In the Path of the Moon

Studies in Ancient Magic and Divination

Editors

TZVI ABUSCH — ANN GUINAN — NILS HEEßEL
FRANCESCA ROCHBERG — F. A. M. WIGGERMANN

VOLUME 6

The Babylonian image of the "man in the moon," conceived as a hero vanquishing a lion, from a Seleucid Uruk tablet in the Vorderasiatsches Museum, Berlin (VAT 7851).

In the Path of the Moon

Babylonian Celestial Divination and Its Legacy

By
Francesca Rochberg

TUTA SUB AEGIDE PALLAS · 1683 ·

BRILL

LEIDEN • BOSTON
2010

This book is printed on acid-free paper.

Library of Congress Cataloging-in-Publication Data

Rochberg, Francesca, 1952–
In the path of the Moon : Babylonian celestial divination and its legacy / by Francesca Rochberg.
p. cm. — (Studies in ancient magic and divination)
ISBN 978-90-04-18389-6 (hard cover : alk. paper) 1. Astrology, Assyro-Babylonian. 2. Astronomy, Assyro-Babylonian 3. Omens—Iraq—Babylonia. 4. Horoscopes—Iraq—Babylonia. 5. Akkadian language—Texts. 6. Cuneiform inscriptions, Akkadian. 7. Philosophy, Ancient. 8. Science—Greece—History. 9. Science—Rome—History. I. Title. II. Series.

BF1714.A86R64 2010
133.5'9235—dc22

2010002805

ISSN 1566-7952
ISBN 978 90 04 18389 6

PRINTED IN THE NETHERLANDS

For Mims and Mitzi

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

In addition to the following list, abbreviations in accordance with the CAD have been used for references to cuneiform texts.

ABCD	*Aspects of Babylonian Celestial Divination*, see Rochberg-Halton, 1988
ABL	*Assyrian and Babylonian Letters*, see Harper, 1902
ACT	*Astronomical Cuneiform Texts*, see Neugebauer, 1955
ACh	*L'astrologie chaldéenne*, see Virolleaud, 1911
AfO	*Archiv für Orientforschung*
AHw	*Akkadisches Handwörterbuch*
AMT	*Assyrian Medical Texts*
ANET	*Ancient Near Eastern Texts*
AOAT	*Alter Orient und Altes Testament*
BA	*Beiträge zur Assyriologie*
BAM	Köcher, *Die babylonische Medizin in Texten und Untersuchungen*
BBSt	King, *Babylonian Boundary Stones*
BH	*Babylonian Horoscopes*, see Rochberg, 1998
BHT	Smith, *Babylonian Historical Texts*
BiOr	*Bibliotheca Orientalis*
BOR	*Babylonian and Oriental Record*
BPO	*Babylonian Planetary Omens*, see Reiner and Pingree, 1981–2005
BRM	*Babylonian Records in the Library of J. Pierpont Morgan*, Clay, 1923
CAD	*The Assyrian Dictionary of the University of Chicago*, 21 vols., Chicago and Glückstadt
CCAG	*Catalogus Codicum Astrologorum Grecorum*
CH	Codex Hammurabi
CRRA	*Comte rendu, Rencontre Assyriologique Internationale*
CT	*Cuneiform Texts from Babylonian Tablets in the British Museum*
CTH	*Catalogue des textes hittites*
EAE	The Akkadian series *Enūma Anu Enlil*
EAT	*Egyptian Astronomical Texts,* see Neugebauer and Parker, 1960, 1964 and 1969
EnEl	The Akkadian poem *Enūma Eliš*
HAMA	*History of Ancient Mathematical Astronomy*, see Neugebauer, 1975

HUCA	*Hebrew Union College Annual*
IEJ	Israel Exploration Journal
IqIp	The Akkadian series *iqqur īpuš*
Izbu	*The Omen Series Šumma Izbu*, see Leichty, 1970
ITT	*Inventaire des tablettes de Tello*
JANES	*Journal of the Ancient Near Eastern Society* of Columbia University
JAOS	*Journal of the American Oriental Society*
JCS	*Journal of Cuneiform Studies*
JEOL	*Jaarbericht Ex Oriente Lux*
KAR	*Keilschrifttexte aur Assur religiösen Inhalts*
KBo	*Keilschrifttexte aus Boghazköi*
KUB	*Keilschrifturkunden aus Boghazköi*
LAS	*Letters from Assyrian Scholars*, see Parpola, 1971 and 1983.
LBAT	*Late Babylonian Astronomical Texts*, see Sachs, 1955
LCL	*Loeb Classical Library*
LKA	*Literarische Keilschrifttexts aus Assur*
MCT	*Mathematical Cuneiform Texts*, see Neugebauer and Sachs, 1945
MDP	*Mémoires de la Délégation en Perse*
MLC	J. Pierpont Morgan Library cuneiform tablet siglum
MSL	*Materialien zum Sumerischen Lexikon*
MUL.APIN	*MUL.APIN An Astronomical Compendium in Cuneiform*, see Hunger and Pingree, 1989
MVAG	Mitteilungen der Vorderasiatisch-Aegyptischen Gesellschaft
OECT	*Oxford Editions of Cuneiform Texts*
OrNS	*Orientalia*, Nova Series
PBS	Publications of the Babylonian Section, University Museum, University of Pennsylvania
PSBA	*Proceedings of the Society of Biblical Archaeology*
RA	*Revue d'Assyriologie*
SAA	*State Archives of Assyria*
SM	*Sfar Malwašia*, see Drower, 1949
STC	*Seven Tablets of Creation*, see King, 1902
STT	*Sultantepe Texts*
SSB	*Sternkunde und Sterndienst Babels*, see Kugler, 1907, 1909–1924
TAPS	*Transactions of the American Philosophical Society*
TBER	Arnaud, *Textes babyloniens d'epoque recente*

TCL	*Textes cunéiformes de Louvre*
Thompson Rep.	*The Reports of the Magicians and Astrologers*, see Thompson, 1900
TUAT	*Texte aus der Umwelt des Alten Testaments*, see Kaiser, 1982–
TvU	Falkenstein, *Topographie von Uruk*
UET	*Ur Excavation Texts*
VAT	Vorderasiatisches Museum, Berlin cuneiform tablet siglum
WO	*Welt des Orients*
WZKM	*Wiener Zeitschrift für die Kunde des Morgenlandes*
YOS	*Yale Oriental Series*
ZA	*Zeitschrift für Assyriologie*

ACKNOWLEDGMENTS

I am grateful to all the editors and publishers for their kind permission to reprint the papers collected in this book:

Introduction Portions originally published in *Mélanges de l'Université Saint-Joseph* 61 (2008), pp. 13–32. Reprinted by permission of the Editor.

Chapter One Originally published in *Archiv für Orientforschung Beiheft* 19 (1982), pp. 363–371.

Chapter Two Originally published in *Journal of Near Eastern Studies* 43 (1984), pp. 115–140.

Chapter Three Originally published in *Journal of Cuneiform Studies* 36 (1984), pp. 127–144. Reprinted by permission of the Editor.

Chapter Four Originally published in F. Rochberg-Halton, ed., *Language, Literature, and History: Philological and Historical Studies Presented to Erica Reiner*, American Oriental Series 67 (New Haven, CT, American Oriental Society, 1987), pp. 327–350. Reprinted by permission of the American Oriental Society.

Chapter Five Originally published in *Zeitschrift für Assyriologie* 77 (1987), pp. 207–228. Reprinted by permission of the Publisher.

Chapter Six Originally published in Erle Leichty, Pamela Gerardi, Abraham Sachs, and Maria deJ Ellis, eds., *A Scientific Humanist: Studies in Memory of Abraham Sachs* Occasional Publications of the Samuel Noah Kramer Fund, 9 (Philadelphia, PA: University Museum, 1988), pp. 319–324. Reprinted by permission of the Babylonian Section of the University Museum, University of Pennsylvania.

Chapter Seven Originally published in *Journal of the American Oriental Society* 108 (1987), pp. 51–62. Reprinted by permission of the American Oriental Society.

Chapter Eight Originally published in *Centaurus* 32 (1989), pp. 146–170. Reprinted by permission of Wiley-Blackwell.

Chapter Nine Originally published in in N.M. Swerdlow, ed., *Ancient Astronomy and Celestial Divination* (Cambridge: MIT Press, 1999), pp. 39–60. Reprinted by permission of MIT Press.

Chapter Ten Originally published in in Barbara Böck, Eva Cancik-Kirschbaum and Thomas Richter eds., *Munuscula Mesopotamica: Festschrift für Johannes Renger*, AOAT 252 (Münster:Ugarit Verlag, 1999), pp. 415–427. Reprinted by permission of the Editors and Publisher of AOAT.

Chapter Eleven Originally published in *ARAM* 11–12 (1999–2000), pp. 237–247. Reprinted by permission of the Publisher.

Chapter Twelve Originally published in Joachim Marzahn and Hans Neumann, eds., *Assyriologica et Semitica, Festschrift für Joachim Oelsner anläßich seines 65. Geburtstages am 18. Februar 1997*, AOAT 267 (Münster: Ugarit Verlag, 2000), pp. 359–375. Reprinted by permission of the Editors and Publisher of AOAT.

Chapter Thirteen Originally published in P. Barker, A.C. Bowen, J.Chabas, G. Freudenthal, and T. Langermann, eds., *Astronomy and Astrology from the Babylonians to Kepler: Essays Presented to Bernard R. Goldstein on the Occasion of his 65th Birthday, Centaurus* 45 (2003), pp. 32–45. Reprinted by permission of Wiley-Blackwell.

Chapter Fourteen Originally published in Charles Burnett, Jan Hogendijk, K. Plofker and Michio Yano, eds., *Studies in the History of the Exact Sciences in Honour of David Pingree* (Leiden: Brill, 2004), pp. 56–94. Reprinted by permission of the Publisher.

Chapter Fifteen Originally published in Ann K. Guinan, Maria de J. Ellis, A.J. Ferrara, Sally M. Freedman, Matthew T. Rutz, Leonhard Sassmannshausen, Steve Tinney, and M.W. Waters, eds., *If A Man Builds A Joyful House: Assyriological Studies in Honor of Erle Verdun Leichty* (Leiden: Brill, 2006), pp. 336–348. Reprinted by permission of the Publisher.

Chapter Sixteen Forthcoming in Beate Pongratz-Leisten, ed., *Reconsidering Revolutionary Monotheism* (Winona Lake, IN: Eisenbrauns). Portions given as lecture in Reconsidering the Concept of "Revolutionary Monotheism" Conference, February 10th-11th, 2007 at the Center for the Study of Religion, Princeton University. Printed by permission of the Publisher.

Chapter Seventeen Originally published in Micah Ross, ed., *From the Banks of the Euphrates: Studies in Honor of Alice Louise Slotsky* (Winona Lake, IN: Eisenbrauns, 2008), pp. 227–244. Reprinted by permission of the Publisher.

Chapter Eighteen Forthcoming in Wouter Henkelman, Charles Jones, Michael Kozuh, and Christopher Woods, eds., *Extraction and Control: Studies in Honor of Matthew W. Stolper*, (Chicago: Oriental Institute Publications). Printed by permission of the Oriental Institute Publications.

Chapter Nineteen Originally published in *Science in Context* 22 (2009), pp. 4–25. Reprinted by permission of Cambridge Journals.

Chapter Twenty Originally published in A. Annus, ed. *Divination and Interpretation of Signs in the Ancient World*, Oriental Institute Seminars 6 (Chicago: Oriental Institute Publications, 2010), pp. 19–27. Given at the Oriental Institute Symposium, Science and Superstition: Interpretation of Signs in the Ancient World, Mar 4–6, 2009. Printed by permission of the Oriental Institute Publications.

Chapter Twenty-One Originally published in G. Frame, Erle Leichty, Jeffery Tigay, and Steve Tinney, eds., *Tablet and Torah: Mesopotamia and the Biblical World, Studies in Honor of Barry L. Eichler*, (Bethesda, MD.: CDL Press). Printed by permission of the Publisher.

Thanks are also due to the Bildarchiv Preußischer Kulturbesitz and their North American representative Art Resource for permission to use the image of tablet VAT 7851 from the Vorderasiatisches Museum, Berlin.

For assistance with fonts, scanning, and formatting, I gratefully acknowledge the help of Debbie Hauser of Bay Area Word Processing. And for having produced Figures1 for chapters VIII and XVIII, I am indebted to Noel M. Swerdlow of Cal Tech. My debt of gratitude also extends in a more general way to the community of scholars of ancient Near Eastern and early Western sciences, who have answered many questions and provided much support over the years in which this work was produced: Noel M. Swerdlow, Bernard R. Goldstein, Alan C. Bowen, David Pingree, Erica Reiner, Hermann Hunger, Geoffrey Lloyd, John M. Steele, Christopher Walker, Charles Burnett, and Dorian Gieseler Greenbaum.

For his warm hospitality and support of my research I want to thank Professor Walther Sallaberger of the Institut für Assyriologie und Hethitologie, Ludwig-Maximilians-Universität, München, where I spent a most enjoyable time in the final months' preparation of this book. Thanks are also due the University of California, Berkeley for granting me a leave of absence, and the LMU-UCB Research in the Humanities initiative, funded by the LMUexcellent International Cooperation, which made possible my stay in Munich as research professor in the spring semester of 2010.

PREFACE

An increasing historical interest in the interaction between the ancient Near East and the western Mediterranean, both in the classical and especially the Hellenistic worlds, has taken hold in the fields of both Classics and Assyriology. The current generation of Classicists and Assyriologists has established a dialogue, but there is much more to be done. The purpose of collecting this series of interrelated essays in Babylonian celestial divination, horoscopy and astronomy, is to make available a body of work which will be useful to readers with an interest in the intellectual cultures of Near Eastern and Mediterranean antiquity. These papers have been written over a long period of time, but their consistent involvement in one way or another with the question of Babylonian celestial sciences and their legacy in the Greco-Roman world argues for bringing them together in one place.

A coherence and continuity throughout these essays is found in two ways. On a descriptive level they are all concerned to explore some of the many facets of the development and practice of the astral sciences in ancient Mesopotamia. In cuneiform texts there was no language to differentiate between what from a modern viewpoint would be called astrology and astronomy, two disciplines for investigating the heavens, one for the prediction of the phenomena themselves, the other for the prognostication of mundane events. In the western Mediterranean, the recipient of much Babylonian material in both domains of learning, the terminology was also not differentiated in a consistent way until late antiquity. Even then the use of *astrologia* versus *astronomia* is not always in accord with our modern distinction. The epistemological separation in the modern age between astronomy as legitimate knowledge produced by a certain method of inquiry (empirical, quantitative and predictive) and astrology as illegitimate belief that human and mundane concerns are reflected in the stars has no equivalent in Near Eastern antiquity. When demarcation criteria such as can be argued for modern science are carried over into antiquity, the results are anachronism and misunderstanding. The evidence for a mode of thought supposed to be unique and endemic to science alone and a culture that represents and maintains that way of thinking is not only highly problematic in any historical period, including the present one, but is also not found in the practice of science in the cultures that come within the framework established by the papers collected here, that is, either the ancient Mesopotamian or the Greco-Roman. Therefore, cuneiform sources for astronomy and astrology alike are accepted throughout these studies as evidence of an integrated and distinctive ancient intellectual culture, one that defined the goals of knowledge and of cognitive inquiry in a particular way.

The essays are presented in chronological order and, with the exception of minor changes, have not been edited to bring them up to date. Some additional bibliographical references have been added in the footnotes to the older essays which were published before certain significant volumes appeared. I feel that an occasional bibliographical anachronism is outweighed by the value of having certain publications acknowledged in appropriate places. The legacy of Babylonian celestial divination, within its own culture and history as manifested in the development of astronomy and horoscopic astrology, as well as outside of its cultural and historical boundaries, west into the Western Mediterranean and further to Western Europe and east beyond the Zagros to Iran and India is a field of vast proportions. It is hoped that the papers collected in this volume cast a few spots of light on some parts of that rich and varied field.

INTRODUCTION

> The Phoenicians, Chaldeans, and Orchinians[1] have familiarity with Leo and the sun, so that they are simpler, kindly, *addicted to astrology*...
>
> Ptolemy, *Tetr.* 2.3

Written evidence of the activity of cuneiform scribes involved in the celestial sciences of astronomy and astrology together span nearly two millennia of ancient Mesopotamian cultural history. The focus on celestial phenomena over the course of this history gave rise to the development and use of astronomical concepts and methods of predicting the phenomena, as well as eventually of a consistent and accurate calendar that served the astronomers until the end of the cuneiform tradition in the first century C.E. The Babylonian celestial sciences, astronomy, as we would call it, celestial divination and, later, horoscopy would remain interconnected and even interdependent. Celestial phenomena were objects of inquiry on several levels, as ominous signs of the future, as the focus of regular empirical observation, and as the goal of mathematical prediction. This feature of cuneiform scribal culture exerted a profound influence upon neighboring as well as farther flung regions, crossing the geographical and historical boundaries of ancient Mesopotamia. The process was already begun during the second millennium B.C.E. with the spread of celestial divination. Later, astronomical parameters, methods, and the idea of genethlialogy, or birth astrology, entered the ambit of Hellenistic culture. The legacy of Babylonian traditions concerning the moon, planets and stars in the Greco-Roman world after the second century B.C.E. is not *per se* the focus of each paper collected here, but throughout, an explicit or implicit awareness of the importance of transmission establishes a broader historical and cultural context for the ancient Mesopotamian celestial sciences.

---

[1] I.e., Ορχήνιοί (*Orchenioi*)," translated as "Orchinians," in F.E. Robbins, *Tetrabiblos*, Loeb Classical Library, Nr. 435, (Cambridge, MA: Harvard University Press and London: Heinemann, 1971 repr.), p. 143, are to be identified with the "Urukeans" (*Orchenoi*) of Strabo and P.Oxy. 4139:8, for which see below, note 39.

Scholarly interest in the legacy of Babylonian celestial divination and astronomy is almost as old as our knowledge of the sources themselves. Already in the early 20th century, C. Bezold and F. Boll explored then recently edited cuneiform astrological texts for parallels in Hellenistic Greek.[2] David Pingree expanded the investigation of the transmission of ancient Near Eastern astral sciences to include astrological and omen literature not only in Greek and Latin, but in Aramaic, Hebrew, Syriac, Arabic, Persian, Demotic, and Sanskrit as well.[3] He further defined the historical dimension of this transmission, focusing on the texts and their parallels within distinct periods, especially the Neo-Assyrian, Persian and Hellenistic periods, and traced such parallels through complex manuscript histories well into the Greek Byzantine and Arabic Middle Ages.

The survival of scientific traditions beyond the local social contexts that first produced them, and their transmission across diverse cultures, for example from ancient Greece to India (as in the case of mathematical astronomy) or ancient Mesopotamia to the Medieval West (as in the case of astrology), once seemed to argue for the propensity of science to universality, to transcend both culture and history. Even such long lived traditions as Western astronomy and astrology experienced adaptation through reception—adaptation which is itself determined by local social and conceptual differences. Transmission and borrowing did not produce a homogeneous scientific tradition, but rather an even greater diversity in the use of astronomical and astrological knowledge during the Greco-Roman period.

Knowledge of the ancient Near Eastern cultural ancestry and scientific lineage of European astronomical science remained extremely limited until the rediscovery and decipherment of cuneiform astronomical texts in the 19th century. With the archaeological recovery of the architectural, artifactual and inscriptional remains of the ancient states of Babylonia and Assyria, cuneiform texts opened a major and

[2] C. Bezold and F. Boll, *Reflexe astrologischer Keilinschriften bei griechischen Schriftstellern*, Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Philosophisch-historische klasse, 2, 7, (Heidelberg: C. Winter, 1911).

[3] D. Pingree, "Legacies in Astronomy and Celestial Omens," in S. Dalley, ed., *The Legacy of Mesopotamia* (Oxford: Clarendon Press, 1998), pp. 125–137, and cf. his "Mesopotamian Astronomy and Asral Omens in other Civilizations," in H. Nissen and J. Renger, eds., *Mesopotamien und seine Nachbarn* (Berlin: Dietrich Reimer Verlag,1982), pp. 613–31; also his *From Astral Omens to Astrology: From Babylon to Bīkāner*, Serie Orientale Roma, 78, (Rome: Istituto Iraliano per L'Africa e l'Oriente).

previously unaccounted for new chapter in the history of Western astronomy and astrology, revealing and clarifying what was from Greco-Roman antiquity to the Renaissance already embedded in the Western astronomical tradition, and until the Middle Ages and later in Indian astronomy as well.

Whereas some pre-modern European heirs of Mesopotamian science were well aware of their astronomical and astrological inheritance, cognizance of specifically Babylonian as opposed to what was thought of as other "Oriental" sources was limited and often inaccurate. Priority in the astronomical sciences had been attributed to both Egypt and Babylonia in a vague sort of way by Greeks of the Hellenistic period and this tradition persisted into late antiquity, as, for example, with Firmicus Maternus, who, in 336 C.E., introduced his *Mathesis* by explaining to his patron, Mavortius, that "that was the point at which I dared to make the rash, impromptu offer to write out for you what the Egyptian sages and Babylonian priests, who are so knowledgeable about the force of the stars, have handed down to us in their teaching about astrology."[4] The traces of this association are even to be seen in European classicists of the Renaissance, such as Scaliger, where in his edition of the 1st century *Astronomica* of Manilius,[5] he said, "Eudoxus was the first to bring astronomy from the Egyptians to his Greek fellow-countrymen."[6] Though a number of Babylonian elements, such as the division of the circle into the 360 units we call degrees, the convention of measuring time as well as arc in the sexagesimal system, the zodiac, and a number of parameters such as the length of the mean lunar (synodic) month ($29;31,50,8,20^{d}$), were embedded in Greek astronomy from the beginning of the Greek's adoption of Babylonian quantitative

[4] *Mathesis* Bk. 1.6, see *Ancient Astrology Theory and Practice: Matheseos Libri VIII*, translated by Jean Rhys Bram (Abingdon, MD: The Astrology Center of America, 1975, repr. 2005 by Astrology Classics), p. 12, and cf. p. 31.

[5] Scaliger attributes the error in the rules given by Manilius for determining the rising times of the zodiacal signs to the fact that he derived them from the Egyptians, "instead of the more worthy method of Hipparchus," see A. Grafton (1983), *Joseph Scaliger: A Study in the History of Classical Scholarship*, 2 vol. (Oxford: Oxford University Press, 1983), vol. 1, pp. 202–203. Grafton notes that "it is a striking coincidence that this guess of Scaliger's about Manilius' sources came near the truth. The rising-time formula of the *Astronomica* came from the Near East—from Babylon, through an intermediary as yet undiscovered. Scaliger had no way of knowing the cuneiform sources in which the Babylonian procedures appear." (p. 203) For discussion of the relevant cuneiform texts, see below, Chapter Fourteen.

[6] Grafton, *Scaliger*, p. 207.

methods in the 2nd century B.C.E., the specific Babylonian sources of these elements remained unknown until the late nineteenth- and early twentieth century decipherment and elucidation of late Babylonian astronomical cuneiform tablets from the Hellenistic Babylonian cities of Babylon and Uruk.

The Hellenistic transmission of Babylonian celestial sciences (astronomy and astrology in our terms) is historiographically complex. It refers both to the Hellenistic period account, how Greco-Roman writers saw their astronomical heritage from the East, and the modern revision, based on cuneiform texts. The modern account itself has two distinct aspects, which have emerged sequentially. First, the recovery and exposition of cuneiform astronomical texts allowed modern scholars to gauge ancient Greek and Roman claims about the history of astronomy against original sources. Second, the reconstruction of a broad intellectual context consisting of the ancient Mesopotamian celestial sciences and even astral theology (for lack of a better term) and their Greek and Latin counterparts, showed that a rich medium existed within which astronomical knowledge and methodologies had meaning and use throughout the entire Mediterranean and Near Eastern region. As J. Evans and L. Berggren said in the preface to their edition of the Hellenistic treatise on astronomy, the *Isagoge* of Geminus, astronomy had "vital links to nearly every other aspect of the culture," that it "had links to ancient religion, for the planets were widely held to be divine, and the celestial phenomena commanded the attention of the poets, who from the time of Hesiod had sung of the celestial signs and of the revolving year."[7]

The questions of why this transmission and how it occurred are difficult and it is not just because our sources do not address them directly. How the Greeks came in contact with Babylonian celestial sciences likely had to do with their contact generally with Near Eastern peoples, texts, and culture in the period following the fall of Persia, including their discovery of the Jews, who, as vividly discussed by A. Momigliano,[8] were sometimes lumped with other priestly wise

[7] James Evans and Lennart J. Berggren, *Geminos's Introduction to the Phenomena: A Translation and Study of a Hellenistic Survey of Astronomy*, (Princeton: Princeton University Press, 2006), p. xv.

[8] Arnaldo Momigliano, *Alien Wisdom: The Limits of Hellenization* (Cambridge and New York: Cambridge University Press, 1971, reprinted 1993), ch. 4.

men from farther East. The work of J.C. VanderKam,[9] H.S. Kvanvig,[10] and more recently M. Albani,[11] U. Glessmer,[12] J. Ben-Dov and W. Horowitz,[13] has cogently demonstrated influence from early Mesopotamian astronomical tradition, and even some later, e.g., the Lunar Three of the non-mathematical astronomical texts of the period after the 7th century B.C.E., upon Jewish apocalyptic literature.[14] In an overview of the scholarship on the calendrical texts of Qumran and the Pseudepigrapha, J. Ben-Dov and S. Saulnier remarked that "it is now acknowledged that the divinatory-scientific literature from Qumran—which is somewhat later than the calendrical texts—can be fruitfully studied in light of scientific texts from Mesopotamia and the Hellenistic world."[15] Elements of Babylonian astronomy discernible in Enochic and Qumranic traditions and the fuller picture of an intellectual cultural bridgehead from Mesopotamia to the Hellenistic Jewish world are part of the medium, just mentioned, for the transmission of astronomical, calendrical, and divinatory or astrological knowledge

[9] J.C. VanderKam, *Enoch and the Growth of an Apocalyptic Tradition* (Washington, D.C.: Catholic Biblical Association of America, 1984), pp. 83–106.

[10] H.S. Kvanvig, *Roots of Apocalyptic: The Mesopotamian Background of the Enoch Figure and the Son of Man* (Neukirchen-Vluyn: Neukirchener Verlag, 1988), pp. 17–242.

[11] M. Albani, *Astronomie und Schöpfungsglaube: Untersuchungen zum astronomischen Henochbuch* (Neukirchen-Vluyn: Neukirchener Verlag, 1994).

[12] U. Glessmer, "Horizontal Measuring in the Babylonian Astronomical Compendium mul.apin and in the Astronomical Book of 1 Enoch," *Henoch* 18 (1996), pp. 259–282.

[13] J. Ben-Dov and W. Horowitz, "The 364-Day Year in Mesopotamia and Qumran," *Meghillot* 1 (2003), pp. 3–24 (in Hebrew), and "The Babylonian Lunar Three in Calendrical Scrolls from Qumran," ZA 95 (2005), pp. 104–120.

[14] The Aramaic astronomical material from Qumran is known from Cave 4. And the astronomical and calendrical Enoch, the *Astronomical Book*, is preserved in the Ethiopic Enoch, I *Enoch* ch. 72–82. See O. Neugebauer, *Ethiopic Astronomy and Computus* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1979), and Maxwell J. Davidson, Angels at Qumran: A Comparitive Study of 1 Enoch 1–36, 72–108 and Sectarian Writings from Qumran (Sheffield: Sheffield Academic Press, 1992).

[15] J. Ben-Dov and Stéphane Saulnier, "Qumran Calendars: A Survey of Scholarship 1980–2007," *Currents in Biblical Research* 7 (2008), pp. 124–168. Cf. M. Popovic, *Reading the Human Body: Physiognomics and Astrology in the Dead Sea Scrolls and Hellenistic-Early Roman Period Judaism* (Leiden: Brill, 2007). While the question of the legacy of cuneiform astronomical and astrological culture on Qumranic and Enochic astronomy seems clear, the physiognomic-astrological compendium *4QZodiacal Physiognomy* and the related text *4QZodiacal Physiognomy ar*, according to Popović, appears less directly reflective of Mesopotamian astrological and physiognomic texts and more at home in a Greek Hellenistic context. See especially chapter 2.

and methodologies within the region of the Near East and Eastern Mediterranean and with which the Greeks came in contact.

The ancient evidence that Greek intellectuals came to learn about Near Eastern scientific traditions is extensive, albeit vague and often misleading, for example, in contexts concerning their cognizance of Babylonian (and Egyptian) celestial observation. Aristotle said the Egyptians and Babylonians "made observations from a very great number of years" and had provided "many reliable data for belief about each of the planets."[16] In his *Bibliotheca Historica*, Diodorus of Sicily in the 1st century B.C. assigned a value to this "great number of years,"[17] saying "as to the number of years which, according to their statements, the order of the Chaldeans has spent on the study of the bodies of the universe, a man can scarcely believe them; for they reckon that, down to Alexander's crossing over into Asia, it has been four hundred and seventy-three thousand years since they began in early times to make their observations of the stars."[18] Roughly a century later, Pliny, in his *Natural History*, invoked Epigenes as an authority on the antiquity of Babylonian astronomical observations, saying they went back 720,000 years.[19] He (Pliny) also claimed that Critodemus, a name associated with Greek horoscopes of the 1st and 2nd centuries of our era, had direct access to Babylonian sources. In Bk 7 of the *Natural History* he mistakenly placed him in the 3rd cent. B.C.E. on the assumption that he was a student of Berossus, the Hellenistic writer of the *History of Babylonia*, who was associated with astrology and with a school on the Island of Cos. Pliny's claim was that Critodemus agreed with Berossus that Babylonian astronomical observations went back 490,000 years.[20] It is not the inaccuracy of the figures that needs comment. They are, as Momigliano put it, "impossible data with which the historian of

---

[16] Aristotle, *De caelo* 291b34–292a9.

[17] Diodorus, *Bibl. Hist.* 2.31.9.

[18] Cf. his reference to "an incredible number of years" in *Bibl. Hist* 1.81.4–5, that "the position and motions of the celestial bodies have received careful observation among the Egyptians, if among other peoples. In fact, they preserve records concerning each from an incredible number of years, and have most ambitiously observed the motions of the planetary stars, their periods, their stations, and furthermore, the powers of each in relation to the births of living creatures–which goods or evils they are able to produce—because zeal concerning these matters has been admired amongh them from ancient times."

[19] Pliny, *Nat. Hist.* 7.193.

[20] Ibid.

antiquity has to learn to live."[21] But to Greeks, whose astronomical inquiry before contact with Babylonian science was not equipped with an empirical foundation of lunar and planetary observations, the idea of keeping many centuries of records of nightly observation of the skies was new and important. B.R. Goldstein and A.C. Bowen have shown that before Hipparchus' time (2nd century B.C.E.) reports of dated Greek observations are severely limited and they concluded that the introduction of empirical data to Greek astronomy was a phenomenon of the 3rd century and not before.[22] This fits within the more general picture of the exposure of Greeks to Near Eastern learning as a result of the aftermath of their political entry into the region.

The exaggerated Greco-Roman attributions of ancient scientific knowledge to Babylonians came to the attention of the 16th century historian and classicist Joseph Scaliger, whose historical reach extended beyond Greece and Rome to the ancient Near East. In his edition, Anthony Grafton describes Scaliger's finding an account of the Greek acquisition of Babylonian science in a 6th century commentary of Simplicius on Aristotle's *De caelo*. From Simplicius Scaliger constructed a story of Aristotle's requesting records of astronomical observations from his son-in-law, Callisthenes, who had allegedly accompained Alexander on his campaign to Asia and was supposedly present at Gaugamela.[23] Simplicius's story included the report that Porphyry claimed Babylonian astronomical observations were preserved for 31,000 years. As Grafton points out, by the time Scaliger dealt with the passage, it was already corrupt, because the fragment of the Neo-Platonist Porphyry from which Simplicius derived his story had been mistranslated back into Greek from a 13th century Latin translation of Moerbeke. Grafton explains, "Porphyry clearly described Callisthenes as looking for and finding astronomical information. This is only reasonable: Simplicius quoted the fragment, after all, in a discussion of the history and character of Greek astronomy. Scaliger, however, paid no attention to the literal sense or larger context of the words... and thus manufactured a description of Babylonian historical records in a

[21] Momigliano, *Alien Wisdom*, p. 90.

[22] B.R. Goldstein and A.C. Bowen, "The Introduction of Dated Observations and Precise Measurement in Greek Astronomy," *Archive for History of Exact Sciences* 43 (1991), pp. 93–132.

[23] See S.M., Burstein, Callisthenes and Babylonian Astronomy: A Note on FgrHIST 124 T3, *Echos du monde classique: Classical Views* 28 (1984), pp. 71–74.

text that never referred to them."[24] After centuries of this kind of second hand and third hand reconstruction and attribution, one can well understand why the discovery of contemporary cuneiform astronomical texts was of critical importance for the history of astronomy.

Strabo, the Greek geographer, who flourished from the mid-first century B.C.E. to some time in the first century C.E., mentions several Babylonian *mathematikoi* by name: Sudines, Kidenas and Naburianus. For the authenticity of Sudines, alleged to have been in the court of King Attalus I (Attalos Soter) of Pergamon, no cuneiform evidence is extant.[25] Evidence that a Sudines wrote on the properties of stones comes from Pliny's *Natural History*, where he claims that this Sudines knew of the provenance of onyx,[26] rock-crystal[27] and amber[28] and commented on the color of pearls[29] and "astroite" or the "star stone."[30] Further mention of Sudines is found in the *Natural History* as a "Chaldean astrologer."[31] Consistent with this designation is a papyrus fragment written in the 3rd century C.E., purportedly summarizing a commentary on the *Timaeus* by the Stoic Posidonius from the 2nd or 1st century B.C.E.[32] Here the influences of the five planets, sun and moon are enumerated in terms of Aristotelian qualities (warm, moist, dry) and further indications are given for the planets Saturn, Jupiter, Mars, and Venus as the "destroyers" of men and women, young and old. The planet Venus as the destroyer of women is given "according

---

[24] Grafton, *Scaliger*, p. 265. See also J.M. Bigwood (1993), "Aristotle and the Elephant Again," *American Journal of Philology* 114, pp. 537–555, esp. p. 547 and note 55.

[25] The Babylonian equivalent of the name is also a puzzle, although an Akkadian name with the common ending *-iddin* "he has given"is possible. A Sudines was named as a diviner (*bārû*) by Polyaenus (*Strategemata* 4, 20, ed. I. Melber, Leipzig 1887, p. 219). The *bārû* interpreted omens from extispicy, which is what this Sudines supposedly performed for King Attalus I of Pergamon before going to battle against the Gauls in about 235 B.C. Attalus was victorious. While Babylonian astronomers were frequently also celestial diviners and experts on ritual and magic, the combination of astronomy and extispicy is not so common.

[26] *Nat. Hist.* 36.59.

[27] Pliny, *Nat. Hist.* 37.25.

[28] Pliny, *Nat. Hist.* 37.34.

[29] Pliny, *Nat. Hist.* 9.115.

[30] Pliny, *Nat. Hist.* 37.133.

[31] Pliny, *Nat. Hist.* 9.115; 37.59; 37.25, 34, 90, 114, and 153.

[32] W. Hübner, "Zum Planetenfragment des Sudines (Pap. Gen inv. 203)," *Zeitschrift für Papyrologie und Epigraphik* 73 (1988), pp. 33–42, and, "Nachtrag zum Planetenfragment des Sudines. P. Gen. Inv. 203," Ibid., pp. 109–110.

to Sudines." Ca. 160 C.E., the astrologer Vettius Valens lists parameters for the length of the year according to Greek and Babylonian astronomy.[33] There Sudines is associated with a year length of 365+ 1/4 + 1/3 + 1/5 days, which makes no astronomical sense. Valens adds that he used Sudines (and Kidenas and Apollonius) to compute lunar eclipses and that he normed the equinoxes and solstices at 8° of their signs.[34] Aries 8° is in fact a legitimate Babylonian norming point for the vernal equinox in a zodiac in which degrees are not counted from the vernal point, but from sidereally fixed zodiacal signs beginning with Aries ("The Hired Man" in the Babylonian zodiac). The norm 8° Aries as the vernal point underlies many Hellenistic astrological texts and continued in use throughout late antiquity.

The name Kidin(nu) appears in the colophons of two cuneiform ephemeris tables, where they are designated as "*tersētu* of Kidin(nu)."[35] The term *tersētu* refers to the tables of dates and positions of the moon and planets computed by linear arithmetic methods characteristic of late Babylonian astronomy. Each of these computed tables mentioning Kidinnu concerns new and full moons for the years mentioned, in one case for 104–102 B.C.E. Valens said he used "Hipparchus for the sun, Sudines and Kidinnu and Apollonius for the moon,"[36] though he makes no specifications about the methods associated with these names. Kidenas is also mentioned by Pliny when he gives values for the maximum elongations of the inner planets from the sun.[37] He says his authorities for these values are Timaeus for Venus (46°) and Kidenas and Sosigenes for Mercury (22°), but what such attributions really mean is impossible to determine.

The third Babylonian named by Strabo, Naburianus, has been interpreted as the Greek version of the Babylonian name Nabû-rimannu that appears in broken context in the colophon of an astronomical tablet from Babylon.[38] The colophon designates this tablet too as a *tersētu* or "computed table," and like the tables of Kidinnu is a table of dates and positions of new and full moons, though later in date,

---

[33] CCAG 5,2, pp. 127, 17–19 = Anthol. 9, 11, ed. Kroll, p. 353, 10–13.
[34] Vettius Valens, *Anthol.* 9.12.10, ed. Kroll, p. 354, 4–7.
[35] Neugebauer, ACT 122 and 123a.
[36] CCAG 5,2, pp. 128, 14–16.
[37] Pliny, *Nat. Hist.* 2. 38–39.
[38] O. Neugebauer, ACT No. 18, lower edge of reverse 1.

for the years 49–48 B.C.E., putting it among the youngest of extant cuneiform lunar ephemerides.

