



**Review of The Cambridge History of Science. Volume 1,  
Ancient Science, ed. Alexander Jones and Liba Taub.  
Cambridge: Cambridge University Press, 2018.**

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*The Cambridge History of Science. Volume 1, Ancient Science*. Edited by ALEXANDER JONES and LIBA TAUB. Cambridge: CAMBRIDGE UNIVERSITY PRESS, 2018. Pp. xix + 642. \$160.

As one would expect from a *Cambridge History* volume dedicated to “ancient science,” this book provides a coherent and accessible overview of the history, sources, philosophy, and sociology of the principal fields of natural inquiry in the ancient world. In terms of geographical span, the book covers Mesopotamia (4 chapters, 93 pages), Egypt (4 chapters, 62 pages), the Mediterranean (16 chapters, 321 pages), India (3 chapters, 66 pages), and China (3 chapters, 65 pages). In terms of subject matter, to each civilization/language-tradition are devoted independent chapters on medicine, mathematics, and astronomy/astrology, though not necessarily in that order, and, to the Greco-Roman world, additional chapters on zoology, botany, geography, optics, harmonics, mechanics, and alchemy. Lastly, in the case of Mesopotamia, Egypt, and the Mediterranean, this idea-oriented core is complimented by introductory chapters outlining the social, historical, and philosophical background relevant to the chapters that follow.

As to framing, as presented in the Introduction, the editors’ approach might be described as a mix of thoughtful minimalism and nonintervention. The Introduction is barely four pages long, and it is largely dedicated to highlighting the pitfalls that the volume aims to avoid: essentialism, anachronism, “scientific” and Greco-Roman exceptionalism, insisting on overly rigid definitions, and reading technical literature independent of context. “Science,” for example, is given a loose working definition comprising “three elements that did not all have to be present in a particular tradition: the collection and organization of information and knowledge; prediction; and causal explanation” (p. 2). The editors leave it at that, they deny any pretensions at exhaustiveness or perfect historiographical objectivity, and they inform us that the authors were essentially free to organize their chapters and interpret “ancient” and “science” as they saw fit. Where the editors do speak out, if only briefly, is in their interest in exploring: [1] transmission and interconnection, both across and *within* individual language cultures, notably between different fields and across the divide between specialist and amateur; [2] “the people who engaged in scientific work, their education, their motivations, and their professional status” (p. 2); [3] emic/actor’s concepts, values, and categorization; and [4] cultural, institutional, and religious settings.

Barring the possibility that Alexander Jones and Liba Taub are in fact Daoist sages, of course, it is unlikely that this five-part, thirty-chapter tome spontaneously organized itself into something so coherent without quite a bit of active direction and intervention on their part. In other words, their vision for this volume, if not the field, is to be found realized through their editorial work on the 614 pages of the body rather than pontificated upon in the Introduction. Throughout, there is a relative unity to each chapter’s minimalism in aim and theoretical/ideological apparatus, as adumbrated in the Introduction, and, where appropriate, the authors naturally engage with the four topics of interest enumerated above (those of

[2] people and [4] settings given their own independent chapters in the case of Mesopotamia, Egypt, and the Mediterranean, as previously mentioned). One likewise sees a fairly consistent effort to introduce and ground the discussion in terms of actor's categories and emic values and aims, which effectively bypasses the matter of defining "science" and focuses the reader on what our historical subjects were actually doing. Equally consistent is the attention to introducing the key sources, concepts, problems, and precedents before launching into a discussion that would be otherwise incomprehensible to an outside reader. Lastly, while each chapter and section is indeed organized differently, there is a relative unity in contents, tone, technicity, and level of detail throughout, as well as a similar compartmentalization and flow between sources, ideas, and chronologies, all of which facilitates the easy reading of both individual chapters and the volume as a whole.

As someone who shares a similar vision for the history of science in the ancient world and a common interest in [1] interconnectedness, [2] people, [3] actor's categories, and [4] settings, I wholeheartedly endorse the volume's general approach. I could cite many reasons as to why, but, in summary, I would say this: after a more than a century spent building up, philosophizing upon, and deconstructing "science" as distinct from "magic," "religion," and whatever parallel yet "purely practical" activities non-Europeans may have been up to, I think there is a weary/optimistic consensus that we should place primary sources first, extend our reading beyond a single corpus, and get back down to the basic matters of textual scholarship and historiography, looking neutrally across language-traditions for outside inspiration. Had the editors chosen to fully engage with the literature in the philosophy of science to justify why such things as rigid observer's categories and Greco-Roman exceptionalism are problematic, their introduction could have easily run the full 642 pages. Instead, they simply put this knowledge into action and provided an example of what to do about it. This is not the first piece of scholarship to do this, but the seal of a *Cambridge History* series marks an important milestone in its establishment as a norm.

