and other celestial events mentioned by ancient and medieval historians. They began to plot events not just against long series of years, but against lunar and solar eclipses that could be dated precisely to the day and the hour. Chronologies became precise and testable in a new sense, and the new passion for exactitude was reflected in efforts to represent time in novel ways. The early modern world saw some remarkable, if often short-lived, experiments in the creation of "graphic history," from the vivid images of wars, massacres, and troubles produced as a coherent series by entrepreneurs and artists in Geneva in 1569–70 to the massively illustrated histories and travel accounts turned out by the house of Theodore de Bry in Frankfurt.[17] To many writers of the period, such as Walter Raleigh, the chronological dimension of history was central. As Alexander Ross put it



[8]

This small chart, on the model of his path-breaking *A Chart of Biography* (1765) appeared in Joseph Priestley's *The History and Present State of Discoveries Relating to Vision, Light, and Colours* (1772). It allows the reader to see at a glance which scientists lived when and gives an overall view of scientific activity in the area of optics since the year 1000.

in his 1652 continuation of Raleigh's *History of the World*, "History, indeed is the Body, but Chronologie the Soul of Historical Knowledge; for History without Chronologie, or a Relation of things past, without mentioning the Times in which they were Acted, is like a Lump or Embryo without articulation, or a Carcass without Life."[18]

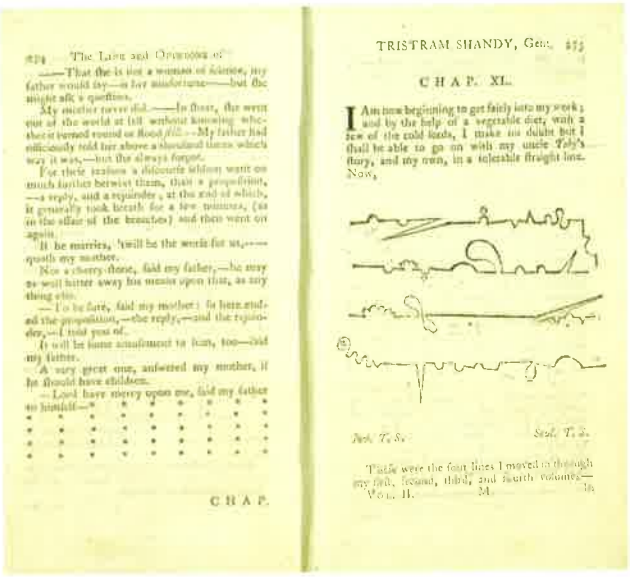
Toward the end of the seventeenth century, technical developments in printing spurred further innovation, while new techniques of engraving made practical larger and more detailed book illustrations. Some chronologists began to take cues from cartographers, with beautiful results. Ultimately, though, the direct application of the geographic metaphor in the field of chronology proved awkward. Despite great advances in research techniques and the exploration of many new forms, representations of time mostly continued to look very much as they had a millennium earlier when the chronographic table was first employed.

It was not until the middle of the eighteenth century that a common visual vocabulary for time maps caught on. But the new linear formats of the eighteenth century were so quickly accepted that, within decades, it was hard to remember a time when they were not already in use. The key problem in chronographics, it turned out, was not how to design more complex visual schemes—the approach of many would-be innovators in the seventeenth century—but, rather, how to simplify, how to create a visual scheme to clearly communicate the uniformity, directionality, and irreversibility of historical time.