The contents of such tables were known to Greek astronomers by at least the first century B.C.E. and by the first century of our era were in use as evidenced by Greek papyri from Oxyrhynchus in Roman Egypt. Greek awareness of the Babylonian inheritance is indicated in one of the 2nd century Oxyrhynchus papyri concerning lunar periods (No. 4139), which not only contains the earliest reference in a Greek text to a lunar parameter of the Babylonian System A lunar theory (6695 anomalistic months in the period relation for lunar anomaly), but also mentions the Ορχη[νοί(?)] (*Orchenoi*) "people of Uruk," the same Ορχηνοί (*Orchenoi*) identified by Strabo as Chaldean astronomers in *Geog*. 16.1.6.[39] Uruk is indeed one of the two principal Mesopotamian cities from which archives of mathematical cuneiform texts have come. The *Orchenioi*, i.e., the people of Orchoe named by Ptolemy in the *Tetrabiblos* Bk. 2.3 concerning the astrological effects on peoples of various regions, is certainly the same demonym referred to by Strabo, and which has the equivalent *Urukayu* in cuneiform texts.[40]

One of the more reliable references to Babylonian astronomy comes in chapter 18 of Geminus' *Introduction to the Phenomena*, where he discusses lunisolar period relations. This work has been variously dated, but Evans and Berggren convincingly argue for a date between 90 and 35 B.C.E., contemporary, therefore, with Diodorus. In chapter 18.9 Geminus says "the mean [daily] motion of the Moon has been found by the Chaldeans to be 13;10,35°." And although he does not identify the other lunar parameters mentioned in this chapter as such, they too are parameters of a typically Babylonian zigzag function for the progress of the moon in degrees per day (= column F of System B lunar theory in O. Neugebauer's terminology).[41] In this same chapter Geminus discusses a lunar cycle used in the prediction of eclipses called the *exeligmos*, or "revolution."[42] The period governs the return of the occurrence of eclipses to a particular time. Geminus' value (669 synodic

---

[39] A. Jones, *Astronomical Papyri from Oxyrhynchus*, Memoirs of the American Philosophical Society 233, (Philadelphia: American Philosophical Society, 1999), vol. I pp. 97–99 and vol. II pp. 22–23, for No. 4139: 8, in broken context.

[40] See note 1 above, and G. Frame, *Babylonia 689–627 B.C.: A Political History* (Leiden: Nederlands Historisch-Archaeologisch Instituut, 1992), p. 34 and note 10.

[41] The parameters of the function are m = 11;06,35, M = 15;14,35, mean daily progress = 13;10,35, and constant difference = 0;18 degrees per day.

[42] Evans and Berggren, *Geminos*, pp. 92–100 and 227–230.

months = 717 anomalistic months = 19,756 days) for the period is consistent with Babylonian period relations and his entire discussion of the *exeligmos* is in line with Babylonian lunar theory.

Other Greco-Roman authors, from the first century B.C.E. to the 3rd century of our era make mention of the Chaldeans: Vitruvius (1st century B.C.E.) in connection with Berossus, Theon of Smyrna (1st–2nd century C.E.) in connection with "saving the phenomena," Ptolemy (2nd century C.E.) in connection with the calendar, and Sextus Empiricus (2nd or 3rd century C.E.) in connection with astrology. Without the ballast provided by cuneiform texts we would have no means of judging these associations and very little idea of the place of Babylonian astronomy in its own or any other intellectual culture. As suggested before, it is through a broader account of the context for thinking about the heavens, on both sides of the Mediterranean, that we can understand some of the reasons why Babylonian technical astronomy became of critical importance in Hellenistic Greek science.

Babylonian celestial science's continuing influence on Greek, Indian, Arabic, Jewish, Byzantine, and mediaeval European astronomy, astrology, and celestial divinatory traditions, made it one of the more long-lasting elements of Mesopotamian civilization.[43] After the Parthians established rule over Babylon in 250 B.C.E. the cuneiform scribes carried on with their astronomical activities in that city until nearly the end of the 1st century of our era, as we know directly from dated astronomical cuneiform tablets from 75 C.E. Testimony to the existence of Babylonian astronomers at this time also comes from the Elder Pliny (23–79 C.E.), who claims to have seen these astronomers in Babylon in the "Temple of Jupiter-Bēl" and how the city had crumbled in ruins around it.[44] Much later, Pausanias in the 2nd century of our era also reported on the existence of the temple of Bēl in the

[43] The most prolific and important work to date is found in the oeuvres of David Pingree. See especially, *From Astral Omens to Astrology, from Babylon to Bikaner*. The Jewish and Byzantine legacy has been the focus of some excellent recent scholarship, for example D. Pingree, "From Alexandria to Baghdad to Byzantium. The Transmission of Astrology," *International Journal of the Classical Tradition* 8 (2001), pp. 3–37, P. Magdalino and M. Mavroudi, *The Occult Sciences in Byzantium* (La pomme d'or, 2006), and M. Popović, *Reading the Human Body: Physiognomics and Astrology in the Dead Sea Scrolls and Hellenistic-Early Roman Period Judaism* (Leiden and Boston: Brill, 2007).

[44] Pliny, *Nat. Hist.* 6.123; 7.193.

midst of a deserted city.[45] The connection between astronomy and the late Babylonian temple is a function of a number of factors, such as the apparent discontinuance of the use of astrology and astronomy by the reigning monarchs of the region after the fall of Assyria—at least there is no good evidence that later royal courts did continue the practice—resulting in a gradual shift of workplace for cuneiform scribes specializing in this knowledge to the preserves of ancient Mesopotamian learning and culture that were the temple of Marduk in Babylon and the Anu temple at Uruk.

As just discussed from the evidence of Geminus' *Introduction* and the Oxyrhynchus papyri, detailed astronomical knowledge, i.e., units, parameters, and methods were transmitted from Babylonian to Greek astronomy by at least the first century B.C.E. The astronomical units and calculations that developed within the framework of the Babylonian sexagesimal number notation system were fundamental to all later astronomical science in the West. The convention of the 360° circle, along with the use of sexagesimal notation, is attested in Greek astronomy by the mid 2nd century B.C.E., and associated with Hipparchus and Hypsicles (ca. 200 B.C.E.),[46] and can be considered to be the point from which Greek astronomical science took on a quantitative dimension. The cubit (KÙŠ = *ammatu*), with its subdivision the finger or digit (ŠU.SI = *ubānu*), was another common unit of distance in Mesopotamia, having an astronomical application. Distances in the heavens between, e.g., fixed stars and the meridian, or between planets and ecliptical stars were measured in cubits, and eclipse magnitudes were measured in fingers. The cubit is used in two of the earliest observations recorded in the *Almagest*, from years 245 and 237 B.C.E.[47] Ptolemy cites Babylonian eclipse reports, giving time of eclipse begin,

[45] Pausanias, *Description of Greece* with an English Translation by W.H.S. Jones, Litt. D., and H.A. Ormerod, M.A., in 4 Volumes, (Cambridge, MA, Harvard University Press; London, William Heinemann Ltd. 1918). In chapter 33.3 he says, "At Babylon the sanctuary of Belus still is left, but of the Babylon that was the greatest city of its time under the sun nothing remains but the wall." Cf. chapter 16, "Secondly, when he [Seleucus] founded Seleucea on the river Tigris and brought to it Babylonian colonists he spared the wall of Babylon as well as the sanctuary of Bel, near which he permitted the Chaldeans to live."

[46] V. De Falco, M.K. Krause, with O. Neugebauer, ed. and trans. *Hypsikles: Die Aufgangszeiten der Gestirne*, Abhandlungen der Akademie der Wissenschaften in Göttingen, philologisch-historische Klasse, Dritte Folge, Nr. 62. (Göttingen: Vandenhoeck & Ruprecht, 1966).

[47] Ptolemy, *Alm.* 9.7, see bibliography under Toomer (1984).

statement of totality, time of mid-eclipse, direction and magnitude of greatest obscuration in digits, in the manner of cuneiform eclipse reports.[48] Ptolemy also refers to historical observations of distances in cubits from Mercury to certain ecliptical stars at dawn and distances of Saturn in digits from ecliptical stars in the evening.[49] These are important data not only for testifying to the influence of Babylonian metrology well into the late Greco-Roman period, but also to Greek awareness of the Babylonian archive of astronomical observations now termed astronomical diaries and a number of other related observational and predictive texts.[50] Outside of Greek astronomy, the Babylonian cubit was also used by Strabo in his *Geography*.[51]

One of the fundamental tools of Greek astronomy, and also astrology, was the zodiac. The dating of the Greek reception of the Babylonian zodiac was certainly sometime in the Hellenistic period. The treatises of Autolycus and Euclid (ca. 300 B.C.E.) already assume the ecliptic and the zodiac, though a reference in Pliny's *Natural History* claims that a certain "Cleostratus" was responsible for introducing the concept to the Greeks around 500 B.C.E.[52] Firm evidence of a 360° zodiac in Greece, however, comes only in the 2nd century B.C.E. with Hypsicles and Hipparchus. In addition to the fundamental elements of astronomy such as the zodiac and the 360° circle, numerical parameters in the form of period relations were also transmitted from Babylonia to the Greek astronomers, as attested in Geminus' *Introduction*, such as the so-called "Metonic cycle," the luni-solar cycle (19 years = 235 months) and the Saros (and exeligmos), the cycle that brings the return of eclipses of similar nature. There are so-called "Saros Cycle Texts" dating to the Achaemenid period which tabulate the months of eclipse possibilities arranged in cycles of 223 months or roughly 18 years. Ptolemy refers to the existence of an earlier estimate of the

---

[48] T.G. Pinches and A.J. Sachs, *Late Babylonian Astronomical and Related Texts*, (Providence, R.I.: Brown University Press, 1955).

[49] *Alm.* 4.6, 11; 5.14; 6.9; 9.7, and 11.7, see bibliography under Toomer (1984).

[50] See A.J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*. Vol I: *Diaries from 652 B.C. to 262 B.C.* (1988); Volume II: *Diaries from 261 B.C. to 165 B.C.* (1989); Volume III: *Diaries from 164 B.C. to 61 B.C.* (1996); Volume IV: *Astronomical Diary Fragments* (forthcoming); Volume V with John M. Steele: *Lunar and Planetary Texts* (2001); H. Hunger, Volume VI: *Goal Year Texts*; Volume VII: *Normal Star Almanacs and Almanacs* (forthcoming), (Vienna, Verlag der Osterreichischen Akademie der Wissenschaften).

[51] Strabo, *Geog.* 2, 1.18.

[52] Pliny, *Nat. Hist.* 2.31.

18-year eclipse period known as the Saros, giving the value in days as 6585 1/3 days, whereas the Babylonian formulation did not give the length of the period in days.[53]

F.X. Kugler was the first to recognize that underlying the eclipse period attributed by Ptolemy to Hipparchus (126007^{d}) is the Babylonian value for the mean synodic month of System B ($29;31,50,8,20^{d}$).[54] He also identified the reduction of Hipparchus' relation to 251 synodic months = 269 anomalistic months as the relation at the basis of the columns in the system B lunar ephemeris dealing with lunar velocity (column F, giving lunar velocity in degrees) and the variation in the length of the lunar month (column G, giving a first approximation of the variable length of the synodic month assuming constant solar velocity of 30° per month). Hipparchus' use of these lunar parameters as well as the period relation for the moon's motion in latitude (5458 synodic months = 5923 draconitic months) further imply Greek knowledge of the Babylonian relation 1 year = 12;22,8 synodic months.

Because of the preponderance of precise and legitimate Babylonian parameters associated by Ptolemy with Hipparchus, he (Hipparchus) has been credited by G. Toomer for introducing these Babylonian parameters into Greek astronomy.[55] In so doing he (Hipparchus) would be responsible for uniting the empirical and the theoretical to establish a quantitative basis for kinematic models of the moon and planets, which until that time had been purely qualitative and without predictive power. The native Greek astronomical tradition was characteristically kinematic as it was based on philosophical dispositions about the spherical perfection, eternity, and beauty of the cosmos. It was, as a result, deeply connected to astral theological conceptions of the divinity of the heavenly bodies (from Plato onward, the stars were viewed as ensoulled) and even (with Stoic philosophy) the idea of the cosmos itself as divine. The adoption of quantitative methods from Babylonia changed the nature of Greek kinematics, giving it a predictive dimension, but, as the late antique astronomical papyri from

---

[53] A. Aaboe, J.P. Britton, J. Henderson, O. Neugebauer, and A.J. Sachs, *Saros Cycle Dates and Related Babylonian Astronomical Texts*, Transactions of the American Philosophical Society 81/6 (Philadelphia: American Philosophical Society, 1991).

[54] Kugler, 1900, pp. 23–24, and Aaboe, 1955.

[55] G.J. Toomer, "Hipparchus and Babylonian Astronomy" in Erle Leichty, Maria de J. Ellis, and Pamela Gerardi, eds., *A Scientific Humanist: Studies in Memory of Abraham Sachs*, Occasional Publications of the Samuel Noah Kramer Fund 9 (Philadelphia: University Museum, 1988), pp. 353–365.

Oxyrhynchus have shown, and as a direct result of the Hellenistic transmission from Babylonia, Greek astronomy came to consist not only of kinematics but also of a non-geometrical but mathematical and predictive astronomy that was essentially Babylonian in content.[56]

Astrology and the importance of the zodiac for Babylonian and later astronomy have already been mentioned. Indeed, astronomical methods, units, and parameters all had a place within an astrological context. The use of astronomy, as a body of knowledge and a method, was as much as matter of astrological prognostication in ancient Mesopotamia as it was later in the Greco-Roman period. Babylonian astrology, that is birth astrology or the construction of horoscopes, had roots in celestial divination. As known from the Neo-Assyrian period (7th century B.C.E.), celestial divination was a highly developed scholarly practice of reading omens in celestial phenomena and interpreting their significance for the general welfare of king and state. A compendium of celestial omens, entitled *Enūma Anu Enlil*, was used as a reference by the Neo-Assyrian scribe-scholars of the royal court, who were in close communication with the kings Esarhaddon and Assurbanipal about what the stars indicated in matters of "national security." But sometime in the fifth century, celestial divination turned its attention to the individual and a new sort of heavenly prognostication was developed in the form of genethlialogy. During the period from ca. 500 to ca. 300 B.C.E., genethlialogical astrology became dependent upon computational astronomy because the goal was to determine the situation of the heavens at the moment of a birth.[57] This required the calculation of the positions of all seven planets (sun, moon, Mercury, Venus, Mars, Jupiter and Saturn). A fine control of the periodicities of the planets was the key to the preparation of a horoscope and this is precisely the basis and structure of Babylonian astronomical texts.

The modern study of late Babylonian astrology and the assessment of its cultural legacy has lagged behind that of astronomy. The seeds of Western astrology have already been identified in cuneiform omens and horoscopes, beginning with the very idea of prognostication by heavenly phenomena and including more concrete borrowings such as planetary aspect (especially the trine aspect that relates three planetary

---

[56] See the evidence in Alexander Jones, *Astronomical Papyri from Oxyrhynchus*, 2 vols. Memoirs of the American Philosophical Society 233 (Philadelphia, PA: American Philosophical Society, 1999).

[57] See BH.

bodies found in zodiacal signs 120° apart), *dodekatemoria*, *hypsomata*, and the association of planets and parts of the body in the style of the *melothesia*, as we have in the scholia to an omen: "if a man's kidney hurts him, (the disease comes from the god) Nergal, as they say: 'the kidney-star is Mars.'"[58] Further specific influences remain a subject of potential investigation on the basis of late Babylonian horoscopic omens. Greek astrology, however, developed a system of stellar influences within a cosmological framework which was a clear departure from Babylonian celestial divination and horoscopy.

The *horoscopus*, or rising point of the ecliptic at the moment of birth, as it is known from Greek horoscopy has thus far not appeared in cuneiform so-called "horoscopes." Nor was the conceptual basis for the *horoscopus*, i.e., the sphere and the continuously moving great circle of the ecliptic, at home in Babylonian astronomy. The physical theory by which Ptolemy explained stellar influence in terms of the power of the aether that is "dispersed through and permeates the whole region about the earth"[59] is equally absent from Mesopotamia. In the Babylonian magical corpus, physical influence from the stars has been suggested by Erica Reiner,[60] but stellar irradiation of substances does not find its way into celestial divination, nor is it the same as the Greek physical theory of astrological influence as the physical substance of the aether is absent from Babylonian physics. Indeed, celestial divination in ancient Mesopotamia seems to have functioned without benefit of a physical theory, its causality being tied to the agency and manifestation of divine will, and not the action of celestial matter upon the mundane. But by the 2nd century B.C.E., the period when Babylonian astronomy made significant inroads into the Hellenistic world, various threads of cuneiform astrological traditions, including omens, horoscopes, astral magic and zodialogical medicine were woven into astrological systems beyond Mesopotamia. Of course it is well to repeat here that the two domains, astronomy and astrology, while differing in their goals, methods and content, were not differentiated along the same lines we draw in our modern classification of sciences. Nor were they well into the Middle Ages.

---

[58] See below, Chapter Seven, and for the melothesia, see E. Reiner, "Two Babylonian Precursors of Astrology," NABU (1993), pp. 21–22.

[59] Ptolemy, *Tetr.* 1.2.

[60] E. Reiner, *Astral Magic in Babylonia*, TAPS 85/4 (Philadelphia: American Philosophical Society, 1995).

Even further behind the study of Babylonian astronomy than astrology is that of the religious dimension in Babylonian celestial sciences. Of course to define a "religious dimension" is problematic because it introduces categorical distinctions that are not part of Babylonian discourse. Nonetheless, in our terms, the "religious" aspect of celestial divination and astrology (and even astronomy) would have to do with the role of the divine in the conception of these disciplines by those who practiced them. This gets to the root of the Mesopotamian scribal notion of knowledge, which is what unites divination, horoscopy, and astronomy in the learned cuneiform tradition. And this way of identifying the elements of knowledge, i.e., systematized, even to some extent codified, knowledge, was connected with the gods from whom it was claimed such scholarly knowledge was derived in the days before the Flood. Much research remains to be done to further penetrate the legacy of Babylonian astral theology in Greek and Greco-Roman cultures.

Clearly, throughout the Hellenistic period there was a widespread if not ubiquitous general association of heaven with the divine across the ancient Near Eastern and Mediterranean cultural arena. Bk 10 of Plato's *Laws* already expressed the belief that heavenly bodies are propelled by a soul whose nature is wise, true and good and that this is the divine in nature which affects all things, including humankind.[61] Aristotle also said "there is a very ancient tradition in the form of a myth, that the stars are gods and that the divine embraces the whole of nature."[62] As far as the stars being gods, such an idea is abundantly attested to in cuneiform texts, though the expression of the divine embracing "nature" would be a difficult one in ancient Mesopotamia where "nature" had no separate status as such. Certainly the gods, or their effects on the physical visible world, were thought to be observable in celestial phenomena, as the many omens listed in *Enūma Anu Enlil* attest.

Cicero in the 1st century B.C.E. said that "contemplating the heavenly bodies the mind arrives at a knowledge of the gods," and that from this knowledge, "arises piety, with its comrades justice and the rest of the virtues, the sources of a life of happiness that vies with and resembles the divine existence and leaves us inferior to the celestial

[61] Plato, *Laws* 10, 899a–d.
[62] Aristotle, *Metaphysics* 12.8.19.

beings in nothing else save immortality, which is immaterial for happiness."[63] Why the contemplation of the heavenly bodies was thought to confer the virtues of piety and happiness is much later explained by Ptolemy in the introductory section of the *Almagest*. There he places the celestial bodies with the eternal and unchanging, hence divine, part of the universe, and claims that "from the constancy, order, symmetry and calm which are associated with the divine, it makes its followers lovers of this divine beauty, accustoming them and reforming their natures, as it were, to a similar spiritual state."[64]

Hellenistic intellectual and religious culture with its multiplicity of ideas about the cosmos, especially the heavenly regions, its luminaries, and their relation to the divine, produced a climate in which it made sense for the celestial sciences of ancient Mespotamia to penetrate the linguistic and cultural boundaries of Hellenism. The legacy of Babylonian celestial divination includes the internal developments within cuneiform scribal culture of astronomy and horoscopic astrology as well as a complex set of surrounding ideas ranging from the divine nature of the heavenly bodies to the idea that a reciprocity between heaven and earth manifested in celestial signs, to models for calculating the appearances of celestial bodies. Traces of each of these ideas, albeit adapted to suit different world-views, other philosophical aims, and changing scientific methods, continued in later ancient Near Eastern and Mediterranean cultures within various currents of astronomical, astrological, or astral theological thought.

[63] Cicero, *De Natura Deorum* 2.61.153.
[64] Ptolemy, *Alm.* 1.1, see bibliography under Toomer (1984).

CHAPTER ONE

FATE AND DIVINATION IN MESOPOTAMIA

Whereas Greek and Roman philosophers posed many questions concerning the nature of fate and its relation to divination, no comparable cuneiform sources are available for the meaning of the Akkadian term *šīmtu*—generally translated by the English word "fate"—or its relation to divination.[1] In Greco-Roman discourse, the two were often connected because it was a common Hellenistic notion that prediction of the future was made possible by a principle called fate.[2] Such a principle does not seem to have existed as such in Mesopotamia, and although we are in possession of an enormous amount of texts relating to Mesopotamian divination—omens of all kinds, extispicy and "astrological" reports, commentaries and letters from diviner-scribes—no explicit connection between prognostication and what we call fate is evident in cuneiform sources. To date no comprehensive study of the

[1] Although the question of fate was already examined by Plato and Aristotle, a doctrine of fate was first elaborated in the Stoa. There fate became a force that directed all things, was identified with *heimarmene* (and *pronoia*), and was considered an aspect of Logos. Our principle sources for Greek views on fate and divination are:

Cicero, *De Divinatione*, translated W.A. Falconer, Loeb Classical Library No. 154 (Cambridge, Mass.: Harvard University Press, 1979);

Cicero, *De Fato*, translated H. Rackham, Loeb Classical Library No. 349 (Cambridge, Mass.: Harvard University Press, 1948);

Chrysippus, see Josiah B. Gould, *The Philosophy of Chrysippus* (Leiden: E.J. Brill, 1970);

Alexander of Aphrodisias, *De Fato*, see *Supplementum Aristotelicum* II ii 164–212, ed. I. Bruns (Berlin 1892). The only English translation is the posthumously published one by A. Fitzgerald (London: Scholartis Press, 1931), see also R.W. Sharples, "Aristotelian and Stoic Conceptions of Necessity in the De Fato of Alexander of Aphrodisias," *Phronesis* 20 (1975) pp. 247–274;

Calcidius, *Tractatus de Fato*, ed. J.H. Waszink in the series *Corpus Platonicum Medii Aevi of the Warburg Institute* (London–Leiden, 1962), see also J. den Boeft, *Calcidius on Fate: His doctrine and sources*, (Leiden: E.J. Brill, 1970).

See also, for a discussion of "fatalism" and the arguments of Aristotle and Diodorus Cronus, Steven M. Cahn, *Fate, Logic, and Time* (New Haven, CT: Yale University Press, 1967, 1969).

[2] See for example, Calcidius, *De Fato* 185: "They (the Stoics) say, the prediction of future events testifies that all things have been arranged and regulated long before; now this arrangement and regulation is called fate."

meaning of "fate" in ancient Mesopotamia has been produced on the order of D. Amand, *Fatalisme et Liberte dans l'Antiquite Grecque*.[3] While the present discussion is in no way a comparative study, evidence from Greek and Latin sources will be adduced where certain terms or concepts prove useful in defining parameters for the corresponding, yet altogether contrasting, Babylonian attitudes. The Greek discussion of fate, often together with the problem of free-will versus determinism, begins with the philosophy of causes in the Greek tradition, so we would not expect these concerns to manifest in Mesopotamian mythology and literature, where the term *šīmtu* is found.[4]

Šīmtu is that which is fixed or determined and more importantly, that which is determined by decree.[5] The verb *šâmu*, from which *šīmtu*

---

[3] D. Amand, *Fatalism et liberté dans l'antiquité grecques: morale antifataliste de Carnéade chez les philosophes grecs et les théologiens chrétiens des quatre premiers siècles* (Louvain: Bibliotheque de l'Université, 1945). The only monograph devoted to the subject in the cuneiform context is Jack N. Lawson, *The Concept of Fate in Ancient Mesopotamia of the First Millennium: Toward an Understanding of Šīmtu* (Wiesbaden: Harrassowitz Verlag, 1994).

[4] It is not at all developed in Plato (See only the discussion of human freedom and fate in the myth of Er, *Politeia* 614b ff.), and not yet prominent in Aristotle (*Ethica Nicomachea* 3.5. Aristotle's views are explicated in the 2nd century C.E. treatise of Alexander of Aphrodisias, *De Fato*, ed. I Bruns, *Supplementum Aristotelicum* II [Berlin, 1892]). Chrysippus (3rd century B.C.) is the first Western philosopher to articulate a principle of causality which accounted for the necessary occurrence of all things, describing fate as "the continuous causal chain of the things that exist" (Chrysippus, *On the Universe* 2.915, see J.B. Gould,*The Philosophy of Chrysippus*, p. 143, note 1). In later Hellenistic philosophy fate and necessity were generally associated, and the dilemma for some (e.g., the Epicureans in their desire for freedom) was to reconcile free will with these bonds of fate. Pamela Huby identifies Epicurus as the first to recognize the free will controversy, in "The First Discovery of the Free Will Problem," *Philosophy* 42 (1967), pp. 353–362. Fate was also not unanimously identified with "providence"—Cleanthes did not accept this equivalence, although Zeno and Chrysippus did—but when mediaeval Christian philosophers and theologians, such as William of Ockham, considered free will in the face of an absolute omniscient God, their discussions were rooted in this Greek philosophical background. For Ockham's analysis of the logical absurdities posed by determinism in his commentary to Aristotle's *De Interpretatione* ch. 9, see *William of Ockham: Predestination, God's Foreknowledge, and Future Contingents*, Translated with an introduction, notes, and appendices by Marilyn McCord Adams and Norman Kretzmann (New York: Appleton-Century-Crofts, 1969), Appendix II, pp. 96–109.

[5] The Sumerian equivalent of *šīmtu* is the compound NAM.TAR, whose precise etymology remains uncertain (see D.O. Edzard's excursus on NAM.TAR in AS 20, p. 70ff.). NAM alone is often taken as a noun meaning "destiny" (*šīmtu*) and TAR is the verb "to decide" or "to determine", and for this reason seems to be based simply on the Akkadian expression *šīmta šâmu.* NAM is also the abstract preformative. Were NAM in NAM.TAR to be interpreted in this way, we would have something like "the act of deciding" or "determining", and the compound would be analogous to those such as NAM.LUGAL "kingship" (see A. Falkenstein, *Das Sumerische*, Handbuch der

derives, has as its primary meaning "to decree" or "to determine."[6] As was pointed out by A.L. Oppenheim,[7] the English words fate and destiny do not adequately reflect the semantic range of the corresponding Akkadian word. The inadequacy of the translation "fate" or "destiny" is rooted in our own linguistic and cultural background, as a result of which our word fate, derived from the Latin *fātum*, has concepts and attitudes inherited from Greco-Roman tradition built into its meaning. Latin *fātum*, literally "that which has been spoken," derives from *fari* "to speak", and from this point of view has an element of correspondance to the term *šâmu* and its derivative *šīmtu* in the sense that *šâmu* implies determining by decree.[8] But while the primary sense of the Latin *fātum* is a divine statement or sentence, and by extension an oracle or portent, its secondary sense points out the conceptual difference between it and the Babylonian term by its entirely negative implications of doom, death, and destruction. While not always negative, the Latin *fātum*, in its secondary sense signified an oracle or portent of doom and the derivative adjective *fātālis* consequently bears the sense of "deadly" or "resulting in death." Our word fate comprises, therefore, the dual aspects of fate as an agent, frequently personified, by which events are predetermined, and as the result or condition thereof, or that which is fated to occur, i.e., predetermined events. The English word fate also implies inevitability, a nuance traceable to Hellenistic thought, but which is not found in Akkadian *šīmtu*. Unfortunately, and despite the wide range of attested occurrences of *šīmtu* in context, the precise implications of the Akkadian term are yet to be fully understood.

Šīmtu refers to preordained or determined norms, usually conceived of as transmitted from a higher power, e.g., from a god to a king, from

Orientalistik.Erste Abteilung,Nahe und der Mittlere Osten Bd. 2, Abschnitt 1–2, Lfg. 1 (Leiden: E.J. Brill, 1964) p. 35, § 15,2 and cf. W.G. Lambert, "Destiny and Divine Intervention in Babylon and Israel," *Oudtestamentische Studiën* 17 (1972), p. 66. Both NAM and NAM.TAR remain as logographic writings for Akkadian *šīmtu*.

[6] See for example, *inu*…*ana* DN…*illilut kiššat nišī išīmušum* "when (the gods) had decreed for Marduk supreme power over all the people" CH i 13; *nuḫša ana nišī išīmuni* "they decreed abundance for mankind," in E. Chiera, *Sumerian Epics and Myths* (Chicago: Oriental Institute Publications, 1964), p. 117 r. iii 7; *pani kalbatim išīmši* *^{d}Enlil* "Enlil decreed (that) she (Lamaštu) should have the face of a dog" Or NS 23 338:2; *šīram ṭābam ana nišī ana dār išīm* "he determined happiness for the people forever" CH xli 36.

[7] A.L. Oppenheim, *Ancient Mesopotamia*, p. 20ff.

[8] The act of naming also fixes destiny, see *ūšibuma ina puḫrišunu inambû šīmāte* "they sat down in their assembly to proclaim the fates" En. el. VI 165; also En. el. II 125 and III 60, see CAD n/1 sub *nabû* 4 a.

a king to a subject, or from a father to his child. Such a meaning for *šīmtu* cuts across the boundaries of textual genre; *šīmtu* occurs in this sense in mythological as well as legal contexts, and in personal letters. Clearly, *šīmtu* is involved in the most basic levels of human experience: the personal, social, and cosmic, that is to say, in the sphere of man's relation to the gods.

In mythology and literature, the highest gods, usually Anu, Enlil, and Ea, are said to decree the destinies, i.e., established the nature and pattern of things both in heaven and earth.[9] The term *šīmtu* also means simply "decree" and can be found in religious contexts alternating or in parallelism with *qibītu* "order" and *zikru* "command."[10] The divine epithet *mušīm šīmāti*, translated as "the one who determines or decrees fate" or "the one who appoints the function or determines the nature of something," is common in historical inscriptions, literary texts and prayers.[11] Note that *šīmtu*, usually plural in this context, was thought to have been introduced with creation, as indicated in the passage from *Enūma Eliš* where the time before *šīmātu* existed is described: *šīmātu la šīmu* "no destinies (i.e., order of things) had been decreed."

The fixed order of things on this highest level emanates from the gods and is in the care and protection of the gods. After the cosmic destinies are established at the beginning of creation, the gods become the guardians of it. In mythological texts and echoed in divine epithets, the cosmic destinies, inscribed on a tablet (*ṭuppi šīmāti*),[12] are symbolic of

---

[9] Other deities are said to "decree destiny" as well. See for example, [d]*Mammetum bānât šīmti ittišunu šīmâti iši[mmi] ištaknu mūta u balāṭa* "Mammetum the creatress of destiny decrees the destinies with them (the Anunnaki), they establish death and life" Thompson, *Gilg.* X vi 37; *maḫriš itti* [d]*Enlil išâm šīmta* "before the symbol of Enlil, she (Šarrat-Nippur) determines destiny" Lambert, *Festschrift Kraus*, Šarrat Nippur Hymn iv 16, cited CAD M/1 sub *maḫriš*; nam.bi i.tar.r[e]: *šīmātīšunu tašiam* "you (Nanna-Suen) determine the cosmic destinies" Å. Sjöberg, *Mondgott* No. 11:16.

[10] See for example: *šīmatka bēlum lu maḫrat ilī* "your decree, lord, is pre-eminent among the gods" En. el. IV 21; [d]*Enki rubûm rabium ša šīmātušu ina maḫra illaka* "Ea the great prince whose decrees take precedence" CH xlii 99, *šīmatka la šanān seqarka* [d]*Anum ištu ūmimma la ininnâ qibītka* "your decree is beyond compare, your command is Anu, from time immemorial your command shall not be changed" En. el. IV 6, also ibid. 4.

[11] For *mušīm šīmāti*, see K. Tallqvist, *Götterepitheta*, pp. 222f., and Mullo-Weir *Lexicon*, pp. 324f.

[12] Often written DUB NAM.MEŠ (or DUB *ši-ma-a-ti*), but on the basis of syllabic spellings *ṭup-pi* NAM.MEŠ, read *ṭuppi šīmāti*, not *ṭupšīmātu*. The tablet of destinies (not the tablets of destiny) is attested in the epic poetry of Anzû (passim), *Erra* (IV 44), and in *Enūma Eliš* (I 157, IV 121, and V 69). Otherwise it is only attested in the epithet of Nabû, *nāši ṭup-pi* NAM.MEŠ (var. *šī-mat*) *ili*, see CAD sub *šīmtu*.

eternal order, serve as an emblem of authority, and convey upon their holder the authority to "decree destinies," i.e., to decide the nature of things. Possession of the tablet by the rightful holder conveys order in the world, while its unlawful possession, such as in the epic poem *Bin šar dadme*, symbolizes complete cosmic catastrophe, evoked in the text by description of the gods' apoplectic shock following Anzû's act of thievery. The illegitimate seizure of the insignia of power throws the universe into a chaos which is only set to rights by means of a "Chaoskampf" and the victory of the hero god, Ningirsu/Ninurta in this case. Cosmic order and legitimate divine power are therefore expressed in literary form, as well as in the divine epithet corpus, as direct functions of the gods and their actions, not as disembodied forces in a realm apart from the gods.

Marduk's acquisition of the right to maintain (and alter) destinies emerges in *Enūma Eliš*.[13] The cosmic destinies often occur in texts together with GIŠ.HUR.MEŠ (*uṣurātu*) "the designs", also representative of universal order. This connection frequently emerges in incantations, where the divine epithet *bēl* NAM. MEŠ *u* GIŠ.HUR.MEŠ is applied to the trio of Ea, Šamaš, and Marduk.[14] Perhaps the *uṣurātu* were the pictorial image of NAM.MEŠ (*šīmātu*), although it is not known what they look like. It became common in later antiquity to depict fate, as did the Orphics with the Wheel,[15] or Cicero and the Stoics with the unfolding rope or chain.[16]

---

[13] *īkimšuma ṭuppi šīmatišu la šīmatišu ina kišibbi iknukamma irtuš itmuḫ* "he (Marduk) took from him (Kingu) the tablet of destinies, not rightfully his, sealed with a seal, and fastened it on his breast" En. el. IV 121. With reference to the gods' ability to change the destinies, cf. (evil came upon Ur, the righteous shepherd (UrNammu) was carried off) an.nè inim.kù.ga.ni.a mu.un.kùr . . . den.líl.le nam.tar.ra.ni.a šu.lul [mu].ni.ib.bal "An changed his holy word . . . Enlil altered his decree of fate deceitfully(?)" JCS 21 112:8f. (Death of Ur-Nammu).

[14] Cf. *bēlet šīmāte šarrat uṣurāte anāku* "I am the lady of the fates, the queen of cosmic designs" KAR 100:13f.

[15] Orphism was a Hellenistic mystery cult believing in successive reincarnations and a cyclical view of time. Fate was the law controlling the course of human history through the process of birth, death, and reincarnation, which were symbolized in the revolutions of a wheel. Simplicius refers to the Orphic "Wheel of fate and birth" (in commentary to Aristotle *De Caelo* 11.1.284a 14, ed. Heiberg [Berlin 1894] 377.13) and Proclus refers to the Orphic "cycle of births" (in Plato *Timaeus* 42c,d). See V. Cioffari, *Fortune and Fate from Democritus to St. Thomas Aquinas*, doctoral diss. Columbia Univ. 1935, p. 33.

[16] Cicero, *De Div.* 1.55.125 says, "Now by Fate I mean the same that the Greeks call *heimarmene*, that is, an orderly succession of causes wherein cause is linked to cause and each cause of itself produces an effect." Fate as a chain is commonly attested in

On the social level, *šīmtu* represents established norms or cultural conventions, often expressed as *šīmat māti*. Says Šamkat to Enkidu, *akul aklam Enkidu šīmat balāṭim šikaram šiti šīmti māti* "eat bread, Enkidu, it is the proper way of life, drink beer, it is the custom of the land."[17] In the prologue to the laws of Hammurabi, Enlil is called *šā'im šīmat māti* "who determines the norms of the land",[18] and in an incantation, Šamaš is invoked as "lord of the social norms" (*šīmat māti*), the one who draws the cosmic designs (*muṣṣir uṣurāti*).[19] Preservation of the divine decrees was ensured by means of cultic ritual, specifically, the ritual of "determining the destinies" on the eighth and eleventh days of the New Year's festival, and in this way divine decrees had social application.[20] It seems that the eleventh day of Nisannu was assigned for "determining the destinies of the land," but whether this can also be connected with "destiny" or norms on the social level is, of course, highly uncertain.

On the personal level, *šīmtu* refers to an individual's lot in life. This usage parallels that of the Greek term *moira*, personified in Homer as a goddess who determined the lifespan of man.[21] In Mesopotamia, the appointed lot of man, although decreed by gods, is characteristically not viewed as unalterable. This accords well with the idea of an order of things susceptible to change or disturbance on the cosmic level, as for example when the harmony of things in the divine realm is threatened by removal of the tablet of destinies. Examples, especially from

---

Stoic writings, see Alexander of Aphrodisias, *De Fato* 24 and 25. See V. Cioffari, *Fortune and Fate*, p. 47.