This approach raises an important question upon which the editors are silent. Namely, one of the greatest things at stake in the definition of "science" in the twentieth century was the demarcation problem: where do you draw the line, for example, between veterinary medicine, animal physiognomy, animal omens, and animal-themed poetry, rituals, and board games? There is a postmodern argument for not drawing any lines at all, but however religiously one places "science" in scare quotes, one must face two inexorable realities in writing a "history of science" in this brave new world. First, there is a limit to how many subjects one can cover in a given academic genre before the piece becomes unpublishably long or loss of narrative focus. Second, there is only so far you can stray from vague modern usage(s) before colleagues and publishers alike communally reject your choice of labels. In "Medicine in Early and Classical Greece," pp. 293–296, Philip van der Eijk lays out a workaround that essentially the same as that we see tacitly employed throughout the majority of the other chapters. Roughly speaking, one embraces modern analogues such as "astronomy" in titles and section headings, im-

mediately qualifying these as heuristics meant to guide the outside reader; one switches to an actor's category or self-contained tradition, shifting the conversation from "astronomy" to *jyotiḥśāstra*, for instance, and all the things that *the latter* may entail; finally, one relies on our historical subjects' taxonomies and argued distinctions to exclude what *they* excluded as off topic. In other words, one uses bait and switch. This is effective, and I too believe it to be our best option, but it does open the door to some confusion upon which I think it worth reflecting.

In "Mesopotamian Mathematics," Jens Høyrup sends the reader to a different chapter to read about the "highly sophisticated numerical techniques" in the respective tradition of astronomy (p. 63); in "Egyptian Mathematics" he does not. In "Greek Mathematics," Nathan Sidoli devotes several pages to the subject (pp. 364–373), overlapping with Jones' chapter, "Greco-Roman Astronomy and Astrology." And in "Mathematical Knowledge and Practices from Early Imperial China until the Tang Dynasty," lastly, Karine Chemla likewise makes no reference whatsoever to this parallel corpus of mathematics, though in this case her two principle subjects, Li Chunfeng 李淳風 (602–670) and Zhen Luan 甄鸞 (fl. 535–570), were equally active in both. Concerning Greece and China, it is probably safe to say that this comes down to the actor's categories hiding behind a title like "Greek Mathematics": in Greek, *all of this* is *mathēmatikē*; in Chinese, though they form an inseparable pair, our sources neatly distinguish *li* 曆 from *suan* 算 (synonyms designating celestial and terrestrial mathematics, respectively, with *li* always coming first). Nevertheless, taking a step back, I think that we need to ask ourselves as a field what we are doing with a modern label like "history of mathematics" if it may not cover or even reference all of a single historical subject's mathematical writings. And if we must effectively separate Ptolemy "the mathematician" from Ptolemy "the astronomer" for the sake of a modern heuristic (to be immediately renounced), then where exactly are we supposed to draw that line through an astronomical work like his *Mathēmatikē Syntaxis*?

This is more a question for the future than a critique, but since I am a sinologist, and the review genre demands it, I will offer one point of criticism concerning "Part V, China." Namely, while I find the core of Karine Chemla, Vivienne Lo, and Christopher Cullen's respective chapters on mathematics, medicine, and astronomy essentially unimpeachable as stand-alone works, I feel that the volume might have better come together as a whole if Part V were modelled upon those dedicated to Mesopotamia and Egypt (Parts I and II).

First, there is no introductory chapter laying out the historical, political, institutional, and sociological setting for "Chinese science" such as Francesca Rochberg does for Mesopotamia, and Annette Imhausen for Egypt. This is ironic, since Chinese, from the first century BCE on, is blessed with what is probably the richest documentation of institutions, social groups, and individual profiles out of any of the language-traditions covered in said volume. By my count, in the astral and mathematical sciences from 317 to 618 alone, for example, we find more than 200 named practitioners, over half of which have biographies, and a more or less unbroken series of thematic historical monographs recounting their activities, de-

bates, writings, and political actions in the principal fields and institutions. There is more than enough here in primary and secondary sources for a separate introduction *à la* Rochberg and Imhausen. Moreover, such an introduction would have added a helpful chronological grounding to Chemla's chapter on mathematics, which leaps forwards and backwards in time, let alone saved Lo and Cullen the trouble of separately introducing the same sequence of events leading to the Han Empire (pp. 576–577, 595–597).

Second, while the core chapters for Mesopotamia and Egypt take us rather neatly from first origins to the end of each language tradition, those for China vary radically in their chronological progression (Chemla) and upper and lower bounds (Chemla and Lo, 221 BCE–1000 CE, then Cullen for origins–175 CE). This too is ironic, since these three fields share such similar corpora and historical arcs. Roughly speaking, for each of these fields, we have random scraps and anecdotes from the Shang (?–1046) on down, old manuscripts from Dunhuang (4<sup>th</sup>–11<sup>th</sup> century), new manuscripts from the 4<sup>th</sup>–2<sup>nd</sup> centuries BCE, and a received tradition marked by monolithic turn-of-the-Common-Era canons and subsequent commentaries and treatises referring back thereto while at once looking forward and outward.

In sum, “Part V, China,” made perfect sense to this sinologist, but I wonder if an outside reader might not get a little lost when reading these three chapters together.

Notwithstanding, *The Cambridge History of Science, Volume 1*, delivers exactly what one would expect of a *Cambridge History*: a coherent, comprehensive, and accessible overview of what we know, careful to bring the reader up to date with the state of the field without getting lost in historical details, complex arguments, or ongoing debates. It very much lives up to tradition in this sense, but its framing of the subject is at once subtle, refreshing, and, as I see it, at the forefront of current trends. In terms of utility, I find it as invaluable as a reference book as it is accessible as introductory reading, and it is a model, in my opinion, of the sort of questions and approach towards which the history of science in the ancient world is rightly moving.

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