Among the most important events of this period was the publication in 1765 of the *Chart of Biography* by the English scientist and theologian Joseph Priestley. [*fig.* **8**] At the level of basic technique, there was little that was new in Priestley's chart. It was a simple measured field with dates indicated along the top and bottom like distances on a ruler. Within the main field of the chart, horizontal lines showed when famous historical figures were born and died: the length and position of each person's life was indicated by a mark that began at their date of birth and ended at their date of death. The *Chart of Biography* was a strikingly simple diagram, and yet it proved a watershed.[19] Though it followed centuries of experimentation, it was the first chart to present a complete and fully theorized visual vocabulary for a time map, and the first to successfully compete with the matrix as a normative structure for representing regular chronology. And it came just at the right time. Priestley's chart was not only effective in displaying dates, it also provided an intuitive visual analogue for concepts of historical progress that were becoming popular during the eighteenth

[9]

Laurence Sterne published his famous satirical novel, *The Life and Opinions of Tristram Shandy, Gentleman*, in nine volumes over the course of the 1760s, just as Joseph Priestley was publishing his great historical timelines. The novel is purportedly the autobiography of its central character, Tristram Shandy, but the narration hinges on Tristram's inability to tell the story without digression. Like Priestley, Sterne was interested in the graphic representation of time: in the novel, Tristram offers a set of diagrams representing the narrative pattern of the first four volumes of his story.



CHAP.

TRISTRAM SHANDY, Gent. 275

CHAP. XL.

I Am now beginning to get fairly into my work; and by the help of a vegetable diet, with a few of the cold herbs, I make no doubt but I shall be able to go on with my uncle Toby's story, and my own, in a tolerable straight line. Now,

Vol. V. Vol. VI.

These were the four lines I moved in through my first, second, third, and fourth volumes—

Vol. II. M. Vol.

century. In Priestley's chart, historical thought and new forms of graphic expression came into dialogue, and each had much to offer the other.

But as Priestley recognized, his innovations posed problems too: historical narrative is not linear. It moves backward and forward making comparisons and contrasts, and branches irregularly following plots and subplots. Part of the advantage of the matrix form was that it facilitated the scholar's understanding of the many intersecting trajectories of history. The form of the timeline, by contrast, emphasized overarching patterns and the big story. This proved a great advantage in some respects, but not all. And Priestley readily admitted this. For him, the timeline was a "most excellent mechanical help to the knowledge of history," not an image of history itself.[20]

Nor was Priestley the only eighteenth-century writer to reflect on the limits of the linear metaphor. [*fig.* 9] During the same years that Priestley published his *Chart of Biography* and its sequel, *A New Chart of History*, the novelist Laurence Sterne was publishing his remarkable satire on linear narrative, *The Life and Opinions of Tristram Shandy, Gentleman*, replete with cooked diagrams mapping the course of Tristram's life story. Like Priestley, Sterne understood the linear representation of time as a complex and artificial construction. But for Sterne, its problems outweighed its advantages. Sterne writes:

> Could a historiographer drive on his history, as a muleteer drives on his mule,—straight forward;—for instance, from *Rome* all the way to *Loretto*, without ever once turning his head aside either to the right hand or to the left,—he might venture to foretell you an hour when he should get to his journey's end:—but the thing is, morally speaking, impossible; for, if he is a man of the least spirit, he will have fifty deviations from a straight line to make with this or that party as he goes along, which he can no ways avoid. He will have views and prospects to himself perpetually soliciting his eye, which he can no more help standing still to look at than he can fly.[21]

For all of their differences, the works of both Priestley and Sterne point to the technical ingenuity and the intensity of the labor required to support a fantasy of linear time.

The timeline offered a new way of visualizing history. And it fundamentally changed the way that history was spoken of as well. Yet it in no way closed off other visual and verbal metaphors and mechanisms of representation. The nineteenth century, which saw the extension of the timeline

[10]