[17] Gilg. P iii 13–14 (OB version), see ANET, p. 77.

[18] CH i 7.

[19] BMS 10:16 and dupl. OECT 6 30 and PBS 1/1 12.

[20] Cf. W.G. Lambert, "History and the Gods: A Review Article," Or NS 39 (1970), p. 174f.

[21] The term *moira* means not only one's portion in life, or lot, but refers also more generally to a portion (of land) or a division (of people, of an army). Like *šīmtu*, it also denotes one's inheritance or patrimony (see Liddell and Scott, *A Greek-English Lexicon*, sub verbo). When fate became the object of philosophical inquiry, particularly in the Hellenistic period, the term used was not *moira*, but *heimarmene*. Although fate was the concern of Greek philosophy before Stoicism, the term *heimarmene* was used only sparingly. Neither Plato nor Aristotle ever fully explicated the problem, but a treatment of the relation of human freedom to fate is found in the myth of Er at the end of the *Politeia* (614b ff.). Aristotle's views, however, are put forth in the extensive treatise by the second century C.E. commentator Alexander of Aphrodisias, *Peri Heimarmene* (see note 1). In the Stoic doctrine of *heimarmene*, fate was seen as an all-pervasive force and became closely associated with astral fatalism, as discussed by Amand, *Fatalisme et Liberté*.

curse formulas, attest to the idea that one's lot, or *šīmtu*, can change either for the better or worse.[22] This must be distinguished from the idea of fortune. Today we naturally link fate and fortune, particularly in reference to an individual, but we cannot assume such a "natural" connection for Mesopotamia. While *fortuna*, which derives from *fors* meaning "chance" or "accident," has the component of chance, and so connotes luck, no true equivalent term or expression is attested in Akkadian. Expressions using *damqu* and *lemnu* can convey a sense of propitious and unpropitious, hence lucky or unlucky, but strictly speaking have nothing to do with luck as something that serves to explain unexpected or chance events. Something like good fortune may, however, be expressed in Akkadian by saying a person has an *ilu, ištaru, lamassu*, or *šēdu.*[23] The personal *šīmtu* is therefore something quite different from luck; while conceived as changeable, *šīmtu* nevertheless does not seem to include an element of chance, but remains restricted to that which is determined by the gods to be one's share or role in life. As the fulfillment of one's granted lot and share of life, *šīmtu* also means death. The term figures in several well-attested euphemistic expressions for death, in particular "he went to his fate" (*ana šīmtišu illik*) and "fate took him away" (*šīmtu ūbilšu*).

Another aspect of *šīmtu* on the mundane level sees as part of the portion alotted to man or other objects, such as plants or stones, all the qualities and characteristics peculiar to him (or it). The myth of Enki and Ninhursag in which Enki endows the plants with their characteristic properties, conferring a NAM upon each one by means of a command, indicates that NAM (*šīmtu*) signifies the nature of the plant.[24] In tablet X of *Lugale*, Ninurta fixes the "destinies" of stones by pronouncing a sentence for each one, meaning he imparts to them their intrinsic nature.[25] In legal usage, *šīmtu* becomes the last will and testament by means of which a person can dispose of property to his heirs. The parallelism with the disposition of qualities and lifespan from deity to man is clear.

---

[22] See for example, ^{d}*Ea pātik niši šīmtašu lilammin* "may Ea, fashioner of mankind, make his an unfortunate lot" BBSt. No. 4 iii II, and DN *bēl šīmāti šīmātišu līrur* "may DN, lord of destinies, curse his destiny" AKA 254 v 90, and cf. [anak]*umma šīmātu unakkar* "I (Gilgamesh) will change the fates" Gilg. I v 2.

[23] Oppenheim, *Ancient Mesopotamia* p. 201.

[24] S.N. Kramer, *Sumerian Mythology* pp. 68–72.

[25] See also Oppenheim, *Ancient Mesopotamia*, p. 207, where he compares this usage of *šīmtu* with Greek *physis* and Latin *natura*.

The personal *šīmtu* is therefore the counterpart in the human sphere of existence to the cosmic norms. A person's life thereby takes part in the ordered system of the world. A passage in an inscription of Nebuchadnezzar is illuminating in this respect: Duku, the place of destinies, which houses Ubšu-ukkin, the shrine of destinies, where Lugaldimmeranki (Marduk),[26] lord of the gods, dwells during the New Year's festival on the eighth and eleventh days; the gods of heaven and earth wait upon him in reverence, bowing and standing before him, and therein he determines the destiny of everlasting days (and) the destiny of my life.[27] The fate of man is in this way viewed in the context of the larger considerations of the world and the gods, i.e., man and his lot, decreed by the gods, was meaningful as part of the larger scheme. The individual was consequently not central in this schema and the related question of human freedom therefore never came to the fore. It is thus far clear that the fates or destinies in which god, king, and man all equally take part reveal a plan which, although set in motion at creation, does not remain unchanging or static. However fixed the world may be, it is not an immutable order, but neither is there room for chance. Chance occurrences would imply the gods had no control or influence, which is obviously incompatible with Mesopotamian evidence.

How can Mesopotamian divination be evaluated in terms of this conceptual framework? On the basis of the many systematic collections of signs and predictions preserved in various omen series, it is clear that omens function as indicators of what can occur by virtue of the ordered schema of phenomena. Determinism would render all things ultimately unavoidable,[28] but because the Mesopotamian system is not a deterministic one, events presaged by omens can be avoided through magical means, as we know from innumerable *namburbi* rituals counteracting the evil consequences of many omen protases. The existence of omens in Mesopotamian culture and scholarly tradition in no way implies a belief that future events follow inevitably from past events. The evidence from Babylonian omen texts suggests the

---

[26] One of the fifty names of Marduk, see *Enūma Eliš* V 112 and ibid. VI 139.

[27] *šīmat ūm darûtim šīmat balāṭija išimmu* Langdon, VAB 4 126:63f.

[28] The implications of determinism are that whatever happens happens of necessity, and whatever does not happen of necessity does not happen at all, or stated more axiomatically, "for everything that ever happens there are conditions such that, given them, nothing else could happen." (*Encyclopedia of Philosophy* vol. 2, p. 362).

very simple premise that if P occurred (or occurs), then Q is its correlation. P is, therefore, not necessarily Q's cause or Q the inevitable result of the occurrence of P. Assuming that omen apodoses provided the material for real predictions, the principle by which the omen text was interpreted could be stated as follows: if P occurred in the past and Q was its consequence (or correlation), then each time P occurs, Q can be expected. There need not be overtones of either chance or necessity; otherwise, what efficacy would there be in apotropaic rituals or prayer? Apparently, the "ancients" were remembered for their use of magical techniques to influence natural events. Seneca remarks, "Antiquity, still uneducated, used to believe that rains were attracted or repelled by incantations. It is so obvious none of these things can happen that it is unnecessary to enroll in the school of some philosopher to learn it."[29] The clear implication, then, is that man could influence (future) events through magical means without disturbing the categories of fixed orders established (i.e. decreed) by the gods.

The concepts of chance and necessity later became central in a number of philosophical works of the Hellenistic period, when the validity of divination was argued from many points of view.[30] Two opposing schools of thought became divided on the question of whether the events predicted by divination happened by chance, i.e., from causes neither natural nor divine, as Cicero and later Calcidius held,[31] or according to the Stoics, by necessity, which to them meant natural causality. The Stoic philosophers saw the existence of omens as a proof of the existence of necessitating causes, or determinism. According to them, divination proved the identity of fate with necessity; this necessity stemmed from causation, and fate was symbolized as a rope or chain of causes.[32] Calcidius (3rd century C.E.) disagreed with the Stoics and considered that prognostication of future events did

[29] Seneca, *Nat. quaest.* 4 B 7.3.

[30] See note 1, and also Aristotle, *De interpretatione*, ch. 9, transl. J.L. Ackrill, *Categories and De interpretatione*, Clarendon Aristotle series, (Oxford: Clarendon Press, 1971 and 1993, 11th imprint).

[31] Cicero's working definition of divination is "the foreseeing and foretelling of events considered as happening by chance." *De Div.* 1.5. 9.

[32] "Moreover, since, as will be shown elsewhere, all things happen by Fate, if there were a man whose soul could discern the links that join each cause with every other cause, then surely he would never be mistaken in any prediction he might make." Cicero *De Div.* 1.56.127, see also Aulus Gellius *Attic Nights* 7.2, cited R. Sorabji, *Necessity, Cause, and Blame, Perspectives on Aristotle's Theory* (Ithaca, N.Y.: Cornell Univ. Press, 1980) p. 70 note 6.

not apply to things which were bound by necessity, but only to things which were uncertain, doubtful, or due to chance.[33] He remarked, for example, how pointless it would be to consult a diviner to find out whether a newborn baby would be mortal or immortal.

A different interpretation of omens emerged when the early Christian fathers sought to reconcile the logical implications of fate as a necessary cause with Providence and God's foreknowledge.[34] While astrology became anathema because it attributed to the stars and planets direct causative influence on the world, omens, even celestial omens, were acceptable, since they did not determine the future but merely indicated it. Origen (fl. c. 185–254 C.E.) admitted that anything could serve as a sign, and cited Gen. 1:14 to show that signs were part of God's plan: "let there be lights in the firmament…and let them be for signs."[35]

We know, from the internal organizing principles that structure Babylonian omen collections, that omens had to do with the schematic order of all phenomena as decreed by the gods. A passage of relevance here is found in the concluding paragraph of EAE tablet 22,[36] the last lunar omen tablet of that series. Although admittedly difficult to interpret, the passage refers to the mythological time when Sin "made the decision" (*mitlukta iškunu*) and as a result, the gods of heaven and earth decreed (*šâmu*) for mankind various adverse conditions—eclipse, deluge, sickness, death, and the seven demons (^{d}*Sibitti*). While we have little evidence for conscious reflection on the connection between the term *šīmtu*, meaning that which is decreed by the gods to occur, and the practice of divination, a number of omens in the oil divination corpus insert the term *šīmtu* between protasis and apodosis, as if to

[33] Calcidius, *Tractatus de Fato* 185, see den Boeft, *Calcidius on Fate*, p. 112f.

[34] The Stoic doctrine of fate, especially the various theories argued by Cleanthes and Chrysippus, were made known to Latin Christianity by the treatment of the subject and its relation to Providence in Calcidius' commentary to the Timaeus (ch. 144ff.). Calcidius and Cicero (especially in the De Fato) provided the basis for later Mediaeval arguments concerning the co-existence of free-will and fate, as discussed in V. Cioffari, *Fortune and Fate*, p. 52.

[35] Origen apud Eusebius, *Praep. Ev.* 6.2; Plotinus refers to Origen's commentary on Genesis, see *Enn.* 2. 3, see also Calcidius *De Fato* 174, and den Boeft, *Calcidius on Fate* pp. 78 and 132f.

[36] EAE 22 concluding paragraph: *tamiātum annātum enūma* ^{d}*Sin mitlukta iškunu ilū ša šamē u erṣetim epšēt amēlūti tubulšunu išimma antalû riḫṣu murṣu mūtu gallû rabûti* ^{d}*Sibitti mahar* ^{d}*Sin ittanapriku*, in ABCD, pp. 270–271 (= ACh Sin 35 50–53).

indicate that the prediction is, in fact, that which is decreed to occur.[37] Elsewhere, particularly in celestial omens, apodoses are termed *purussû*, a legal metaphor which relates to *šīmtu* in the sense of a decision or determination. The eclipse tablet EAE 20 makes use of this terminology in a formulaic statement preceding each apodosis: *ina libbi ana GN purussû nadin* "through it (the eclipse) the decision (i.e. prediction) is given for the country."[38] An additional phrase is occasionally provided at the end of an omen in EAE 20, stating *kīam ittašu u purussûšu* "thus is its sign and its prediction."[39]

In Mesopotamia, omens provided an avenue of communication between god and man, a kind of contact between the divine and mundane spheres of existence. "O Šamaš," Nebuchadnezzar said, "give me direct answers in (your) oracular pronouncements and (through) divination!"[40] The protases are the physical signs themselves (GISKIM/*ittu*) and the apodoses are the determined or sometimes literally "decided" correlation (EŠ.BAR/*purussû*). A careful study of the relationships between the terms NAM.TAR, GIŠ.HUR, GISKIM, and EŠ.BAR would bring us closer to an understanding of the conceptual basis of divination and its relationship to magic.[41]

The preliminary exploration of the term *šīmtu* was offered here with the hope of opening a new perspective on the fundamental principles of Babylonian divination. Both divination and the concept of "fate" in Mesopotamia are here seen to be distinct from their later Greek

---

[37] [*šumma šamnam ana m*]*ê addīna kibram la irši ana mārakimma ittur šīmtum marṣum iballuṭ* "if when I drop oil into water it forms no ledge(?) and returned to an elongated shape(?), decision: the sick one will recover" CT 3 2:3–5, and cf. KAR 212 ii 31 and dupl. DA 50:20.

[38] ABCD, EAE 20 §§ I–XII (7).

[39] Ibid. EAE 20 § V recensions A and B (9), § X (9), and § XI (9).

[40] *Šamaš attama ina dīnim u bīri išariš apalanni* Langdon VAS 4 102 iii 21.

[41] See the following introduction to an incantation (LKA 109:1–8, and dupl. JRAS 1929 285:1–6): ÉN ^{d}*Ea* ^{d}*Šamaš* ^{d}*Asalluhi ilāni rabûti dā'inu dīn māti mušimmu šīmāti muṣṣiru uṣurati mussiqu isqēti ša šamê u erṣetim attunuma šīmāti šâmu uṣurāti ussuru ša qātēkunuma šīmāt balāṭi attunuma tašimma uṣurāt balāti attunuma tuṣṣara purussî balāṭi attunuma taparrasa* "Incantation: Ea, Šamaš, Marduk, the great gods, you are the ones who judge the law of the land, who determine the nature of things, who draw the cosmic designs, who assign the (good and bad) lots for heaven and earth; it is in your power (lit., hands) to decree the destinies and to draw the cosmic designs; you determine the destinies of life, you draw the designs of life, you decide the decisions of life". Note the interesting parallel of the term *isqu* "lot" with *šīmtu; isqu* denotes fate or destiny assigned by the gods as well as the lot or fortune of an individual (see CAD sub verbo meaning 3), and like *šīmtu, isqu* also denotes the nature or inherent character of something (see CAD s.v. meaning 4).

counterparts, as represented in the philosophical tradition. Babylonian omen texts make manifest the belief in a schematic order of all phenomena; that insight into the future course of events could be obtained reflects an assumption that events were prearranged in accordance with some interpretable design, one which, nevertheless, was susceptible to the forces of magic. The course of events was thereby considered neither causally connected with the signs that portended them, nor inevitable consequences thereof. This interpretation of Babylonian divination gains support by all that can be adduced from the notion of fate as expressed by *šīmtu*. Because of its implication for the manner in which the world of the gods and the physical world of man and of phenomena relate to one another in the Babylonian view, the term *šīmtu* is indeed key to a fuller understanding of Babylonian divination.

CHAPTER TWO

NEW EVIDENCE FOR THE HISTORY OF ASTROLOGY

The association made in the Greco-Roman world between the profession "astrologer" and the name "Chaldean" is abundantly attested to in Hellenistic literature, and the renown of the "Chaldeans" as expert practitioners of astrology that emerged in the Hellenistic period continued even into late antiquity. Although originally denoting a people or nation, the term "Chaldean" gradually came to be associated with a priestly class.[1] This is the meaning of "Chaldean" understood by the more well-known Greek historians, the earliest of whom was Herodotus (*Histories* 1.181.5), then Ctesias (*Persika* 2), and later Diodorus (*Bibliotheca Historica* 2.29–31). With the Hellenistic period, "Oriental wisdom" took on almost fashionable status, and Babylonian (Chaldean), Egyptian, and Persian (Zoroastrian) traditions—both real and imaginary—became confused within the Greek context.[2] The earliest history of the Hellenistic association of the name "Chaldean" with the profession of astrologer is difficult to trace.[3] But certainly one of the indications that the impetus for Greek developments in astrology derived from Babylonia are the later and numerous references to the learned traditions of "Chaldeans" by Greek and Roman writers.[4] To explain the actual development of Greek forms of astrology as direct borrowings from Babylonian concepts has so far not been possible due to a complete lack of evidence. Since the theories, methods, and underlying philosophical rationale of Hellenistic astrology do not resemble

[1] An early usage of "Chaldean" to denote a people is attested perhaps as early as the fifth century B.C.E.: Hellanicus *Persika*: see F. Jacoby, *Die Fragmente der griechischen Historiker*, Teil 1 (Berlin, 1923), p. 122. no. 4 F 59.

[2] See A. Momigliano, *Alien Wisdom: The Limits of Hellenization* (Cambridge and New York: Cambridge University Press, 1975), pp. 141–49.

[3] See, in the second century B.C., Cato *De Agricultura* 5.4, ed. W.D. Hooper and H.B. Ash (Cambridge, Mass.: Harvard University Press, 1936), where Chaldeans are listed among various types of diviners. In the first century B.C. Strabo *Geography* 16.1.16. ed. H.L. Jones (Cambridge, MA.: Harvard University Press, 1966), vol. 7, uses the name Chaldean both as a profession and as a gentilic.

[4] See HAMA, pp. 612f.

those of Babylonian celestial omens, they have been considered to be distinctively Hellenistic Greek in origin.

Textual sources for Hellenistic astrology stem largely from the latter half of the Hellenistic period and therefore reflect the astrology in its most elaborate Greco-Roman form, furthest removed from contacts with Babylonian celestial divination.[5] On the other hand, the bulk of our evidence for Babylonian celestial divination dates from the seventh century B.C.E., and earlier, and derives primarily from the omen series *Enūma Anu Enlil*, its commentaries, and the reports of the scholars to the Sargonid kings in which *Enūma Anu Enlil* is cited and interpreted.[6]

Astrology can be historically differentiated from the branch of Babylonian divination that interpreted celestial signs as portents. As defined by David Pingree, astrology is "the study of the impact of the celestial bodies-Moon, Sun, Mercury, Venus, Mars, Jupiter, Saturn, the fixed

[5] For the major sources for Hellenistic astrology, see A. Bouché-Leclercq, *L'Astrologie grecque* (Paris, 1899); Cumont, Boll et al., eds., CCAG (Brussels: Lamertin, 1898–1951), vols. 1–12; and for an outline of specific authors and texts with complete biographical and bibliographical information, see D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, MA. and London: Harvard University Press, 1978), vol. 2, pp. 421–45.

[6] For the texts of *Enūma Anu Enlil*, see the following editions available to date [bibliography updated]. Tablet numbers are not always known, as fragmentary preservation sometimes precludes assigning tablet numbers and/or the series was numbered variously in antiquity: L. Verderame, *Le Tavole I–VI della serie astrologica Enūma Anu Enlil*, Nisaba 2 (Messina: Dipartimento di science dell'antichità, Università di Messina, 2002); F. Rochberg Halton, ABCD for Tablets 15–22; Erlend Gehlken, "Die Adad-Tafeln der Omenserie *Enūma Anu Enlil*. Teil 1: Einfuhrung," *Baghdader Mitteilungen* 36 (2005), pp. 235–273, and idem, "Die Adad-Tafeln der Omenserie *Enūma Anu Enlil*. Teil 2. Dei beiden ersten Donnertafeln (EAE 42 und 43)," *Zeitschrift fur Orientarchäeologie* 1 (2008), pp. 256–314; W.H. von Soldt, *Solar Omens of Enuma Anu Enlil: Tablets 23 (24)–29 (30)*, (Leiden: Nederlands Historisch-Archaeologisch Instituut te Istanbul, 1995); E. Reiner and D. Pingree, *The Venus Tablet of Ammiṣaduqa*, Bibliotheca Mesopotamica 2/1, (Malibu: Undena, 1975) [= BPO 1] for Tablet 63, E.Reiner and D. Pingree, *Enūma Anu Enlil Tablets 50–51*, Bibliotheca Mesopotamica 2/2, (Malibu: Undena, 1981) [= BPO 2], Erica Reiner and David Pingree, *Babylonian Planetary Omens, Part Three* (Groningen: Styx, 1998) [= BPO 3] for Tablets 59–60, and E. Reiner, *Babylonian Planetary Omens, Part 4* (Leiden and Boston: Brill/Styx, 2005) [= BPO 4] for Tablets 64/65 and other Jupiter Tablets. See also the articles of E. Weidner, "Die astrologische Serie Enuma Anu Enlil," AfO 14 (1941/44), pp. 172–195 and 308–318, and 17 (1954/56), pp. 71–89, and Charles Virolleaud, *L'Astrologie chaldéenne: le livre intitulé "enuma (Anu) [ilu]Bêl"* (Paris, 1908–12), fascs. 1–14; For the Reports, see R. Campbell Thompson, *The Reports of the Magicians and Astrologers of Nineveh and Babylon* (London, 1900), vols. 1–2; and S. Parpola, *Letters from Assyrian Scholars to the Kings Esarhaddon and Assurbanipal,* AOAT 5/1 (NeukirchenVluyn: Verlag Butzon & Bercker Kevelaer, 1970).

stars, and sometimes the lunar nodes-upon the sublunar world."[7] So defined, astrology cannot antedate the Hellenistic period as it depends entirely upon the idea of a finite spherical and geocentric universe, viewed in accordance with Aristotelian physics and cosmology. Astrology, therefore, implies the existence on the one hand of a celestial or supralunary realm of concentric spheres composed of fiery ether in which the seven planets and the fixed stars are found, and on the other, a sublunar realm consisting of the static earth and the other elemental spheres of water, air, and fire. The universe was also characterized as a sphere having a proper motion of uniform eternal rotation about the fixed center of the earth. This circular motion, made manifest by the daily rotation of the fixed stars, contrasted with the rectilinear motion characteristic of the sublunar spheres.[8] Related to the problem of accounting for the eternal circular motion observed in the heavenly bodies was the problem of identifying the substance of which the heavenly bodies were made, and Aristotle distinguished the celestial element ether from the four terrestrial elements. Plato saw the stars as composed of fire (*Timaeus* 40a), and, as W.D. Ross points out, "no one, perhaps, before Aristotle had thought the celestial bodies to be composed of an element peculiar to themselves."[9] The dualism fundamental to Greek astrology therefore has a corollary in terms of the physical structure of the cosmos by virtue of the radical distinction made between the substance comprising the celestial spheres and those of the sublunar regions.

Hellenistic astrology took two major forms: genethlialogy (or horoscopy), in which the individual obtained personal predictions, and universal (or general) astrology, in which predictions were aimed at political states and entire races of men. These exercised enormous impact on cultural, intellectual, and religious levels of Hellenistic civilization. As noted by Pingree, this impact had much to do with a favorable intellectual climate for the acceptance of astrology that existed as a result

[7] D. Pingree, "Astrology" in *Dictionary of the History of Ideas.* vol. 1, p. 118; see also idem, "Astrology," *Encyclopaedia Britannica*, 15th ed., vol. 2. p. 219.

[8] See Aristotle, *Physics* 261b.27ff. (edition used: *Aristotle's Physics.* ed. W.D. Ross [Oxford: Clarendon Press, 1936], pp. 446 and 265a.27 (ibid., pp. 451f.), and cf., on the nature of circular motion according to Aristotle, the introduction to Ross's edition, pp. 92f.

[9] Ibid., p. 96.

of the Platonist and Peripatetic schools, each of which regarded the celestial spheres as in some way superior to the mundane, or sublunar, sphere.[10] The Platonists viewed the celestial motions as reflections of divine reason (νους) because they were subject to mathematical laws; the Aristotelians viewed the circular motion of the luminaries as perfect and eternal, hence prior to, and in that sense superior to, the linear motions upward and downward that characterized the sublunar regions.[11] These ideas, together with the analogy between the macrocosm and microcosm, which implied that man's soul was a reflection of the cosmic soul, provided the rationale for direct stellar influence upon society (i.e., the practice of general astrology) and the individual (i.e., the practice of genethlialogy). The microcosm-macrocosm analogy is therefore embedded within the astrological interpretation of the cosmos and man's relation to it.[12] While this analogy can be traced to Democritus (fl. ca. 460–400 B.C.E.) and fifth-century atomism, and also seems to have been a doctrine developed by Diogenes (who wrote between 440 and 423 B.C.E.), the basic idea of an intimate relationship between the heavens and man may well be even older.[13] A complementary and intimate connection between heaven and earth, however, does not necessitate the direct and absolutely determinative influence of the motions of the celestial bodies upon the earth. That is a Greek, or Hellenistic, concept, one which has no parallel in Babylonian omen texts.

The contrast between Babylonian and Greek methods and rationale for prognostication on the basis of celestial events can be expressed in terms of the difference between a form of divination on the one hand, in which the deity provides ominous signs in the heavens to be read and interpreted by a specialist, and on the other, a mechanistic theory

---

[10] See Pingree, "Astrology" (*Dictionary of the History of Ideas*, vol. 1), p. 119.

[11] Plato *Timaeus* 33b (edition used: F.M. Cornford, *Plato's Cosmology: The "Timaeus" of Plato* [Indianapolis: Bobbs-Merrill, 1975], p. 54). See also Aristotle's *Physics* 265a 13, ed. W.D. Ross, p. 451.

[12] According to W.C.K. Guthrie, "it is usually accepted that Democritus was the first known Greek to apply to man the term microcosm (μικρος κοσμος), i.e., little world-order; the word *kosmos* has by now undoubtedly acquired the meaning 'world,' while still emphasizing the element of system and order which distinguishes it from precosmic chaos). This is a term which, with its Latin equivalent *minor mundus*, became common in Hellenistic and Graeco-Roman circles, particularly those connected with mystical religion of Neopythagorean or Gnostic type" (Guthrie, *A History of Philosophy*, vol. 2 [Cambridge, 1965], p. 471).

[13] Ibid., pp. 381 and 471.

of physical causality, in which the stars and planets themselves directly produce effects on earth. In addition, divination is, in principle, susceptible to the efficacy of magic, whereas astrology (in its most deterministic form) connotes inevitability.[14]

Given the marked contrast between the two systems, all parallels and elements traceable from Greek astrology back to Babylonian omens are of great historical interest. As already indicated by A.J. Sachs, the period of greatest value for a study of the Babylonian contribution to Hellenistic astrology should be the period between 600 and 300 B.C.E.; during this period not only did Babylonian celestial divination evidence major changes, but the zodiac was also first introduced, making possible the development of horoscopy.[15]

The text presented below, BM 36746,[16] falls somewhere within the latter part of this period. Although paleographically it is difficult to distinguish between an Achaemenid and Seleucid date, the appearance of the zodiac in the text would place it some time after 400 B.C.E. The logographic forms used for the names of constellations (see table 1) serve as an internal dating criterion, placing the text within the sphere of the MUL.APIN tradition. That is, the text preserves the older forms of the names of constellations, as contrasted with, for example, BRM 4 19 and other late Babylonian astrological texts that already contain abbreviated Seleucid forms such as are found in late mathematical astronomical texts.[17] The importance of BM 36746 for the history of astrology lies in the fact that it exhibits for the first time in cuneiform literature forerunners to a number of astrological theories known before only from Hellenistic Greek sources, and further paralleled in third century Indian astrology. This text, therefore, serves

---

[14] The close association of astrologers and magicians, particularly as drawn by Christian opponents of astrology, however, points to the widespread use of magic in connection with astrology, despite the theoretical determinism implicit in the system. See A.A. Barb, "The Survival of Magic Arts" in A. Momigliano, ed., *The Conflict between Paganism and Christianity in the Fourth Century* (Oxford: Clarendon Press, 1963), pp. 100–25, and cf. E.R. Dodds, "Theurgy and its Relationship to Neoplatonism," *Journal of Roman Studies* 37 (1947), pp. 55–69. What is important for the paradox of the application of magic to an inherently fatalistic system such as astrology is that the objective of theurgy, according to Dodds, was to enable its practitioners to escape εἱμαρμένη (fate).

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

[16] I thank the Trustees of the British Museum for permission to publish this tablet.

[17] See A. Ungnad, "Besprechungskunst and Astrologie in Babylonien," AfO 14 (1941–44), pp. 274–82.

Table 1. Names of Zodiacal Constellations

	MUL.APIN	BM 36746	BRM 4 20	BRM 4 19	*ACTACT*
Aries	MUL.LÚ. ḪUN.GÁ	MUL.LÚ .ḪUN.GÁ	MUL.LÚ.ḪUN.GÁ	LU	ḪUN(KU)
Taurus	MUL.GU$_4$.AN.NA	MUL.LÚ.Ḫ UN.GÁ	MUL.MUL	TE.TE	TE.TE
Gemini	MUL.MAŠ.TAB.BA. GAL.GAL	MUL.MAŠ.TAB.BA. GAL.GAL	MUL.MAŠ.TAB.BA. GAL.GAL	MAŠ. MAŠ	MAŠ. MAŠ
Cancer	MULAI.LUL	HUU.AI.LUI	HUU.AI.LUI	SAL+DIŠ+U (KUŠU/ALLA)	SAL+DIŠ+U (KUŠU/ALLA)
Leo	MUL.UR.GU.LA	MUL.UR.GU.LA	MUL.UR.A	UR.A	A
Virgo	MUL.AB.SÍN	MUL.AB.SÍN	MUL.AB.SÍN (var.: MUL.KI. DIL.DIL)	KI.DIL.DIL	KI.DIL.DIL
Libra	MUL *Zibanītum*	*Zibanītum*	*Zibanītum* (var.: MUL.GIŠ.RIN)	RIN	RIN
Scorpius	MUL.GÍR.TAB	MUL.GÍR.TAB	MUL.GÍR.TAB	GÍR.TAB	MUL.GÍR.TAB
Sagittarius	MUL.PA.BIL.SAG	MUL.PA.BIL.SAG	MUL.PA.BIL.SAG	PA.BIL.SAG	PA
Capricorn	MUL.SUḪUR. MÁŠ	MUL.SUḪUR. MÁŠ	MUL.SUḪUR. MÁŠ	MÁŠ	MÁŠ
Aquarius	MUL.GU.LA	MUL.GU.LA	MUL.GU.LA	GU (var.: GU.LA)	GU
Pisces	MUL.KUN.MEŠ	[. . .]	MUL.KUN.MEŠ	AŠ.GÁN	ZÍB.ME

as a connecting link between the omens of *Enūma Anu Enlil* and later Greek astrology.

While one of the primary features of late astrology, and particularly of horoscopic astrology, is the significance assigned to the relationship between lunar and planetary positions and their movements with respect to one another, Babylonian celestial divination, as represented by the series *Enūma Anu Enlil*, is characterized by an overall segregation of the various celestial phenomena and their portents into separate units. In *Enūma Anu Enlil*, lunar omens are rarely combined with solar, planetary, or stellar signs; one notable exception are the meteorological phenomena regularly incorporated within the lunar eclipse omens—wind, rain, thunder, and lightning.[18] This practice seems to have had an historical impact, as the association of various seismic and meteorological phenomena (particularly the prevailing winds) with eclipses continued in Greek astrology.[19]

---

[18] The most commonly occurring protases in which eclipses are associated with winds are the following (from *Enūma Anu Enlil* and parallel texts):

a) *šumma antalû ina* IM.x *ušarrīmma* IM.y *illik*, "if an eclipse begins in the direction (i.e., lunar quadrant) x and wind y blows" EAE 15:§§6'–8' (*Babylonica* 3 280+K.3770 21–26 [unpub.] and BM 32513 r. 6'–16' [unpub.]);

b) *šumma ina* MN UD.15.KAM *antalû šitkunma šūtu (iltānu, šadû, amurru) illik*, "if an eclipse occurs on the 15th day of month such-and-such and the south (north, east, or west) wind blows"; EAE 16 omens 13–16 of each monthly paragraph (see, for example, month 11: *ACh Sin* 27+28 [K. 3903+11554+3912]:5'–7', and from month III: *ACh Sin* 27+28:17'–22' and *Bab.* 3 269f. i 10'–15');

c) *šumma ina* MN UD.14.KAM *antalû šitkunma*... *ina lumun libbišu* IM.X *itbēma*... IM. X *ina qātika tukâl*, "if an eclipse occurs on the 14th day of month such-and-such... while it (the moon) is eclipsed, wind x blows... bear in mind wind x"; EAE 20 formula (see, for a specific example, *ACh* Suppl. 2 26:1–4—[*šumma ina Ni*]*sanni* UD.14.KAM *antalû šitkunma*... *ina lumun libbišu amurru itbēma*... *amurra ina qātika tukâl*).

In each paragraph of EAE 20, the wind which blew during the eclipse is named and is the prime indicator of the geographical area affected by that eclipse, i.e., the direction from which the wind blows corresponds to the locus of the events predicted in the apodoses. The instruction to "bear in mind" a particular wind refers to this correspondance between the prevailing wind and the locus of the predicted events.

Other meteorological effects, such as clouds, rain, thunder, and lightning, were incorporated to a lesser extent than were the prevailing winds. See, for example, STT 326:5, 6, 9, and 10; UET 6 413 r. I and 3; cf. Labat, *Calendrier* §§90–91.

[19] See the fifth-century work, Hephaestio Thebanus *Apotelesmatica* 1.2 1, ed. D. Pingree (Leipzig, 1973), pp. 54–55. Here the relationship between the wind blowing and the element of time (i.e., the beginning or end) of the eclipse determines the nature of the portent. Cf. also Aristotle *Meteorologie* 2.8. ed. H.D.P. Lee (Cambridge, Mass.: Harvard University Press, 1952), p. 215.

In view of this, the tablet BM 36746 is significant as a transitional source from the lunar eclipse omens of *Enūma Anu Enlil*, which rarely mention planets or stars, to the astrology of the later Greco-Roman period in which great significance is attached not only to the zodiacal sign in which a lunar eclipse occurs, but also to the planets visible during that particular occurrence.[20] BM 36746 constitutes one of the few sources for the systematic application of the concept of the zodiac in omens of the *Enūma Anu Enlil* tradition. Moveover, the manner in which this text combines eclipse omens with zodiacal signs and planetary positions emerges later as one of the fundamental concepts of what has been considered Hellenistic, as opposed to Babylonian, astrology.

The text BM 36746 presents a collection of twelve lunar eclipse omens. Only seven of the original twelve are preserved, but each omen follows a clearly defined pattern which enables some of the major elements of the broken protases to be restored with confidence. Despite close parallels with Greek astrology, the content of this tablet can be traced back to older Babylonian literary and scholarly tradition: elements of the protases stem from the tradition of *Enūma Anu Enlil*, and parallels with other cuneiform texts, notably, E.F. Weidner's "Gestirn-Darstellungen" texts, as well as the "prophecy" texts, also indicate the

[20] It should be noted that the solar eclipse omens of *Enūma Anu Enlil* commonly include the visibility of Jupiter and Venus in stock omen protases; see, for example. DIŠ AN.GE$_6$ GAR-*ma* [d]*Dilbat u* [d]SAG.ME.GAR IGI.MEŠ, "if a (solar) eclipse occurs and Venus and Jupiter are seen." ACh Šamaš 9:21, 39, and 55; ibid. Supp. 31:15, 50, 67, and 76 (= EAE 32); DIŠ *u$_4$-um* KAxMI [d]*Dilbat u* [d]UD-AL.TAR KI-*šú* IGI. MEŠ, "if on the day of the (solar) eclipse Venus and Jupiter are seen with it (the sun)"; Craig, AAT 28:18; ACh Šamaš 10:35, 48, 67, 80, and 99; also UCP 9 pls. 9:10 and 24 (all = EAE 33); and Craig, AAT *25:15* and rev. 28 (= EAE 35); and ACh Šamaš 11, passim (= EAE 35).

Only the lunar eclipse omens of EAE 20 include planets and stars in the protases. Venus (*Dilbat*), Mars (*Ṣalbatānu*), and Jupiter (SAG.ME.GAR) are the planets mentioned, and a small number of fixed stars Orion (MUL.SIPA.ZI.AN.NA, see EAE 20 §XII recension B clause [7], omitted in recension A); Aquila (MUL.*erû*, see EAE 20 §111 recensions A and B clause [8]); and MUL.NU.MUŠ.DA (identification unknown, see EAE 20 §VII recension B clause [8], omitted in recension A); "stars" (*kakkabānu*) are also mentioned, as in *kakkabānu eliš uṣûni*, "stars above came out" (variant: *kakkabu iṣrurma*, "a star flashed"); see EAE 20 §IV recensions A and B clause (5). In contrast to BM 36746, the references to these planets and stars do not fit a schematic pattern. For EAE 20, see ABCD.

degree to which the material of BM 36746 is drawn from other works in the scribal repertoire.[21]

The eclipse omens of BM 36746, however, are differentiated from those of *Enūma Anu Enlil* primarily by their particular use of the names of the zodiacal constellations. Each of the twelve omens conforms to the same pattern, as follows: if a lunar eclipse occurs in zodiacal sign, and the night watch comes to an end and the wind (north, south, east, or west) blows, Jupiter (or Venus) is (or: is not) present and Saturn or Mars stand in zodiacal sign, and zodical sign$_3$ (respectively) (see table 2). The predictions in each apodosis apply to one of the four primary lands representing the traditional four quarters of the inhabited world: Akkad, Elam, Amurru, and Subartu. As shown in table 2, the major elements of the protases, namely, the positions in the zodiac of the eclipsed moon and the planets Saturn and Mars, form a schematic arrangement of four groups of three zodiacal signs each. This particular arrangement into four groups of the zodiacal signs of the moon, Saturn, and Mars, represents a Babylonian version of what has become known from Greek astrology as the theory of aspect, and here specifically trine aspect.[22] In Greek astrological terminology, one such group of three signs is a trigon or triplicity (see Figure 1).

