THE HEAVENLY WRITING

DIVINATION, HOROSCOPY, AND ASTRONOMY IN MESOPOTAMIAN CULTURE

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CAMBRIDGE
UNIVERSITY PRESS

PUBLISHED BY THE PRESS SYNDICATE OF THE UNIVERSITY OF CAMBRIDGE
The Pitt Building, Trumpington Street, Cambridge, United Kingdom

CAMBRIDGE UNIVERSITY PRESS
The Edinburgh Building, Cambridge CB2 2RU, UK
40 West 20th Street, New York, NY 10011-4211, USA
477 Williamstown Road, Port Melbourne, VIC 3207, Australia
Ruiz de Alarcón 13, 28014 Madrid, Spain
Dock House, The Waterfront, Cape Town 8001, South Africa

http://www.cambridge.org

First published 2004

Printed in the United States of America

Typeface Adobe Garamond 10.75/13 pt. *System* LaTeX 2ε [TB]

A catalog record for this book is available from the British Library.

Library of Congress Cataloging in Publication Data
Rochberg, Francesca, 1952–
The heavenly writing : divination, horoscopy, and astronomy in
Mesopotamian culture / Francesca Rochberg.
p. cm.
Includes bibliographical references and index.
ISBN 0-521-83010-9
1. Astrology, Assyro-Babylonian. 2. Astronomy, Assyro-Babylonian. I. Title.
BF1714.A86R63 2004
133.5′0935 – dc22 2004043566

ISBN 0 521 83010 9 hardback

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PROLOGUE

To the ancient Mesopotamian literati of the middle of the first millennium B.C., the patterns of stars covering the sky were a celestial script. The "heavenly writing" (*šiṭir šamê* or *šiṭirti šamāmī*) was a poetic metaphor occasionally used in Babylonian royal inscriptions to refer to temples made beautiful "like the stars" (*kīma šiṭir šamê*, literally, "like the heavenly writing").[1] In these Babylonian inscriptions, the metaphor is not used explicitly for astrology or celestial divination, but the notion of the stars as a heavenly script implies their capacity to be read and interpreted. Representing the work of the divine, the stars, "written" in the sky as they were conceived to be, could convey a sense of the eternal. When Neo-Assyrian King Sennacherib (704–681 B.C.) claimed of his capital city Nineveh that its "plan was drawn since time immemorial with the heavenly writing," he meant that, when the gods drew the stars upon the heavens, they also drew up the plans for that city.[2] A seventh-century scholarly text from Aššur explains the starry sky as the "lower heavens" (*šamû šaplûti*), made of jasper, on whose surface the god Marduk drew

[1] In the following inscriptions of Nebuchadnezzar: Stephen Langdon, *Neubabylonischen Königsinschriften* VAB 4 (Leipzig: J. C. Hinrichs, 1912), p. 178 i 39, also ibid. 74 ii 2, YOS 1 44 i 21; cf. *BBSt.* No. 5 ii 28, also Neo-Babylonian. In the form *šiṭir burūmê* literally, "writing of the firmament," see *CAD*, s.v. *burūmû* usage b, occurring predominantly in Neo-Assyrian royal inscriptions but also in a hymn to Aššur, for which see A. Livingstone, *Court Poetry and Literary Miscellanea*, SAA 3 (Helsinki: University of Helsinki Press, 1989), p. 4, No. 1:21. See also E. Reiner, *Astral Magic in Babylonia* (Philadelphia: American Philosophical Society, 1995), p. 9, and W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake: IN: Eisenbrauns, 1998), p. 15, note 25, and p. 226.

[2] D. D. Luckenbill, *The Annals of Sennacherib*, OIP 2 (Chicago: University of Chicago Press, 1924), p. 94:64.

"the constellations of the gods" (*lumāši ša ilāni*).[3] The image of the heavens as a stone surface upon which a god could draw or write, as a scribe would a clay tablet, complements the metaphoric trope of the heavenly writing. In their discussion of the term *lumāšu* "constellation," used in the sense of a form of writing with astral pictographs or "astroglyphs," as they have been called, M. Roaf and A. Zgoll note that Sumerian mul "star" (or mul-an, "heavenly star") "can refer both to a star in the sky and to a cuneiform sign on a tablet."[4] They further remark on the relationship between the arrangement of stars in certain constellations and that of the wedges in cuneiform signs.[5] The metaphor of the heavenly writing therefore related the constellations to cuneiform signs from which one could read and derive meaning, and thus expressed the idea that written messages were encoded in celestial phenomena.[6] A remarkable coincidence of conception appears with explicit reference to astrology in *The Enneads* of Plotinus, in which he says "we may think of the stars as letters perpetually being inscribed on the heavens or inscribed once for all."[7]

Although the metaphor is not so often attested, it is entirely consistent with the abundant evidence of the Babylonian celestial divination texts. These presuppose the belief that, if one could read the celestial signs in the sky, written by the gods, and interpret their meanings, events concerning the welfare of the king, the state, and its people as a whole could be divined.[8] The major part of the written corpus of Mesopotamian scribal

[3] *KAR* 307 33; see W. Horowitz, *Mesopotamian Cosmic Geography*, pp. 3 and 13–15, also plate I, for text copy. Other references to the "drawing" of stars (*kakkabāni eṣēru*) may be found s.v. *eṣēru* in *CAD* E, meaning 1 b and c.