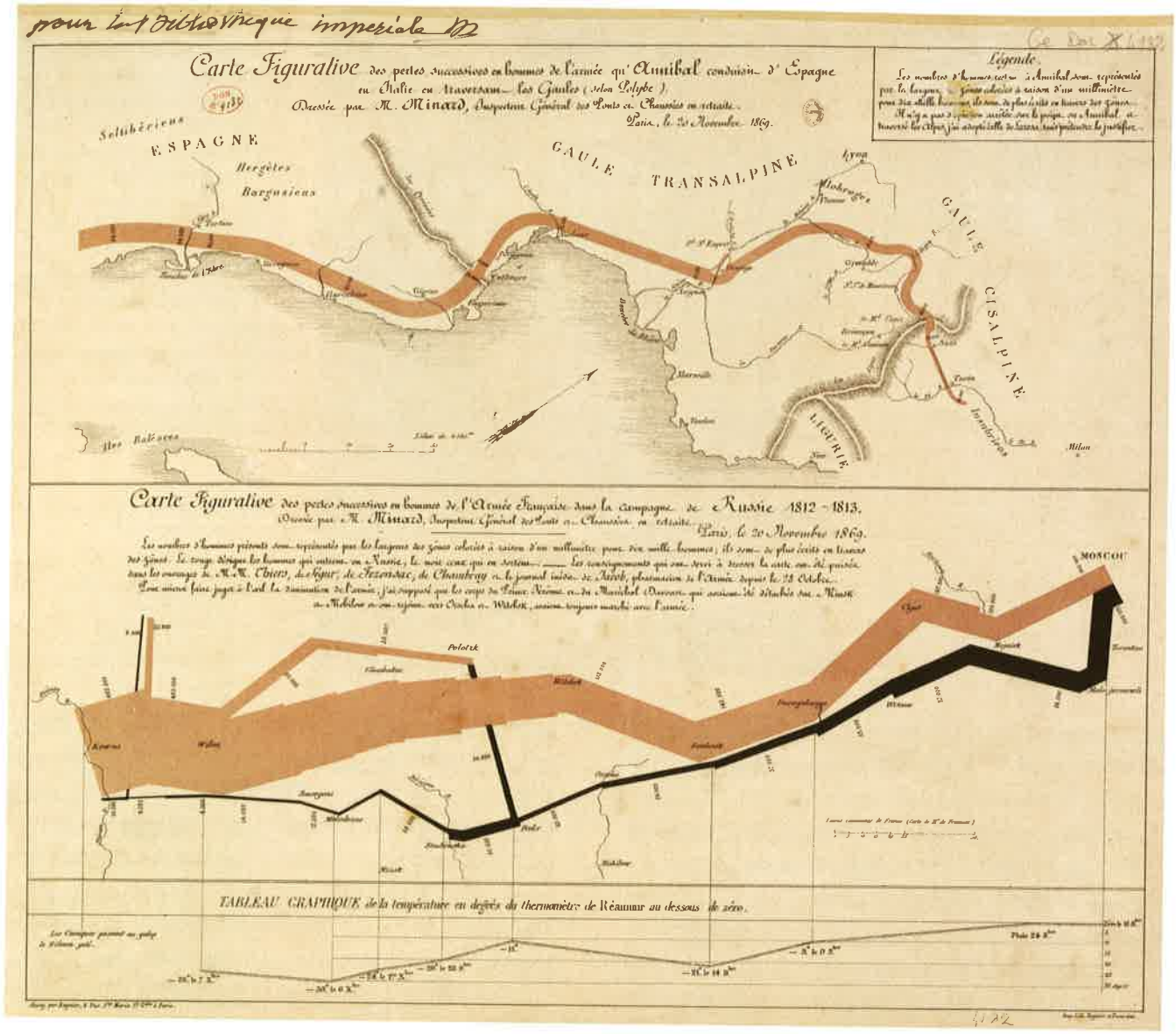
Cross section of a giant sequoia at the American Museum of Natural History in New York City, photographed in the 1950s. When the tree was felled in California in 1891, it stood 331 feet tall and measured 90 feet around at the base. This section contains 1,342 annual rings, dating the tree to the mid-sixth century. As currently exhibited, the rings are marked at intervals of 100 years and inscribed with notable historical events including the invention of the refracting telescope used by Galileo (1600), the founding of Yale College (1700), and Napoleon seizing power in France (1800).