The theory of aspect, as formulated in Greek astrology reflects the concept of the circular zodiac from which the various geometrical relationships between zodiacal signs that constitute the aspects are derived. In other words, the manipulation of aspect requires the existence of the zodiac, which provides the framework upon which the techniques of horoscopy are based.[23] The zodiac of twelve signs of equal 30-degree length had its origin in Babylonia sometime during the fifth century B.C.E., the period of the development of scientific mathematical astronomy, and was invented for use in astronomical

---

[21] See Weidner, *Gestirn-Darstellungen auf babylonischen Tontafeln*, Österreichische Akademie der Wissenschaften. Philosophisch-Historische Klasse. Sitzungsberichte, 254. Bd., 2. (Graz, Vienna, Köln, Böhlau in Kommission, 1967). For the "prophecy texts," see A.K. Grayson and W.G. Lambert, "Akkadian Prophecies," JCS 18 (1964), pp. 7–30, with previous bibliography; R.D. Biggs, "More Akkadian 'Prophecies,'" *Iraq* 29 (1967), pp. 117–32.

[22] I gratefully acknowledge the assistance of David Pingree in understanding the structure of this tablet and for his identification of the Greek trine aspect as its basis.

[23] The zodiac is defined as a belt of approximately 12 degrees breadth, extending north and south of the ecliptic, or the oblique circle which describes the apparent path of the sun through the stars in about one year.

Table 2. Schematic Table for BM 36746

Sign of Moon	Wind	Benefic planet in sign of Moon	Sign of malefic planets	Country
[Aries]	[north]	[. . .]	[Saturn: Leo / Mars: Sagittarius]	[Akkad]
[Taurus]	[south]	[. . .]	[Saturn: Virgo / Mars: Capricorn]	[Elam]
[Gemini]	[west]	[. . .]	[Saturn: Libra / Mars: Aquarius]	[Amurru]
[Cancer]	[east]	[. . .]	[Saturn: Scorpius / Mars: Pisces]	Subartu
Leo	North	Jupiter not present	Saturn: Aries / Mars: Sagittarius	Akkad
Virgo	south+east	Venus not present	[Saturn]: Taurus / [Mars]: Capricorn	Elam
Libra	south+west	Jupiter not present	Saturn: Aquarius / Mars: Gemini	Amurru
Scorpius	east	Jupiter [. . .]	Saturn: [Pisces] / Mars: Cancer	Subartu
Sagittarius	[north]	Jupiter [. . .]	Jupiter [sic]: Leo; "The Field"; Aries	Akkad
Capricorn	south	Venus not present	[Saturn: Taurus] / [Mars]: Virgo	Elam
[Aquarius]	[west]	[. . .]	[Saturn: Gemini / Mars: Libra]	[Amurru]
[Pisces]	[east]	[. . .]	[Saturn: Cancer / Mars: Scorpius]	[Subartu]

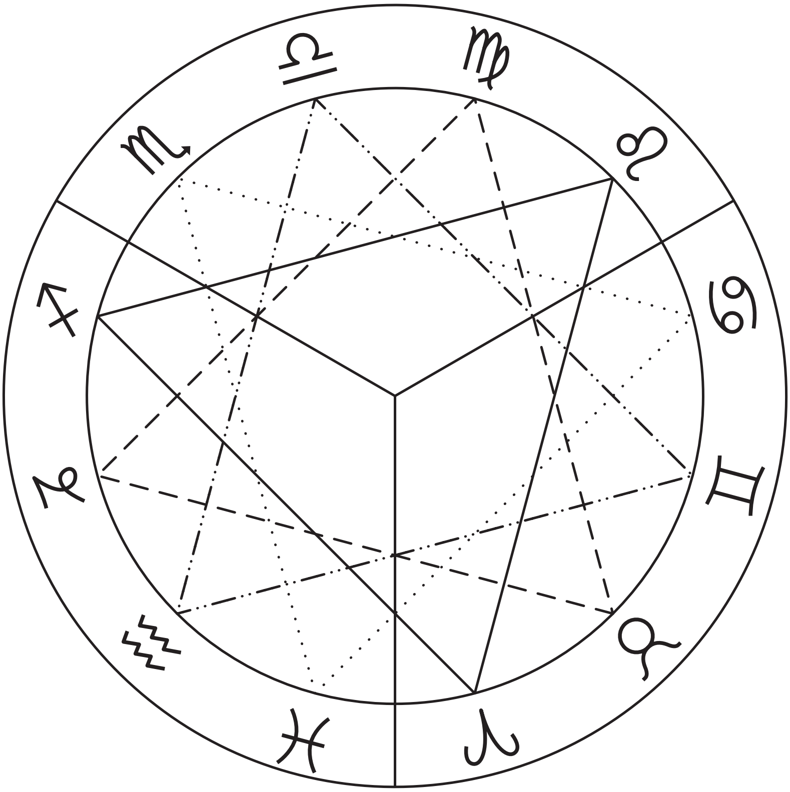


Figure 1. Trine aspect and four triplicities

computation, not divination. It provided a standard reference system for the measuring of the daily (or monthly) progress of the sun and the planets with respect to the twelve equal 30-degree segments.

Before the invention of the zodiac, seventeen ecliptical constellations were used, both in early astronomical texts and in celestial divination, to indicate positions of the moon or planets in the sky. This group of stars marked the daily progress of the moon along its path (or within 5° to 6° of the ecliptic) each month and was defined in MUL. APIN as follows: *ilāni ša ina ḫarrān* ᵈ*Sin izzazzūma* ᵈ*Sin izzazzuma* ᵈ*Sin ēma arḫi* [*ina pi*]*rikšunu ītenettiquma iltanappatušunūti*, "the stars (lit., "gods") which stand in the path of the moon; the moon always passes through and comes in contact with them in the course of each month."[24] This

[24] MUL.APIN, Tablet I; see CT 33 8 iv 38f.; cf. AJSL 40 189.

group includes all twelve zodiacal constellations with the addition of the Pleiades, Orion, Perseus, Auriga, and the western and eastern fish of Pisces. A development in the Babylonian method of designating celestial positions can be roughly traced (without implying a linear evolution) from an early method of citing positions of celestial bodies with respect to the horizon, as in the astrolabe texts,[25] to a method whereby positions are given with respect to ecliptical reference stars, i.e., the stars in the path of the moon as in MUL.APIN, and therefore in use ca. 1100 B.C.E., to the method found in Seleucid non-mathematical astronomical texts in which positions (longitudes) are located with reference to another group numbering thirty or so ecliptical stars, now referred to as Normal-Stars after J. Epping's terminology.[26] Concurrent with the use of Normal-Stars in the non-mathematical astronomical texts, the mathematical astronomical texts (published in ACT*)* expressed longitudes in degrees within the twelve zodiacal signs, reckoned from a "vernal point."

The earliest Greek evidence for the theory of triplicities comes from the *Isagoge* of Geminus, a first century C.E. treatise (written approximately 50 C.E.) summarizing contemporary astronomical knowledge.[27] Much Babylonian data stemming from the lunar theory has already been recognized in this work and thereby attests to the extent of Babylonian influence on early Greek astronomy.[28] In chapter 2. 5–11 of the *Isagoge*, Geminus mentions astrological aspect, about which he is skeptical, as well as a doctrine of the "Chaldeans" in which the four winds are correlated with the four triplicities, and his description concurs with the text of BM 36746 (see table 5 below).[29] BM 36746

---

[25] See Weidner, *Handbuch der babylonischen Astronomie*, vol. I (Leipzig: Hinrichs, 1915, reprint Zentralantiquariat, 1976), p. 65f. (Pinches astrolabe); ibid., p. 66 (Astrolabe B section C 1–12); also SSB, vol. 1, p. 229 and J. Schaumberger, SSB, Erg. 3, pp. 324–30.

[26] See J. Epping and J.N. Strassmaier, "Babylonische Mondbeobachtungen aus den Jahren 38 und 79 der Seleuciden-Aera." ZA 7 (1892), pp. 224f.; SSB, vol. 1, p. 291, and SSB vol. 2, pp. 550f. Note the star catalogue in which longitudes of Normal-Stars are given in degrees of zodiacal signs, published by Sachs, "A Late Babylonian Star Catalog," JCS 7 (1952), pp. 146–50.

[27] Geminus *Isagoge* 2; see the edition of C. Manitius, *Gemini Elementa Astronomiae* (Leipzig, 1898), pp. 21–23.

[28] See HAMA, pp. 578–87; cf. O. Pedersen, *A Survey of the Almagest*, Acta Historica Scientiarum Naturalium et Medicinalium, vol. 30 (Odense: Odense Universitetsforlag, 1974), pp. 162–63.

[29] Cf. A. Schott and J. Schaumberger, "Vier Briefe Mar-Ištars über Himmelserscheinungen der Jahre –670/668 an Asarhaddon," ZA 47 (1941), pp. 109, n. 1.

illustrates the same use of zodiacal signs but without the accompanying geometrical concept of a circular ecliptic.

BM 36746, therefore, contains the following elements paralleled closely by Greek astrological theory: 1) the trine relationship between the position or sign of the eclipsed moon in the zodiac and the position of a (malefic) planet, either Saturn or Mars; 2) the presence or absence of a (benefit) planet, either Jupiter or Venus, in the moon's sign is also noted; and 3) the system by which each of the four triplicities is associated with one of the four winds and in this way indicates the country affected by the ill portent of the eclipse.

Beginning with the first element paralleled in Greek material: trine aspect is defined in Ptolemy's *Tetrabiblos*, or *Apotelesmatika*, "Astrological influences," as "those (signs) which are in trine, enclosing one and one-third right angles, four signs and 120 degrees."[30] In other words, among the zodiacal signs, those in trine aspect are the following: Aries (1), Leo (5), and Sagittarius (9); Taurus (2), Virgo (6), and Capricorn (10); and so on (see figure 1). Four varieties of aspect were recognized by Greek astrologers from the first century onwards. These are termed "opposition" (διάμετρον) (relation is to the seventh place in the series of twelve), "quartile" (τετράγωνον) (relation is to the fourth [left] and tenth [right] places), "trine" (τρίγωνον) (relation to the fifth [left] and ninth [right] places), and "sextile" (ἑξάγωνον) (relation to the third [left] and eleventh [right] places).[31] Of the four aspects, trine and sextile were considered harmonious because they contained signs of the same primary nature, meaning all female or all male signs.[32] This attribution was based on an assignment of the zodiacal signs alternately to the masculine and diurnal nature (diurnal because of the association of the day with heat and active force) and the feminine and nocturnal nature (nocturnal because of the association of night with moisture and rest). Pingree has pointed out that the practice of alternating masculine and feminine signs in Greek astrology is related to Pythagorean number theory and that, in addition, the fact that the masculine signs

---

[30] See Ptolemy *Tetrabiblos* 1.13, ed. F.E. Robbins (Cambridge, Mass.: Harvard University Press, 1940).

[31] Pingree, *Yavanajātaka*, vol. 2, p. 223. On astrological aspect in general, see A. Bouché-Leclercq, *L'Astrologie grecque* (Paris: E. Leroux, 1899), reprinted in *Culture et civilisation* (Brussels, 1963), pp. 165–79.

[32] See Ptolemy, *Tetr.* 1.13 and Bouché-Leclercq, *L'Astrologie grecque*, p. 169, nn. 2 and 3.

are solar and the feminine are lunar results from the genders of the Sun and Moon in Greek mythology.[33]

The use of astrological aspect depends entirely on the existence of the zodiac, but since *Enūma Anu Enlil*'s codified material antedates the invention of the zodiac by several centuries, traditional *Enūma Anu Enlil* omens make use only of zodiacal constellations, not zodiacal signs. While BM 36746 apparently represents a stage in the development of omens later than that of *Enūma Anu Enlil* (some time during the Achaemenid period), *Enūma Anu Enlil* traditions remain embedded within the new omens. The omens of BM 36746 make use of zodiacal signs, but there is no evidence of any particular attribution of "natures" to them, masculine or feminine or otherwise. This seems to be characteristic only of Hellenistic astrology.

Ptolemy attributes to the "Chaldeans" a system whereby a planet governs a particular triplicity. The planet is designated as the "lord" of that triplicity.[34] According to Ptolemy, the lords of the triplicities are as in table 3.

Table 3. Lords of the Triplicities

Triplicity	Lord
♈♌♐	Jupiter
♉♍♑	Venus
♊♎♒	Saturn (and Mercury[35])
♋♏♓	Mars

[33] Pingree, *Yavanajātaka*, vol. 2, p. 207 sub 30, citing C. Darmstadt, *De Nechepsonis-Petosiridis Isagoge quaestiones selectae* (Leipzig, 1916), pp. 17–20 (unavailable to me).

[34] Ptolemy *Tetr.* 1.21: the Chaldaean method involves a sequence, simple, to be sure, and more plausible, though not so self-sufficient with respect to the government of the triangles and the disposition of quantity, so that, nevertheless, one could easily understand them even without a diagram. For in the first triplicity, Aries, Leo, and Sagittarius, which has with them the same division by signs as with the Egyptians, the lord of the triplicity, Jupiter, is the first to receive terms; then the lord of the next triangle, Venus; next the lord of the triangle of Gemini, Saturn, and Mercury; and finally the lord of the remaining triplicity, Mars. In the second triplicity, Taurus, Virgo, and Capricorn, which again has the same division by signs: Venus is first, then Saturn, and again Mercury, after these Mars, and finally Jupiter. This arrangement in general is observed also in the remaining two triplicities (see table 3).

[35] In order to assign rulership to all five planets once for each of the five "terms" or subdivisions, the rulership of the third triplicity was divided between a day-(Saturn) and a night-rulership (Mercury). Note that while Jupiter and Venus are benefic and Saturn and Mars are malefic, Mercury is of neutral status. See note 38, below.

A doctrine of astrological "terms" (ὅρια) further assigns subdivisions of a zodiacal sign to each planetary "lord." The system of terms attributed by Ptolemy (*Tetr.* 1. 21. 12–19) to the "Chaldeans" assigns these subdivisions of each 30-degree sign in linear sequence (with difference 1) to the planetary lords as in table 4. The order of the planets which forms the basis for the schema of the lords of the triplicities is the same arrangement as that discovered by F. Boll in the Neo-Babylonian astronomical texts, namely, Jupiter, Venus, Saturn, Mercury, Mars.[36]

As observed by Pingree and Neugebauer, the use of a standard Babylonian-arrangement of the planets underlying the doctrine of "terms" does not necessarily point to Babylonian origin.[37]

BM 36746 also arranges the planets in a fixed sequence within each omen which concurs in essence with the earlier and later sequences known from the astronomical texts but omits Mercury altogether. Therefore only the benefics (Jupiter and Venus) and malefics (Saturn and Mars) appear in the text. This arrangement also concurs with the schema of the lords of the triplicities for the first "term" or subdivision of the triplicities, i.e., Jupiter, Venus, Saturn, Mars (see Table 4). In BM 36746, however, one of the benefics is always connected with the first sign of a given triplicity, and the two malefics are connected with the two other signs respectively. The planets remain in this fixed order, most likely based on the standard Babylonian arrangement of planets referred to above, and this arrangement does not parallel the formal schema for "rulership" of triplicities known in later Greek astrology.

Even though Venus and Jupiter, the benefics, are associated with the same zodiacal sign as is the moon in BM 36746, whereas Saturn and Mars, the malefics, are associated with the signs in the eclipsed moon's trine, explicit benefic and malefic influence on the planets cannot be recognized in BM 36746.[38] An overview of the apodoses

---

[36] See below, Chapter Six, and see HAMA, p. 690: F. Boll, "Neues zur babylonischen Planetenordnung," ZA 28 (1913): 350f.; and *idem*, *Realencyklopädie der classischen Altertumswissenschaft* 14 (1912): cols. 2561–64. Note that the sequence was modified in the Seleucid period astronomical texts to Jupiter, Venus, Mercury, Saturn, Mars. See SSB, vol. l, pp. 9 and 11.

[37] HAMA, p. 690; Pingree, *Yavanajātaka*, vol. 2, p. 214.

[38] This particular alignment of planets, however, is explained in Ptolemy *Tetr.* 1.4–5 (Loeb ed. pp. 35–39). The beneficent or maleficent influence of the planets is designated symetricaily on the basis of their having qualities of heat, cold, moisture, and dryness, and this is inferred from the planets' positions relative to one another (ibid. 1.4, p. 37). Jupiter and Venus, together with the moon, are considered to have qualities of heat and moisture, and so are beneficent. Saturn and Mars have the

Table 4. Terms (ὅρια), based on Pingree, Yavanajātaka, vol. 2, p. 214. Cf. HAMA, fig. 33

	1st triplicity	2nd triplicity	3rd triplicity	4th triplicity
1–8° (8°)	Jupiter	Venus	Saturn	Mars
9–15° (7°)	Venus	Saturn	Mercury	Jupiter
16–21° (6°)	Saturn	Mercury	Mars	Venus
22–26° (5°)	Mercury	Mars	Jupiter	Saturn
27–30° (4°)	Mars	Jupiter	Venus	Mercury

reveals a lack of any overt parallelism here between Babylonian and Greek practice. Apparently beneficent and maleficent consequences of an eclipse did not depend on a particular planet's position in a particular zodiacal sign. The technique of identifying the land affected by the eclipse with the wind blowing during that eclipse, known from *Enūma Anu Enlil*,[39] seems to be the only procedure applied in this text. No matter what land was indicated by a certain wind, the predictions seem to be unfavorable. Moreover, the simple rule that what is bad for a foreign land (meaning Amurru, Elam, or Subartu) must be good for Akkad (Babylonia), seems to apply in all the apodoses preserved, but perhaps the surviving sample of apodoses is insufficient for evaluating this particular point.[40]

In various Greek astrological schemata, the triplicities are associated in turn with the four cardinal points (winds) by virtue of their governing planet. Jupiter, for example, is associated with the first

---

opposite effect by virtue of their cold and dryness, respectively. Mercury has both powers because it possesses both qualities of dryness and moisture.

[39] In EAE 15, the first line of each group of four omens forms a schema correlating the quadrant of the onset of the eclipse to the affected country in which north = Akkad, south = Elam. west = Amurru, and east = Subartu. In the next three omens of each of these sections, however, a schema emerges which correlates, by using the same system of equivalents as in the quadrant-to-country schema, the wind, which has been introduced into the protasis with the country referred to in the apodosis. See *Babyloniaca* 3 280 (K.2306) + K.3770 (unpub.): 21–26 and dupl. BM 32513 r. 6–16 (unpub.) (= EAE 15 §§6–9, §9 is restored on the basis of BM 121034: 22–25, see ABCD, pp. 74–76). This particular schema is paralleled by one which connects the direction of the clearing of an eclipse with the country and its king to be affected. The schema is: north = Akkad, south Elam, west = Amurru, east = Subartu. See VAT 9740 + 11670 iv 5–8, a Middle Assyrian text published in transliteration by Weidner, AfO 17 80–81.

[40] It was not uncommon for omen predictions to be interpreted as favorable for "Akkad" (Babylonia) and unfavorable for the enemy land or king (KUR/LUGAL KÚR). See, for example, LAS 279:23ff.; also ABL 137, cited in the note to LAS 279:15ff.; also Dietrich, WO 4 (1968): 234ff., obv. 6ff.

triplicity and the north, Venus with the second triplicity and the south, as they are in BM 36746. In the cuneiform text, Venus is mentioned specifically only with the second triplicity and south, and it is stated that Venus is "not present" (*ul izziz*).[41] Again, the earliest Greek evidence is found in Geminus *Isagoge* 2. 8–11, with the schema shown in table 5. The cuneiform text agrees at every point with this early Greek schema. Later variations are attested in Greek astrology.[42]

The correspondence between winds and eclipses can be traced back as far as the late second millennium, in one of the Middle Assyrian prototypes of the eclipse omens of *Enūma Anu Enlil*, and this correspondence remains an integral part of the Neo-Assyrian version of the lunar eclipse tablets as a whole.[43] Because of the directional, hence geographic, influence of the winds, the four winds are traditionally assigned to the four quarters of the inhabited world: Akkad, Subartu, Elam, and Amurru, resulting in a schematic correspondence between the protasis and apodosis of the omen. The further association of the four winds, which are synonymous with the cardinal points, with the schematic regions, or quadrants of the lunar disk constitutes one of the constants in a system of "astrological" geography.

---

[41] Venus cannot be seen within the same zodiacal sign as the moon because the planet never reaches an elongation greater than 47°, while the eclipsed moon is at 180° elongation.

[42] Firmicus Maternus *Mathesis* 2.12, ed. W. Kroll, F. Skutsch, and K. Ziegler, 2 vols. (Leipzig, 1897–1913, repr. 1968) (the sequence becomes N, S, E, W); see Pingree, *Yavanajātaka*, vol. 2, p. 225. The Indian system is again modified, see ibid., pp. 223–27.

[43] I wish to thank Douglas Kennedy for generously bringing to my attention the unpublished Middle Assyrian text BM 121034. The text is divided into ruled sections containing various schematic lunar eclipse phenomena. The schema found in the fourth section may be restored by the parallel in EAE 15 §6 (sources: *Babyloniaca* 3 280 + K.3770 [unpub.]: 21–25; VAT 9803 [publ. in transliteration only, Weidner AfO 17 71] iii 18'; BM 32513 [unpub.] rev. 6–9) as follows:

10 [DIŠ AN.GE$_6$ *ina* IM.I SAR-*ma* IM.U$_{18}$].LU DU *šal-pu-ut-ti Šu-bar-ri-i* [...]

11 [DIŠ AN.GE$_6$ *ina* IM.I SAR-*ma* IM.SI].SÁ DU LUGAL *Ak-ka-di-i* BA.BE

12 [DIŠ AN.GE$_6$ *ina* IM.I SAR-*ma* IM.KUR.R]A DU ᵈIM GÌR.BAL BE.MEŠ GÁL.MEŠ x [...]

13 [DIŠ AN.GE$_6$ *ina* IM.I SAR-*ma* IM.MAR.TU DU ZI(?)]-⸢ut⸣ *Gu-ti-um* LUGAL *Ak-ka-di-*⸢*i* x⸣

[If an eclipse begins in the north (quadrant of the lunar disk) and the so[uth wind blows: destruction of Šubarû [...]

[If an eclipse begins in the north and the no]rth wind blows: the king of Akkad will die.

[If an eclipse begins in the north and the ea]st wind blows: Adad will inundate; there will be plague [...]

[If an eclipse begins in the north and the west wind blows: at]tack(?) of the Guti: the king of Akkad ⸢...⸣.

Table 5. Triplicities and Winds

	Triplicity	Wind
1	♈♌♐	North
2	♉♍♑	South
3	♊♎♒	West
4	♋♏♓	East

This system enabled regions of the earth (including countries and cities) to be correlated with celestial phenomena.[44] This particular part of the astrological geography, i.e., that involving the four winds, was only one of several such techniques for correlating the four regions of the world to other groups of four entities—months, in groups of four, or days of the month—and together these systems constituted a broad schematic and practical framework within which the omens were organized and interpreted. The practice of connecting the wind blowing during an eclipse with the lunar quadrant darkened by the eclipse shadow and thereby to the geographical region to be affected by the eclipse is not only clear from the omen series *Enūma Anu Enlil* itself, but is also evident in the Neo-Assyrian scholars' reports to the Sargonid kings, as in the following: *u šumma issakan qaqquru bīt ulappatanni u šari āliku issēniš innassaḫa*, "and if it (the eclipse) occurs, the region where it will have its effect and the wind blowing will be excerpted together," the region where the eclipse has its effect being derived from the darkened quadrant.[45] Evidence for the "regional" impact of eclipse portents known from both *Enūma Anu Enlil* and the new text BM 36746, in which the position of the eclipsed moon in the zodiac appears as a new variable, shows that Babylonian celestial omen schemata indeed influenced the shaping of Greek astrological doctrine.[46]

[44] See E.F. Weidner, "Astrologische Geographie im alten Orient," AfO 20 (1963), pp. 117–21.

[45] ABL 38 r. 3ff., see Parpola, LAS 25.

[46] Cf. Ptolemy *Tetr.* 5: "We are to judge of the first portion of the inquiry, which is regional, in the following manner: in the eclipses of sun and moon as they occur, particularly those more easily observed, we shall examine the region of the zodiac in which they take place, and the countries in familiarity with its triangles, and in similar fashion ascertain which of the cities, either from their horoscope at the time of their founding and the position of the luminaries at the time, or from the mid-heavens of the nativity of their then rulers, are sympathetic to the zodiacal sign of the eclipse. And in whatsoever countries or cities we discover a familiarity of this kind, we must suppose that some event will occur which applies, generally speaking, to all of them,

Despite the fact that the omens in BM 36746 are not attested as such in *Enūma Anu Enlil*, each constituent element of the omens can be traced to the traditions of the codified celestial omen series. The clause containing the time of the eclipse can be traced to EAE 19,[47] and the mention of the wind blowing during the eclipse to EAE 15–16 and 19–20.[48] Although omens for the appearance, or eclipse, of the moon in zodiacal, or ecliptical, constellations do not occur in any canonical tablet of *Enūma Anu Enlil*, there is evidence that the celestial diviners, of at least the Neo-Assyrian period, observed this phenomenon. In "astrological" reports and in *Enūma Anu Enlil*-related scholia, observations occur in the form *šumma Sin ina qaqqar* MUL… *adir*, "if the moon becomes dark (i.e., eclipsed) in the region of star such-and-such," the named star being one of the seventeen ecliptical constellations defined as being "in the path of the moon" (*ina ḫarrān Sin*).[49] The "stars in the path of the moon," therefore, served as reference stars and were used as such, particularly in the lunar eclipse omens.

---

particularly to those which bear a relation to the actual zodiacal sign of the eclipse and to those of them in which the eclipse, since it took place above the earth, was visible."

[47] The time of the eclipse is given as EN.NUN (*maṣṣarta*) *igmur,* "it (the moon) finishes the watch", thus referring to an eclipse which occurs for the duration of a watch. This element of the protasis is diagnostic of EAE 19, sec. 2 (see ABCD). See the catchline of EAE 19, sec. I (source: Sm. 1041 iv 9"–10" [unpub.] (+)K. 6217):

9" [DIŠ AN.GE$_6$ EN.NUN AN.USAN, GAR-*ma* EN.NUN *ig-mur u* IM.I DU ŠUB-*ti* MAN NIM.MA.K[I] *u Gu-ti*.KI *u* KUR-*šu-n*[*u*…]

10" DIŠ AN.GE$_6$ KI.MIN-*ma* EN.NUN *ig-mur u* IM.II DU ŠUB MAN URI.KI *u* KUR-*šú*

If an eclipse occurs in the evening watch and it finishes the watch and the south wind blows: downfall of the king of Elam and Guti and their country.[…].

If an eclipse ditto, and it finishes the watch and the north wind blows: downfall of the king of Akkad and his country.

(Sources for EAE 19, sec. 2: STT 329 r. 1ff.; KUB 4 64 A: 6–14; DS 32–23 [a-c] passim [unpub. Oriental Institute tablets]; see also for EAE 19 omens excerpted: Thompson, Rep. 272A:2; ibid. 271 r. 2; 80–7–19, 103: 6–7 [unpub. excerpt tablet]; 85–5–22, 77:3 [unpub. excerpt tablet].) All unpublished texts referred to were read from photos generously provided by Erica Reiner and collated at the British Museum.

[48] For EAE 15, 16, and 20, see n. 18 above. Add to these, EAE 19, sec. 2: STT 329 r. 1ff., and dupls.; see n. 47 above for text references.

[49] See Weidner, AfO 20 118 (MNB 1849) r. 38–52 and dupls. ACh Supp. 1: 1–8; BM 38164 ii 1' ff. (unpub.); for excerpted omens, see Thompson, Rep. 271:8; ABL 1444 r, I; UET 6 413 r. 11; 82–5–22, 77 r. I l; 83–1–18, 499 r. 9, and 80–7–19, 103 r. 6 (all unpub. excerpt tablets, read from photos kindly provided by Erica Reiner and collated at the British Museum). See also the unpub. "astrological" commentary BM 47447 r. 16, 18, 23, 25, 27, and 29 in which omens for the setting of a lunar eclipse include the constellation in which the moon was located during the eclipse.

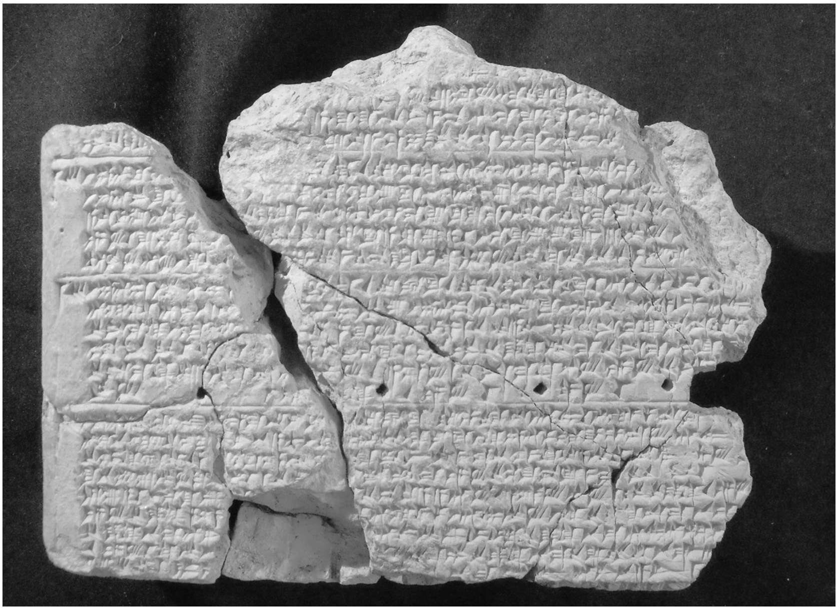


Figure 2. BM 36746 obv., courtesy of the Trustees of the British Museum

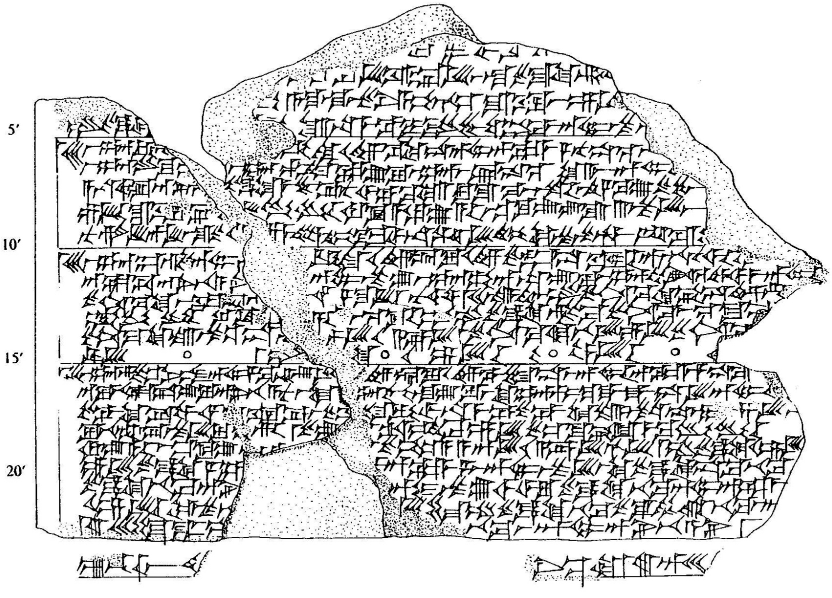


Figure 3. BM 36746 obv.

Further convincing evidence exists for the origin of BM 36746's schema in *Enūma Anu Enlil*. An excerpt tablet from *Enūma Anu Enlil* with commentary to lunar eclipse omens attests to a system whereby not only winds and directions, but also months, are assigned to a country.[50] This system organizes the twelve months into four groups of three months each, and the relation between the three in each group is to the fifth and ninth place in the series of twelve. In short, the months have been arranged into "triplicities." This excerpt tablet affords the best insight into the particular use of the zodiacal signs found in BM 36746; namely, an old system of "triplicities" of twelve months has simply been applied to the twelve zodiacal signs. The evidence from the excerpt tablet constitutes the original Babylonian schema upon which the zodiacal triplicities found in the new text were based. The existence of such a prototype accounts for the presence of such "triplicities" more adequately than does backward borrowing from

[50] See ACh Supp. 2 118 r. 2–3:
2 ITI.BARA, ITI.NE ITI.GAN KUR URI.KI : ITI.GU$_4$ ITI.KIN IT.AB KUR.NIM.MA.KI
3 ITI.SIG$_4$, ITI.DU$_6$, ITI.ZÍZ KUR.MAR.TU.KI : IT.ŠU ITI.APIN ITI.ŠE KUR SU.BIR$_4$, *u Gu-ti-i*
That is:

MONTHS			COUNTRY
1	5	9	Akkad
2	6	10	Elam
3	7	11	Amurru
4	8	12	Subartu and Gutium

This scheme connecting the month of an eclipse occurrence to the affected country concurs with that of the triplicities in BM 36746. Note also the parallel ACh 2 19:13–15, and see Weidner AfO 19 109.

The scheme which connects the winds to the country is also in agreement; however, the order of presentation is different. See ACh Supp. 2 118 r. 6–7:
6 IM.U$_{18}$.LU KUR.NIM.MA.KI: IM.SI.SÁ KUR.URI. KI : IM.KUR.RA KUR.SU.BIR$_4$ *u Gu-ti-i*
7 IM.MAR.TU KUR.MAR.TU
That is:

WINDS	COUNTRY
S	Elam
N	Akkad
E	Subartu and Gutium
W	Amurru

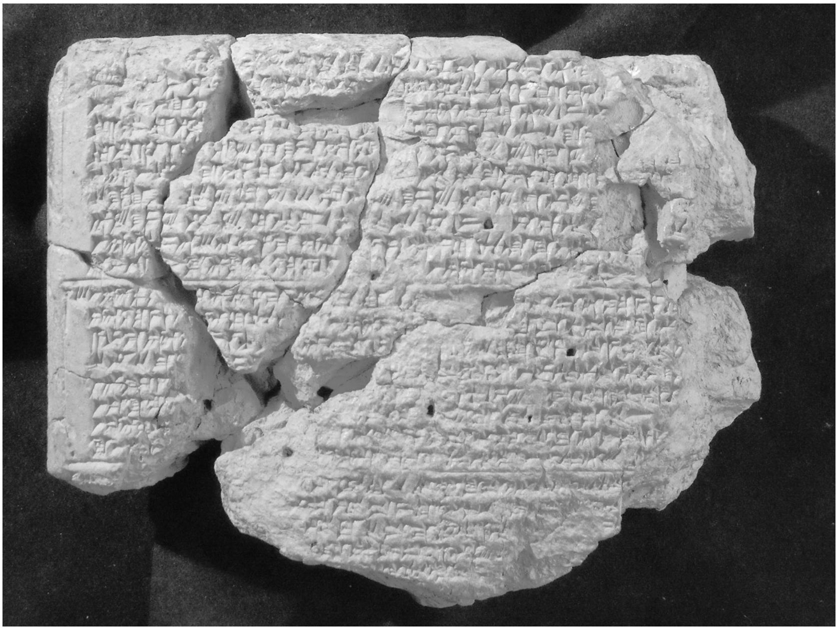


Figure 4. BM 36746 rev., courtesy of the Trustees of the British Museum

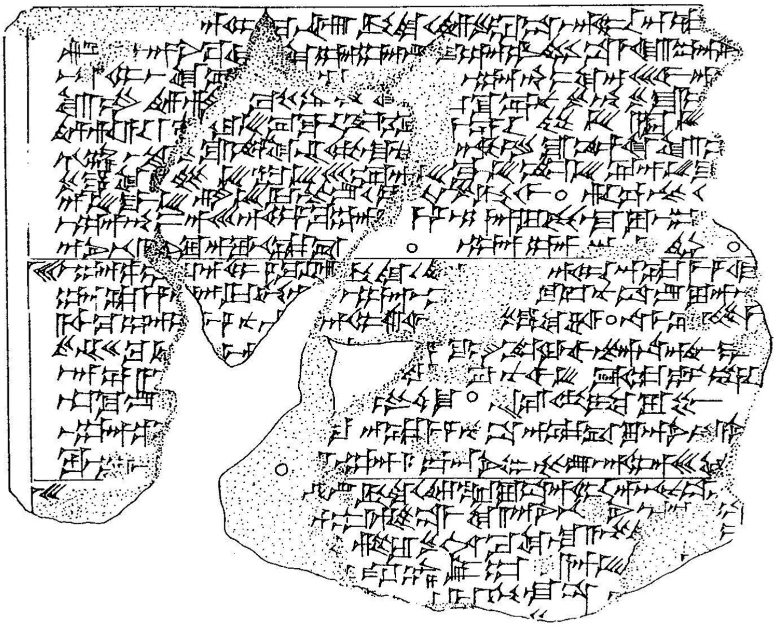


Figure 5. BM 36746 rev.

Hellenistic Greek concepts, which would be possible only if BM 36746 were datable to the Seleucid period.[51]

The theory of aspect, as modified in Greek astrology, consists of the various geometrical relationships between the twelve signs of the zodiac. In the case of trine aspect (as is shown in fig. 1 above), four triangles are imagined inside the circle. While Greek mathematics and astronomy can be characterized by an emphasis on spatial relationships and geometry rather than on numerical computation, an absence of geometrical concepts characterizes a large part of Babylonian mathematics and astronomy. Late Babylonian mathematical astronomy achieved quantitatively accurate results from purely arithmetic methods without reference to a geometrical picture or model. The omen text BM 36746, when seen in the context of the schematic manipulation of winds, countries, and months into groups of three, four, and twelve, is characteristically Babylonian in its use of zodiacal signs without an accompanying geometrical concept. This text, therefore, not only establishes substantive connections between aspects of late Hellenistic astrological methods and those of post-*Enūma Anu Enlil* celestial omens, but even more importantly, it shows that the basis of some of these methods was already inherent in the traditions of Babylonian celestial omens.