[4] Michael Roaf and Annette Zgoll, "Assyrian Astroglyphs: Lord Aberdeen's Black Stone and the Prisms of Esarhaddon," *ZA* 91 (2001), p. 289 and note 68.

[5] Ibid.

[6] The notion of the god (often Šamaš) as "writing" the signs on the exta of sheep is well known; see, e.g., *ina libbi immeri tašaṭṭar šīre tašakkan dīnu* "you (Šamaš) write upon the flesh inside the sheep (i.e., the entrails), you establish (there) an oracular decision," *OECT* 6 pl. 30 K.2824:12.

[7] Plotinus, *The Enneads*, 2nd ed., trans. Stephen McKenna (London: Faber and Faber, 1956), 2.3, p. 96.

[8] The importance of the metaphor of writing for the Babylonian literati is discussed in Piotr Michalowski, "Presence at the Creation," in *Lingering Over Words: Studies in Ancient Near Eastern Literature in Honor of William L. Moran*, Harvard Semitic Studies 37 (Atlanta, GA: Scholars Press, 1990), p. 395 with note 54. A parallel between hermeneutical techniques of Jewish Kabbalah and the cuneiform scribes' methods of interpretation of their own esoteric written traditions, in particular those relating to celestial divination and wisdom literature, has been hinted at by Michalowski, ibid., p. 395, and documented by

scholarship consisted of collections of a variety of "omens," omens that were by no means limited to those of the heavens. In such omen collections, prognostications, stated as cases in the form *if x occurs, then y will occur*, correlated physical phenomena with events of political, economic, or social significance. These omens functioned as a vehicle for much systematization and observation of diverse aspects of the natural world. As such, the divination corpora represent the product of the collective, systematic, and cumulative effort to study, among other things, many aspects of what we regard as nature, or natural phenomena, by Mesopotamian scribal scholarship.

To speak of Mesopotamian scribal scholarship in such a general way perhaps requires a note of explanation. Assyriologists are familiar with the connotation of the phrase "stream of tradition" in reference to Sumerian and Akkadian texts. The term was used by A. L. Oppenheim to represent the literary corpus preserved by cuneiform copyists over the course of nearly two millennia and over a wide geographical area within the Mesopotamian cultural sphere of influence.[9] This continuous tradition can be differentiated from the quantities of nonliterary texts, that is, documents recording transactions and events of many aspects of Mesopotamian civilization. Oppenheim spoke of a "cultural continuum" and "the scribal tradition," both of which notions are implied by "Mesopotamian scribal scholarship." However, although Oppenheim's "stream of tradition" was defined less in terms of an ideological stance and more in terms of the functional result of the training of scribes, my reference to Mesopotamian scribal scholarship carries more ideological weight as a term that unifies both the practices and the presuppositions of scribes associated with literary, meaning "scholarly," divination, while also rendering into English the Akkadian *ṭupšarrūtu* "scholarship" (literally, "the art of the scribe").

Although the motives for systematizing all the phenomena of interest had as much to do with the correlations found between the phenomena and the events presaged by them as with a desire to understand the phenomena alone, the systematization and understanding of the phenomena

S. Lieberman, "A Mesopotamian Background for the So-Called *Aggadic* 'Measures' of Biblical Hermeneutics?," *HUCA* 58 (1987), pp. 157–225. Cf. S. Parpola in "Mesopotamian Astrology and Astronomy as Domains of the Mesopotamian 'Wisdom,' in Hannes D. Galter, ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Grazer Morgenländische Studien 3 (Graz: Grazkult, 1993), p. 58, and again in his "The Assyrian Tree of Life," *JNES* 52 (1993), pp. 161–298.

[9] A. L. Oppenheim, *Ancient Mesopotamia: Portrait of a Dead Civilization* (Chicago/London: University of Chicago Press, rev. edition by E. Reiner, 1977), p. 13.

themselves, to whatever degree was possible, were products of scholarly divination. The physical phenomena collected in the omen texts and the principles of their organization reflect the interests and methods of Mesopotamian scribal scholarship. Characteristic of such methods are empirical study and the creation of schematic systems to interpret the meaning of the enormous variety of signs in the compilation and redaction of the omen collections.

The systematic recording of ominous celestial and terrestrial occurrences subject to observation, imagination, or experience was an intellectual expression of an assumption that the gods were not only inseparable from all possible natural phenomena by virtue of their cosmology, but were also responsible for the associations between phenomena in nature and events in human society. The gods were viewed as the ultimate causes of the ominous occurrences as well as the authorities behind the texts in which the omens were compiled. The importance of the heavens as a great field against which the gods made known certain mundane events is unmistakable in the culture of Assyria and Babylonia in the Neo-Assyrian and Neo-Babylonian periods. This is amply attested to by the omens of the official compilation of celestial omens, *Enūma Anu Enlil*, placed in the library of Nineveh and in the royal correspondence between Sargonid Kings Esarhaddon (680–669 B.C.) and Aššurbanipal (668–627 B.C.) and their learned advisors who used the handbook *Enūma Anu Enlil*.[10] The scholars' correspondence reveals an extensive observational activity combined with astrological interpretation and provides some insight into the practical response to the forebodings of celestial omens.