into many new areas of application, also saw the resurgence of other temporal figures that had interacted and competed with linear imagery for many centuries. Throughout the medieval and early modern periods, for example, the statue that Nebuchadnezzar dreamed of in Chapter 2 of the book of Daniel, and that Daniel explicated as depicting the four great empires that would rule the world in turn, could and did serve as an armature for world history. And with the religious revivals of the eighteenth and nineteenth centuries, figures of Nebuchadnezzar's statue spread again like wildfire. But, in this new resurgence, something was different. Nineteenth-century visionaries used timelines to elucidate their allegories and to give them precision. They became experts in visual code shifting, translating back and forth between the bare lines of Priestley and his emulators and the vivid images of the apocalyptic traditions.

During the mid-nineteenth century, a strong positivist tendency also emerged in chronography, especially in the areas where technical devices could be used to measure and record events of historical significance. [*fig.* **10**] The development of photography, film, and other imaging technologies in the nineteenth and twentieth centuries permitted the recording of time-sequenced phenomena, and ever more precise instruments and methods, such as the chronophotographic apparatuses of Étienne-Jules Marey and Eadweard Muybridge on the one hand and the tree ring analysis of Andrew Ellicott Douglass on the other, made visible for the first time events taking place at very high and low speeds. Researchers such as these opened new possibilities for the study of the past. They also in some ways encouraged people to think that historical events might be recorded and represented in truly objective ways.

But, while the convention of the timeline came to seem more and more natural, its development tended also to raise new questions. [*fig.* **11**] In some cases, filling in an ideal timeline with more and better data only pushed it toward the absurd. Jacques Barbeu-Dubourg's 1753 *Chronologie universelle*, mounted on a scroll and encased in a protective box, was 54 feet long. Later attempts to reanchor the timeline in material reference, as in the case of Charles Joseph Minard's famous 1869 diagram, *Carte figurative des pertes successives en hommes de l'armée française dans la campagne de Russie 1812–1813* (Thematic map displaying the successive casualties of the French army in the Russian campaign 1812–1813), produced results that were beautiful but ultimately put into question the promise of the straight line.

The visual simplicity of Minard's diagram is paradigmatic—as is the numbing pathos of its articulation across

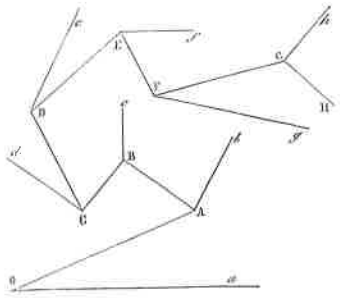


[11]

In the 1860s, the French engineer Charles Joseph Minard devised a number of new and influential infographic techniques. Among the most famous of his charts from this period is the 1869 *Carte figurative des pertes successives en hommes de l'armée française dans la campagne de Russie 1812–1813 comparées à celle d'Hannibal durant la 2ème Guerre Punique*. The two diagrams, published together, show the size and attrition of the armies of Hannibal in his expedition across the Alps during the Punic wars and of Napoleon during his assault on Russia. The colored band in the diagrams indicates the army's strength of numbers—in both charts, one millimeter in thickness represents ten thousand men. The chart of Napoleon's march includes an indication of temperature as well.

[12]