Text BM 36746+36842+37173

obv. 1'

2' [ ] X ⌜E⌝.MEŠ SAḪAR DUB.MEŠ AŠ.TE KUR SU.KI ZI-*a*[*ḫ*. . .]

3' [(space for 10–12 signs)] *x a-la-la ina* KUR DÙ.A.BI TAR-*is* SU.KÚ *ina* UN.ME[Š GÁL

4' LUGAL KUR.URI.K[I *na-mu-šú i-ḫar-ru*]-⌜*ub*⌝ KIMIN *na-me-e i-rap-pu-ud šum-ma ina* AN.GE_6 MU x [

5' DIŠ *Sin ina* MUL.UR.G[U.LA AN.GE_6 GAR-*ma* EN.NUN *i*]*g-mur u* IM.SI.SÁ DU AN.GE_6 ᵈSAG.ME.GAR NU DU-*iz* M[UL.UDU.IDIM.SAG.UŠ *ú-lu* ᵈ*Ṣal-bat-a-nu*]

[51] A Seleucid date cannot be entirely ruled out, but the dating can only be based on script ductus and internal criteria, such as the logographic forms of the names of stars, neither of which is conclusive but may point to a date earlier than the Seleucid period. As far as scholastic traditions are concerned, the scanty evidence for contact between Greeks and Babylonians in the early period cannot support a case for Greek influence on Babylonian practice in this instance.

6’ *ina* MUL.LÚ.ḪUN.G[Á *ú-lu ina*] MUL.PA.BIL.SAG. *ú-lu ina* MUL.AŠ.GÁN DU-*iz* KIMIN *ina* AN.GE$_6$-*š*[*ú* TUR NIGIN-*ma* MUL.LUGAL *ina* ŠÀ-*šú* DU-*iz*]

7’ *a-na* GISKIM *an-ni-t*[*um* LUGAL] KUR.URI.KI *me-sír dan-nu* IGI-*mar-ma* KIMIN DIB-*su-ma ina* AŠ.TE-*šú ina* ḪI.GAR-*ma ú-šat-bu-*[*šú-ma*]

8’ UN.MEŠ-*šú* SU.KU ⸢*dan-nu*⸣ I[GI].MEŠ ŠEŠ SES-*šú ru-u$_8$–a ru-ú-a-šú ina* GIŠ.TUKUL *ú-šam-qát* 3 MU.MEŠ A[Š.TE KUR. UR.KI…]

9’ NU GI.MEŠ DINGIR.MEŠ *ina* SU KUR TA[K$_4$.MEŠ U]N.ME BIR.ME *ḫi-pí* BARA$_2$-*ši-na* TAK$_4$.MEŠ *ḫi-pí* SILIM-*mu ina* KUR. TAR.ME ^{d}*En-lil a-*[*na* KUR *a-na* SAL.ḪUL *ú-ša-ri*…]

10’ DIŠ *Sin ina* MUL.AB.SÍN AN.GE$_6$ [GAR-*ma* EN.NUN *ig-mur*] *u* IM.KUR RA DU KAxMI-*šú* ^{d}*Dil-bat* NU IGI-*šú* x […]

11’ ^{d}SAG.UŠ ^{d}*Ṣal-bat-a-ni* [(3–4 signs)] AN-*lum-mu-ú ina* MUL. GU$_4$.AN.NA *ú-lu ina* MUL.SUḪUR.MAŠ IGI.ME AN.GE$_6$-*šú* […LUGAL (?)]

12’ KUR.NIM.MA.KI *ina* KA X X [(X) *uš-tá*]*l-pat* NÍG.ŠU.MEŠ-*šú* NU SIG$_5$ l-*niš* KAR-*a’* LUGAL KUR.NIM.MA.KI *qá-du* IM.RI.[A-*šú* ŠUB-*ma*(?)…]

13’ GAZ ŠEŠ ŠEŠ-*šú ru-u$_8$-*<*a*> *ru-*[*u$_8$*]*-a-šú ina* GIŠ.TUKUL-*šú* GAZ LUGAL KUR.URI.KI ZI-*ma* KUR.NIM.MA *ina* GIŠ.TUKUL X […]

14’ KUR.NIM.MA.KI *kar-mu-tú* DU [ŠÈ]G.MEŠ *u* A.KAL.MEŠ *ana* KUR.NIM.MA.KI TAR.MEŠ UN.MEŠ KUR.NIM.MA.[KI…]

15’ TUK.MEŠ *ana* LUGAL URI.KI *u* UN.MEŠ-*šú*: ERÍN.MEŠ-*šú* SI[LIM-*mu*…]

16’ DIŠ *Sin ina* MUL *Zi-ba-ni-tum* AN.GE$_6$ GAR-*ma* EN.NUN *ig-*[*mur*] IM.U$_{18}$.LU ⸢*u*⸣ IM.MAR.TU DU *ina* AN.GE$_6$-*šú* ^{d}SAG.ME.GAR DU-*zu* […]

17’ ^{d}UDU.IDIM.SAG.UŠ *ú-lu* ^{d}*Ṣal-bat-a-nu ina* KI MUL.GU.LA *ú-lu ina* KI MUL.MAŠ.TAB.BA.GAL.GAL DU.MEŠ AN.GE$_6$-*š*[*ú*…]

18’ KUR.MAR.KI *uš-tál-pat* [SU].KÚ KALAG *ina* KUR.M[AR(?). TU(?)].KI GÁL-*ši na-me-e* KUR.MAR.KI *kar-mu-tú* DU-⸢*ak* UN⸣. MEŠ B[IR.MEŠ…]

19' DIB-*bat* ^{d}*En-líl* MU.MEŠ *ip-p*[*i*]*-ri ana* KUR *ú-*[*še-ri*]*-da-am-ma* UN.MEŠ KUR GIŠ.TUKUL ÍL.ME-*ma* ŠEŠ ŠEŠ-*šú r*[*u-u*$_8$*–a*]

20' *ru-ú-a-šú ina* GIŠ.TUKUL *ú-*[*šam-qát* (3–4 signs)] KUR.BI DIRI ŠEG.MEŠ *u* A.KAL.MEŠ TAR.MEŠ *ana* LUGAL KUR.URI.KI *u* UN.MEŠ-[*šú* SILIM-*mu*]

21' UN.MEŠ KUR.URI.KI NINDA *nap-*[*šá* KÚ.MEŠ (3 signs)] ^{d}SAG.ME.GAR *ina* AN.GE$_6$ MU.MEŠ *ina* KI KUR.URI.KI DU-*ma* BE-*ma* [...]

22' KUR.URI.KI BE-*ma* ^{d}*Ṣal-*[*bat-a-nu* (2–3 signs)] AN-*lum-mu-ú* IGI ḪUL KUR.URI.KI BE-*ma* AN.GE$_6$ ^{d}SAG.ME.[GAR ... *ana* LUGAL.KUR.URI.KI]

23' *ú* UN.MEŠ-*šú* SILIM-*mu* BE-[*ma* (6 signs)] *ana Sin* TU LUGAL KUR.URI.KI BE-*ma* KUR-*su* BIR-*aḫ* BE-*ma ina* A[N.GE$_6$-*šú* ^{d}*Dil-bat*]

24' *ana* ŠÀ *Sin* TU DUMU L[UGAL *ana* É AD-*šú* TU (7 signs)] BE-*ma ina* AN.GE$_6$ ^{d}*Ṣal-bat-a-ni ana* [ŠA *Sin* TU ARAD *ana*]

lo. edge 25' ⸢É EN⸣-*šú ina* ḪI.[GAR DÙ-*uš* BE-*ma* MU]L.KAK.SI.SÀ *ana* ŠÀ ^{d}*Sin* [TU ...]

rev. 1 [DIŠ *Sin ina* MUL.GÍR.TAB] AN.GE$_6$ [GAR]-*ma* EN.NUN *ig-mur u* IM.KUR.RA DU *ina* AN.GE$_6$-*šú* ^{d}SA[G.ME.GAR DU-*ma* ...]

2 ⸢X⸣ [MU]L.KAK.SI.S[Á (x)] KI MUL.MUL *ú-*⸢*lu*⸣ MUL.AL.LUL DU.ME KIMIN MUL *Ṣa*[*l-bat-a-nu* ...]

3 *ina* AN.!?MI *ina qé-re*[*b*(?) x x] ⸢x⸣ [(5–6 signs)] *ina* MUL.GÍR.TAB KI ^{d}*Sin* IGI AN [...]

4 KIMIN LUGAL IM.GI [ZI(?)]-*ma* ⸢x x KI⸣ [*ina*(?)] GIŠ.TUKUL *dan-nu* KUR-*ád* KUR.SU.BI[R$_4$.KI ... LUGAL KUR.SU.BIR$_4$.KI *qá-du*(?)]

5 IM.RI.A-*šú ana* I[ZI(?)]/GI[Š.TUKUL(?)]ŠUB.MEŠ É.GAL-*šú* IZI KÚ [*na-m*]*e-e-šú* BIR.MEŠ ÍD.MEŠ [KU$_6$.MEŠ BAL.MEŠ ...]

6 TAR-*as* AŠ.TE KUR.SU.BIR$_4$.KI EN *ul-la-nu-*[*ma*] BAL LUGAL SU.BIR$_4$.KI KIMIN X [...] ⸢X⸣ [...]

7 KUR.URI.KI BIR.MEŠ X.MEŠ *eš-ret* DINGIR.MEŠ GAL.MEŠ GIBIL.MEŠ É DINGIR. [MEŠ] GA[L.MEŠ GIBIL.MEŠ (?) *ana* É.MEŠ-*šú-nu*(?)]

8 DINGIR.MEŠ GAL.MEŠ GLMES *taš-mu-ú u* SIL[IM-*m*]*u ina* KUR GÁL-*ši ri-e-mu u* [SILIM-*mu ina* KUR GÁL-*ši*. . .] KUR [. . .]

9 *ina* MUL.GÍR.TAB ^{d}*Sin* AN.GE$_{6}$ GAR-*ma* MUL.[SAG].ME.GAR *ina* MUL.UR.GU.LA *lu ina* MU[L. . . .]

10 ^{d} *Ṣal-bat-a-ni lu* ^{d}UDU.IDIM.SAG.UŠ *ina* MUL.MUL M[UL.AL.L]UL [. . .]

11 DIŠ *Sin ina* MUL.PA.BI[L.S]AG AN.GE$_{6}$ GAR-*ma* EN.NUN [*i*]*g-mur u* I[M.SI.SÁ DU *ina*] AN.GE$_{6}$-*šú* ^{d}SAG.ME.GAR [KI ^{d}*Sin* IGI(?)]

12 MUL.SAG.ME.GAR *in*[*a* M]UL.UR.GU.L[A] *ina* MUL.AŠ.GÁ[N *u* MUL.LÚ].ḪUN.GÁ NU DU *ú-lu* ^{d}X[. . .]

13 ÍR-*ma* MUL.S[AG.M]E.GAR NU ⸢DU(?)⸣ AN.GE$_{6}$ ŠÀ.ḪU[L x x x] KUR.URI.KI ZÁḪ *na-me-e-*⸢*šú*⸣ BIR.ME [. . .]

14 KUR EN MAN-*ma* TU[K-*ši*] ⸢IGI x⸣ [(5 signs)] ⸢NIG.ŠU LUGAL⸣ IZI ŠUB *ina* IGI MU.AN.NA ^{d}IM R[A-*iṣ*. . . ŠEG]

15 *ina* AN-*e* A.K[AL *ina* IDIM TAR-*as*. . . UN.MEŠ] ⸢x x⸣ *dan-nu* IGI.MEŠ AMA UGU DUMU.SAL KÁ-*šú* [*id-dil* ŠEŠ ŠEŠ-*šú ru-u*$_{8}$*-a ru-ú-a-šú*]

16 *ina* GIŠ.TUKUL *u-*[*šam-qát* (10–12 signs)] LUGAL UGU(?) ^{d}*En-lil ul i-ṭi-ib-bu*[. . .]

17 *ina* MUL.PA.B[IL.SAG ^{d}*Sin* AN.GE$_{6}$ GAR-*ma*. . .] ⸢x⸣ MUL.SAG.ME.GAR NU DU ^{d}SAG.UŠ *lu* ^{d}*Ṣal-bat-a-ni* [*ina* MUL.UR.GU.LA]

18 *lu ina* ⸢x x⸣ [(8(?) signs)] x *ina* MUL *ana*(?) MUL *ṣal-lum-mu-ú ina* AN.GE$_{6}$ ^{d}Sin K[I. . .]

19 DIŠ *S*[*in ina* MUL.SUḪUR.MAŠ AN.GE$_{6}$ GAR-*ma* E]N.NUN *ig-mur u* IM.U$_{18}$.LU DU AN.GE$_{6}$-*šú* ^{d}*Dil-bat* NU DU [^{d}SAG.UŠ *ú-lu*]

20 [^{d}*Ṣal-bat-a-nu ina* KI MUL.GU$_{4}$.AN.NA *u* M]UL.AB.SÍN DU.ME KIMIN ^{d}*Ṣal-bat-*[*a*]*-ni* ⸢*ina* MUL. . . .⸣ DU [. . .]

21 [. . .] ZI-*ib* KUR.NIM.MA.KI *la a mu x* [. . .]

22 [. . . *ú*]*-ra-as-sa-ap* ŠEG.MEŠ [. . .]

23 [. . . MUL].UR.GU.LA DU [. . .]

remainder broken

Translation

obv. 1’ ....
2’ [...the irri]gation ditches will be heaped with earth; the rule of Subartu will be expelled;
3’ [...].... the refrain of the work song will stop everywhere in the land. [There will be] famine among the people.
4’ The countryside (belonging to the) king of Akkad will become a wasteland; variant: he (the king) will roam the steppe. If in the eclipse..[...].

5’–6’ If the moon is eclipsed in Leo and finishes the watch and the north wind blows, Jupiter does not stand (in) the eclipse; Saturn and Mars stand in Aries or in Sagittarius or The Field; variant: in its eclipse [a halo surrounds (the moon) and Regulus stands within it].
7’ For this sign: [the king] of Akkad will experience severe hardship/*šibbu* disease; variant: it will seize him, and in a revolt they will oust him from his throne.
8’–9’ His people will experience great famine; brother will kill his brother, friend his friend, in battle. For three years [...] will not return [to the throne of Akkad]; the gods will [abandon] the country; [the people will be scattered, break (= the people) will abandon their shrines; break (= mercy and) well-being will end in the land; Enlil [will maliciously oppress the country...]

10’ If the moon is eclipsed in Virgo and [finishes the watch] and the south and east winds blow, Venus is not visible in its eclipse ..[...]
11’ Saturn (and) Mars [...].... in Taurus or in Capricorn are visible; its eclipse [...the king of (?)]
12’ Elam in.... [will be de]stroyed; his possessions.... together will be plundered; the king of Elam together with [his k]in [will be slaughtered;...]
13’ will kill/be killed; brother his brother, friend his friend will kill in battle; the king of Akkad will rise up and [destroy(?)] the land of Elam in an attack [...]

14’ Elam will turn into ruins; [ra]ins and floods will cease in Elam; the people of Elam [. . .]
15’ will [. . .]; for the king of Akkad and his people; variant: his troops; we[ll-being . . .].

16’ If the moon is eclipsed in Libra and finishes the watch and the south and west winds blow; Jupiter stands in its eclipse [. . .]
17’ Saturn and Mars stand in the region of Aquarius or in the region of Gemini; its eclipse [. . .]
18’ Amurru will be destroyed; there will be great famine in Amurru; the countryside of Amurru will fall into ruins; the people [will be dispersed . . .]
19’ will be seized; Enlil will bring years of struggle down upon the land; the people of the land will take up arms, brother his brother, fri[end]
20’ his friend will [destroy] in battle [. . .] will cover that land; rains and floods will cease; for the king of Akkad and his people: [well-being];
21’ The people of Akkad [will enjoy pl]entiful food [. . . If] Jupiter. . . . stands in the region of Akkad during its eclipse; If [. . .]
22’ Akkad; if M[ars . . .] a flash is seen, destruction of Akkad; if the eclipse Jupi[ter . . . for the king of Akkad]
23’ and his people: well-being; i[f . . .] enters the moon, the king of Akkad will die; his land will be scattered; if in the ecl[ipse Venus]
24’ enters within the moon, the son of the k[ing will enter his father’s house . . .] If in the eclipse Mars to [. . . a slave(?)]
25’ will re[bel] against the family of his master [. . . of S]irius [enters] within the moon [. . .].

rev. 1 [If the moon is] eclipsed in [Scorpius] and finishes the watch and the east wind blows; Jupi[ter stands] in its eclipse [. . .]
2 . . . . Sirius with/in the region of the Pleiades. . . . Cancer stand; ditto Mar[s . . .]
3 in the eclipse with[in(?) . . .] is seen in Scorpius with the moon, ... [. . .]
4 ditto, a rebel king will [rise up] and conquer the land ⌜of . . .⌝ in an attack; Subar[tu . . . the king of Subartu together with]

5 his kin will be cast into a fire(?)/will fall in ba[ttle(?)]; fire will consume his palace; his countryside will be scattered; the rivers [will become devoid of fish…]

6 will cease; the throne of Subartu will change as (it was) before; ditto the king of Subartu.… […]

7 the land of Akkad will be scattered;.… will restore the sanctuaries of the great gods; the temples of the great gods [will be restored(?)]

8 the great gods will return [to their temples]; favorable hearing and reprieve will be in the land; mercy and [reprieve will be in the land…] the land […]

9 in Scorpius a lunar eclipse occurs and Jupiter [stands] in Leo or in […];

10 Mars and Saturn [stand] in the Pleiades, Canc[er…]

11 If the moon is eclipsed in Sa[git]tarius and finishes the watch and the n[orth wind blows], Jupiter [is seen with the moon(?) in] its eclipse;

12 Jupiter i[n L]eo, in the Fiel[d and Ar]ies does not stand, and.… […]

13 is eclipsed (lit., "cries"), and Ju[pit]er does not stand(?).…[…] Akkad will be destroyed; its countryside will be scattered […]

14 the land will h[ave] another master.… (someone) will set the king's possessions afire; in the beginning of the year, Adad will inund[ate…rain]

15 in the sky, floo[d in the source will stop…the people] will experience great.…; mother [will bar] her (text: his) door against daughter; [brother his brother, friend his friend]

16 will s[lay] in battle […] the king.…Enlil will not.…[…]

17 in Sagit[tarius the moon is eclipsed…].… Jupiter does not stand; Saturn and Mars [in Leo]

18 or in.… […].… (context obscure)

19 If the mo[on is eclipsed in Capricorn] and finishes the [wa]tch, and the south wind blows; (in) its eclipse Venus does not stand, [Saturn and]

20 [Mars] stand [in the region of Taurus or V]irgo; ditto, Mars […] stands […]

21 […] attack of Elam.… […]

22 [...] will slaughter [...] rains [...]
23 [...] stands [in] Leo [...]
remainder broken

Commentary

obv. 2' Parallel: LBAT 1580 r. 3; see Weidner, *Gestirn-Darstellungen*, Text 3, p. 36, but read AŠ.TE (not *aš-la*) KUR SU.BIR$_4$.KI ZI-*a*.

3'–4' Parallel: LBAT 1580 r. 4f.; see Weidner, *Gestirn-Darstellungen*, Text 3, p. 36, and CAD s.v. *alālu* sub. b.

5'–7' Restored from parallel: VAT 7847 + AO 6448 (= TCL 6 12); see Weidner, *Gestirn-Darstellungen*, Text 2, p. 15 obv. 1ff. [*šar*] *Akkadî me-sír dannu immarma*: parallel in Weidner, *Gestirn-Darstellungen*, p. 15:2; CAD also reads as *mēsiru*; see s.v. mng. 2, and parallels are cited by Weidner in his note to line 2. A reading *šib-bu* can also be suggested; cf. Boissier, *Choix* 1, 33, *23* (*šib-bu dannu* [...]), cited *A Hw.* sub *šibbu* II.

8' Restored from parallel VAT 7647 + obv. 3, Weidner, *Gestirn-Darstellungen*, p. 15, but the first half of line 3 is not paralleled in BM 36746. *aḫu aḫašu rū'a rū'ašu ina kakki ušamqat*: this apodosis occurs in the prophecy texts; see *Iraq* 29 120:16 and dupls., also possibly LBAT 1543 r.(?) 8'; see *Iraq* 29, p. 131; also *BiOr* 28 8 ii 3f. ("Marduk Prophecy"). In other celestial omens, see ACh Adad 12 i 2. Note the variant in Weidner, *Gestirn-Darstellungen*, p. 15 line 3: 2 ME MU.MEŠ. Weidner cites parallels for long periods of hardship predicted in omen apodoses in the note to line 3 (ACh Adad 17:36, and the references in his article on the prophecy text genre, AfO 13, pp. 234ff.

9' Parallel: VAT 7847 + obv. 4 has *ilū ina zumur māti* BE.MEŠ, for which Weidner suggests the reading *išabbusu*, based on a parallel from Izbu (CT 27 10:7), although *inessû* is the more likely reading of the logogram BAD; see Biggs's review of Weidner in JNES 30 (1971), p. 73. BM 36746, however, shows traces of TAK$_4$ similar to the TAK$_4$ used in the middle of the same line (see copy). On the evidence of Weidner's text, the first *ḫepi* probably represents *nišū* (UN.ME), which would provide the feminine plural required by *parakkēšina*. The second *ḫepi* can be restored as *rēmu*, and the restoration for the end of the line is based on parallels, see AHw. *šurru* I D sub la for references.

10'–11' Parallels: VAT 7847 + r. 1ff.; see Weidner, *Gestirn-Darstellungen*, Text 2, p. 29; and cf. Weidner, AfO 17, p. 80; ACh Supp. 2 19:13; ibid. 118:19. *Ṣalbatāni*: variant of *Ṣalbatānu* (in the nominative case), occurs again in 11. 24', r. 10; 17, and 20. Not attested elswhere, except where the name of the planet is declined, see ZI *šá* ^{d}*Ṣal-bat-a-ni*, "velocity of Mars," ACT 802 Section 6, r. 7, p. 373.

AN-lum-mu-ú: occurs also in 1. 22'. In the light of r. 18, where *ṣal*(NI)-*lum-mu-ú* appears, it is likely that all three occurrences are to be taken as the same lexical item, although the reading remains obscure. If it is etymologized as a Sumerian loanword, the Sumerian níg(or: zal). lum.ma has been proposed, see *CAD* s.v. *ṣallummû* discussion section. AN-*lum-mu-ú* is, however, not attested elsewhere as a variant spelling of the technical term *ṣallummû*, "meteoric flash, fireball(?)," that apparently can emanate from fixed stars or a planet, or be seen as an independent phenomenon. See the dictionaries for references.

12' Cf. *Iraq* 29 122:25

15' Cf. the similar apodosis in Old Babylonian lunar eclipse omens: BM 22696:17 (unpub.) LUGAL *Ak-ka-di-i* URU.KI *ú ni-šu ša-al-ma*, and BM 86381:18 (unpub.) LUGAL URI *a-lum ú ni-ši-*⌜*šu*⌝ *ša-al-mu*.

18' See *CAD* s.v. *alāku*, mng. 4a–2' for *karmūtu illak*. The end of the line is restored in accordance with line 9' above.

19' Cf. ACh Sin 3:3.

20' For the end of the line, cf. note to 15' above.

21' *MU.MEŠ*: *šuāti* in late Babylonian; see AHw. s.v. *šuāti, šuātu*.

23'–24' Suggested restorations: BE-[*me ina* AN.GE$_{6}$ ^{d}SAG.ME.GAR] *ana Sin* TU (= *īrub*). This could be a restatement of the part of the protasis (see 1. 16') in which Jupiter was said to stand (*izziz*) "in its (the moon's) eclipse" (*ina attalīšu*). The next break probably contains a reference to Venus's standing within the moon, i.e., an occultation of the planet ([BE-*ma ina* A]N.GE$_{6}$-*šú* ^{d}*Dil-bat*] *ana* ŠÀ *Sin* TU) and parallels are known for both protasis and accompanying apodosis, DUMU L[UGAL *ana* É *AD-šú* TU]; see EAE 20 §1 (5): *ina šurinnišu Dilbat* [*ana libbišu īrub*] *mār šarri ana kussî abišu ana bīt abišu irrub* (*ACh* Supp. 2 26:2f.; *ACh* Supp. 29:2), and in the same text, (8): *Dilbat ana libbišu īrubu mār šarri ana bīt abišu irrub* (*ACh* Supp. 2 26:7; K. 3016:6 [unpub. Geers copy]). Cf. BPO 2 VI 5a and 2 IV 5a, also V 3a.

Old Babylonian lunar eclipse omens also parallel this apodosis: AN.TA.LÙ ITI.MN UD.20.KAM GAR DUMU LUGAL *ana* É *a-bi-šu i-ru-um-ma* GIŠ.GU.ZA [*i-ṣa-bat*] (BM 22696 r. 4 [unpub.]), and [BE UD].20. KAM DUMU LUGAL *ana* GU.ZA.GIŠ [*sic*] *a-bi-šu i-ru-ub* (BM 86381 iii 5 [unpub.]).

25' Parallel: Thompson Rep. 244A: 2.

rev. 2–3 One expects the positions of Saturn and Mars here to be in Pisces and Cancer respectively (i.e., forming the fourth triplicity ♋♏♓), but instead, there is mention of Sirius and the Pleiades in addition to Cancer. The positions of Mars and Saturn are repeated as the Pleiades and Cancer in line 10. MUL.MUL can vary with MUL. GU$_4$.AN.NA as the designation of Taurus, but I can see no explanation for the replacement of Pisces with Taurus if one assumes the schema is followed throughout the text.

5 Parallel: VAT 7847 + obv. 3; see Weidner, *Gestirn-Darstellungen*, p. 15, and Cf. A.DAM.MEŠ-*šú* BIR.MEŠ, TCL 6 1 r. 56 (extispicy). ÍD.MEŠ [KU$_6$.MEŠ BAL. MEŠ *(= ubbala(?)*]: restored after the prophecy text BiOr 28 11 iii 6.

7 Cf. [*e*]*šrēt ilāni*(DINGIR.DINGIR) *inneppušu*, JCS 18 20 ii 23 (prophecy text), and *bitāti ilāni rabûti ūtaddaša,* Thompson, *Rep.* 207 r. 6f.

8 Restored after BPO 2 XV 25; III 10; but cf. VAT 7847 obv. 4; see Weidner, *Gestirn-Darstellungen*, p. 15: ARḪUŠ *u* SILIM.MEŠ BE *ina*(!) KUR(!) (see Biggs, JNES 30: 73) TAR.MEŠ and from the prophecy text BiOr 28 11:18, ARḪUS.MEŠ UN.[ḪI.A GIN-*an*].

14 KUR EN MAN-*ma* TU[K-*ši*]: restored from prophecy text *Iraq* 29 124:38; see also TCL 6 1:8 (extispicy). For

parallel to ⌜NÍG.ŠU LUGAL⌝ IZI ŠUB see BRM 4 22 rev. 10' (physiognomic omens).

15 Before *dannu* one expects SU.KÚ, or the like, but the traces are not suggestive of this. Note parallel with the prophecy texts: *ummu eli mārti bābša iddil* BiOr 28 15:15' and JCS 19 20 iii 15.

16 ^{d}*En-lil ul i-ṭi-ib/ip-bu/pu* [...]: The verb may come from *ṭâbu/ ṭiābu*, but since the form *iṭibbu* requires a plural subject (e.g., *atḫū i-ṭib-bu* = ŠEŠ.MEŠ(*aḫḫū*) *i-ṭi-ib-bu CT* 41 29:15 [commentary to *šumma ālu* tablet XLVI]), it may be that the subject is simply broken away. Neither *ṭebû*, "to sink," nor *ṭepû*, "to bring up, add to," seems to make any sense.

22 [*ú*]*-ra-as-sa-ap*: no parallels for the D-stem are attested in omen texts, but the G-stem is well attested in prophecy texts in the apodosis *rū'a rū'ašu ina kakki irassip*; see *Iraq* 29 120:16; BiOr 28 8:4; and ACh Supp. 2 40 r. 7.

CHAPTER THREE

CANONICITY IN CUNEIFORM TEXTS

Introduction

By the seventh century B.C.E. the tablets and series comprising the literature of the scholars in the scientific disciplines of divination, medicine, and magic had attained a kind of literary stabilization in the sense that old material was conscientiously maintained in its traditional form and new material was no longer being incorporated on a large scale. The internal literary development of the "scientific" texts is frequently traceable in skeletal outline, where the Neo-Assyrian recensions have clear forerunners in Old Babylonian, Middle Babylonian, or Middle Assyrian copies. The process by which the celestial omen series *Enūma Anu Enlil* or any other omen series reached its final form is nowhere explained or even mentioned in our sources, but is thought to be the work of Kassite period transcribers and editors, since many representative texts of the scholarly tradition, omens, or lexical texts, emerged from the library of Tiglath-Pileser I (1115–1107 B.C.E.) in essentially the same form in which they are later attested in Neo-Assyrian and Neo-Babylonian copies.[1] In addition, W.G. Lambert argued for an institution of ancestry which showed that during the Kassite period scribal families, particularly of Uruk and Babylon, were responsible for the codification and transmission of the literary-scholarly tradition.[2]

The conscious effort on the part of these assumed Kassite editors to preserve and transmit texts of the learned tradition may, however, not have been "canonization" in the sense in which the term is applied to the biblical text with all its connotations.[3] Rather, it may be viewed in

---

[1] M. Civil, "Lexicography," in *Sumerological studies in honor of Thorkild Jacobsen*, Assyriological Studies 20 (Chicago: University of Chicago Press, 1976), p. 128.

[2] W.G. Lambert, "Ancestors, Authors and Canonicity," JCS 11 (1957), pp. 1–14, with additions and corrections on p. 112. See also W.W. Hallo, "New Viewpoints on Cuneiform Literature," IEJ 12 (1962), pp. 14–16.

[3] The introduction of the Greek word κανών as a technical term applied to a corpus of religious texts (the New Testament) was a late Christian innovation of roughly the fourth century A.D. The canonical status of the Old and New Testaments represents

terms of standardization of formal aspects of the text, that is, the number and arrangement of tablets, while a degree of flexibility remained permissible in the content, in terms of exactly what a particular tablet was to include and in what order, thus resulting in only a relative stabilization of the wording of the text. There is in any case no evidence in the cuneiform scholarly tradition that suggests that standardization became a rigorous law applied to a text's particular form and content. As Lambert pointed out, "much Akkadian literature did assume a fixed form, did become a *textus receptus*, but not all. The Gilgameš Epic never reached a canonical form and *Enūma Anu Enlil* circulated in several variant official editions."[4] Exact wording does not seem to have been an essential ingredient in textual transmission.

What is more evident in the colophons and catalogs of Akkadian literary and omen texts is the serialization of the order and sequence of tablets within multi-tablet compilations. It is not clear how the final serializing was achieved and how long the process took. In the case of the series Izbu, Leichty observed that "the ordering and standardizing of the texts into the twenty-four tablet Kuyunjik edition was probably not the work of a single man at a fixed point of time, but was rather a continuing process covering a long period of time in several different places. It must also be remembered, because of this, that when the text was standardized it did not result in a single edition, but rather

a later attribution stemming from some new assessment of the texts not necessarily original to or inherent in the compositions comprising the canon. The canonization of the biblical writings was a process that spanned some five centuries and the first evidence of the application of the term does not appear until the list of divinely inspired books officially recognized by the Church was issued by the Greek bishop Athanasius (see B. Childs, *Introduction to the Old Testament as Scripture* [Philadelphia: Fortress Press, 1979], p. 50). Although the term canon belongs to Christian usage, some notion of the special status of the scriptures was already developed within the Rabbinic tradition, as is clear from the Mishnaic reference to the "sacred writings" (*kitᵉbê haqqôdeš*) that were said to "defile the hands" (*mᵉṭamme'îm 'et-hayyādayim*) (Yadaim 3,5, and see P.R. Ackroyd in P.R. Ackroyd and C.F. Evans, eds., *The Cambridge History of the Bible*, p. 1: *From the Beginnings to Jerome* (Cambridge and New York: Cambridge University Press, 1970), p. 113; see also S.Z. Leiman, *The Canonization of Hebrew Scripture: The Talmudic and Midrashic Evidence*, Transactions of the Connecticut Academy of Arts and Sciences 47 [Hamden CT: Archon Books, 1976], pp. 102–20). The Jewish notion of canon included the acceptance of divine authority, the morally binding character of the texts, and its fixed-that is, unaltered and unalterable-nature (see Ackroyd, *Cambridge History of the Bible* 1, p. 116). Indeed, these were the fundamental notions of canonicity that were inherited by the Christians.

[4] Lambert, "Ancestors, Authors and Canonicity," p. 9 with note 34.

in several parallel editions each with varying details, depending upon their source."[5]

On the basis of this apparent standardization, as well as insights into authorship provided by various literary and scholarly texts, some form of canonicity has been generally held to be a characteristic of these genres of cuneiform literature, in particular, of the divination corpus. Since neither a process of canonization nor anything regarding a Babylonian notion of canonicity can be recognized in cuneiform sources, a cuneiform "canon" proves difficult to define. The biblical text provides the well-known model of canon, according to which canon refers to a corpus of texts selected on the basis of some unified content or purpose, subsequently fixed in an authoritative version, considered to embody law so that it becomes normative for belief and conduct, and held to be revealed in character. An enormous literature has been built up around the debate, which itself goes back to the early Christian period, concerning such aspects as the extent of the biblical canon (that is, which books are in the Bible), the history of the stabilization of the texts, and what is meant by the authoritative nature of the canonical text.[6]

The fully articulated (and quite late) concept of canonicity peculiar to both the Hebrew Bible and New Testament stems not primarily from formal considerations of text or genre, but from the acceptance of those writings as normative for the faith and practice of the religious community.[7] This attitude was in part a function of the divine authority believed to be inherent in those texts. The criteria on the basis of which attributions of canonical status are made of the biblical writings, therefore, do not readily apply to cuneiform texts, particularly so inasmuch as the theological dimension is not a factor. Against the background of the biblical definition(s) of canon, perhaps the aspects of the corpus of texts belonging to the Mesopotamian tradition of

[5] Erle Leichty, *The omen series Šumma izbu*, Texts from Cuneiform Sources 4 (Locust Valley, N.Y.: J.J. Augustin, 1970), p. 26.

[6] For bibliography see Childs, *Introduction*, ch. 2: "The Problem of the Canon."

[7] Childs notes that "among the Church fathers the term canon was used in a variety of combinations—'rule of truth', 'rule of faith'—as a norm of church doctrine and practise." (Childs, *Introduction*, p. 50; see also. H.W. Beyer, 'κανών,' in Geoffrey W. Bromiley, ed., *Theological Dictionary of the New Testament*, 3 [Grand Rapids: Eerdmans, 1964–76], pp. 600ff. sub C 1.) Similarly in the Judaic tradition the final criterion for canonicity of a book is the requirement that it be authoritative for religious practice and/or doctrine; see Leiman, *Canonization*, pp. 14–16 and passim.

scholarly divination that share features with the biblical canon are limited to those of "text stability and fixed sequence of tablets within a series."[8] As long as many aspects of the biblical canon debate remain in dispute, our understanding of the possible "canonicity" of Akkadian scholarly texts will not be furthered by attempts to carry over the categories and concepts from one model to the other.

Neither has there been consensus among Assyriologists on the specific use of the term "canonical." As M. Civil points out in his brief history of the term,[9] its meaning has ranged from the recension of a text which constitutes "the single authoritative work"[10] for a given subject, to the more open interpretation as "purely literary"[11] as opposed to archival texts. The terminological problem becomes more acute when we consider that the particular scholarly tradition that the scribes designated by *aḫû*, "extraneous, unusual," is frequently translated "non-canonical."[12]

On the evidence of a number of letters from scholars to the Neo-Assyrian court and a literary catalog of roughly the same period, it appears that the scribe-scholars had devised a classification system to differentiate various "streams"[13] of textual transmission.[14] One stream consisted of the literary works termed *iškaru*, our presumed "canonical texts," or official editions. Another was that of the extraneous sources termed *aḫû*. Extraneous is used here in its first sense of "coming from outside," that is, extrinsic, rather than its secondary although perhaps more commonly used sense of "not being pertinent" or "superfluous." A third stream was the oral tradition of the experts, referred to as *ša pî ummâni*, frequently recorded in written commentaries or referred to

[8] Civil, MSL 14, p. 168.
[9] Civil, MSL 14, p. 168.
[10] W. von Soden, "Leistung und Grenze sumerischer und babylonischer Wissenschaft," in *Die Welt als Geschichte* 2 (1936), pp. 432f. with note 28.
[11] W.W. Hallo, "Contributions to Neo-Sumerian," HUCA 29 (1958), p. 88, and see also id., "New Viewpoints on Cuneiform Literature," pp. 21–26.
[12] F.R. Kraus, "Die physiognomischen Omina der Babylonier," MVAG 40/2 (1935), p. 38, and see also CAD A/1 s.v. *aḫû* mng. 2b, "referring to omens not in the standard series," with "non-canonical" used in translation of passages cited there, and AHw 1 22b s.v. mng. 4, "serienfremd, unkanonisch."
[13] For the term "stream of tradition," see A.L. Oppenheim, *Ancient Mesopotamia, Portrait of a Dead Civilization* (rev. ed. Erica Reiner; Chicago and London, 1977), p. 13.
[14] For the letters see ABL 519 (= LAS 13); ABL 453; ABL 13; and see the references in CAD A/l s.v. *aḫû* mng. 2b; for the catalog Rm. 150 see W.G. Lambert, "A Late Assyrian Catalogue of Literary and Scholarly Texts," in Kramer AV p. 314. Compare Civil, MSL 14 168, for the same outline of three modes of transmission.

in the letters from scholars to the kings Esarhaddon and Assurbanipal.[15] Commentaries (*mukallimtu*), explanatory word lists (*ṣātu*), excerpts *(liqtu)*, and other forms of scholia comprise still another aspect or perhaps branch of the scribal tradition. The stream of tradition by means of which knowledge was both preserved and passed on can therefore be seen as a composite, made up of several channels in which different classes of texts are represented by different terms within a native typology. Since all the criteria that established the basis for this typology are not ascertainable, it will probably not be possible to bring our modern terminology designating texts as canonical and non-canonical, into alignment with the ancient system. But it may be possible on the basis of available, albeit limited, evidence to determine at least some of the criteria that distinguished *aḫû* from *iškaru* texts.

