

Timekeeping

The movement of the stars is readily available to the human eye, and solar and lunar cycles have an enormous impact on human culture, so not surprisingly, the earliest diagrammatic charts derive from observation of the heavens. Like maps and architectural plans, these charts demonstrate a capacity for abstraction. Their diagrammatic character imposes a conventional, schematic order on natural phenomena and then functions as if it were equivalent to the original. The organization of the calendar into a year of approximately 360 days, organized

into larger groupings of weeks or months, arises in the ancient Mesopotamian region by about 2100 BCE.⁸⁵ Like writing and numeracy, calendar systems also arise independently in most parts

of the world and are usually based on observable solar, lunar, or planetary cycles.⁸⁶ We are so accustomed to understanding the heavens as a set of quadrants and coordinates that we barely register these systems or the graphical conventions. The idea of a celestial sphere, with its equal divisions on an ecliptic or meridian, projects a sense of rhythm, order, and regularity onto the flux of temporal change. The very idea of a year becomes reified through familiarity with the form. The astrological and astronomical divisions of the skies get projected onto human experience as a scheme, or reference frame, against which such experience can be understood or measured. Like maps, celestial coordinate systems become a reified intellectual construct, a graphical scheme through which hu-

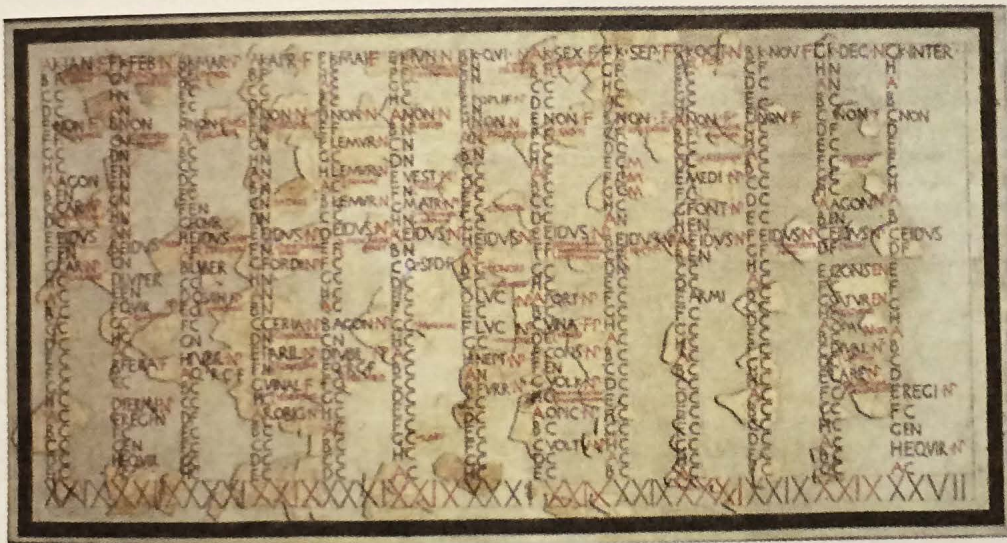


Babylonian star chart and calendar from the library of Ashurbanipal, Nineveh, inscribed with Assyrian cuneiform (circa 720 BCE).

man beings create a relation to the phenomenal world.

The Romans had a quasi-grid system for marking time in months and days, but our familiar calendar grid is of much later vintage, appearing only well into the age of print.⁸⁷ Western calendar grids, with their division of the week into seven days, led or finished by the Sabbath, impose a cycle of beginnings and endings to the flow of time. The seven-day division is a residue of lunar cycles, structuring time according to the waxing, waning, full, and new moons.⁸⁸

Days, months, and years have a source in planetary revolutions and movements—but what is an *hour*? It is not de-



termined by a natural cycle. The structure of hours has no such natural source, and variations in the divisions of time, as well as the identification of the moment of a day's beginning, have varied in ancient and indigenous cultures. We think of days as entities, bounded and discrete, because of our habits of waking and sleeping according to the rising and setting sun. But chunking of time into hourly units has become naturalized by the representations so familiar in our daily use. Such conceits are the result of long habits of shared thought, conventions, or cognitive maps. Any reordering of months into single lines of days—or into other graphical

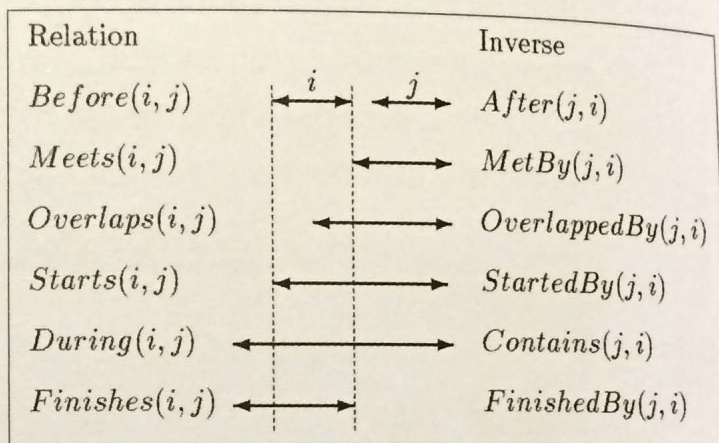
Calendar of Roman *fasti*, Republican era (84-55 BCE), found at Nero's Villa at Antium, reconstructed by Adriano La Regina (1998).

schemes—strikes us as arbitrary and disorienting. The visual order of the calendar seems like the very structure of time itself, so naturalized has it become through graphic conventions. Like lines on a map demarcating one state or nation from another, the division of one day from another is powerfully structured through graphical conventions. These diagrammatic schemes are *performative*. They make the world by structuring our experience of it.