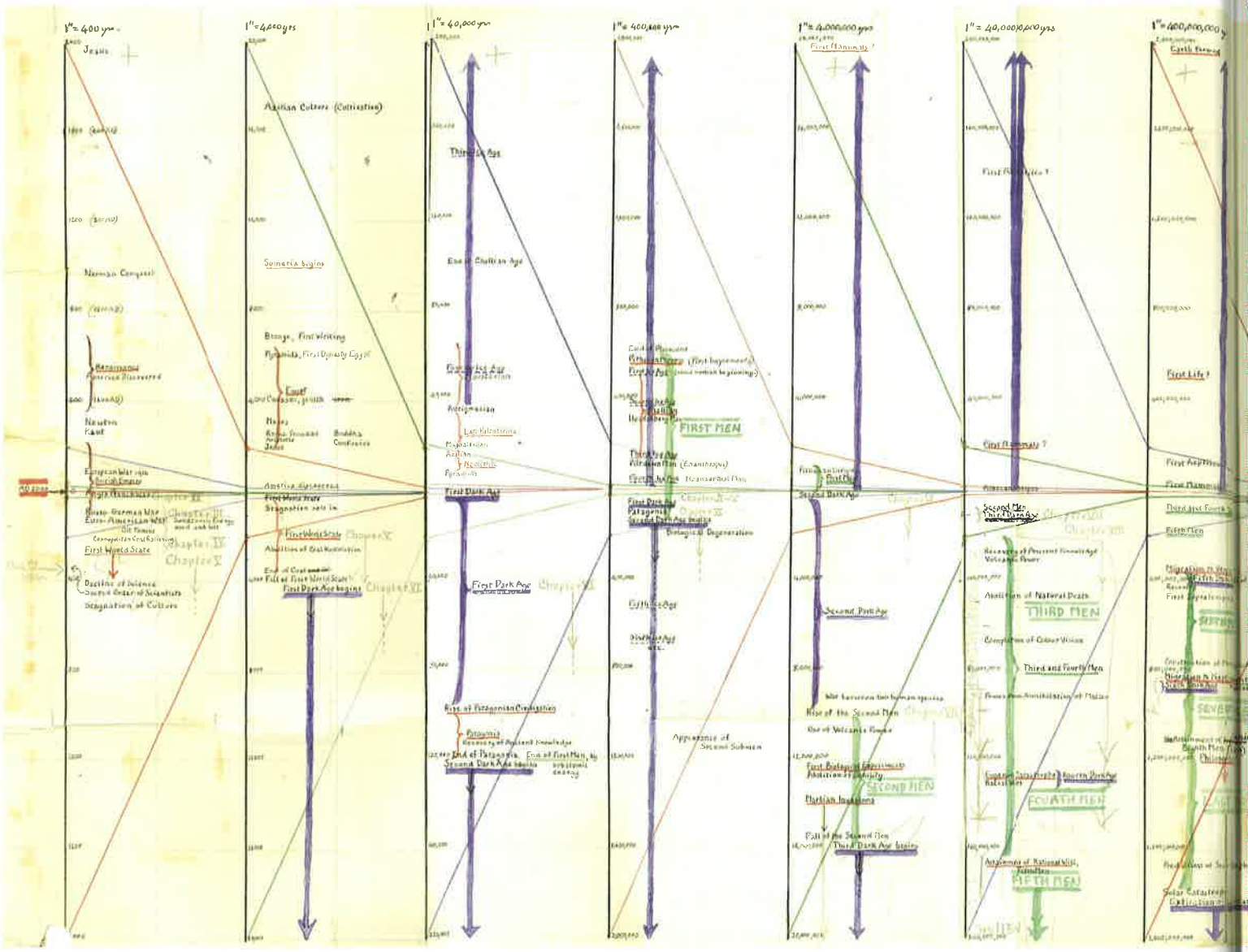
Charles Renouvier, diagram in which uppercase letters represent actual events, lowercase letters events that did not happen, from 1876