Beyond establishing a discreet genre or identifying a general category of texts, there is the difficult problem of describing what it is that uniquely characterizes the corpus of texts we have designated as canonical. To prepare the way for such a general investigation, I will focus here on the more specific problem concerning the nature of an *aḫû* text exemplar from *Enūma Anu Enlil* and the relationship between the category *aḫû* and its counterpart, the so-called canonical version from the series or *iškaru.* I will approach the problem in terms of whether or not these two classifications of texts may be distinguished on the basis of the criteria that have been used to claim the existence of a canonical tradition of scholarly texts, namely standardization, serialization, and authority.

The discussion which follows is based on evidence from the celestial divination corpus *Enūma Anu Enlil*, as that text series has provided the possibility for systematic comparison of an *aḫû* source with a corresponding group of sources from the official Neo-Assyrian recension, deriving largely from the library of Assurbanipal.[16] Whether or not it will be possible to generalize from the results of the present study can only be determined as further evidence from various text genres are similarly compared.

[15] See LAS 13 r. 2, ACh Adad 7:22, ACh Adad 30:10, ACh Ištar 5:18 (all subscripts to *mukallimtu* commentaries); compare the references sub *mašʾâltu* in the dictionaries.

[16] See below, Chapter Four.

The Stabilization and Standardization of Tradition

The formation of comprehensive omen and other learned corpora served the practical needs of the scholarly segment of the scribal profession. Omen series constitute the major product of Mesopotamian scribal scholarship and in most instances can be seen to evolve toward a more or less stabilized form from the time they are first attested in the Old Babylonian period to the Neo-Assyrian recensions known primarily from Nineveh and Assur. The celestial omen series *Enūma Anu Enlil* exemplifies this evolution of a series.[17] The observations of celestial signs together with artificial elaborations and correlations in terms of mundane events were apparently collected, organized, and stabilized as a scholarly reference work sometime before the eleventh century.[18]

The Neo-Assyrian lunar eclipse omen texts represent the fullest development of the subject matter into series of omens covering all imaginable variations and combinations of eclipse variables so that they may be interpreted according to traditionally accepted schemata, such as north = Subartu, south = Akkad, and so on, where the cardinal points stand for the schematic quadrants of the lunar disk.[19] For all their systematic repetitions and comprehensiveness, the Neo-Assyrian sources for *Enūma Anu Enlil* tablets 15–22, containing the lunar eclipse omens, exhibit a mixture of writing conventions. Logographic writing predominates, especially for technical vocabulary, but no strict conventions hold. In the standard text of the eclipse series, survivals of Old Babylonian spellings are evident both in passages with attested Old Babylonian forerunners[20] and passages for which there are no

---

[17] The development of the series from a corpus of Old Babylonian forerunners will be explicated in a forthcoming article by the author. The Old Babylonian tablets are listed below in note 21.

[18] Civil, MSL 14 169 and in *Studies Jacobsen*, p. 128; E.F. Weidner, "Die astrologische Serie Enûma Anu Enlil," AfO 14 (1941–44), pp. 175f.

[19] Three schemata are attested in which the schematic moon (divided into four parts) is correlated with cardinal points and the four quarters of the world (Akkad, Subartu, Elam, and Amurru). For an outline of the three sets of correspondences see A. Schott and J. Schaumberger, "Vier Briefe Mar-Ištars and Asarhaddon," ZA 47 (1941), pp. 106ff.; see also Kugler, SSB 2 60ff., and Ungnad, *Subartu* (Berlin, 1936) §§ 62–81.

[20] For example, *ni-šu še-er-ri-ši-na a-na* KÙ.BABBAR *i-pa-aš-ša-ra* (BM 16775:25, and the corresponding Neo-Assyrian omen UN.MEŠ TUR.MEŠ-*ši-na ana* KÙ.BABBAR BÚR.MEŠ (ACh Sin 33:39 and duplicate AfO 17 pl. 3:15'; also ACh Sin 34:2.

extant Old Babylonian parallels. Of course it cannot be proved that all syllabic writings reflect Old Babylonian material, since so few Old Babylonian celestial omen texts are available for comparison with the later recensions.[21] The lack of uniformity of the NeoAssyrian orthography can be accounted for by the lengthy process of standardization. Each source reflects the gradual accumulation of textual change, improvements, and corruptions, over centuries during which scribal conventions changed. From the standpoint of textual history, the Neo-Assyrian period represents the final stage in the development of the series *Enūma Anu Enlil.* All themes relating to celestial phenomena are organized according to compositional elements into a final codified form. Thus *Enūma Anu Enlil* was preserved and transmitted as part of a wider intellectual tradition down to the cessation of the cuneiform scribal tradition during the Seleucid period.

This Mesopotamian intellectual tradition remained unchallenged and legitimate in the form in which it was passed on and thereby promoted a cultural continuum. Oppenheim has pointed to "the desire to maintain a written tradition" as "an important culture trait of Mesopotamian civilization."[22] Although he did not refer directly to the issue of canonicity, Oppenheim observed that the motivation behind Mesopotamia's conscious maintaining of tradition is not "the intention of preserving a body of religious writings or the wish to sustain one tradition against or in competition with rival traditions,"[23] both of which reasons can be found in the background of the biblical model of canon. Instead, he added, "in Mesopotamia this continuity of tradition was achieved by a purely operational though highly effective circumstance rather than by ideological pressures: it was considered an essential part of the training of each scribe to copy faithfully the texts that made up the stream of tradition."[24] The scribal curriculum can therefore be seen in the service of cultural continuity.

---

[21] To date the following Old Babylonian celestial omens are known: (1) T. Bauer, ZA 43 (1936), pp. 308–314, originally published by W. Šileiko, "Mondlaufprognosen aus der Zeit der ersten babylonischen Dynastie," *Comptes-Rendus de 1'Academie des Sciences de l'URSS* (1927), pp. 125–28; (2) BM 22696; (3) BM 88381; (4) BM 16775; and (5) BM 109154 (all lunar eclipse omens, identified and brought to my attention by D. Kennedy; (6) BM 97210 (excerpt tablet(?) containing Šamaš; and Adad omens, identified and brought to my attention by Christopher Walker); (7) VAT 7525 i 12–15, mentioned by Weidner, AfO 14 (1941–44) 175n.7, of uncertain identification.

[22] Oppenheim, *Ancient Mesopotamia*, p. 13.

[23] Oppenheim, *Ancient Mesopotamia*, pp. 13f.

[24] Oppenheim, *Ancient Mesopotamia*, p. 14.

Another impetus for the continuity and preservation of tradition comes from the practice of Mesopotamian divination, which operated on the basis of the traditional interpretations of precedents. The omen series were not mere fossil records, but continued to have currency as reference books because the association of a celestial (or terrestrial) phenomenon with a public event would hold true whenever the given phenomenon occurred. In this sense the omen corpora represented a highly conservative but nevertheless vital written tradition.

It may be of interest to point out here that the nature of the Babylonian written tradition does not conform to the theoretical paradigm for explaining "tradition" advanced by Jack Goody in his work on the psycho-social impact of literacy.[25] Once the Mesopotamian intellectual tradition was stabilized in the form of multi-tablet series, the unchanging consistency of this traditional body of knowledge (sometime maintained in the face of contradictory new knowledge, as is apparent in *Enūma Anu Enlil* where omens for non-occurring phenomena are retained) runs counter to what Goody and Watt predict of written tradition in literate societies, namely, the inevitable re-evaluation and revision of older tradition under "a much more conscious, comparative and critical attitude to the accepted world picture, and notably to the notions of God, the universe and the past."[26] According to their analysis of attitudes toward the past in non-literate and literate societies, non-literate societies develop neither criticism nor scepticism of their traditions. The past, being orally transmitted, is continually in concord with the present by means of an "unobtrusive adaptation of past tradition to present needs."[27] Conversely, when the past assumes a frozen written form, the discord between past and present finds its resolution through a new and active criticism which can then reject or revise old tradition in accordance with the growth of knowledge.

Mesopotamian material offers a wholly different configuration which cannot be easily fitted into the binary scheme proposed by Goody and Watt.[28] Mesopotamia is distinguished by its extensive written tradition

---

[25] Jack Goody, *The Domestication of the Savage Mind* (Cambridge and New York: Cambridge University Press, 1977), and also Jack Goody and Ian Watt, "The Consequences of Literacy," in J.R. Goody, ed., *Literacy in Traditional Societies* (Cambridge and New York: Cambridge University Press, 1968), pp. 27–68.

[26] Goody and Watt in *Literacy in Traditional Societies*, p. 48.

[27] Goody and Watt in *Literacy in Traditional Societies*, p. 48.

[28] Goody and Watt recognize the problem of fitting the Mesopotamian material into their scheme, but attribute the difficulty not to a difference in that civilization's

whose primary validity was precisely that it recorded traditions originating in the distant past and preserved for present and future generations of scribes the language and culture of their forebears. The continuing validity of the divination corpus, determined by the fact that it represented a record of celestial (or terrestrial) "occurrences" and correlations in terms of mundane events made in the past, illustrates this point.

Authority and Authorship

Although the serialization of Akkadian literary and omen texts is evident from colophons and catalogs, and a relative standardization is apparent in the duplicate copies of these same genres made over centuries, the process of formulation of such texts into an authoritative body of works, a binding canon, *stricto sensu*, is not at all evident. Lambert found in the cuneiform scribal tradition "no suggestion of a systematic selection of literary works, nor of a conscious attempt to produce authoritative works which were passed on,"[29] both of which are essential elements of canonization in its usual sense. Lambert also added that "the very word 'canon' is unfortunate in suggesting this kind of activity."[30] The question of the authoritative status of the texts is a thorny one because it involves two conditions for which we have no direct evidence: (1) on what basis would a text be considered authoritative, that is, does it embody the word of the divine, or some other officially approved source, and (2) what would the effect be of that text's authoritative status, that is, would other texts be invalidated by it? We may add a third condition, which applies when the representative *iškaru* and *aḫû* sources for the lunar eclipse section of *Enūma Anu Enlil* are considered: (3) can evidence for a systematic demarcation

attitude toward tradition as such, which would be more to the point, but rather to the fact that the sheer difficulty of writing cuneiform restricted literacy to a learned elite which held the effects of literacy (as they predict them) to a minimum. In their view, the conservative force of the literati (the "oligoliterate," p. 36) and the particular character of logographic cuneiform (which they incorrectly describe as a writing system that primarily symbolizes objects rather than speech) are what account for the limited effects of literacy in the ancient Near East. See Goody and Watt, *Literacy in Traditional Societies*, pp. 36ff.

[29] Lambert, "Ancestors, Authors, and Canonicity," p. 9.

[30] Lambert, "Ancestors, Authors, and Canonicity," p. 9.

between "authoritative" scholarly works and "non-authoritative" ones be construed in the terminology *iškaru* and *aḫû*?

A sense in which cuneiform texts can be said to have authoritative status derives from scribal conventions concerning authorship of texts. A literary catalog claims for *Enūma Anu Enlil* (as also for *alamdimmû, izbu*, and other omen series) authorship by the god Ea (*ša pî* ^{d}*E*[*a*]).[31] In that catalog of authors Ea is the only divine name that appears; it is listed first in the catalog, followed by the sage Adapa. The isolated example of explicit divine authorship derived, as Lambert suggests, from a kind of cosmological thinking regarding the relationship between the divine realm and the phenomenal world in which certain occurrences could be read as signs or divine warnings. The naming of a divine author of omen series can therefore be explained in terms of the ancient understanding of omens as a kind of divine language. If a deity was thought to produce signs to be interpreted by experts (as was Šamaš for liver omens), it follows that that deity could also be thought of as the author of omen literature. With regard to Ea, Lambert points out that this deity was frequently associated with esoteric knowledge as is shown by the ascription to him of incantation and ritual texts.[32] But divine authorship, placed as it is in the literary catalog in the context of legendary authors, human authors of great antiquity, and descendants of ancestral scribes, fits into a broader pattern of antiquity of authorship. The antiquity rather than the divinity of authorship clearly emerges as the important criterion for a text's authoritative status.

Another first millennium tradition, attested in scholia and colophons, attributed the origin of certain texts to the age of the antediluvian sages.[33] Lambert has drawn a connection between this form of the tradition or antiquity of authorship and Berossus' claim that the totality of all knowledge was revealed to and handed down by the antediluvian sages.[34] The distinction between the Babylonian placing

[31] Lambert, "A Catalogue of Texts and Authors," JCS 16 (1962), p. 64 I (K.2248):1–4.

[32] Lambert, "A Catalogue of Texts and Authors," JCS 16 (1962), p. 72.

[33] See the colophons discussed by Lambert, "Ancestors, Authors and Canonicity," pp. 7–8; on the author Oannes/Adapa, see id., "A Catalogue of Texts and Authors," pp. 73–74; and id., "Enmeduranki and Related Matters," JCS 21 (1967), pp. 132f.

[34] F. Jacoby, *Die Fragmente der griechischen Historiker* (Berlin and Leiden, 1923–58) 3C1, 680F1, and see S.M. Burstein, *The Babyloniaca of Berossus*, SANE 1/5 (Malibu, 1978), p. 14 Bk. 1.5, "From the time of that beast [Oannes] nothing further has been discovered." (Cf. Schnabel, Berossus p. 253.) The implication of this passage is not only that civilization was not the product of human history but followed from divine revelation, but also that, as Burstein put it (p. 7), "the beginning of history was also its end since

the origin of certain texts with the sages of the distant days before the flood[35] and the latter more encompassing claim for the revealed character of esoteric knowledge found in Berossus should however be noted.

With regard to divination and especially *Enūma Anu Enlil*, a text edited by Lambert ascribes the revelation of oil, liver, and celestial divination by Šamaš and Adad to Enmeduranki, the antediluvian king of Sippar who in turn handed down his knowledge to the privileged men of Nippur, Sippar, and Babylon.[36] The intent of this text, as Lambert indicates, is not to establish the revealed character of divination (in particular, of oil divination, liver divination, and the holding of the cedar-rod), but rather to establish a legitimacy to the line of learned masters (the expression LÚ.UM.ME.A *mûdû* is found in JCS 21 132:19) who instruct their "sons" in the divination and ritual lore imparted to Enmeduranki, king of Sippar, in the days before the Deluge.[37] A parallel to this derivation of learned literature from the antediluvian age is found in the colophon of a hemerology, where reference is made to "originals of Sippar, Nippur, Babylon, Larsa, Ur, Uruk, and Eridu."[38] The interpretation of this unusual colophon is by no means transparent, but, following Lambert, it is not likely that the scribe had seven copies before him; rather, as Lambert said, "the seven originals of the Assur colophon are nothing but a deduction from the seven sages."[39]

The two traditions (if indeed they are established traditions rather than random trends in Babylonian scholia) that derive the series *Enūma Anu Enlil* from Ea in one text and from the revelation to an antediluvian king in another are not making a theological claim. By ascribing

everything thereafter could only be, and quite explicitly was, preservation, exegesis and application of that initial revelation to life." Put this way, the text amounts to a rationale for the formation of a "canon." Whether Berossus expressed something true for Mesopotamian attitudes toward tradition is still not clear.

35 See, for example, . . . *ba-ru-ti* . . . *ša pî apkallē labirûti ša lam abūbi*, "the craft of the *bārû* . . . according to the old sages from before the flood" (AMT 105:22), cited in Lambert, "Ancestors, Authors and Canonicity," p. 8.

36 Lambert, "Enmeduranki and Related Matters," pp. 132–33.

37 Lambert, "Enmeduranki and Related Matters," p. 127.

38 KAR 177 obv. iv 25–rev. iv 3, see Lambert, "Ancestors, Authors and Canonicity," p. 8 and note 31.

39 Lambert, "Ancestors, Authors and Canonicity," p. 8.

the series to a divine or legendary author, these traditions both simply attribute to the text the most ancient possible origin.[40]

No evidence links the traditions about authorship that suggest a correlation between antiquity and authority to the emergence of an official corpus of practical handbooks used by professional scholar-scribes. The reverse may in fact be true. The "catalog of texts and authors" is apparently the product of seventh-century scholarship,[41] and, as we know from actual manuscript histories of specific texts and as is indicated by the scribal convention of ancestry, the creation of the official scholastic repertoire is considered to be the product of the mid- to late-second millennium. If a series (*iškaru*) had authoritative status by virtue of its place in the repertoire, that status was not the result of ascription of great antiquity to an author, but rather was a function of its representing a literary consensus produced by the scribal schools under the imprimatur of "the great organizations," that is, temple or palace.[42]

An aḫû *Text from* Enūma Anu Enlil

The term *aḫû*, "extraneous" (written syllabically or BAR), appears to denote a classification primarily applicable to casuistic literature, and more specifically to the so-called scientific texts, that is, divination and medicine. Evidence points to the existence of *aḫû* collections of the celestial omens *Enūma Anu Enlil*, the terrestrial omens *šumma ālu ina mēlê šakin*, the menology *iqqur îpuš*, the physiognomic omens *alamdimmû*, the teratological omens *izbu*, as well as medical prescriptions.[43] The term is also applied to tablets in the lexical series and is found in a catalog of Sumerian liturgical texts where a number of balag's have the qualification *aḫû*.[44] The term *aḫû* has been understood to mean

[40] See W.W. Hallo, "On the Antiquity of Sumerian Literature," JAOS 88 (1968), p. 176, and id., "New Viewpoints on Cuneiform Literature," p. 16.

[41] Lambert, "A Catalogue of Texts and Authors," p. 76.

[42] See Oppenheim, *Ancient Mesopotamia*, pp. 95ff., on the "great institutions." See also Hallo, "New Viewpoints on Cuneiform Literature," pp. 24–25.

[43] Boissier DA 105:39 (*ālu*); RA 28 136 (Rm. 150):13f., see Lambert in Kramer AV p. 314 (*iqqur īpuš*); Kraus Texte 64 rev. 6, 23 rev. 8, and 24 rev. 14 (physiognomic omens); CT 27 49 K.4031 rev. 15, CT 28 3:17, CT 28 4:12, CT 28 32 rev. 7, see Leichty Izbu p. 199 (*izbu*); Streck Ash. 370 q 4, also Hunger Kolophone No. 329 (medical).

[44] 4R 53 i 34ff., and see Civil, MSL 14, p. 168.

"non-canonical" in the context of omens not belonging to the *iškaru*, or official, series, an interpretation that has contributed greatly to the view that something like a selective or authoritative canonical tradition existed for omen texts. Another indication that such a distinction was made between official texts and texts falling outside that category comes from the fact that the scribes occasionally referred to texts of the *iškaru* as "good" (*damqu*) in contrast to "extraneous" (*aḫû*), meaning extrinsic to the *iškaru.*[45]

The relationship between the two classifications *iškaru* and *aḫû* of *Enūma Anu Enlil* may be examined using two representative groups of texts from each. The assumed 29th *aḫû* text[46] is to my knowledge the only nearly complete *aḫû* text preserved from *Enūma Anu Enlil.* The identification of this tablet as "*aḫû*" was originally made by Weidner, who connected six sources (five of which were joins, the sixth a duplicate) from the library of Assurbanipal with the last incipit in the Assur catalog of *Enūma Anu Enlil* that designated the tablet as the 29th in a series of IM.GÍD.DA.MEŠ BAR.MEŠ.[47] Whether the tablet identified itself as *aḫû* cannot be established because neither subscript nor colophon is preserved.

The assumed 29th *aḫû* tablet contains lunar eclipse omens that compare in an interesting way with those of the official edition of *Enūma Anu Enlil* tablets 15–22. The general thematic elements of the protases made up of the characteristic phenomena of a lunar eclipse are shared by the *aḫû* text and the *iškaru* version of tablets 15–22. These are elements such as the date, the time, the color, and the direction of the eclipse shadow, as well as frequently the prevailing wind at the time of the eclipse occurrence. While these thematic elements are shared by the two traditions, the particular phenomena possible under each general theme (for example, the particular day of the month, or the particular color of the eclipsed moon) are not shared. In fact, little or no overlap can be demonstrated between the content of the official lunar eclipse series and that of the *aḫû* version. The *aḫû* tradition, therefore, seems to be unusual with respect to its content, whereas its organizing principles, manifest in the arrangement of the protases, correspond with those of *Enūma Anu Enlil* tablets 15–22, taken as a group.

---

45 See ABL 453 rev. 14 and ABL 13:25.
46 See further, Chapter Four.
47 Weidner, AfO 14 (1941–44), pp. 185f.

A brief enumeration of some of the discrepancies between the two traditions will suffice here.[48] The days of the month given for the occurrence of an eclipse in the standard lunar eclipse omen texts comprise a fixed schema, which includes days 14, 15, 16, 20, and 21. This sequence was so rooted in the tradition that the Hittite lunar eclipse omens show the same schematic sequence of days.[49] The traditional character of the schema can be the only explanation for the borrowing of a sequence of days that is otherwise inexplicable from the point of view of astronomy, days 20 and 21 being impossible for the opposition of sun and moon. The *aḫû* text diverges from this widespread tradition in having omens primarily for eclipses of the 12th and 13th days, with the 14th sometimes given as a variant; all of these are theoretically possible days for an eclipse, the actual span being the 12th through the 15th day.

Another departure from the official tradition can be seen in the omens for the color of the eclipsed moon. The sequence of colors in the standard series is representative of an even more inclusive tradition than that represented by the eclipse days. The particular color schema-white, black, red, and yellow-can be found in other omen series as well.[50] It is clear again that observationally valid characteristics of lunar eclipses were not the only variables included within the protases of *Enūma Anu Enlil.* Rather, the schemata and phraseology common to the omen tradition as a whole made their imprint in the standard texts of varous series within the tradition. In the *aḫû* text only part of the color sequence just described occurs,[51] but in addition the *aḫû* text contains an otherwise unattested way of describing the darkness of the eclipsed moon. The moon is said to be dark, using the word *da'mu*, written MÚD, and is further qualified as appearing like sulphur fire, or like lapis lazuli, or like smoke, or like a cloud.[52]

[48] See Chapter Four.

[49] See KUB 8 4; KBo 8 47; JCS 24 (1972) 175 no. 75; KUB 8 1; KBo 1318; KBo 1315; KBo 34 7; KUB 8 5; also KBo 13 14 (+)16 (+?) KUB 8 7, see Laroche, CTH 532 II. An excerpt text with omens for *šumma ālu* combined with celestial omens may be added to these sources; see H.G. Güterbock, AfO 18 (1957–58) 80 iv 4–12.

[50] See Leichty *Izbu* 67:13–15; 189:59'–63'; 196 (K.13443):3–6; CT 38 10:28, 11:29ff.

[51] The formula is IGI.MEŠ-*šú* SA_5.MEŠ (MI.ME, SIG_7.ME), "its features (*panūšu*) are red (black, yellow)," see K.3563+:36,40, rev. 7, rev. 25 (below, p. 00). Note the alternate reading for IGI.MEŠ : *nanmuršu*, "its appearance," written syllabically in the Assur catalog, AfO 14 (1941–44), p. 185 ii 4.

[52] K.3563+:2, 48, 60, rev. 12, 20 (see below, Chapter Four).

This is expressed as *panūšu kīma kibrīti* MÚD, "its features are dark like sulphur fire," and similarly for the other comparisons, lapis lazuli, etc. Note that sulphur fire, lapis lazuli, smoke, and clouds are described as "dark" even though we associate at least lapis and sulphur fire and, frequently, smoke with the color blue. This fully corroborates what has been well-known ever since Landsberger's "Über Farben," that no differentiation of and consequently no word for the color blue exists in the Akkadian lexicon.[53]

Lastly, the *aḫû* text presents its own unique formulation with regard to the direction of the movement of the eclipse shadow. The stock phrase in *Enūma Anu Enlil* is simply "in direction x it begins and in direction y it clears" (*ina* IM_x SAR-*ma ina* IM_{x2} $ZALAG_2$), where SAR (*šurrû*) and $ZALAG_2$ (*namāru*) are the technical terms for the beginning and clearing of the eclipse.[54] The *aḫû* text on the other hand uses the verb *arāmu*, "to cover," in the following statement: "the eclipse covered the moon in direction x and it cleared as it covered" (*ana* IM_x *īrimma kî īrimu izku*).[55] The use of the verb *arāmu* as a technical term for "to eclipse" or "occult" is to my knowledge not attested elsewhere in omen texts, but appears in late astronomical texts, where it is written ŠÚ, or syllabically as *a-rim.*[56]

Iškaru *and* aḫû, *Canonical and Non-Canonical?*

Once we have established that the *aḫû* material constitutes a genuinely separate tradition from that of the Neo-Assyrian standard series (*iškaru*), and we do not know how generalizable the evidence from this one segment of *Enūma Anu Enlil* might be, we need to know how the *aḫû* texts fit into the scribal tradition as a whole and in what relation they were to the *iškaru.* In the absence of additional *aḫû* sources which might be compared against their corresponding *iškaru* texts it is impossible to answer these questions satisfactorily.[57] Neither is it

[53] B. Landsberger, "Über Farben in sumerisch-akkadischen," JCS 21 (1967), p. 139 and note 7.

[54] For example throughout *Enūma Anu Enlil* 15, see Bab. 3 280 and AfO 17 (1954–56), pp. 71f. (VAT 9803); cf. AfO 17 81 (VAT 9740+11670) rev. ii 5–8 (= EAE 20).

[55] K.3563+:23, 30f., 54, rev. 8, 18f., 29f. (see below, Chapter Four).

[56] See LBAT 1251 rev. 24 (goal-year text) and LBAT 1448:7 (eclipse report).

[57] For some fragments of *aḫû* texts from the *izbu* series, see the three excerpt texts in Leichty, *Izbu*, pp. 198f.

possible by means of the lunar eclipse omen texts, both *aḫû* and *iškaru*, to determine (1) whether the *aḫû* classification preserves material which had been consciously separated or excluded from the main series; or (2) whether it simply represents an alternate tradition, not in competition with the *iškaru* for validity or acceptance; or (3) whether it forms a subsidiary of the *iškaru*, thereby indicating some hierarchical division within the divination corpus into main text and offshoots.

That the "29th *aḫû* tablet" of *Enūma Anu Enlil* was an official part of the scribal repertoire can be seen from the fact that duplicates were made and its incipit was entered into an official catalog of omen tablets from Assur which included both *Enūma Anu Enlil* and its *aḫû* tablets side by side.[58] The extant copy was made from yet another tablet, as the occurrence several times of *ḫīpi* and *ḫīpi eššu* makes clear.[59] If evidence for standardization includes, in addition to the relatively fixed form of the Neo-Assyrian recensions, the division and serialization into tablets (*ṭuppu*), then the *aḫû* classification appears equally to be a standardized product of the editorial process that produced the official series *Enūma Anu Enlil*.

If we consider the lunar eclipse *aḫû* text to be representative, its content is distinguishable from that of the series proper. The Assur catalog lists 29 tablets classified as *aḫû* in *Enūma Anu Enlil* and indicates that the order of the *aḫû* tablets was fixed. Texts classified as *aḫû* were obviously transmitted in the same way as were other omen tablets. Even though direct evidence for the editorial classification process is unknown (for example, whether selection or rejection of texts was involved) since only the end products and not the intermediary stages are extant, the *aḫû* texts must represent an integral part of the scribal tradition, as their stabilization and serialization suggest. While the *aḫû* texts may indeed have been considered extrinsic to the more widely circulating *iškaru*, they were clearly not excluded from the stream of tradition as a whole. The *aḫû* material was neither subsumed under nor superseded by the official edition of *Enūma Anu Enlil*.

---

[58] For this catalog, which included incipits from both *Enūma Anu Enlil* and *šumma ālu*, see Weidner's comments in AfO 11 (1936–37), p. 360 and also in AfO 14 (1941–44), p. 185. The first line of the assumed 29th *aḫû* text differs from the incipit quoted in the Assur catalog in that the verb of the protasis is written with the logogram TAB (= *ḫamāṭu*). See below, p. 109, note to line 1 of the text.

[59] K.3563+:21, 25, rev. 19, 21ff. (see below, Chapter Four).

Subscripts of tablets containing *aḫû* omens frequently state that the *aḫû* omens derive from a *ṭuppu šanûmma*, "a second tablet" or "another tablet," written either DUB 2(.KAM) or DUB MAN.[60] Parpola has interpreted the designation *ṭuppu šanûmma* as a technical term (meaning "secondary" or "alternate" tablet) for tablets containing *aḫû* omens,[61] the implication being that *aḫû* material was considered to be different from that of the series proper and was maintained as a distinct collection on separate tablets. This possibility was also considered by Weidner in his study of *Enūma Anu Enlil*.[62] It is clear that extraneous lines could be inserted within a "canonical" framework, as is illustrated by the following subscript and catch line:[63] 29 MU.MEŠ *a-ḫu-ti šá ina* ŠÀ *ṭup-pí šá-nim-ma in-nam-ru-ma* […] DIŠ MUL.Dil-bat *ina* ITI.BARA$_2$ IGI EBUR KUR GÁL-*ši* KIMIN SI.SÁ DUB 57.KAM UD.AN.^{d}*En-líl*, "29 extraneous omens which are found on a second tablet; (catch:) 'If Venus appears in Nisannu there will be a harvest of the land, var.: it will thrive'; 57th tablet of *Enūma Anu Enlil*." The subscript identifies the text as containing lines from another (a second) tablet, but the catch line shows that the next work in the series is the 59th tablet of *Enūma Anu Enlil*.[64] In another example an otherwise "canonical" copy of *Enūma Anu Enlil* astral omens has two *aḫû* omens inserted between rulings. These two lines are designated immediately following the second apodosis as 2 MU *šá* ŠÀ DUB MAN-*i*, "two lines from another tablet."[65] In a third case, *ṭuppu šanûmma* is found in the subscript of an excerpt tablet of astral omens: 12 MU.MEŠ BAR.BAR *šá* KA DUB MAN-*ma*, "12 extraneous omens according to the wording of another tablet."[66] Since no other subscripts are preserved on that tablet, it is not clear whether the omens excerpted in other ruled sections of this

---

[60] Weidner, AfO 14 (1941–44), pp. 183ff., and compare Parpola, LAS 2, p. 348 note 641. The two adjectives *šanû* I (written 2.KAM(.MA)) and *šanû* II (written MAN) in AHw 3 1164b–1165a are combined in a single lexeme in CAD Š s.v. *šanû* adj., with the meaning *inter alia* "second (of two or more), something else, another."

[61] Parpola, LAS 2, p. 348 note 641.

[62] Weidner, AfO 14 (1941–44) 184.

[63] ACh Ištar 23:31–33.

[64] The tablet numbers are frequently one (or two) number(s) off in copies of *Enūma Anu Enlil*, since several systems of numbering this series were in existence. For example, it is apparent from the subscript of a commentary tablet that *Enūma Anu Enlil* had 70 tablets, while a source identified with this "70th" tablet bears the number 68 in its subscript. I have followed the edition of Reiner and Pingree in identifying the cited catch line as that of EAE 59, for which see Reiner, BPO 2, p. 23.

[65] K.3107:4, see CAD Š s.v. *šanû* adj. mng. 1.

[66] ACh Supp. 2 68 rev. 16. Cf. *ša pî ṭuppi* MAN-*i*, ACh Sin 19:15 (coll.).

same tablet are also from *aḫû* collections or whether the lines referred to in the subscript are the only extraneous lines inserted within an otherwise normal collection of omens from *Enūma Anu Enlil* proper.

Whether the adjective *šanû* has the force of a technical term when applied to *ṭuppu* is not certain. Evidence may be adduced that this designation is not necessarily always associated with *aḫû* material, but is in fact parallel to expressions like the following *u'iltu šanîtu anassaḫa*, "I will excerpt a second tablet" (Thompson Rep. 188 rev. 4) and *ṭuppam ša-ni-e-a-am nippuš*, "we will draw up another tablet" (KBo 1 5 iv 28).[67] The frequent appearance of the term in subscripts identifying *aḫû* lines, however, underscores the separation between the traditions of "canonical" and "extraneous" omens.

By virtue of their place as an integral part of the composite scribal tradition, the *aḫû* texts may have carried the same "authoritative" status as those of the *iškaru*. Authority was perhaps after all chiefly a matter of official endorsement, while the scribal tradition concerning antiquity of authorship may have been an outgrowth of the institution of scribal scholarship itself. Apparently the approval of the king was required for preparation of new copies of series for the Neo-Assyrian library at Nineveh.[68] A revised edition of LAS 331 written by the scribe Akkullānu to Assurbanipal shows, despite its fragmentary condition, that the scholar who was to inscribe the new edition of the omen series (title of the series referred to is broken in obv. 2) checked with the king for approval of the material to be included and asked whether the *aḫû* tablets ([DUB.MEŠ *a-ḫ*]*u-ú-ti*, obv. 3) were to be written on another tablet, a *ṭuppu šanûmma*.[69] That there should be a question of whether to separate the *aḫû* omens or not suggests relatively little difference in terms of their legitimate standing in the repertoire.[70] Nor were they deemed unworthy of commentary, as is shown by the few glosses on one exemplar of the *aḫû* text referred to above.[71] At least in the case of the *iškaru Enūma Anu Enlil* and its related *aḫû* tradition, we have no evidence for a selection process that eliminated the *aḫû* material as unacceptable or not useful. The references to *aḫû* texts of other

---

[67] Compare also (introducing another *Enūma Anu Enlil* commentary) *ša pî ummāni* 2-*e*, "according to another scholar," K.11092+ ii 28, cited CAD Š s.v. *šanû* adj. mng. 1 b 1'–a'.

[68] Oppenheim, *Ancient Mesopotamia*, p. 244 and note 22.

[69] Parpola, LAS 331 rev. 3–5, see revised transliteration in LAS 2 513.

[70] See Parpola LAS 348, commentary to lines rev. 3ff.

[71] K.3563+:56 and rev. 7 (see below, Chapter Four).

omen series also show them to be on an equal footing with the official editions and merely provide additional or simply different material.

Since no categorical separation between the two groups of texts designated *iškaru* and *aḫû*, respectively, can be detected in terms either of standardization or authority, the distinction between the two looks less like one between traditionally conceived "canonical" and "non-canonical" texts and more like the reflection of a thorough and systematic typology of distinct classes of texts within the corpus of scholarly divination and therefore also within the "stream of tradition" in general. The distinction between *iškaru* and *aḫû* texts seems to be based upon the particular content of these texts, that is, the content of the *aḫû* texts, judging by our exemplar the "29th *aḫû* tablet of *Enūma Anu Enlil*," seems not to be exactly duplicated in any tablet from the main series. The content of these texts is then simply extrinsic to the main series, as the designation implies. Where this extrinsic material came from, how it entered the repertoire, and why it was never directly incorporated into the series proper are unanswerable questions. The distinction between the two classes of texts is perhaps more subtle than presently available evidence would allow us to perceive.

Whether the designation "canon," broadly conceived, is appropriate to this corpus as a whole is arguable up to a point, but clearly the nature of the Babylonian "canon" is unique and not definable in terms of any other known model, least of all the biblical one. An historical process of editing and redacting texts is demonstrable for cuneiform scholarly divination, but evidence for selectivity and an interest in producing authoritative and immutable texts characteristic of the biblical canonization process is lacking. The aspect of the "canonicity" of cuneiform texts that concerns antiquity of authorship simply points to the high regard for traditions of scholarship which the scholars themselves traced back to the sages of the time before the legendary Flood. This absolutely contrasts with the particular doctrinal aspect of canonicity in the Hebrew Bible and New Testament which concerns theological claims about the origin, sacredness, authority, and inspirational nature of that canonized literature.

CHAPTER FOUR

THE ASSUMED 29th *AḪÛ* TABLET OF *ENŪMA ANU ENLIL*

Omen series were the product of Mesopotamian scribal scholarship and in some cases, the celestial omen series *Enūma Anu Enlil* for one, can be seen to develop toward a more or less fixed or standardized form from the Old Babylonian period to the Neo-Assyrian period. The same may be said for the lexical series, which, as M. Civil has pointed out, emerged from the library of Tiglath-Pileser 1 (1115–1077 B.C.E.) in the form in which they were still preserved in copies found at the Nineveh library as well as later Neo-Babylonian copies.[1] The process by which these texts reached their final form is nowhere explained or even mentioned in our sources, but is often assumed to be the work of Kassite period transcribers and editors. To describe their conscious effort to preserve and transmit texts of the learned tradition as a process of canonization, however, may evoke unwarranted parallels with that of the Old Testament. Although the serialization of literary and omen texts is evident from colophons and catalogs, the process of formulation of these texts into an authoritative canon is not at all clear. As Lambert has said, some Akkadian texts did attain a fixed form, but many did not, as in the case of the Gilgameš Epic.[2] I support Lambert's view that "the modern Assyriologist's conception of the canon as that body of literature which emerged from the temple schools of the Kassite period has some confirmation in the famous scribes who belonged to this age. There is however in the traditions which we have examined no suggestion of a systematic selection of literary works, nor of a conscious attempt to produce authoritative editions of works which were passed on. The very word 'canon' is unfortunate in suggesting this kind of activity."[3] The purpose of this essay is to present the text of the celestial omen tablet classified by the scribes as *aḫû*, i.e., "extraneous," or "non-canonical." To date the tablet represents our only extant source for the *aḫû* tradition, which is otherwise known to

[1] M. Civil, "Lexicography," in Studies Jacobsen, p. 120.
[2] W.G. Lambert, "Ancestors, Authors, and Canonicity," JCS 11 (1967), p. 9.
[3] Ibid., p. 9.

us strictly through references to it by scribes. A better understanding of the meaning of the term *aḫû* is of importance for a broader understanding of canonicity in the cuneiform scribal tradition.[4]

The cuneiform "stream of tradition" was of a composite nature, comprised of at least three distinct traditions: the literary works termed *iškaru,* our presumed "canonical texts," or official editions, the extraneous sources termed *aḫû*, and an oral tradition (*ša pī ummâni*) known only through references to it by the scribe-scholars.[5] Commentaries (*mukallimtu*), explanatory word lists (*ṣâtu*), excerpts (*liqtu*), and other forms of scholia comprise still another aspect of the scribal tradition. The evidence that certain texts were designated *aḫû* "extraneous (in its first sense of coming from outside, i.e., extrinsic, not its secondary sense of not being pertinent, superfluous)" appears in catchlines, catalogs, and in letters from the scholars to the Neo-Assyrian court. Evidence points to the existence of *aḫû* collections of *Enūma Anu Enlil*,[6] *ālu ina mēle šakin*,[7] *iqqur īpuš*,[8] physiognomic omens,[9]

---

[4] See above, Chapter Three.