The perception of the world as a communication medium between humankind and god operated on two basic levels: one in which the diviner simply interpreted what was observed or observable without "interference" by the diviner; the second in which the deity responded to various manipulations by the diviner, for example, drops of oil in the water bowl or the inspection of the exta of a sacrificed sheep. The sources for Mesopotamian divination can typically be classified as one of these two basic divination techniques. The former serves to unify a number of quite disparate omen compilations (to be described in greater detail in Chapter 2) under a single category termed "unprovoked" divination. That the so-called unprovoked omens could have been viewed as a coherent whole is suggested by the

[10] See Parpola, *LAS* Parts I and II, H. Hunger, *Astrological Reports to Assyrian Kings*, SAA 8 (Helsinki: Helsinki University Press, 1992) and Parpola, *Letters from Assyrian and Babylonian Scholars*, SAA 10 (Helsinki: Helsinki University Press, 1993).

fact that some diviners were experts in a number of different fields of unprovoked divination. In a letter from the celestial divination expert Marduk-šāpik-zēri to King Aššurbanipal, the scribe reviewed for the king the extent of his learning:

> I fully master my father's profession, the discipline of lamentation; I have studied and chanted the Series. I am competent in [...], "mouth-washing" and purification of the palace [...]. I have examined healthy and sick flesh. I have read the (astrological omen series) *Enūma Anu Enlil* [...] and made astronomical observations. I have read the (anomaly series) *Šumma izbu*, the (physiognomical works) [*Kataduqqû, Alamdi*]*mmû* and *Nigdimdimmû* [... and the (terrestrial omen series) *Šum*]*ma ālu*.[11]

For Marduk-šāpik-zēri, at least, celestial divination belonged within a broader field of knowledge that included terrestrial, physiognomic, and anomalous birth omens, as well as medicine.

If the outward form and underlying rationale is the same for all these omen types, it seems unjustified to separate celestial divination from the rest of the unprovoked omens in a study of Mesopotamian science. The fact that celestial divination dealt with astronomical phenomena, a legitimate object of scientific investigation from a modern point of view, has perhaps given this form of divination something of an edge in the history of science, measured by the relative attention given these texts as opposed to, say, the omens from malformed fetuses (*izbu*). The features of celestial divination that warrant its classification as "science," however, are found in all forms of scholarly omens. It is as important to an understanding of Mesopotamian celestial divination to see its connection to other, noncelestial, omen texts as it is its connection to astronomical texts that are not ostensibly divinatory.

Among the features of Mesopotamian scholarly texts discussed in this book will not be found the once-standard "Listenwissenschaft," defined in W. von Soden's classic "Leistung und Grenze sumerischer und babylonischer Wissenschaft."[12] The idea that ancient Mesopotamian science is to be found in word lists – or omen lists – that order and classify the world does not go far enough either in its assumption that science is systematized knowledge or that Mesopotamian thought about "the world" is

[11] S. Parpola, *Letters from Assyrian and Babylonian Scholars*, p. 122, No. 160:36–42.

[12] Originally published in *Die Welt als Geschichte* 2 (1936), pp. 411–64 and pp. 509–57, then reprinted with addenda in B. Landsberger and W. von Soden, *Die Eigenbegrifflichkeit der babylonischen Welt. Leistung und Grenze sumerischer und babylonischer Wissenschaft* (Darmstadt: Wissenschaftliche Buchgesellschaft, 1965).

limited to a desire to classify and systematize. A related problem with this approach is the search for an explanation for the "classificatory" nature of "ancient Near Eastern science" in literacy itself, the written (list-) form of this alleged science, but this aspect has been addressed by M. T. Larsen and more recently by N. Veldhuis and D. Brown.[13]

Extant from the same period in which the divination series were developed and standardized, or from the Old Babylonian up to the Neo-Assyrian period, are also astronomical texts, that is, texts in which celestial phenomena are treated in a strictly technical or descriptive way and, for the most part, are not combined with prognostication from heavenly phenomena. Early Babylonian astronomy is represented chiefly by the compendium MUL.APIN and several isolated texts covering subjects such as the seasonal appearances of fixed stars, planetary observations, or daylight schemes.[14] The astronomical compendium MUL.APIN focuses directly on cataloging and systematizing a wide variety of celestial phenomena. Subjects found in MUL.APIN include names and relative positions in the sky of fixed stars, dates of their heliacal risings, simultaneous risings and settings of certain stars and constellations, so-called *ziqpu* stars that cross the zenith of the observer, stars in the path of the moon, astronomical seasons, luni–solar intercalation rules with fixed stars, stellar calendar, appearances and disappearances of the five planets (Mercury, Venus, Mars, Jupiter, and Saturn), periods of visibility and invisibility of the planets,[15] length of daylight scheme, and lunar visibility scheme. Copies of this astronomical compendium date to the period of Aššurbanipal's library and