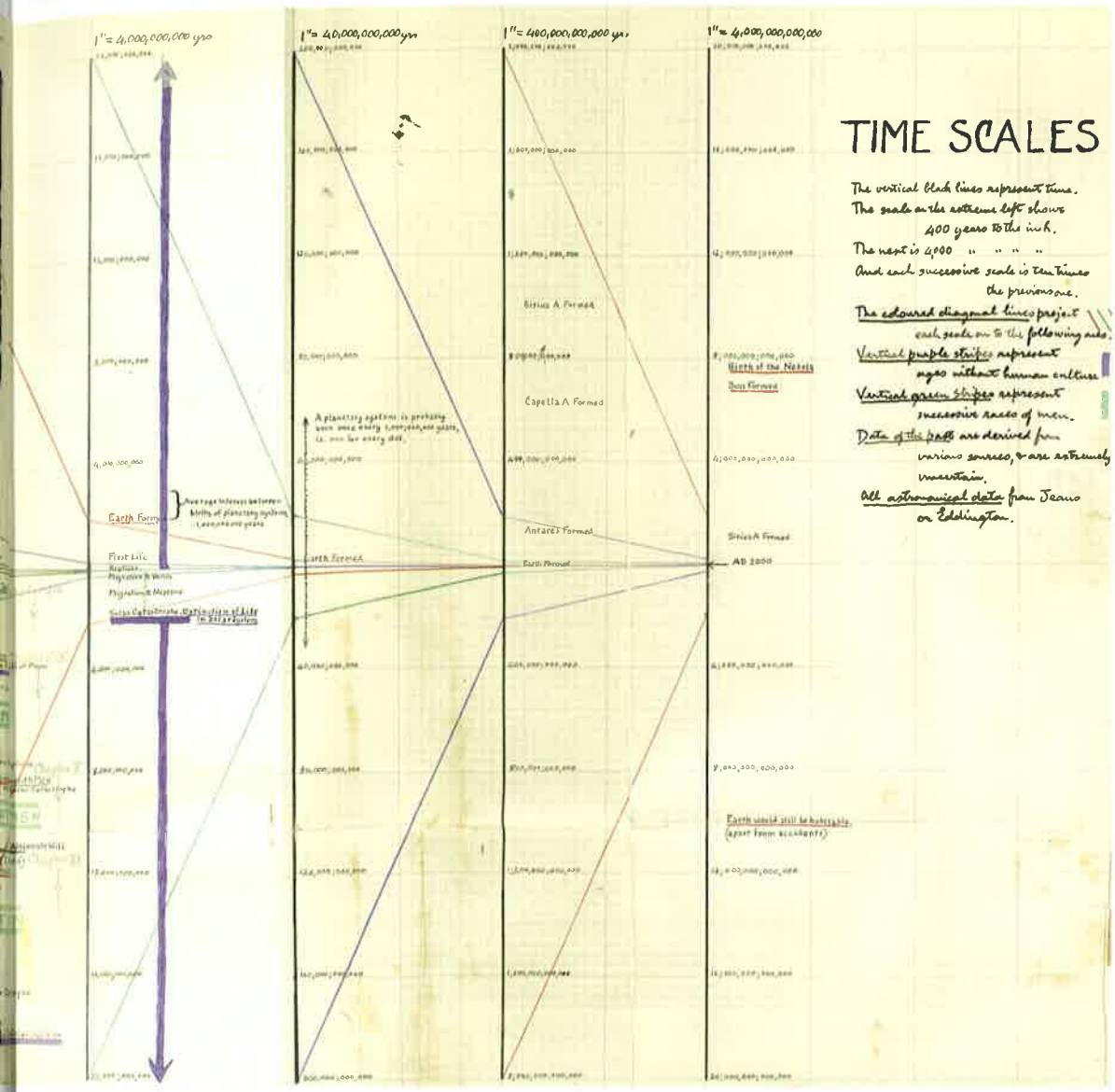


the space of the Russian winter. At the same time, through color, angle, and shape, Minard's chart marks the centrality of the idea of *reversal* in the thinking and telling of history. Minard's chart may be more accurate than Priestley's, not because it carries more or better historical detail but because it reads in the complex, sometimes paradoxical way in which a real story is told. The same could be said for the branching time map in Charles Renouvier's 1876 *Uchronie (l'utopie dans l'histoire): Esquisse historique apocryphe du développement de la civilisation européenne tel qu'il n'a pas été, tel qu'il aurait pu être* (Uchronia [utopia in time]: An outline of the development of European civilization, not as it was, but as it could have been), which depicts both the actual course of history and alternative paths that might have been if other historical choices and actions had been taken. [*fig.* **12**] Other philosophers took an even more critical position. At the end of the nineteenth century, the French philosopher Henri Bergson decried the metaphor of the timeline itself as a deceiving idol.[22]