[5] See LAS 13 r. 2: *šumu anniu la ša iškarimma šû ša pī ummâni šû* "This omen is not from the (canonical) series, but it is from the oral tradition of the scholars." The oral tradition is also referred to in the subscripts to the *mukallimtu* commentaries, see ACh Adad *7:22: mukallimti* DIŠ UD.AN.[d]EN.LÍL *šūt ša pī ummâni ša libbi šumma ina Nisanni* *[d]Adad rigimšu iddi* "commentary of Enūma Anu Enlil from the oral tradition concerning (the tablet entitled) 'if Adad thunders in Nisannu'." Cf. ACh Adad 30:10 and ACh Ištar 5:18. Cf. also the references sub *maš'āltu* (a type of commentary characterized by questions) in the dictionaries.

[6] See LAS 13 r. 8: *anniu la ša iškarimma šû aḫiu šû* "This omen is not from the (canonical) series, it is extraneous." See also RA 28 136 (Rm. 150:10), see Lambert, "A Late Assyrian Catalogue of Literary and Scholarly Texts," in Barry L. Eichler, Jane W. Heimerdinger, and Åke W. Sjöberg, eds., *Kramer Anniversary Volume: Cuneiform Studies in Honor of Samuel Noah Kramer*, AOAT 25 (Kevelaer: Butzon & Bercker, 1976), p. 314: *inūma anu [d]en.líl iškar aḫûti* (BAR.MEŠ) "The non-canonical Enūma Anu Enlil."

[7] A.Boissier, *Documents Assyriens: relatifs aux présages* (Paris: Librairie E. Bouillon, 1894), p. 105:39: *17 šumāti aḫûti šut šumma ālu ina mēlê šakin* "17 extraneous lines from (the series) 'if a city is situated on a high place'."

[8] RA 28 136 (Rm. 150:13f.), see Lambert in *Kramer Anniversary Volume*, p. 314: *šumma iqqur īpuš adi aḫûti* (BAR.MEŠ) "(the series) 'if he destroys and rebuilds' with its extraneous omens."

[9] Kraus, *Texte* 64 r. 6: ŠÁ *liqti aḫûti* (BAR.MEŠ) "from an excerpt tablet of extraneous omens." See also ibid. 23 r. 8 and 24 r. 14: *aḫûti* (BAR.MEŠ) *ša ina le'î ul šaṭru* "extraneous (omens) which have not been written on a wooden writing board." Cf. ibid. 51 A 5'.

izbu,[10] and medical prescriptions.[11] The term *aḫû* therefore seems to denote a classification applicable only to casuistic literature, and more specifically, only to the so-called scientific texts, i.e., divination and medicine. The term has been understood to mean "non-canonical" in the context of omens not belonging to the *iškaru* or "standard" series, an interpretation that has contributed to the view that something like a canonical tradition existed for the omen texts. A stronger indication that such a distinction was made between standard or "canonical" texts and texts falling outside that category comes from the fact that the scribes sometimes referred to texts in the *iškaru* or main series as *damqu* "good" in contrast to *aḫû* "extraneous" (i.e., extrinsic to the main text).[12]

In the discussion that follows, I compare the prominent features of the *aḫû* text's protases against those of the corresponding main text of the lunar eclipse section of *Enūma Anu Enlil.*[13] The *aḫû* text presents a great many philological problems, only one of which is the fact that a number of expressions representing eclipse terminology occur only in this text and are by no means self-explanatory. It is hoped that further study of this text will bring the solution to some of the many textual problems I have left unsolved.

Two catalogs of incipits are extant for the reconstruction of the celestial omen series *Enūma Anu Enlil*, one from Assur and the other from Uruk. In his discussion and outline of the sources for the reconstruction of this series, Weidner drew attention to what is preserved of a list of 29 "non-canonical" tablets (IM.GÍD.DA.MEŠ BAR.MEŠ) included in the catalog from Assur.[14] Only two incipits are preserved

---

[10] CT 28 3:17: 15.TA.ÀM *šumāti* (MU.MEŠ) *aḫûti* (BAR.MEŠ) *ša iš* [*tu*…*nasḫa*] "15 extraneous omens excerpted from…," and cf. ibid. 4:12. See also CT 27 49 K. 4031 r. 15: […*ištu*] *libbi šumma izbu* BAR-*i nasḫa* "excerpted from an extraneous recension of "if an anomaly."

[11] M. Streck, *Assurbanipal und die letzten assyrischen Könige bis zum Untergange Niniveh's* (Leipzig: J.C. Hinrichs, 1916), p. 370 q 4: *bulṭī ištu muḫḫi adi ṣuprī liqti aḫûti* "prescriptions (arranged) from head to toe, an extraneous collection," and see also H.Hunger, *Babylonische und assyrische Kolophone*, AOAT 2 (Kevelaer: Butzon u. Bercker; Neukirchen-Vluyn: Neukirchener Verlag des Erziehungsvereins, 1968), No. 329.

[12] ABL 453 r. 14: *ṭuppāni* 30 40 SIG_5.MEŠ *ammar ina muḫḫi qurbūni u aḫiūti ibašši* "there are thirty or forty tablets (including) canonical (lit. good) ones, whatever is pertinent, and non-canonical (lit. extraneous) ones," also ABL 13:25: *rēš ṭuppāni ma'duti lu* 20 *lu* 30 SIG_5.MEŠ *aḫiūti* <*anašši*> "I am holding many tablets, twenty or thirty, canonical (lit. good) and non-canonical (lit. extraneous)."

[13] See ABCD.

[14] VAT 9583 + 10324, top of col. ii, see AfO 14 pl. 3.

before the subscript, those of the "28th" and "29th" tablets. I reproduce here, without collation, Weidner's transliteration of this section (col. ii 1–5, AfO 14 (1941–44), p. 185):

1 [...].MEŠ a-dir-ma [a-šar ^{d}Šamaš]
2 [u]š-tap-pa-a GUB-iz[15]
3 DIŠ Sin ina ITI.BARA$_2$ UD.12.KAM iḫ̮-mu-ṭam-ma
4 ba-ra-ri it-ta-'-dir na-an-mur-šú GIM IZI LU(?) a-a-a[r...]
5 SU.NIGIN 29 DUB.MEŠ IM.GÍD.DA.MEŠ BAR.MEŠ

Concerning the "29th" tablet, Weidner retracted his earlier suggestion that it is related to EAE 15 and listed six sources for another tablet that can be identified by the incipit in lines ii 3–4 of the Assur catalog.[16] Indeed, line 1 of this particular tablet may be restored by means of the Assur catalog incipit.[17] The six sources are as follows:

a) Rm. 303 = ACh Supp. 30
b) K. 3761 = ACh Supp. 2 23a
c) Rm. 2,252 = ACh Supp. 2 23b and Bab. 3 283
d) K. 3563 = ACh Supp. 2 25
e) 82–3–23,33 = ACh Supp. 2 28
f) K. 11736 = unpub. (see Bezold Cat. III, p. 1190)

To these we may add one small duplicate fragment g) K. 12238 (unpub.), identified by E. Reiner. Weidner remarked that the six sources "teilweise aneinander anschliessen," and in fact, a, b, d, e, and f are now joined forming a complete tablet with top and bottom intact (see photo). The two remaining fragments represent duplicates.

The *aḫ̮û*-text is structurally similar to that of the Nineveh library edition of *Enūma Anu Enlil* tablets 15–22, the edition which for the sake of comparison will serve as our standard or official edition. The following outline of elements of the protases are shared by the *aḫ̮û*-text and the EAE tablets just mentioned, which constitute the lunar eclipse section of the series.

---

[15] For discussion and parallels to the "28th" tablet, see Weidner, "Die astrologische Serie Enūma Anu Enlil," AfO 14 (1941–44), p. 185f., and id., AfO 11 (1936–37), p. 360.
[16] AfO 11 360.
[17] AfO 14 186.

(i) Date of Eclipse, Occurrence (Month and Day)
(ii) Time of Eclipse Occurrence
(iii) Color of Eclipsed Moon
(iv) Direction of Shadow over the Face of the Moon
(v) Prevailing Wind

These data are found in the omens of the standard text of *Enūma Anu Enlil* 15–22 when considered as a whole. But despite the structural similarity between these two versions, the particular content of the *aḫû*-text is largely unparalleled in the standard edition of lunar eclipse omens. That is to say, the *aḫû*-text is unusual only with regard to its content, not to its form.

(i) Date of Eclipse, Occurrence (Month and Day)
The arrangement of eclipse omens by months is found in nearly all EAE lunar eclipse tablets.[18] The twelve months, or thirteen if *Addaru arkû* is included, provide the basic and most obvious structural framework in which other eclipse phenomena are organized within the protases. The *aḫû*-text ends at month IX *(*Kislīmu), which is difficult to explain unless the text represents some sort of excerpt tablet, which, however, seems doubtful to me.

Whereas the days given for the occurrence of an eclipse in the standard texts comprise a fixed schema: days 14, 15, 16, 20, and 21, the *aḫû*-text has omens for the 12th and 13th days (the 14th occurs as an alternative day in lines 15 and 59). The 12th and 13th days are theoretically acceptable for the possibility of an eclipse. Opposition occurs on the average 14.7 days after conjunction, varying ± ¾ day. But depending on the length of time between conjunction and first visibility, which can vary between 16½ and 66 hours, full moon can occur on the 12th, 13th, 14th, or l5th.[19]

(ii) Time of Eclipse Occurrence
In the standard edition of EAE, the time and duration of a lunar eclipse is generally expressed in terms of the three night watches,

[18] See ABCD.
[19] These days are given in the texts containing rituals for the king in the event of an eclipse, see CT 4 5 and KB 6/2, pp. 42ff.

unless the eclipse occurs while the moon is either rising or setting.[20] The *aḫû*-text on the other hand employs the phrase *adi*... *akim* "it is obscured until...," with several different time indications:

1) *adi* BAR *akim*, var. *adi* BAR-*šú akim* "until the (var. its) BAR (midpoint?) it is obscured."
2) *adi* BAR *mūši akim* "until the BAR (midpoint?) of night it is obscured."
3) *adi* ᵈ*Šamaš ultāpâ akim* "until the sun rises it is obscured."
4) *adi maṣṣartu illiku akim* "until the watch passes it is obscured."

The verb **akāmu* is related to the substantive **akāmu* "a cloud of dust, mist," (CAD s.v.) which is attested primarily in astronomical texts where it denotes a condition of obscured visibility due to mist or the like, as in *a-kám* NU PAP "misty, not observed."[21] This verb is attested only in this particular *aḫû*-text, and always in the stative. It is most likely denominative from *akāmu* "mist" and in the present context should have the meaning "to be or become obscured (due to meteorological causes)." It is also worth considering, however, whether the verb *akāmu* can also mean by extension "to be or become obscured, dark," making it a synonym of *adāru* "to be dark." In fact, we find that *adir* varies with *akim* in the phrase ⌜EN⌝ [BAR]- šú a-dir (rev. 25).

Parallels from *Enūma Anu Enlil* are not readily available for the particular use of the term BAR in the temporal clauses of the *aḫû*-text. BAR (*mišlu*) "midpoint" is used to denote time and duration (see CAD s.v. *mišlu* mng. 2a), but is more often in construct with other terms for the particular time period referred to, as in *mišil šatti* "mid-year," *mišil maṣṣartu* "midwatch," or *mišil ūmi* "midday." Since, however, the referent is not stated in the *aḫû*-text, BAR remains obscure. Either

---

[20] The expression for a rising eclipsed moon is *Sin adriš uṣī* "the moon rises dimly visible," as in the following from an astrological commentary: ⌜d⌝*Sin ad-riš* È-*ma id-lip* "the moon rises dimly visible and lingers on," BM 47447:24 (unpub. tablet collated and cited with the kind permission of the Trustees of the British Museum). See also, DIŠ *Sin ad-riš* [È]-*ma* EN ZALAG$_2$ DU-*zu* "if the moon [rises] dimly visible and stands until the clearing (of the eclipse)/until dawn," ibid. 26. For a setting eclipsed moon, *Sin adriš īrub* "the moon sets dimly visible," see e.g., DIŠ *Sin ad-riš* TU *ina i-dir-tu*$_4$ [*ina* IM].DIRI TU-*ma ina* IM.DIRI ŠÚ-*ma* "if the moon sets darkly (means) it sets/enters *(erēbu)* in darkness [in a c]loud, or it sets (*rabû*) in a cloud," ibid. 28.

[21] LBAT 1445 i 1', and see CAD *s.v. akāmu* usage c. This parallels DIRI NU PAP "cloudy, not observed," LBAT 1237:5, see ZA 6 (1881), pp. 89ff.

the midpoint of the total duration of the eclipse or the midpoint of the watch in which the eclipse occurs are possible interpretations. Although there are no direct parallels in the temporal clauses of EAE 20, one can present a case for BAR as the middle of the eclipse duration with the help of this text. In EAE 20, the time of the eclipse is expressed by the watch plus the verbs *šurrû* "to begin," *mašālu* "to be half," and *qatû* "to end." The moon is understood to be the subject of the temporal verbs, with the watch in the adverbial accusative. The following will serve as an illustration: If an eclipse occurs on the 14th of Nisannu…and *barārita imšulma* "during the evening watch it is half."[22] If it is also taken into consideration that in BAR-*šú* (see above sub ii 1) the possessive pronominal suffix probably refers to Sin, BAR-*šú* then represents the BAR of the moon, or the midpoint of the eclipse duration rather than of the watch. The meaning of the phrase *adi mišli(šu) akim* "it is obscured until (its) midpoint," would mean that because of poor visibility the eclipse was not observable until it was half over. This must be considered a provisional interpretation for which we await further parallels or contradictory evidence.[23]

Though the expression BAR MI (*mišil mūši*) is not attested elsewhere for "midnight," it may be acceptable in the context of the *aḫû*-text (rev. 5, 14, and 20).[24] In late astronomy, BAR MI "half night" is a technical term that has nothing to do with the present BAR MI.[25] In Seleucid astronomical texts BAR MI refers to the computed value of the length of half the night used in finding the value "KUR," or the time between moonrise and sunrise on the morning of the last visibility of the moon.

---

[22] ACh Supp. 2 26:10, restored by ACh Supp. 29:15 which contains the variant *ina barārīti* "in the evening watch."

[23] Another phrase, unfortunately also obscure, is found in EAE 20 which bears on the problem of the "midpoint." The moon is said to "go up to/beyond the midpoint in its eclipse" *ina nandurišu eli mašālim illik.* In one instance this line occurs as a variant for *qablīta ušarrīma la uqatti* "it (the eclipse) began (in) the middle watch and did not come to an end (lit. make the watch end)," see AFO 17 pl. 1 VAT 9419:5'. Elsewhere in the same tablet (EAE 20 paragraph for Month IX) this phrase occurs in three duplicates: *qablītu ina- al ina nandurišu eli mašālim illik* "the middle watch…he went until the midpoint," see ACh Supp. 2 118:16, the other two duplicates are unpublished. While the contexts are obscure in every case, the evidence from EAE 20 points to the *mašālum* having a relationship to the middle watch, suggesting that the midpoint is that of the duration of night.

[24] See CAD s.v. *mūšu* usage b-2'.

[25] ACT 202:12f., see glossary p. 474 s.v. ge_6.

(iii) Color of Eclipsed Moon

Light refraction from the earth's atmosphere produces various colors, mostly reds and oranges, in an eclipsed moon. In *Enūma Anu Enlil* and its Old Babylonian forerunners, red is most frequently mentioned as the color of the eclipsed moon, either as SA_5 (*sāmu*) or in the phrase *sūmšu peli* "its redness is red," which refers possibly to a particular shade of red.[26] In EAE 16 and 17, omens for eclipses of other colors besides red occur. The colors appear in the normal sequence BAB-BAR (*peṣi*) "white," MI (*salim*) "black," SA_5 (*sām*) "red," SIG_7 (*aruq*) "yellow, and GÙN (*burrum*) "variegated." In EAE 17, *du'ummu* "dark" replaces GÙN.[27]

Clouds, mists, and the like can also affect the color of the moon during an eclipse, or can make the full moon appear like an eclipsed moon. Astrological commentaries sometimes explain the colors of an eclipse as the effect of a cloud: DIŠ AN.MI GAR-*ma ina* IM.DIRI BABBAR MI SA_5 SIG_7 *u* GÙN *u du-'-um* DU-*ma u* $ZALAG_2$-*ir* "if an eclipse occurs and it stands in a white, black, red, yellow, or variegated, or dark cloud and (then) clears."[28] This is explained with DIŠ $AN.GE_6$ GAR-ma AN.[M]I.BI BABBAR MI SA_5 SI[G_7: *ina* I]M.DIRI $AN.GE_6$ GAR-*ma* "if an eclipse occurs and that eclipse is white, black, red, or yel[low (means)] the eclipse occurred [in a cl]oud."[29]

The expressions occurring in the *aḫû*-text for the color of the moon are not paralleled in *Enūma Anu Enlil*, and therefore present some problems in interpretation. Two basic formulations alternate throughout the text: IGI.MEŠ- *šú* SA_5 (SIG_7, MI) "its features[30] are red (yellow, black)," and IGI.MEŠ-*šú* GIM ... BE "its features are BE like ..." Four comparisons are given for the "color" BE:

1) GIM KI.A.^{d}ÍD "like sulphur fire"
2) GIM NA_4.ZA.GIN "like lapis lazuli"
3) GIM *qut-ri* "like smoke"
4) GIM *ur-pí* "like a cloud"

[26] See B. Landsberger, "Über Farben in sumerisch-akkadischen," JCS 21 (1967), p. 142.
[27] See the reference cited CAD s.v. *du'ummu* usage b, ACh Sin 26:5.
[28] BM 47447:9–10.
[29] BM 47447:22.
[30] Note the variant from the Assur catalog incipit *na-an-mur-šú* "its appearance," see AfO 14 185 ii 4.

It would seem on the face of it that BE means "blue," particularly given that a sulphur flame typically burns blue and lapis lazuli is characteristically an azure blue. As is well known, however, there is no Akkadian word for the color blue.[31] Alternatively, and more probably, BE is to be read MÚD (*da'mu*) "dark."[32] In celestial omens, *da'mu* can refer to the light of the sun or moon.[33] And as for the aptness of the comparisons, clouds and smoke can conceivably be "dark," perhaps grey or blue (see above, said of a cloud),[34] and the flame of sulphur fire may be described as "dark" if we can cite as a parallel the examples from the series *ālu* where *da'mu* is said of a flame.[35]

(iv) Direction of Shadow over the Face of the Moon

In describing the direction of movement of the eclipse shadow, the *aḫû*-text again presents its own unique formulation. Instead of the frequently attested *ina* IM_{X} SAR-*ma ina* IM_{y} ZALAG_2 "it (the eclipse) begins in direction x and clears in direction y,"[36] the *aḫû*-text uses the verb *arāmu* in the following phrase: *ana* IM *īrimma kī īrimu izku* "it (the eclipse) covered (the moon) in direction x and it cleared as it covered."

In the context of lunar omens, *arāmu* has the meaning "to obscure," or "eclipse." In Erimhuš, *arāmu* occurs in a group with *adāru* "to be dark" and *katāmu* "to cover."[37] If the range of meaning falls within that of *adāru* and *katāmu*, a translation "eclipse" is possible, however it seems to refer more generally to any obscuration as illustrated by the following where *arāmu* is not said of the full moon: *qaran imittišu irrimma* "(something) covers its right cusp," which is the explanation given for *šumma Sin*... *qaran imittišu almat* "if the moon's right cusp is black."[38]

[31] See Landsberger, "Über Farben," p. 139 and note 7 where "Blaublindheit" is discussed. Landsberger quotes from an evolutionary perspective on the development of color differentiation that "der Farbsinn hat sich bei der Menschheit langsam entwickelt; bei Griechen and Romer sind nur Rot and Gelb Farbbegriffe, Grün noch wenig deutlich, Blau noch nicht von Dunkel differenziert."

[32] [mu-ud] [BAD] = *da-'-mu* A 11/3:12; see CAD *da'mu* lexical section.

[33] See CAD *da'mu* usage f.

[34] Cf. *summa ūmu zīmusu kima qutri* "If the glow of the day is like smoke," ABL 405:9.

[35] See CAD *da'mu* usage d.

[36] E.g., throughout EAE 15, see Bab. 3 280 and AfO 17 71f. (VAT 9803); cf. AfO 17 81 (VAT 9740 + 11670) r ii 5–8 (= EAE 20).

[37] Erimhuš V 120–22: šú = *a-da-ri*, KAK $^{\text{šu-du-lu}}$ŠUDUL = *ka-ta-mu*, NI-ak-a = *a-ra-mu*, see TCL 6 35 iii 22–24.

[38] ACh Supp. 7:18.

In late astronomical texts *arāmu* is written with the logogram ŠÚ, e.g., *gabbi<šu>* ŠÚ-*im* "its entirety is obscured (i.e., totally eclipsed)."[39] ŠÚ-*im* could theoretically be read *katim*, but is to be understood as the stative of *arāmu,* given the syllabic spelling *a-rim*: Á SI *u* KUR *a-rim* "it is eclipsed on the southeast side (of the lunar disk)."[40] A parallel for the expression for a total eclipse (*gabbišu īrim/arim*) may be cited from the *aḫû*-text obv. 49: *gabbišu īrimma ana šūti īrimma* "it (the eclipse) obscured its entirety and it eclipsed on the south (side of the lunar disk)."[41]

The designations north, south, east, and west seem to refer to schematic quadrants of the moon, which in the predictions can be correlated with one of the four countries Akkad, Subartu, Elam, or Amurru. This is clear from the following schema given in an astrological commentary:[42]

15 30 KUR URI.KI "the right of the moon is Akkad"
2,30 30 KUR NIM.MA.KI "the left of the moon is Elam"
AN.TA 30 KUR MAR.TU.KI "the upper part of the moon is Amurru"
KLTA 30 KUR SU.BIR$_4$.KI "the lower part of the moon is Subartu"

The arrangement of the quadrants, i.e., which way is north, south, etc., is difficult to determine.[43] Because the moon travels from west to east in its orbit, the earth's shadow enters the moon from the east side. One observes an eclipse therefore beginning on the east, or the left side (facing south), with variations in the points of first contact being either on the upper or lower portion of that side. The *aḫû*-text has eclipses beginning on the south, north, and west sides. Twice the

39 LBAT 1251 r. 24, a goal-year text.
40 LBAT 1448:7, an eclipse report.
41 Cf. ACh Sin 31:8, a commentary to eclipse tablet EAE 15: *gab-bi-šú ir-rim-m*[*a*].
42 This represents a composite reconstruction of the following four texts: CT 26 40 iv 23–26 (K. 250); AfO 19 pl. 32:45–48 (= AO 8196 col. iii) with variant KUR SU.KI *u* [*Gu-ti.*KI]; ACh Supp. 2 118 r. 8–9 with variant EGIR for KI.TA and the addition of *Gu-ti-i* to Subartu; and Thompson Rep. 268:11–12 with syllabic spellings *e-la-a-ti* and *šap-la-a-ti.*
43 Three different schematic arrangements of the quadrants are attested, see A. Schott and J. Schaumberger, "Vier Briefe Mar-Ištars an Esarhaddon über Himmelserscheinungen der Jahre -670/668," ZA 47 (1941), pp. 106ff. See also A. Ungnad, *Subartu* (Berlin, 1936), §§ 62–81, and F.X. Kugler, *Sternkunde and Sterndienst in Babel* II (Munster, 1909–1924), pp. 60ff.

eclipse begins on the south and clears on the east (obv. 49 and r. 5), but none begin in the "east." Since the designations east, west, and so on may not coincide with east and west with respect to the horizon, it is not possible to analyze these eclipses with respect to the directional impact of the shadow.

(v) Prevailing Wind

The wind blowing during an eclipse is commonly included in the protases of *Enūma Anu Enlil* 15–22. We can reconstruct a theory on this basis connecting the lunar quadrant being eclipsed and the wind blowing on one hand, to the country affected by that eclipse on the other. In *Enūma Anu Enlil*, the verbs used with the winds are *alāku* "to blow" (see CAD s.v. *alāku* mng. 3i), *tebû* "to rise"[44] and *rakābu* "to ride."[45] In the *aḫû*-text, however, in addition to the common IM$_x$ DU (*illik*) "wind$_x$ blew," the verb *šiāḫu/šâḫu* "to blow(?)" or "rise (said of a wind)" is used in the phrase IM$_x$ *i-ši/še-ḫa-am-ma* "wind$_x$ rose up" (obv. 24, 63, and 4. 26). In the synonym lists, *šâḫu* is given as a synonym of *alāku*.[46]

This particular usage seems to be restricted to the present *aḫû*-text and its duplicates. Note also that *šâḫu* occurs only with the south wind. If other winds are mentioned, *alāku* is the preferred verb (see e.g., obv. 37).

Other more general observations as to the relationship between the two traditions as illustrated by the present *aḫû* text and the eclipse tablets of *Enūma Anu Enlil* can only be briefly mentioned. The *aḫû* texts were kept at the library of Assurbanipal along with the rest of the scholars' reference works. The Assur catalog of incipits included both *Enūma Anu Enlil* and *aḫû* traditions, side by side so to speak.[47] The letters from the scholars that quote from both traditions indicate no critical evaluation determining the *ahû* material to be less valid or less worthy of quotation. Nor were they deemed unworthy of commentary as evidenced by the few glosses on one of the exemplars of the *aḫû* text.[48] That *aḫû* texts were also preserved and transmitted is clear from the existence of several duplicates to the tablet described here, as well

---

[44] Written ZI: If an eclipse occurs on the 14th day of Nisannu...and *ina lumun libbišu amurru itbēma* "while he is eclipsed (lit. in his distress) the west wind rises," see ACh Supp. 2 26:2 and dupl. ACh Supp. 29:2.

[45] See ACh Šamaš 2:2.

[46] See CAD s.v. *alāku*, lexical section and also s.v. *šâḫu* B and AHw s.v. *šiāḫu*.

[47] See above p. 87 and note 14.

[48] See obv. 56 and r. 7.

as from the fact that they were included within the catalog of *Enūma Anu Enlil* tablets. At least in the case of the *iškaru Enūma Anu Enlil* and its related *aḫû* tradition, we have no evidence of a selection process that eliminated the *aḫû* tradition as unacceptable or not useful. It was neither subsumed under nor superseded by the official edition of *Enūma Anu Enlil* tablets 15–22. While the *aḫû* texts may indeed have been considered extrinsic to the more widely known or used *iškaru,* they were not excluded from the stream of tradition as a whole. The references to *aḫû* texts of the other omen series also show them to be on an equal footing with the official editions and merely provide additional or simply different material.[49] The distinction between the two groups begins to look less like one between canonical and non-canonical texts and more like the reflection of a thorough and systematic classification of distinct traditions within the corpus of scholarly divination.

Text: K. 3563+

1 DIŠ *ina* ITI.BARA$_2$ UD.12.KAM [d]30 TAB-*ma b*[*a-ra-ri it-ta-ʾ-dar* IGI.MEŠ-*šú*]
2 GIM IZI KI.A. [d]ÍD BE.ME E[N BAR *a-kim ina* IM… *i-rim-ma*]
3 *ki i-ri-mu ú-zak-ki bu-lim* […BE.MEŠ]
4 *i-na* KUR *i-mìn-du* KUR NIM.MA.KI UKÚ X […]
5 ZI.GA *A-ga-dè*.KI *šá* MU-*šú la* M[U AŠ.TE DIB-*bat*…]
6 UN.MEŠ TUR.ME BE Ì.LÁ NUN.ME KUR-*ád* NA$_4$ [ŠUR-*nun*…]
7 *e-ṭu-tu* IGI-*mar* NÍG.[ḪA.LAM.MA(?) GAR]
8 DIŠ UD.12.KAM AN.GE$_6$ GAR-*ma* UD.13.KAM Á [d][…]
9 LUGAL KUR URI.KI x […]
10 DIŠ *ina* ITI.BARA$_2$ UD.13.KAM AN.GE$_6$ [d]3[0…]
11 AN *za-ku-ú* MUL AN-*e* x […]
12 *ina* KUR GAR-*an* UN.MEŠ KUR.MEŠ ⸢LUGAL(?)⸣ […]
13 DINGIR.MEŠ *ana* KUR URI.KI ARḪUŠ [TUK.MEŠ]
14 KUR NIM.MA.KI L[Ú/Š[EŠ…]
15 DIŠ UD.13.KAM AN.GE$_6$ GAR-*ma* UD.14.KAM KI [d]UTU IGI x […]
16 LUGAL *ši-pir-šú i-kaš-šad* KA x […]
17 A.RÁ KUR SI.SÁ GÌR LÚ.KÚR *ku-us-s*[*a-at*…] x x […]
18 DIŠ [d]30 AN.GE$_6$ GAR-*ma* UN.MEŠ-*šú* NU IGI RI BIR-*a* [(3 signs)] NUN LUGAL *u um-ma-*⸢*nu*⸣

[49] As in the letters ABL 453 and 13, see above note 13.

19 KI.TA DU.ME DINGIR.ME *ana* ⸢KUR⸣ URI.KI AR UŠ ⸢NU TUK.MEŠ⸣ [(1–2 signs)] ⸢NUN⸣ [x] *be-lut kib-ra-a-ti*

20 *ana* SILIM.ME LUGAL *u* É.GAL-*šú um-ma-nu-šú* BE-⸢*ma*⸣ ^{d}30 *it-*[*t*]*a-'-da-ru-ma*

21 EN.NUN BAD.ME *ina* KUR SU.BIR$_4$.KI SU.KÚ ⸢GAL⸣-*ši ina ṭup-pi* ⸢MU(?)⸣ MUL $^{\text{ḫi-pí eš-šu}}$MEŠ

22 DIŠ *ina* ITI.GU$_4$ UD.13.KAM 30 *a-dir* GIM [x] SIG$_7$ *ina* EN.NUN AN.[USAN$_2$] *ul-ta-dir-šú-ma*

23 EN BAR *a-kim ina* IM.U$_{18}$.[LU] *i-rim-ma ki i-ri-*[*m*]*u ú-zak-ki*

24 IM.U$_{18}$.LU *i-š*[*i-ḫa*]*-am-ma e-ṭu-tu i-di-*[*ir*(?)]*-tu šá-kin* AN.GE$_6$ *ṣab-tu*

25 $^{\text{ḫi-pí eš-šu}}$ *a-*[x G]IM ^{d}UTU *ul-ta-pa-a a-kim* LUGAL *ina* É.GAL-*šú* DIB-*ma*

26 KI [K]A(?) URU-*šú u* UN.MEŠ-*šú ina* GIŠ.TUKUL I[M(?)] ⸢ŠÚ⸣ *x ra-im mu-tu-šú ina* BAD$_5$.BAD$_5$

27 [ ] DUMU LUGAL *šá* URU ZAG.MU GIŠ.GU.ZA DIB-[*m*]*a* MU.3.KAM *be-lut* UN.MEŠ DÚ-*uš*

28 [DIŠ *ina* ITI.G]U$_4$ *ina* EN.NUN MURUB$_4$.BA *a-dir-ma* SA$_5$ [(x)] ⸢x⸣ *ul-lu-uḫ a-dir-ma*

29 *a-dir-šú* GI.NA UD.DA-*su* ZALAG$_2$-*át* A[N *za*]*-ku-ú* IM.SI.SÁ TAG NU DU

30 ^{d}IŠKUR ŠÈG.ME-šú *u* ⸢A.KAL(?) x x⸣ [x *k*]*an-nu ana* IM.SI.SÁ *i-rim*

31 *ki i-ri-mu iz-ku* LUGAL ⸢x x x x *ba*⸣ BE LUGAL NIM.MA.KI *lit-tu-tu* DU-*ak*

32 SUḪUŠ AŠ.TE-*šú* GI.NA KI [x x] x-*as* MU KUR NIM.MA.KI ÍL

33 GIG NU TI.LA *ina* KUR ⸢x x⸣ [KI] GÁL-*ši* EBUR KUR URI.KI SI.SÁ

34 ÍD.ME *i-gap-pu-šá* ⸢x⸣ [(x)] ⸢x⸣ ŠE.BAR BE.ME ^{d}IŠKUR KA-*šú* ŠUB-*ma* NIM.GÍR *ib-riq*

35 2 ITI GIG.AN.T[I.LA] *ina* KUR GÁL-*ši*

36 DIŠ *ina* ITI.SIG$_4$ UD.13.KAM ^{d}[30 *a-dir*] IGI.MEŠ-*šú* MI.ME *ina* EN.NUN AN.TA *a-dir* EN BAR IGI-*mar*

37 IM.MAR.TU DU [*ina* IM.MAR].TU *i-rim-ma* IM.MAR.TU *iz-ku* ŠUB-*tú* É.MAŠ DINGIR.MEŠ

38 BAD$_5$.BAD$_5$ EDIN.MEŠ [ ] x.MEŠ DUMU.MEŠ-*šú* ⸢NIGIN⸣-*ma ina* KA ^{d}UTU-*ši* KIN.KIN GAZ-*ku*

39 *ši-pir-š*[*ú*…]*-bu* SI.SÁ

Figure 1. K3563 + obv.
Courtesy of the Trustees of the British Museum

40 [DIŠ *ina* ITI]. ⌜ŠU UD.12/13.KAM⌝^{d}30 *a-dir* IGI.MEŠ-*šú* SIG$_{7}$ IM.SI.SÁ *i-rim-ma ki i-ri-mu iz-ku*

41 [ ] EBUR KUR URI.KI ^{d}IŠKUR *ú*-x-*ši* ŠE.GIŠ.I NU SI.SÁ ⌜x⌝ ŠE.GIŠ.Ì NU SI.SÁ

42 [x] ⌜GIM(?)⌝É ^{d}NAM.TAR BE ŠEŠ LUGAL AŠ.TE DIB-*ma*

43 SUḪUŠ AŠ.TE-*šú* NU GI.NA *ina* HI.GAR [GAZ-*ku*(?)]

44 DIŠ *ina* ITI.ŠU ^{d}30 AN.GE$_{6}$ GAR-*ma* SA$_{5}$ IM.SI.SÁ DU *i-ri-mu ki i-ri-mu* [*iz-ku*]

45 UD.DA-*su* ZALAG$_{2}$-*át* AN *za-ku-ú* EBUR KUR URI.KI SI.SÁ KA ŠUB-x [. . .]

46 LUGAL KUR URI.KI *ina* KUR *ú-ṣar-ra-mu* AŠ.TE-*šú* ŠUB-*di* LUGAL KÚR GAZ x[. . . BE-*ma*]

47 *ana* SILIM.ME LUGAL *u* É.GAL-*šú* NUN *ina* É.GAL LUGAL [x x x] DIŠ EN *ṭup-pi* MU.BI UR.⌜x⌝ [x x x]-*ru*/ŠUB

48 DIŠ *ina* ITI.NE UD.12.KAM ^{d}30 *a-dir* IGI.MEŠ-*šú* MI *u* SIG$_{7}$ *tuk-kup* GIM *ur-pi* BE

49 *gab-bi-šú i-rim-ma ana* IM.U$_{18}$.LU *i-rim-ma ana* IM.KUR.RA *iz-ku* ERÍN-*nu* LÚ.KÚR

50 *a-ḫa-meš i-še-eb-ba ṭuḫ-da* MAR.TU.KI *Su-tu-ú* KÚ-*ma* UD.13.KAM KI ^{d}[UTU] IGI

51 KA NU GI.NA A.RÁ *la e-šèr-ti ina* KUR URI.KI G[ÁL-*ši*]

52 DIŠ *ina* ITI.NE UD.13.KAM AN.GE$_{6}$ ^{d}30 *a-dir* EN EN.NUN DU-*ku a-kim* IGI.MEŠ-*šú* SIG$_{7}$.ME

53 EN BAR-*šú a-kim* KI *i šá ta i-rim-ma zi-im* KÙ.GI GAR EN *iz-ku-ú* IM.U$_{18}$.LU DU

54 DINGIR.MEŠ *ana* GALGA-*šú-nu* ARHUŠ! *ana* KUR URI.KI TUK.MEŠ *ana* IM.SI.SÁ *i-rim-ma ki-i i-ri-mu iz-ku*

55 LUGAL *ana* KUR-*šú* ŠU SUM-*in ṭuḫ-du* DIN *meš-ru-ú ina* KUR NIM.MA.KI GÁL.MEŠ

56 LUGAL *ḫas-su-ta*//$^{\text{LUGAL BE-}su\text{-}ta}$ DU-*ak* KUR LÚ.KÚR NIM.MA.KI AŠ-TE-*šú* DIB-*bat* ZI-*ut* ERÍN-*ni* LÚ.KÚR

57 *šá* KUR NIM.MA.KI UD.14.KAM KI ^{d}UTU IGI EN *ṭup-pi* MU KA GI.NA *lìb-bi* KUR DÙG.G[A]

58 A.RÁ KUR *eš-ret* LÚ.KÚR.MEŠ DU$_{8}$.DU$_{8}$ GÌR^{II} LUGA[L. . .]

59 DIŠ *ina* ITI.KIN.^{d}INNIN *lu-u* UD.13.KAM *lu-u* UD.14.KAM UD.ME EN.NUN ^{d}30 a-dir EN.NUN DU-*ma a-dir* IGI.MES-*šú*

60 GIM NA$_{4}$.ZA.GÌN BE EN BAR-*šú a-kim ana* IM.MAR.TU *ki i-rim-ma* IM.MAR.TU DU AN-*ú e-ṭu-ú*

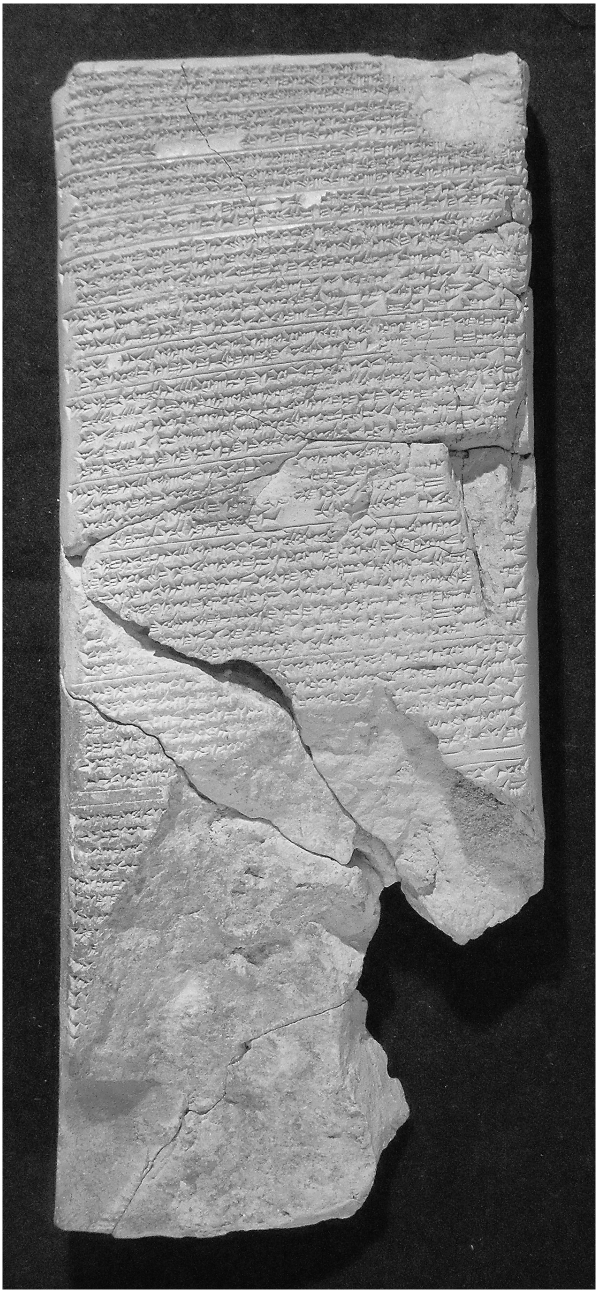


Figure 2. K3563 + rev.
Courtesy of the Trustees of the British Museum

61 UD.DA-*su kat-mat* DUMU LUGAL *ana* AŠ.TE UD.UD.MEŠ-*ma* AŠ.TE NU DIB-*bat er-re-bu ina* IM.MAR.TU NUN.MEŠ *ú-kal*-[x]$^{\text{// \textit{u-k[al-...]}}}$

62 8 MU.MEŠ$^{\text{16 MU.MEŠ}}$ LUGAL-*tam* DÙ-*uš* GÚ.È *be-eḫ-rum ina im ma* ERÍN LÚ.KÚR KUR-*ád ṭuḫ-du u meš-ru-ú*

63 *ina* GÌR$^{\text{II}}$-*šú* GÁL.ME LÚ.KÚR-*šú* UŠ.MEŠ-*ma du-muq-šu ul ú-šeṣ-ṣi* IM.U$_{18}$.LU *i-še-ḫa-am-ma*

64 [ ].MEŠ-*šú* BE KUR SU.BIR$_{4}$.KI UKÚ [(x)] DIB-*bat* GÌR UN.MEŠ-*šú ana* [...]

rev.

