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BOOK REVIEWS

NEW LIGHT ON MUL.APIN

Writing Science Before the Greeks: A Naturalistic Analysis of the Babylonian Astronomical Treatise MUL.APIN. Rita Watson and Wayne Horowitz (Brill, Leiden, 2011). Pp. xxviii + 224. €97. ISBN 978-90-04-20230-6.

This new study of the Akkadian astronomical 'compendium' MUL.APIN, or 'Plough Star', is the result of a collaboration between Rita Watson, a developmental psychologist, and Wayne Horowitz, an Assyriologist. MUL.APIN, attested mainly through tablets and fragments from Assyria from the seventh century B.C. and later ones from Babylonia, was likely composed between the twelfth and the seventh century B.C. The authors subject this well-studied composition to a new form of analysis rooted in the cognitive sciences, an approach that has rarely, if at all, been applied to cuneiform texts. The starting point of their study is the existing authoritative edition of MUL.APIN by Hermann Hunger and David Pingree (1989), whose translation is reproduced at the end of the book. Since only insignificant new fragments have been discovered since 1989, a new philological edition is not provided. In chap. 1 the authors explain why they selected MUL.APIN, a rare example of a well-preserved scholarly cuneiform text, extant in a single canonical version whose composition reflects some process of gradual incorporation of distinct layers of scientific knowledge. In §1.5 the authors introduce their central argument that is worked out in detail in chap. 4, namely that the structure of MUL.APIN shows a progression towards 'higher' levels of astronomical knowledge. As I will suggest below, this claim is open to debate. A minor point of critique concerns the term 'naturalistic', whose meaning is explained as "grounding cultural explanation in the biological substrates of human cognition" (p. 20). It remains unclear why this somewhat confusing term is used instead of the more readily understandable 'cognitive'.

Chap. 2 provides a useful introduction to cognitive aspects of writing. Writing allows permanent storage of information, thereby reducing the load on working memory and increasing the amount of information that can be utilized for a task. Moreover, it allows for rereading and reinterpretation, without which a complex scientific text such as MUL.APIN could not be composed and used. The authors argue that the more analysis a text requires ('inferential demands'), the more pronounced are the cognitive effects of writing. Accidentally, this would suggest that the vast corpus of Mesopotamian astrological omens and the scholarly commentaries associated with it may represent a better test case for their cognitive analysis, since these texts require even greater analytical and interpretative skills than MUL.APIN (*cf.* David Brown, *Mesopotamian planetary astronomy-astrology*, 2000).

Chap. 3 discusses the frames of reference, categories and concepts underlying MUL.APIN. They function as diagnostics of cognitive change in the next chapter, which contains a section-by-section analysis of MUL.APIN. The results are summarized

in chap. 5, which includes very interesting observations about the structure of MUL.APIN that seem to have escaped other investigators. As remarked earlier, the authors uncover a systematic development in MUL.APIN towards increasing abstraction and complexity regarding the use of spatial and temporal reference frames, rhetorical devices, taxonomy of stars, formulation of procedures, definitions and axioms. In chap. 6 the authors argue that this progression cannot be explained by a process of mere accretion of astronomical knowledge but, rather, reflects a cognitive development in line with their "inferential model" developed in chap. 2. The increasing use of precise reference frames, complete formulations and conventional rhetorical devices is said to reflect an increasing understanding of what makes a written text comprehensible to a reader. In chap. 7 it is argued that the cognitive effects evident in MUL.APIN may have boosted the development of astronomy in Mesopotamia. However, it is not obvious that these effects can be pinned down within MUL.APIN, which is a comparably late composition. There are much earlier cuneiform texts, e.g., Old Babylonian compilations of increasingly complex mathematical problems, that exhibit cognitive skills of at least similar and probably greater sophistication. Hence the cognitive skills evident in MUL.APIN may have existed earlier in other branches of Mesopotamian scholarship.

A more problematic feature of the analysis concerns the final section of MUL.APIN, which contains astrological omens dealing with stars and planets. Although the authors affirm the modern view that astrological omens are rational with respect to the Mesopotamian belief system, it is apparent that they have considerable difficulty in accounting for this material within their own cognitive framework. In their view the omens contradict the progressive development of astronomical knowledge in MUL.APIN and may not attest to the underlying beliefs of the scribes. It is therefore suggested that omens were included only in order to justify the practical value of astronomy or out of an antiquarian interest (pp. 121–2, 172). Thus, omens are in effect portrayed anachronistically as a distinct form of scholarship in which the composers of MUL.APIN were not really interested. However, if one takes seriously the cognitive progression identified by the authors then the final section with omens should be consistent with it. Alternatively one might argue that a cognitive analysis cannot account for all structural features of MUL.APIN. A solution may be found through a hermeneutical and pragmatic analysis of MUL.APIN, which may reveal the actual or possible usages and mutual dependencies of the different sections including the omens. In fact, the position of the astrological material in MUL.APIN is strikingly analogous to that of the terrestrial sections in the later astronomical diaries from Babylonia. In both cases the astronomical material may play an instrumental role for astrological prediction.

All in all, the authors should be congratulated for this groundbreaking study. Apart from significant new insights into MUL.APIN it has opened up a new avenue for research on ancient scientific texts that is likely to yield further interesting results, particularly if the cognitive analysis is combined with other approaches.

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