Reflection on the question of deep time, too, engendered self-consciously estranging forms of temporal mapping, as in the several billion year long timeline of future history that the philosopher and science fiction writer Olaf Stapledon used as the structure for his metahistorical parable, *Last and First Men*, from 1930.[23] [*fig.* **13**] Stapledon knew that it is hard to envision human history in terms of billions of years. He also knew that projected on a timeline, his vision would look almost natural. Stapledon employed the intuitive form of the timeline to shake up his readers' assumptions about the values implied in the very scale of our historical narratives. And in recent years similar devices have been used effectively by environmentalist groups such as the Long Now Foundation. [*fig.* **14**] Throughout the past two centuries, from Francis Picabia to On Kawara and from J. J. Grandville to Saul Steinberg, visual artists have interrogated and poked fun at our presuppositions about graphic representation of historical time. Works such as theirs point to both change and persistence in the problem of chronological representation—to the vitality of the forms created by Eusebius and Priestley and to the conceptual difficulties that they continue to present.

In *Cartographies of Time*, we offer a short account of how modern forms of chronological representation emerged and how they embedded themselves in the modern imagination. In doing so, we hope to shed some light on Western views of history, to clarify the complex relationship between ideas and modes of representation, and to offer an introductory grammar of the graphics of historical representation.


1" = 400 yrs
1" = 4000 yrs
1" = 40,000 yrs
1" = 400,000 yrs
1" = 4,000,000 yrs
1" = 40,000,000 yrs
1" = 400,000,000 yrs
Jesus
Norman Conquest
Neutron
Kauf
Chapter II
Chapter III
Chapter IV
Chapter V
Chapter VI
Chapter VII
Chapter VIII
Chapter IX
Chapter X
Chapter XI
First World State
Decline of Science
Stagnation of Cultures
Artisan Cultures (Cultivation)
Sumeria begins
Bronze, First Writing
Pyramids, First Dynasty Egypt
Kauf
Nazis
Buddha
Confucius
First World State
First Dark Age begins
Third Dark Age
End of Chalcon Age
First Dark Age
Rise of Patagonian Civilization
Patagonia
End of Patagonia
End of First Men, by
Second Dark Age begins
Appearance of
Second Species
FIRST MEN
Second Dark Age
Rise of the Second Men
Martian Invasions
Fall of the Second Men
Third Dark Age begins
SECOND MEN
Abolition of Natural Death
THIRD MEN
Completion of Colour Vision
Third and Fourth Men
Fourth Dark Age
FOURTH MEN
Attainment of National Will,
Abolition
FIFTH MEN
Earth Formed
First Life ?
First Amphibians
First Mammals
Third and Fourth ?
Fifth Men
Migration to Mars
First Interplanetary
SIXTH
SEVENTH
Solar Catastrophe
Extinction



[13]

Manuscript timeline for Olaf Stapledon's classic 1930 science fiction novel, *Last and First Men: A Story of the Near and Far Future*. Stapledon's book gives an evolutionary history of humanity over two billion years and eighteen great biological and cultural revolutions. The published work includes a set of timelines drawn to different scales, from the historical to the cosmological. His manuscript timeline works the same way: the vertical black lines represent time; the line at the far left is drawn to a scale of 400 years to the inch; the next is 4,000 years to the inch, and each successive scale is ten times the previous. Colored diagonal lines project each scale onto the following ones. Vertical purple stripes represent ages without human culture. Vertical green stripes indicate successive races of men.

Special Collections and Archives, University of Liverpool Library. Courtesy of John Stapledon.

[14]

The Long Now Foundation, comparative time scales of the concept of the long now, 1999