[13] See Mogens Trolle Larsen, "The Mesopotamian Lukewarm Mind: Reflections on Science, Divination and Literacy," in F. Rochberg-Halton, ed., *Language, Literature and History: Philological and Historical Studies Presented to Erica Reiner* (New Haven, CT: American Oriental Society, 1987), pp. 203–25, Niek Veldhuis, "Elementary Education at Nippur: The Lists of Trees and Wooden Objects," Ph.D. dissertation (Groningen: Rijksuniversiteit Groningen, 1997), pp. 137–46, and D. Brown, *Mesopotamian Planetary Astronomy–Astrology, Cuneiform Monographs 18* (Groningen: Styx Publications, 2000), p. 76, note 203.

[14] H. Hunger and David Pingree, *MUL.APIN: An Astronomical Compendium in Cuneiform* (Horn, Austria: Ferdinand Berger & Söhne, Archiv für Orientforschung, 1989), Supplement 24.

[15] The determination of such periods was not yet very precise. In fact, Brown, *Mesopotamian Planetary Astronomy–Astrology*, pp. 113–116, and 146–151, argues for the "ideal" function of the planetary period values, i.e., not to predict planetary appearances, but merely to gauge whether an appearance was early or late, and therefore to be made amenable to divinatory analysis as a favorable or unfavorable sign. This idea is confirmed by the evidence in the Neo-Assyrian letters from scholars.

later, but parts of this work no doubt antedate the earliest dated copy by some centuries.[16] From the calendric correspondences given in the text (MUL.APIN II i 9–18) between stellar heliacal and acronychal risings and the dates of equinoxes and solstices as well as the positions of sun and moon relative to certain stars at equinox and solstice, D. Pingree and H. Hunger have argued for a date of circa 1000 B.C. for the final formulation of the text.[17] Its primary interest is calendric, some of which is related to the risings, settings, and culminations of fixed stars. The fixed-star catalog of MUL.APIN contains sixty rising and setting stars, six circumpolar stars, and five planets. The stars are arranged in groups according to the "paths" on which they are seen to rise and set. Three broad paths are designated by the names of the three great gods, Anu, Ea, and Enlil, and describe only roughly demarcated bands of varying declination, Ea being to the south, Enlil to the north, and Anu in the middle, or close to the equator. As it is explained in a commentary to *Enūma Anu Enlil*, the Mesopotamian definition of the paths is not with respect to the celestial equator, a concept they did not have, but rather with respect to the eastern horizon.[18] Despite its primary interest in the phenomena themselves, and hence our classification of the text as astronomical, the final section of MUL.APIN is devoted to celestial omens (MUL.APIN II iii 22–39).

With the exception of the brief planetary sections of MUL.APIN (I i 38; I ii 13–15; II i 40–41; and II i 38–67), the nondivinatory astronomical sources from this early period concern themselves primarily with fixed stars, the calendar, and the length of daylight. The simplest of the fixed-star schemes is represented by the so-called Astrolabe, or "Three Stars Each," in which a schematic calendar associating the appearance of fixed stars of the three "paths" of Anu, Enlil, and Ea with certain months is found.[19] Other astronomical texts of this early period also deal with the fixed stars, such as the catalogs of stars on or near the zenith (*ziqpu*s),[20]

[16] For the Late Babylonian period MUL.APIN, see W. Horowitz, "Two MUL.APIN Fragments," *AfO* 36/37 (1989–1990), pp. 116–117 and Hunger–Pingree, *Astral Sciences*, p. 57, idem, *MUL.APIN*, p. 9.

[17] Hunger-Pingree, *MUL.APIN*, pp. 11–12.

[18] The term for horizon is TÙR/*tarbaṣu* "the cattle pen," see *Enūma Anu Enlil* 50–51 III 24b, *BPO* 2, pp. 42–3.

[19] B. L. van der Waerden, "Babylonian Astronomy II. The Thirty-Six Stars," *JNES* 8 (1949), pp. 6–26; C. B. F. Walker and H. Hunger, "Zwölfmaldrei," *MDOG* 109 (1977), pp. 27–34.