James Allen and George Ferguson analyzed temporal relations using “interval logic,” an abstract set of rules that describe relations that can also

be expressed graphically.⁸⁹ Their goal was to identify the basic set of possibilities for the ways intervals in time could be related. Their list of primitives is based on assumptions about temporality that might not hold in fiction, imaginative works, or possible worlds scenarios, but apply well to linear, homogeneous, and continuous models of time. So, notions like “branches” or “parallels” are absent from their list of relations, which are descriptions of discrete intervals on a timeline. But the example serves very well to demonstrate that sets of relations that can be described logically or mathematically can also be expressed graphically. We have no difficulty understanding the meaning of “before,” “after,” or “meets” in the list compiled by Allen and Ferguson.

Some of these logics verge on philosophical investigations—as in the case of attention to the difficult “dividing instant” problem so crucial to computational operations (which side of a divide does a moment separating one task from an-



other belong to in an algorithmically initiated process). But these logical approaches do not provide an adequate conceptual framework for humanistic experience of temporal relations. Interpenetrated time, recollection and regret, or even the simple distinction between the time of telling and the time of the told in any narrative do not match the categories offered by the discrete categories of Allen and Ferguson's chart.

Temporal divisions have other ideological underpinnings. A timeline, with its single, linear, homogeneous directional flow, expresses a model of temporality consistent with empirical sciences.⁹⁰ But humanistic documents embody many alternative versions of temporality. Humanists deal with the representation of temporality *of* documents (when they were created), *in* documents (narrated, represented, depicted temporality), the construction of temporality *across* documents (the temporality of historical events), and also the shape of temporality that emerges *from* documentary evidence (the shape of an era, a season, a period, or epoch). They need a way to graph and chart temporality in an approach that suits the basic principles of interpretative knowledge.

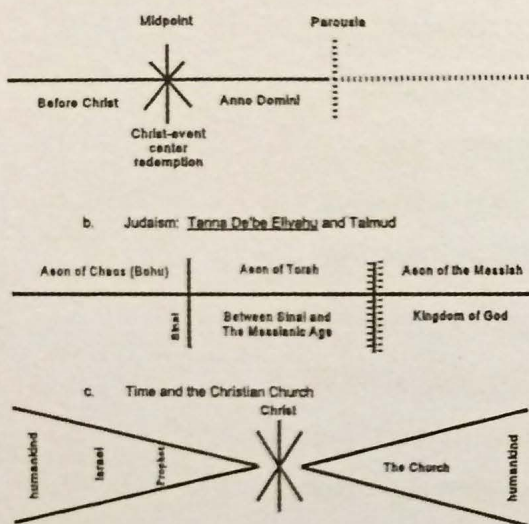
Conceptions of temporality in humanities documents do not conform to those used in the social and empirical sciences. In empirical sciences, time is understood as continuous, uni-directional, and homogenous. Its metrics are standardized, its direction is irreversible, and it has no breaks, folds, holes, wrinkles, or reworkings. But in the humanities time is frequently understood *and represented* as discontinuous, multi-directional, and variable. Temporal dimensions of humanities artifacts are often expressed in relational terms: before such and such happened, or after a significant event. Retrospection and anticipation factor heavily in humanistic works, and the models of temporality that arise from historical and literary documents include multiple viewpoints. Anticipa-

tion, foreshadowing, flashbacks, and other asynchronous segments are a regular part of narratives, and they create alternative branchings, prospective and retrospective approaches to the understanding of events that cannot be shown on empirical timelines.⁹¹

Human experience of temporality is always relational, thus the marking of epochs in accord with expectations of a messiah's return or in recognition of this as a still-future event

mark major distinctions in the Christian and Jewish world views.⁹² All of historical time takes its measure in relation to such markers and milestones, and the shape of temporality is an expression of belief, not a chart of standard metrics. The experience of time is highly subjective, as is that of space, and thus the sense of a long moment, a swift day, a fast movie, a slow book requires elasticity in the ways we measure, record, and express temporality. The human record is full of gaps and breaks, rup-

tures and missing documents, so that any historical reconstruction necessarily provides only partial evidence. Humanistic temporality is broken, discontinuous, partial, fragmented in its fundamental conception and model. How to find the right graphical language to communicate this knowledge in ways that are sufficiently consistent to achieve consensus while being flexible enough to inscribe the inflections that characterize subjective experience?



Herbert Bronstein, diagramming time in relation to cultural events; from *Time, Order, Chaos: The study of Time*, James Fraser ed. (Madison, CT: International Universities Press, 1998).