[20] J. Schaumberger, "Die Ziqpu-Gestirne nach neuen Keilschrifttexten," *ZA* 50 (1952), pp. 214–229, Hunger–Pingree, *Astral Sciences*, pp. 84–90.

alignments between *ziqpu* and other stars,[21] and other intervals between stars such as in the difficult DAL.BA.AN.NA text.[22]

These are the major astronomical texts to which the celestial omens of *Enūma Anu Enlil* bear close relation. Aspects of early planetary and lunar astronomy are also embedded within the omen series *Enūma Anu Enlil* itself.[23] Later, in the period immediately preceding the hellenization of Babylonia, or roughly between 600 and 300 B.C., changes occur both in Babylonian astronomy and celestial divination, but continuities with the older tradition persist. In astronomy a significant change from the earlier material is reflected in the appearance of many observational records, made on a nightly basis, and assembled in an archive in the city of Babylon. The nightly watch of the sky seems to have been standard Babylonian practice since the reign of King Nabonassar (747–734 B.C.). Although no eighth-century examples are preserved, observational texts were prepared at Babylon from the middle of that century, as is indicated in later compilations of lunar eclipse reports. These so-called astronomical diaries collected lunar, planetary, meteorological, economic, and occasionally political events night by night, usually (at least in the later diaries) for six (or seven) months of a Babylonian year, recording daily positions of the moon and planets visible above the local horizon, as in the following excerpted lines from a diary dated in the year 331 B.C.:

Night of the 20th, last part of the night, the moon was [nn cubi]ts below β Geminorum, the moon being $^2/_3$ cubit back to the west. The 21st, equinox; I did not watch. Ni[ght of the 22nd, last part of the night,] [the moon was] 6 cubits [below] ϵ Leonis, the moon having passed $^1/_2$ cubit behind α Leonis. Night of the 24th, clouds were in the sky.[24]

In addition to observational data of astronomical interest, the diaries recorded observations of other events as well, some of a political nature.

[21] See D. Pingree and Christopher Walker, "A Babylonian Star Catalogue: BM 78161," in E. Leichty, M. deJ. Ellis and P. Gerardi, eds., *A Scientific Humanist: Studies in Memory of Abraham Sachs*, Occasional Publications of the Samuel Noah Kramer Fund 9 (Philadelphia: Babylonian Section, University Museum, 1988), pp. 313–22, and discussed in Hunger–Pingree, *Astral Sciences*, pp. 90–7; cf. J. Koch, "Der Sternkatalog BM 78161," *WO* 23 (1992), pp. 39–67.

[22] C. B. F. Walker, "The Dalbanna Text: A Mesopotamian Star-List," *WO* 26 (1995), pp. 27–42, J. Koch, "Der Dalbanna-Sternenkatalog," *WO* 26 (1995), pp. 39–67, and discussed in Hunger–Pingree, *Astral Sciences*, pp. 100–11.

[23] Hunger–Pingree, *Astral Sciences*, pp. 32–50.

[24] Sachs–Hunger, *Diaries*, Vol. I, 1988, No. −330, p. 177.

The previously quoted diary of 331 B.C., for example, contains the report of Darius III's defeat by Alexander the Great at Gaugamela:

that month (Month VI), on the 11th, panic occurred in the camp before the king [. . . .] lay[?] opposite the king. On the 24th, in the morning, the king of the world [. . . .] the standard[?] [. . . .] they fought with each other, and a heavy[?] defeat of the troops of [. . . .] the troops of the king deserted him and [went[?]] to their cities [. . . .] they fled to the land of the Guti [. . . . Month VII. . .]. . . . That month, from the 1st to [. . . .] came to Babylon saying "Esangila [. . . ."] and the Babylonians for the property of Esangila [. . . .] On the 11th, in Sippar an order of Al[exander . . . . ". . . .] I shall not enter your houses". On the 13th, [. . . .] to[?] the outer gate of Esangila and [. . . .] On the 14th, these[?] Ionians a bull [. . . .] short, fatty tissue [. . . .] Alexander, king of the world, [came[?] in]to Babylon [. . . . hor]ses and equipment of [. . . .] and the Babylonians and the people of [. . . .] a message to [. . . .].[25]

Evidence of historical value such as that contained in this broken passage make the diaries a rich source for the Late Babylonian period. Above all, the diaries represent an invaluable source of contemporary dated observations, no doubt the source of the Babylonian observations utilized by Ptolemy in the *Almagest*. Those of Mercury in *Almagest* IX 7, for example, are dated "according to the Chaldeans," that is, in the Seleucid Era, and they make use of the cubit, as seen in the previously quoted excerpt, as well as the ecliptical norming stars known from their use in the diaries.[26]

To this same period, from circa 600 to 300 B.C., belong equally significant developments in the application of celestial divination. Sachs called attention to precisely this period, cautioning against an "a priori assumption of a static condition in Babylonian thought on astrology" during these centuries.[27] From the omens of *Enūma Anu Enlil*, traditionally concerned with the king and the state, a personal form of prognostication from the heavens evolved, which took two forms. Formally related to the traditional celestial omens were nativity omens, which gave forecasts for individuals born at the time of the occurrence of various astronomical phenomena.[28] Not in omen form were horoscope texts, although the resemblance to Greek texts of that designation is quite superficial. Few

[25] Sachs–Hunger, *Diaries*, Vol. I. 1988, No. −330, p. 179.

[26] G. J. Toomer, *Ptolemy's Almagest* (New York/Berlin/Heidelberg/Tokyo: Springer-Verlag, 1984), p. 13 and 450-2.

[27] A. Sachs, "Babylonian Horoscopes," *JCS* 6 (1952), p. 53.

[28] See for example, *TCL* 6 14 in ibid., pp. 65–75; also idem, *LBAT* 1593 rev. 3′–10′ (KI zodiacal sign *alid* "born in the region of such-and-such zodiacal sign").

personal predictions are ever given in the Babylonian horoscopes, although a few do include such statements. These are given as omen apodoses familiar from nativity omens. Although celestial divination in omen form was transmitted to the West, beginning already in the second millennium B.C. through Syria and Anatolia to the Aegean world, during the Persian and Hellenistic periods another phase of such intellectual transmission is evident in Egypt[29] and in Greece, where its traces can be seen in the so-called general or universal astrology. This latest form of astrology to develop in Babylonia, that is, the horoscope, would be decisive for the further development of western genthlialogy through Greek, Islamic, Jewish, and Christian channels. Personal birth omens and horoscopes, referred to collectively as "astrology" in Sachs's previous statement, became dependent on astronomy in a new way. In the horoscopes in particular, an interdependent relationship between astrology and predictive astronomy is demonstrable by the identification of connections among a variety of astronomical text genres and the content of horoscopes. Celestial divination, which carries through from the middle of the second practically to the end of the first millennium B.C., and the Babylonian astronomy of the post-500 B.C. period provide the intellectual context for the Babylonian horoscopes, which bear relation to both of these distinct traditions. Because of these relationships, the horoscopes afford a unique view into Late Babylonian astronomical science.

The present book considers celestial divination and horoscope texts most centrally, but in relation to these are the astronomical texts, both early and late, observational and mathematical, as well as the sizable corpus of correspondence from Neo-Assyrian scribe–scholars to Kings Esarhaddon and Aššurbanipal. All the texts produced by such scribes as a result of diverse forms of inquiry into heavenly phenomena, from those that subject the phenomena to rigorous mathematical description to those that forecast human events on the basis of the phenomena, fell under the purview of what was called *ṭupšarrūtu Enūma Anu Enlil* "the art of the scribe of (the celestial omen series) *Enūma Anu Enlil*." As products of "the art of the scribe" in Mesopotamia, Babylonian divinatory, astrological, and astronomical texts reflect the ideas and concerns of an educated elite. Nothing whatever about the ideas of common Babylonian citizens about the heavens or the gods are contained within these sources. If they are, we have no basis on which to recognize them as such. When we consider the

[29] Richard A. Parker, *A Vienna Demotic Papyrus on Eclipses- and Lunar-Omens* (Providence, RI: Brown University Press, 1959).

many classifications of texts of diverse interests and objectives reflected in the different text headings created by the scribes, we must acknowledge a high degree of native classification and differentiation between the parts of this coherent but multifaceted discipline of celestial inquiry. The interrelations drawn by this study between various texts and their subjects in no way is meant to obliterate these important genre distinctions, or indeed, the sometimes fine differences in the nature of the omen texts, such as between lunar and planetary omens.

One further historiographical point needs to be made before proceeding. Whether one sees continuity or discontinuity from Babylonian celestial divination to the later developed astronomy can be correlated with divergent historiographies of science. The diachronic relation between celestial omens and nondivinatory astronomical texts was once taken as evidence of a progressive development from the magical and divinatory interest in celestial phenomena to the predictive and theoretical.[30] In accordance with an older historiography of science, such a model followed largely from the idea of science as knowledge and that changes, especially advancements, in knowledge signaled human progress. In more recent literature, however, the idea of the sciences comprising disembodied models, theories, or methods of predicting phenomena has been rejected in favor of the notion of a fully integrated historical, social, and culturally conditioned phenomenon. Evidence of change is no longer taken to indicate simply the forward march of a reified science, but rather more complex creative or reactive processes at work within the cultural framework of the historical science in question. This in no way is to dispute the element of progress in some sciences that come within the scope of the history of science. The present discussion, however, deals with a different problem, namely, that to set up a question concerning a continuity or discontinuity between divination and astronomy introduces a distinction, and indeed propagates a distinction in our interpretation of the material between the thinking and doing of divination and magic on one hand and the thinking and doing of science on the other. In the ancient Near East, our sources do indeed indicate an indisputable progressiveness in astronomy. Nonetheless, the realms of "astronomy" and "astrology" were not separate in Mesopotamian intellectual culture, and so a self-conscious distinction between them such as we make in using these terms does not emerge in the cuneiform corpus.

[30] For the historiography of this view, see Chapter 1. For a recent version of this model, see Brown, *Mesopotamian Planetary Astronomy–Astrology*, pp. 218 and 234.

I take for granted further that the science–religion rift has no meaning in the context of the cuneiform sources. Indeed, that conflict, as S. Fuller put it,

> is a product of the late nineteenth-century historical imagination. Only once the natural sciences had begun to assume religion's role as the seat of authoritative knowledge in Western society did the previous history start to be written in terms of science's deliberate attempt to wrench that role away from religion.[31]

One cannot find in Mesopotamian society a comparable institutional separation between the two enterprises of "science" and "religion." Mesopotamian scribal scholarship supported a wide diversity of textual forms and content, including divination of all kinds (celestial being only one), mathematics, observation, and predictive or theoretical astronomy. Distinctions of the order of form, content, or goal make for a diverse body of scribal scholarship, but these distinctions certainly do not carry dichotomous implications for "modes of thinking" of the order of divination/religion/naive/false versus astronomy/science/sophisticated/true.

Therefore, to speak of science in any way as emerging out of divination, or, put the other way around, to imagine that celestial omen literature provided some sort of ground out of which prediction of phenomena came to be a new and scientific goal and a new kind of thinking, in my view, merely recasts an outmoded historiography, namely, that from magic is born science. Magic becomes categorically prescientific or unscientific, and the science that develops later is dependent on some kind of cognitive difference. Although I recognize the anachronistic element in classifying the cuneiform texts as "science" or in using the terms "astronomy" and "astrology," the fact remains that in studying history we necessarily approach the material from an outsider's point of view. These texts are considered here to represent sources that have a contribution to make not only to our understanding of early forms of astrology and astronomy, but also to the earliest history of science.

The rediscovery and decipherment of Babylonian astronomical cuneiform texts more than 100 years ago by J. Epping, J. N. Strassmaier, and F. X. Kugler, and the subsequent penetrating technical analysis of their mathematical methods by the collaboration between historians of astronomy and assyriologists, pushed back the chronological and cultural boundaries of the history of the exact sciences in the western tradition.

[31] S. Fuller, *Thomas Kuhn: A Philosophical History for Our Times* (Chicago/London: University of Chicago Press, 2000), p. 80, note 107.

Related texts of divinatory and horoscopic content raise additional questions and shed a different light on our reconstruction of science in its earliest stages. Babylonian astronomy comprises a significant chapter in the history of western astronomy, one whose significance exceeds even the long duration of ancient Mesopotamian civilization in its continuing influence on Greek, Indian, Arabic, and Medieval European astronomy. The astrological, that is, celestial omen and horoscope, texts comprise an equally legitimate chapter in the history of science as it developed in the West, and, as did Babylonian astronomical techniques, made an impact beyond the cultural boundaries of the ancient Near East to the Aegean and greater Mediterranean and eventually the European milieu well into the Renaissance.[32] An eastern influence is also found in Sanskrit, Pahlavi, and Arabic texts of Late Antiquity and the Middle Ages.[33] By exploring the interrelated parts of the astronomical and astrological traditions of ancient Mesopotamia, this book examines the motivation and goals of Babylonian celestial divination and horoscopy, the approach to physical phenomena as manifestations of the divine, and the function of tradition and the "religious" in the context and (ancient) conceptualization of celestial inquiry within Mesopotamian scribal culture.

[32] See Valerie I. J. Flint, *The Rise of Magic in Early Medieval Europe* (Princeton, NJ: Princeton University Press, 1991); S. J. Tester, *A History of Western Astrology* (Woodbridge, Suffolk, England: Boydell, 1987); Laura Ackerman Smoller, *History, Prophecy, and the Stars: The Christian Astrology of Pierre d'Ailly 1350–1420* (Princeton, NJ: Princeton University Press, 1994).

[33] D. Pingree, *From Astral Omens to Astrology: From Babylon to Bīkāner*, Serie Orientale Roma 78 (Rome: Istituto Italiano per l'Africa e l'Oriente, 1997).

1

THE HISTORIOGRAPHY OF MESOPOTAMIAN SCIENCE

If science has a universal aspect underlying any and all its manifestations in human culture, then a reappraisal of the nature of scientific inquiry should pertain in some measure to modern and to Babylonian science alike. And even if no universal essence is to be found among the various attempts to understand the phenomena of nature, then certainly no cogent argument against inclusion of the attempts evidenced in cuneiform texts can be given as we would certainly want to know the extent of science's diversity. If our conception of science is necessarily grounded in evidence of both its results and its practice, then history has an important role to play, as was suggested in the opening statement of Thomas Kuhn's *The Structure of Scientific Revolutions* when he said, "History, if viewed as a repository for more than anecdote or chronology, could produce a decisive transformation in the image of science by which we are now possessed."[1]

The rediscovery of the earliest evidence for the cultural and intellectual practice we term science is a relatively recent achievement in the history of scholarship. From the first readings of cuneiform astronomical texts in the late nineteenth century by J. Epping and J. N. Strassmaier to the publication of *Astronomical Cuneiform Texts* by O. Neugebauer in 1955 and the *Astronomical Diaries* by A. J. Sachs and H. Hunger from 1988 to 2001, it is clear that the process of decipherment and analysis of Babylonian astronomy has taken place over a span of time during which the idea of science itself has undergone significant changes. The history of science is necessarily influenced by an attendant view of science "in general," even

[1] T. S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962), p. 1.

if that view regards science as an entirely culture-specific, and therefore not a generalizable, phenomenon.

Because a working definition of science for historians has become increasingly subject to criticisms stemming from criteria employed to identify and demarcate science in history, especially criteria established by modern western standards, there seems to be little consensus any longer regarding such a definition. Efforts to understand science in history now reflect greater attention to cultural and social context and so represent a more broadly historicist or even relativistic approach, as compared against the historiography of the first half of the twentieth century with its emphatic demarcation criteria. Accordingly, the place of Mesopotamian science within a general history of science has shifted with the change in historiography. Equally significant to the reevaluation of the status and character of Mesopotamian science in the wider context of Mediterranean antiquity are recent changes in our understanding of the nature of Greek astronomy, and Greek science generally.

The aim of the following discussion is not to explicate particular Babylonian scientific texts or theories, but to address the historiographical issue of the reception of cuneiform astronomical texts into the history of science. The early stages of this history reflect textbook modernist ideas about the nature of science, ideas that, under the influence of a postpositivist orientation in the philosophy of science since the 1960s, have gradually been replaced in a new historiography of science. The terms of my discussion will be familiar enough. It is not the "historicization" of science or the break with old epistemologies per se that concerns this chapter, but rather the history of the perception of Babylonian science as a result of these significant changes in the fields of the history and philosophy of science.

1.1 THE RECEPTION OF BABYLONIAN ASTRONOMY INTO THE HISTORY OF SCIENCE

Until the relatively recent turn away from the pervasive influence of the logical positivists on historians of science, when the model of western science provided the standard against which all other sciences would be judged, the ancient Greeks were assumed to be the inventors of science. In the history of astronomy, the recovery of the civilizations of the ancient Near East eventually necessitated the updating of the view of Greek astronomical science by an acknowledgment of the Greek debt to their Near Eastern predecessors. Specifically, Greek astronomy came to be seen to

depend in significant ways on technical details borrowed from a Babylonian tradition.[2]

Despite the acknowledgment of an intellectual transmission from Babylonia to the Greeks, when it came to general histories of science, Babylonian learning (along with that of other non-Greek ancient sources such as those from Egypt, India, and China) would be contrasted with Greek "knowledge" in one of two ways. What the eastern ancients "knew" was categorized either as mere craft, developed out of practical necessity, or as theological speculation not anchored by logical, causal, or rational inquiry into physical phenomena. In his paper in M. Claggett's well-known 1957 "Critical Problems" conference, published in 1959, A. Crombie issued an authoritative formulation of this position:

I do not think that the opinion that science is organized common sense or generalized craftsmanship and technology survives comparison with the actual scientific tradition, a tradition which seems to me to be essentially Western and to begin with the Greeks. Impressive as are the technological achievements of ancient Babylonia, Assyria, and Egypt, of ancient China and India, as scholars have presented them to us they lack the essential elements of science, the generalized conceptions of scientific explanation and of mathematical proof.[3]

[2] Evidence, both literary and iconographic, of Greek awareness of Near Eastern tradition goes back to the Bronze Age, as documented in Sarah P. Morris, *Daidalos and the Origins of Greek Art* (Princeton, NJ: Princeton University Press, 1992), especially Chap. 5, "From Bronze to Iron: Greece and Its Oriental Culture," pp. 101–49; see also Peyton Randolph Helm, "'Greeks' in the Neo-Assyrian Levant and 'Assyria' in Early Greek Writers," Ph.D. dissertation (Philadelphia: University of Pennsylvania, 1980), M. L. West, *The East Face of Helicon: West Asiatic Elements in Greek Poetry and Myth* (Oxford: Clarendon, 1997), and R. Rollinger, "The Ancient Greeks and the Impact of the Ancient Near East: Textual Evidence and Historical Perspective (ca. 750–650 B.C.)," in R. M. Whiting, ed., *Mythology and Mythologies: Methodological Approaches to Intercultural Influences* (Helsinki: The Neo-Assyrian Text Corpus Project, Melammu Symposia II, 2001), pp. 233–64. As far as astronomy is concerned, the transmission of mathematical astronomy appears to have occurred not before the Hellenistic period (after 300 B.C.), but hints of earlier borrowings may be found, e.g., in the Metonic cycle; see A. C. Bowen and B. R. Goldstein, "Meton of Athens and Astronomy in the Late Fifth Century B.C.," in E. Leichty, M. deJ. Ellis, and P. Gerardi, eds., *A Scientific Humanist: Studies in Memory of Abraham Sachs*, Occasional Publications of the Samuel Noah Kramer Fund 9 (Philadelphia: Babylonian Section, University Museum, 1988), pp. 39–82; also B. R. Goldstein and A. C. Bowen, "A New View of Early Greek Astronomy," *Isis* 74 (1983), pp. 330–40, reprinted in Michael H. Shank, ed., *The Scientific Enterprise in Antiquity and the Middle Ages* (Chicago/London: University of Chicago Press, 2000), pp. 85–95.

[3] A. C. Crombie, "The Significance of Medieval Discussions of Scientific Method for the Scientific Revolution," in Marshall Clagett, ed., *Critical Problems in the History of Science*, (Madison, WI/Milwaukee, WI/London: University of Wisconsin Press, 1959), p. 81.