1 [DIŠ *ina* ITI].KIN $^{\text{d}}$30 *a-dir* IGI.MEŠ-*šú zi-im* KÙ.GI GAR-*nu pa gab kam mi a ú šu an a-kim* AN [(10–12 signs)]

2 *ina* SIG$_{5}$ AN.MEŠ SA$_{5}$ *e-ṭu-ú ana* IM.U$_{18}$.LU *i-rim-ma ki i-ri-mu iz-ku* IM.MAR.TU [...]

3 *ina* É.GAL-*šú* DIB-*ma ul um-taš-šar* NUN.ME *ina* MU.BI BE.ME EBUR KUR URI.KI SI.SÁ EN *ṭup-pi* MU.B[I...]

4 DIŠ *ina* ITI.DU$_{6}$ UD.12.KAM $^{\text{d}}$30 TAB-*ma ba-ra-ra it-ta-ʾ-dar* IGI.MES-set GIM *ur-pí* BE *gab-bi-šú i-r*[*im-ma* (7–8 signs)]

5 IZI *iq-qa-di ina* IM.U$_{18}$.LU *i-rim-ma* IM.KUR.RA *iz-ku* EN BAR MI *a-kim* [(6 signs)]

6 TIL BAL *na-zaq* KUR IM *la ṭa-bu* ZI-*ma* SAG.DU x [(5–6 x signs)]

7 DIŠ *ina* ITI.DU$_{6}$ UD.13.KAM AN.GE$_{6}$ $^{\text{d}}$30 *a-dir* IGI.MEŠ-*šú* SA$_{5}$.MEŠ AN-*ú za-ku-tam*$^{\text{AN-\textit{ú} za-ku-\textit{ú}}}$ *it ud* UD.DA-*su* ZALAG$_{2}$-⸢*át* EN EN.NUN⸣ [(x)] ⸢*a-kim*⸣

8 *ana* IM.SI.SÁ *i-rim-ma ki i-ri-mu iz-ku* IM.SI.SÁ DU *nu-ḫu-uš* KUR URI.KI *ana* SILIM.ME LUGAL EBUR KUR MAR.KI SI.S[Á]

9 ŠE.GIŠ.Ì *u* ZÚ.LUM.MA SI.SÁ.ME *ana* SILIM.ME LUGAL *u* ZI.GA ŠÀ-*šú* NUN *ra-ʾ-im* LUGAL *ina* GIŠ.TUKUL *ina* EDIN BE

10 DIŠ UD.12.KAM KI MAN NU IGI GÌR$^{\text{II}}$ LÚ.KÚR *ana* KUR EBUR KUR NIM.MA.KI $^{\text{d}}$IŠKUR TÙM

11 LUGAL NIM.MA.KI *lit-tu-ta* DU BE-*ma* EBUR KUR NIM.MA.KI SI.SÁ LUGAL NIM.MA.KI *ina* MU.BI BE

12 DIŠ *ina* ITI.APIN UD.13.KAM EN.NUN DU-*ma* $^{\text{d}}$30 *a-dir* IGI.ME- *šú* GIM IZI KI.A $^{\text{d}}$ÍD BE.MEŠ ZI-*ut* BURU$_{5}$.⸢ḪI.A⸣ [*ina* K]UR

13 ^{d}IŠKUR KA-*šú* ŠUB-*ma* NIM.GÍR *ib-riq* BURU$_{5}$.ḪI.A ZI-*ti* ZI-*ma* EBUR KUR ⸢URI.KI KÚ⸣

14 EN BAR MI *a-kim ana* IM.SI.SÁ *i-rim-ma ki i-ri-mu iz-ku* ŠUB-*ti ú-ma-am* EDIN

15 DIŠ *ina* ITI.APIN ^{d}30 *a-dir-ma* EN ^{d}UTU *ul-ta-pa-a a-kim* KI.BAL KUR URI.KI

16 *qa-lal* NUN.ME *e*-KUR UN.MEŠ *ina qaq-qa-ri* NÁ.MEŠ ÌR UGU [*be*]*-lí-šú* GAR-*an*

17 *šá* ^{d}30 *ina* MI KAxMI-*ma* ^{d}UTU *ul-ta-pa-am-ma iṭ-ṭu-lu-šu*

18 DIŠ *ina* ITI.*ḫi* ^{d}30 *a-dir-ma* IGI.MEŠ-*šú* SA$_{5}$ EN.NUN *a-kim ana* IM.U$_{18}$.LU *i-rim-ma ki i-ri-mu*

19 *iz-ku* EN $^{\textit{ḫi-pí}}$ SAG GIŠ.PA *ina* KUR *i-šaq-qi šá-ʾ-a-lu ina* É.GAL *i-dan-nín*

20 DIŠ *ina* ITI.GAN UD.13.KAM ^{d}30 EN.NUN DU-*ma* EN BAR MI *a-kim* IGI.MEŠ-*šú* GIM *qut-ri* BE

21 *gab* $^{\textit{ḫi-pí eš-šu}}$ UD.DA-*su* SA$_{5}$-*át* AN-*ú* GIM *ur-p*í *zi-im* KÙ.GI GAR-*an* AN-*e* ZALAG$_{2}$-*ir*

22 *la* $^{\textit{ḫi-pí eš-šu}}$ DINGIR.ME GIM ŠÈG.ME *iz-nu-un* IM.SI.SÁ *i-rim-ma ki i-ri mu iz-ku*

23 *šá*$^{\textit{hi-pí eš-šu}}$ DU.MEŠ 3 MU.MEŠ EBUR KUR SI.SÁ *ṭuḫ-du u meš-ru-ú ina* KUR GAR-*an*

24 LUGAL URI.KI *lit-tu-tu* DU-*ak* SUḪUŠ GIŠ.GU.ZA-*šú* GI.NA DUMU LUGAL AŠ.TE AD-*šú* DIB-[*bat*]

25 DIŠ *ina* ITI.GAN ^{d}30 *a-dir* IGI.MEŠ-*šú* MI [EN] ⸢BAR⸣-*šú a-dir ana* IM.MAR.T[U…]

26 IM.U$_{18}$.LU *i-ši-ḫa-am-ma* I[M(?) x x x] ⸢x⸣ MI *i-di* MUL.MEŠ AN-[*e* (5 signs)]

27 ZI-*ut* BURU$_{5}$.ḪI.A ZI-*ma* EBUR KUR URI.KI KÚ *x* IM(?) *i* […]

28 [(x)] KUR LÚ.KÚR *ana* KUR LUGAL URI.KI KUR S[U.B]IR$_{4}$.KI ^{d}IŠ[KUR…]

29 [DIŠ *ina* IT]I.GAN AN.GE$_{6}$ ^{d}30 *a-dir* IGI.ME-*šú zi-im* KÙ.GI GAR-*nu ina* IM.SI.S[Á *i-rim-ma*]

30 *ki i-ri-mu iz-ku* IM.SI.SÁ DU *ina* EN.NUN *i-ri-mu iz-ku* AN-*ú z*[*a-ku*]*-ú*

31 [UD.]DA-*su* ZALAG$_{2}$-*át* MUL.ME-*šú na-aṭ-lu ana* ŠID.ME MU ŠÈG.ME KUR ŠUB x[…]x.ME

32 EB[UR] KUR.URI.KI SI.SÁ EBUR ŠE.GIŠ.Ì *ana pi en nu/aš* (?) DIB-*bat* 12 UD.MEŠ *mu-tu* [x-x]-*tu*

33 *ina* KUR [x x] *ma-aḫ-ṣu* NU TI.LA TAG-*ma* UŠ-*šú* LUGAL *ina* GIŠ.TUKUL LÚ.KÚR [DIB]-*bat*
34 UR.GI$_7$ EDIN.⌜NA⌝ *bu-la ú-šam-qa-tu* SAL.PEŠ$_4$.MEŠ BE.MEŠ EN *ṭup-p*[*i*] MU
35 DIŠ 30 *ina la* ITI EN.NUN-*šú ina* x[(3 signs)]-*šú a-dir* LUGAL URI.KI *ina x* ᵈ*En-líl ina* GIŠ.TUKUL BE
36 KUR.URI.KI BIR-a MURUB$_4$ AN [(2–3 signs)]x *ka si* x x *ṣi* DINGIR.ME *u* NUN.ME
37 *i-šá-an-nu-ú* KA È X[…]X.MEŠ X.MEŠ *eṣ-re-ti-šú-nu*
38 *i-šim-mu-ú* SILIM KA DINGIR [(9–10 signs)] MU.3.KAM KÁ NU BE
39 ḪUL-*tu ina líb-bi* GÌR.NITÁ ᵈ*En-*[*líl* (?) (8 signs) 310 *ina* ITI NU EN.NUN-*šú*
40 *ina* NU UD.DUG$_4$.GA-*š*[*ú* (15 signs) *i*]-*qu-ul-lu*
41 DIŠ AN-*ú* GI.NA X[…]
42 IGI.NIGIN.GAR.ME […]
43 DIŠ AN-*ú* GI.N[A…]
44 KA KÚR […]
45 DIŠ AN-*ú* G[I.NA…]
46 DIŠ AN-*ú* […]
47 DIŠ AN-⌜*ú*⌝ […]
48 DIŠ KI […]
49 x[…]
50 DIŠ AN […]
51 DIŠ A[N…]
52 DIŠ x[…]
53 DIŠ […]
54 DIŠ […]
55 DIŠ […]
(8–10 lines broken to bottom of reverse)

Duplicates
Rm. 2,252 (see Bab. 3 283)

obv. 1' […]⌜IGI⌝. MEŠ-*šú* […]
2' […]⌜*pa gab*⌝ *mi a ú šu an a-kim* […]
3' […] *ina* SIG$_5$ AN.MEŠ SA$_5$ *e- u-ú* IM.U$_{18}$.⌜LU⌝ [*i-rim-ma*…]
4' [IM.U$_{18}$.LU *i*]-*ši- a-am-ma* IGI.MEŠ-*šú* x[…]
5' […*ul*] *um-taš-šar* NUN.MEŠ *ina* MU.BI B[E.MEŠ…]
6' […] (uninscribed) *i*-x-[…]

7’ […] *it-ta-ʾ-dar* IGI.MEŠ-*šú* […]
8’ […]x IZI *i*[*q-qa-di*…]
9’ […]x BAR […]

rev. 1’ […ŠE].GIŠ.Ì *u* Z[Ú.LUM.MA…]
2’ […] *ina* GIŠ.TUKUL *ina* E[DIN BE]
3’ […EB]UR KUR NIM.MA.KE ᵈI[ŠKUR TÙM…]
4’ [EBUR KUR NIM.M]A.KI SI.SÁ LUGAL NIM.MA.KI *in*[*a* MU.BI BE]
5’ […] GIM IZI KI.A.ᵈÍD […]
6’ […]⌜*ib-riq*⌝ $BURU_5$.ḪI.A ⌜ZI-*ti*(?)⌝ ZI-*ma* EBUR KUR URI.K[I…]
7’ […*ki*] *i-ri-mu iz-ku* ŠUB-*tim ú-ma-am* E[DIN]
8’ […ᵈUTU *ul-ta-pa*[-*a a-kim* KI.BAL KUR [URI.KI…]
9’ […N]Á.MEŠ ÌR UGU EN-*šú x*[…]
10’ [ᵈUTU *ul-ta-p*]*a-am-ma iṭ-ṭu-*[*lu- šu*]
11’ […]x IM.U_{18}.LU *i-rim-ma ki* [*i-ri-mu iz-ku*…]
12’ […]É.GAL *i*(?)-[…]

K. 12238
obv.(?) 1’ […] x […]
1’ […]-⌜ma(?)⌝ *i di*(?)⌜*ana*⌝ IM.⌜U_{18}⌝.LU […]
3’ […].MEŠ DUMU.UŠ *ú-šat-b*[*a*(?)-*šú*…]
4’ […] IGI UD ŠÚ […]
5’ […*a*]-*dir* IGI.MEŠ-*šú* SIG_7 […]
6’ […] *ki ana* IM.U[$_{18}$.LU…]

break

Translation

1. If on the 12th day of Nisannu the moon is eclipsed and becomes dark in the evening, his features are dark like sulphur fire; [he is obscured until the midpoint; it (the eclipse) covered on the…and]
3. as it covered it cleared; the herds […; deaths] will become numerous in the land; Elam will become impoverished […]
5. uprising of Akkad; the one whose name was not cal[led will seize the throne;] the population will diminish, variant: decrease in number; princes will conquer; [it will] hail; […]
7. darkness will be seen; [there will be] destru[ction…]

8. If on the 12th day and 13th day an eclipse occurs; the side of [...] the kind of Akkad.... [...]
10. If on the 13th day of Nisannu a lunar eclipse [occurs...] the sky is clear; a star of the sky.... [...] will occur in the land, the people of the lands.... [...]
13. the gods [will have] mercy upon Akkad; Elam... [...]
15. If an eclipse occurs on the 13th day, and on the 14th day (the moon) is seen with the sun [...]
16. the king will attain his goal; the behavior of the land will be proper; the foot of the enemy will [...]
18. If a lunar eclipse occurs; his people...will be scattered, [...] prince, king, and army stand(?) below; the gods will not have mercy upon Akkad; [...]...rulership of the four quarters;
20. for the well-being of the king and his palace (and) his army; If the moon becomes dark and the watch comes to an end(?), there will be famine in Subartu at the end of the year(?); star—new break.
22. If on the 13th day of Ajaru the moon is dark; it is yellow like [...] in the evening watch it becomes eclipsed (lit. it [the eclipse] worries him [the moon]) and is obscured until the midpoint; it covered on the south (quadrant) and as it covered it cleared;
24. the south wind rose up and there was darkness....
25. -new break-[...] the sun appears, he is obscured; the king will be seized in his palace and...his city and his people in battle.... his friendship in defeat(?)
27. [...] the son of the king of a city on my border will ascend the throne and for three years will exercise rulership of the people.
28. [If in Aj]aru in the middle watch he (the moon) is dark and red; [...] adorned(?) (and) is dark
29. and his darkness is normal; his light is bright; the sky is clear; it (the eclipse) touched the north...; Adad will [...] his rains and floods.... is covered to the north;
31. as it covered it cleared; the king.... or, the king of Elam will attain old age; the foundation of his throne will be firm.... [...]...the ...of Elam will be raised;
33. there will be an incurable illness in the land of...; the crops of Akkad will thrive; the rivers will be swollen; [...] and barley will...; Adad will thunder and there will be lightning; for two months recovery from ill[nesses] will occur in the land.
36. If on the 13th day of Simanu the m[oon is dark]; his features are black; in the evening watch he is dark and is seen until the

midpoint; the west wind blew; it covered [in the west] and cleared in the west; downfall of the high priest of the gods;

38. defeat in the countryside [. . .] the . . .'s of his sons will be besieged(?) and by the word of Šamaš. . . . will be killed;
39. h[is] work [. . .] will be successful.
40. If [on the 12th/13th day of Du'ūzu] the moon is dark; his features are yellow; it covered on the north and as it covered it cleared;
41. [. . .] Adad will . . . the crops of Akkad; the sesame will not thrive; [. . .] of sesame will not thrive; . . . the temple of Namtar will . . .; the king's brother will take the throne but the foundation of his throne will not be firm; [he will be killed(?)] in a rebellion.
44. If a lunar eclipse occurs in Du'ūzu and is red; the north wind blows; it covered (on the . . . quadrant) and as it covered [it cleared];
45. his light is bright; the sky is clear; the crops of Akkad will thrive; . . .
46. the king of Akkad will establish his throne in the land which he covets; he will defeat an enemy king [. . . If (you observe the eclipse)];
47. for the well-being of the king and his palace: a prince in the palace of the king [. . .]; if during the end of that year. . . .
48. If the moon is dark on the 12th day of Abu; his features are flecked black and yellow; he is dark like a cloud; it covered his entirety and it covered on the south and cleared on the east; the army of the enemy
50. together will become sated; the Sutû will consume the abundance of Amurru; on the 13th day he (the moon) is seen with the s[un]; false utterance and improper behavior will b[e] in Akkad.
52. If the moon is dark on the 13th day of Abu; he is obscured until the watch passes; his features are yellow; he is obscured until his midpoint; it covered with(?) . . . and had the luster of gold until it cleared; the south wind blows; the gods as their decision will have mercy (text: counsel) upon Akkad; he is obscured on the north (quadrant) and as it covers it clears;
55. The king will help(?) his country (lit. give the hand to his country); there will be abundance, life, riches in Elam; the king will become wise; the throne of the enemy land Elam will be seized; uprising of the enemy army of Elam; on the 14th day he (the moon) is seen with the sun; during the end of the year a reliable decision; the heart of the land will be happy; the behavior of the land will be proper; the enemies will retreat; the foot of the kin[g . . .]

59. If on either the 13th or 14th day of Ulūlu…the moon is dark; the watch passes and it is dark; his features are dark like lapis lazuli; he is obscured until his midpoint; on the west (quadrant) as it covered, the west wind blew; the sky is dark;
61. his light is covered; the son of the king will become purified (i.e., will perform *elēlu*-rituals) for (accession to) the throne but will not take the throne; an intruder will…. princes in the west; for 8 (gloss: 16) years he will exercise kingship;…; he will conquer the enemy army; there will be abundance and riches in his path; he will continually pursue his enemy, and his luck will not run out; the south wind blew and his […]'s…; Subartu will become impoverished […] will seize; the foot of his people will […] to […].

rev.

1. [If in the month of] Ulūlu the moon is dark; his features have the luster of gold;…red, dark; it covered on the south and as it covered it cleared; the west wind [blew]; [the king(?)] will be seized in his palace and will not be set free; princes will die in that year; the crops of Akkad will thrive; during the end of th[at] year […]
4. If on the 12th day of Tašrītu the moon is eclipsed and becomes dark in the evening, his features are dark like a cloud; his entirety is co[vered…];
5. a fire is kindled; it covered on the south and cleared in the east; it is dark until midnight […]; termination of a reign; grief for a country, a wind of bad fortune will blow and the head of….
7. If on the 13th day of Tašrītu the moon is dark; his features are red; the sky is clear…. his light is bright, until the watch [passes(?)] he is obscured; it covered on the north and as it covered it cleared; the north wind blew; abundance of the people of Akkad; well-being for the king; the crops of Amurru will thrive;
9. sesame and dates will thrive; well-being for the king and his offspring; the prince beloved of the king will die on the battlefield.
10. If on the 12th day he (the moon) is not seen with the sun; foot of the enemy in the land; Adad will wipe out the crops of Elam; the king of Elam will attain old age, or, the crops of Elam will thrive; the king of Elam will die in that year.
12. If on the 13th day of Arahsamna the watch passes and the moon is dark; his features are dark like sulphur fire; attack of locusts [in(?)

the la]nd; Adad will thunder and there will be lightning; . . . locusts will attack and devour the harvest of Akkad;

14. until midnight it is obscured; it covered on the north and as it covered it cleared; death of the wild animals of the steppe.

15. If the moon is dark in Arahsamna and is obscured until the sun rises; revolt of Akkad; humiliation of princes;. . .; the people will lie down upon the ground; servant will go against his master; the moon is eclipsed at night and the sun rises and sees him.

18. If the moon is dark in the month-break(?)-and his features are red; during(?) the watch he is obscured; it covered on the south and as it covered it cleared; until-break-the head of the mace will rise high in the land; questioning will be severe in the palace.

20. If on the 13th of Kislīmu the moon is dark; the watch passes and he is obscured until midnight; his features are dark like smoke; -new break-; his light is red; the sky has a golden glow like a cloud; the sky is clear;

22. -new break- . . . there will be rain; it covered on the north and as it covered it cleared; -new break-will go; for three years the crops of the land will thrive; abundance and riches will be in the land;

24. the king of Akkad will attain old age; the foundation of his throne will be firm; the son of the king will seize his father's throne.

25. If the moon is dark in Kislīmu; his features are dark; he is dark until his [midpoint]; [it covered] on the west[. . .]; the south wind rose up and [. . .] . . . stars of the sk[y. . .]; attack of locusts will rise up and devour the crops of Akkad; . . .

27. [. . .] the land of the enemy to the land of the king of Akkad; Ad[ad will . . .] the land of Subartu.

29. [If in Kis]līmu the moon is dark; his features have the luster of gold; [it covered] on the nort[h and] as it covered it cleared; the north wind blew; it covered and cleared during the watch; the sky is clear; his light is bright; his stars become visible; . . .;

32. the harvest of Akkad will thrive; the harvest of sesame . . . will be seized; for twelve days death(?); . . . in the land [. . .] an incurable . . . will attack and pursue him; the king will [cap]ture the enemy in battle;

34. a dog of the steppe will cause the death of cattle; pregnant women will die during the end of the year.

35. If the moon is dark at an unexpected time (lit. not in the month of his watch(?)) and his [. . .]; the king of Akkad will die in battle by the . . . of Enlil;

36. Akkad will be scattered; the middle of the sky [...]...gods and princes will....
37. ...[...]...their....
38. will...[...] for three years the gate will not be opened;
39. evil in the heart of the official of En[lil (?)...an eclipse of (?) the mo]on not in the month of his watch (means) not at his specified time [...] will heed.
41. If the sky is normal(?)....

remainder too fragmentary for translation

Commentary

1. TAB-*ma* = *iḫmuṭamma*. Cf. the incipit to EAE 15, DIŠ 30 TAB-*ma ba-ra-ri it-ta-ʾ-dar* "If the moon is TAB and becomes dark in the evening watch," AfO 14 pl. 1:15 (catalogue of EAE from Uruk, Seleucid text). See also the duplicate ACh Sin 30:48 (catchline on a tablet of EAE 14) and ACh Sin 3:32. The same protasis occurs in two fragments of uncertain identification, viz. K. 10379 and K. 11309, tentatively identified by Weidner as belonging to EAE 2 (AfO 14 [1941–44], p. 195 sub c and see also AfO 17 p. 71 note 1). In the variant K. 11309, TAB is written syllabically *iḫ-mu-ṭam-ma* (see also ACh Sin 3:41). The meaning of *ḫamāṭu* in this context is ambiguous. Weidner has understood TAB to mean "to glow red," from *ḫamāṭu* "B" "to turn" or "to be inflamed" (see CAD s.v.). The red glow of an eclipsed moon is common and would support such an interpretation. On the other hand, but perhaps only through confusion of the logogram TAB for "*ḫamāṭu* B," the homonym *ḫamāṭu* "to be too soon," "to be early" is used in eclipse omens as a synonym of *šurrû* "to begin," which is also written TAB (see especially the Neo-Babylonian eclipse reports, e.g., LBAT 1427 r. 4 DU_6 14 48 *ana* $ZALAG_2$ *ina* KUR TAB "Month VII day 14, 48° before sunrise, it [the eclipse] begins on the south," and see also ibid. obv. 3 and LBAT 1416 rev. middle section 2 Á U_{18} TAB "it [the eclipse] begins on the south"). For this usage (where *ḫamāṭu* and *šurru* are interchangeable), see AfO 14 pl. 7 ii 13f: *šumma antalû ina ṣīt šamši iḫ-mu-ṭa ina erēb šamši immir* TAB // *ḫamāṭu* // TAB // *šurrû* "If an eclipse begins in the east and clears in the west, TAB is *ḫamāṭu* and TAB is *šurrû*." This usage can be ruled out for the present text. A third possibility is that *ḫamāṭu* "A," given its equivalence in synonym lists with *dulluḫu* "to be hurried" or "to be restless," and by extension "to be perturbed," can mean in a metaphoric sense "to be eclipsed." Such "psychological" metaphors are not uncommon in

eclipse terminology, and I have opted for this interpretation in my translation. As both *ḫamāṭu*'s are equated with *dulluḫu* (see CAD s.v. lexical sections), these homonyms may already have been subject to confusion and ambiguity.
4. Cf. KUR.BI UKÚ-*in* Leichty *Izbu* III 44f., and see below line 64.
6. BE = *šumma* "*or*," used to indicate the alternative *maṭû* for *ṣeḫēru.* See also lines 31 and rev. 11 for the same usage.
16. For *šarru šipiršu ikkaššad*, see Thompson Rep. 201 r. 2 and cf. the "prophecy text" Iraq 29 120:13.
18. NU IGI RI is obscure. For *nišē issappaḫa*, see ACh Supp. 2 32:34; ACh Sin 3:131; ACh Supp. 27(28):13, and duplicate AfO 17 pl. 1:14, and passim in lunar omina. There may have been conflation of two lines here.
21. *ina ṭuppi* MU: The adverbial *ṭuppi* "(end of) a period of time," see AHw. s.v. *ṭuppi* p. 1394b and discussion by Rowton, JNES 10 (1951), p. 184ff., with reference to these lines, see p. 193. See the more common phrase *adi ṭuppi šatti* below lines 47, 57, rev. 3 and 34, and cf. ACh Supp. 2 70:11 DIŠ *a-di ṭup-pi* MU.AN.NA ^{d}*Dil-bat ana* ŠÀ 30 TU "If during(?) the end of the year Venus enters within the moon," also ibid. 29 written EN *ṭup-p*[i]. The specific interval of time denoted by *ṭuppi šatti* in the lunar omens remains obscure.
29. IM.SI.SÁ TAG NU DU: The reading *iltāna ilput ul izziz/illik* may be proposed with certain reservations. The subject may be understood as the eclipse, cf. CAD s.v. *lapātu* mng. lc where the shadow of an eclipse is said to touch, i.e., cover, a quadrant of the moon. If however IM.SI.SÁ refers to the north wind, *ul illik* "does not blow" would fit the context but could not be reconciled with TAG (*lapātu*).
35. GIG.AN.TI.LA = *murṣāni balāṭu* "to recover from illnesses." See ACh Supp. 2 118 rev. 1–2: AN.GE$_6$ EN.NUN.USAN$_2$ *a-na* NAM. BAD.MEŠ//AN.GE$_6$ EN.NUN.MURUB$_4$.BA ⌜*a-na* KI.LAM⌝ [TUR] AN.GE$_6$ EN.NUN.ZAL.LI *a-na* GIG.AN.TI.LA, and its Old Babylonian parallel (BM 86381:1–3, cited by permission of the Trustees of the British Museum): [BE AN.T]A.LÙ *ba-ra-ar-tim a-na mu-ta-nim* [BE AN.T]A.LÙ *qá-ab-li-tim a-na* KI.LAM TUR.RA [BE AN.T]A.LÙ *ša-at ur-ri a-na mu-ur-ṣa-ni ba-la-ṭi*. See also ACh *Šamaš* 8:55 (If a solar eclipse occurs on the 30th day)...GIG.AN.TI.LA *ina māti* [*ibaššu*].
37. É.MAŠ = *šangû.* Cf. ŠUB-*ti* É.MAŠ, A. Boissier *Choix de textes relatifs à la divination assyro-babylonienne* (Genève: H. Kündig, 1905), Nr. 64:11.
41. ^{d}IŠKUR *ú*-x-*ši*: One expects a form of *abālu*, cf. rev. 10, written TÙM, but the signs are not so.

46f. Restored on the basis of the following parallel: BE-*ma ana* SILIM LUGAL URU *u* UN.MEŠ-*šú* DÙ-*ma,* see ABCD, EAE 17 II D ii 11, EAE 17 II E rev. 12, EAE 17 II § IV F 15', and EAE 17 11 § VI. 11.
56. KUR LÚ.KÚR...DIB-*bat* does not represent standard phraseology, but cannot be construed otherwise.
58. One would like to have GÌR^{II} LUGA[L *ú-na-aš-šá-qu*] "(the enemies) [will kiss] the feet of the kin[g]," but there is not enough room at the end of the line.
rev. 13. ZI-*ti: tibūti* "invation"(?). See also duplicate (Rm. 2,252) line rev. 6'. It is more likely that the apodosis should read ZI-*ut* BURU$_5$.ḪI.A ZI-*ma* etc., see rev. 27.
16. *e*-KUR is problematic. Another possibility is to read SÌLA LAL "flax will decrease," cf. references in CAD sub *qû* A mng. lb, and take NUN.ME as a new subject, leaving *e*-KUR as a finite verb form of uncertain root.
18. ITI.*ḫi* for ITI $^{\text{ḫi-pí}}$. Note the presence of *ḫīpi* in rev. 19, 21, 22, and 23 along the left side.
33. One would prefer *ma-ar-ṣu,* but text shows a clear -*aḫ* sign.
37–38 to the break are completely obscure.
39. For GÌR.NITÁ ^{d}*En-líl*, see Iraq 29 122:17 (prophecy text).
40. [...*i*]-*qu-ul-lu:* Cf. ACh Sin 35:41, cited CAD s.v. *qâlu* A mng. 2b2'.
41ff. AN-*ú gi-na-a:* For parallel, see ACh Adad 31:76–80: *šumma* AN-*ú gi-na-a ḫi-il*-[...]

CHAPTER FIVE

TCL 6 13: MIXED TRADITIONS IN LATE BABYLONIAN ASTROLOGY

Introduction

As is the case in nearly all aspects of Mesopotamian culture, the study of Babylonian astrology is still very much a matter of *Quellenforschung*. This is particularly true for the late Babylonian astrology, preserved in texts of the period from ca. 500 B.C.E. to Seleucid times. But even the older celestial omen tradition as represented by the omen series *Enūma Anu Enlil* is not fully available in modern editions and a vast corpus of texts of astrological content (including *Enūma Anu Enlil*-type celestial omens, nativity omens, horoscopes, and iatro-astrology) from Achaemenid and Seleucid periods remains to be studied.[1] In the period following 500 B.C.E., a greater diversity is found in the traditions of celestial divination and astrology than before. The "classical" *Enūma Anu Enlil* tradition is now joined by new forms of personal astrology reflected in cuneiform horoscopes and nativity omens, both dependent on the introduction of the zodiac.

The text edited here has long been available in a published copy, TCL 6 13.[2] It belongs to the late period of Babylonian astrology, and in its combination of public (derivative of *Enūma Anu Enlil*) and personal astrology, TCL 6 13 reflects a variety of traditional forms and "doctrines," and presents much that is not familiar to us from *Enūma Anu Enlil* alone. Although in some respects the difficulties encountered in this text both philologically and with regard to interpretation remain impenetrable, the light shed on a number of points justifies its treatment here.[3]

[1] For available editions of celestial omen texts, see above, Chapter Two, note 6.

[2] See the description of the text by H. Zimmern, ZA 32 (1918/19), pp. 69ff.

[3] I wish to thank Dr. Denyse Homès-Fredericq of the Musées royaux d'art et d'histoire in Brussels for generously providing me with a photo with which I could collate the text.

TCL 6 13 is part of a 2-col. tablet from Seleucid Uruk, containing 29 lines on one side and 25 on the other with a number of paragraphs written at a 90° angle (as in TCL 6 12+VAT 7847, and related texts.[4] The tablet is distinguished by two geometrical figures drawn to the left of the text on both obverse and reverse. The figure on the reverse is a circle within which four equilateral triangles have been inscribed. Such a design is immediately recognizable in terms of later Greek astrology as depicting the doctrine of trine aspect. The likelihood of this actually being the case will be taken up below (pp. 132–3). The other figure presents a great many problems of interpretation. A circle is divided into four unequal quadrants by two lines intersecting at angles of roughly 75° and 105°. In one quadrant we find the remark PAP *itguru*, which probably refers to the crossed or crooked shape of the diagram itself. The rest of the inscribed material on the diagram is for the most part unintelligible.

Some elements of TCL 6 13 relate to the practice of nativities, showing parallels in both nativity omens and horoscopes. These assign personal characteristics and future fortunes to individuals born when one of the seven planets comes forth (obv. ii 1–6). The seven planets are Jupiter, Venus, Mercury, Mars, Saturn, Moon, and Sun, in the standard order found in Seleucid astronomical texts. The moon and sun when eclipsed are also included in this schema. This first section is marked off by a double ruling and is followed by (to us) abstruse instructions concerning something termed DUR, which seems to describe some relationship between, or configuration of, planets, presumably in the various zodiacal signs (see lines 11–28). The sign DUR appears again only on the reverse, where the presence of planets (and sometimes Sirius)[5] in the DUR and whether they are bright (GUR_4 = *ba'ālu*) or faint (SIG = *unnušu; unnutu*) are interpreted by means of omen apodoses concerning public affairs. In place of apodoses of this nature, occasionally a comment about what kind of "sign" (*ittu*) *is* signified,

[4] See E.F. Weidner, *Gestirn-Darstellungen auf babylonischen Tontafeln*, Österreichische Akademie der Wissenschaften. Philosophisch-Historische Klasse. Sitzungsberichte, 254. Bd., 2. (Graz, Vienna, Köln, Böhlau in Kommission, 1967).

[5] Note that the vassal treaties of Esarhaddon were concluded "before stars," specified as "in the presence of Jupiter, Venus, Saturn, Mercury, Mars, and Sirius," in lines 13–15 of the treaty, see D.J. Wiseman, "Treaties," *Iraq* 20/1 (1958), and see S. Parpola, LAS 1 r. 18–19. For another (private) pact made in the names of Jupiter and Sirius, see Parpola, "A Letter from Šamaš- šumu-ukin to Esarhaddon," *Iraq* 34 (1972), p. 22 r. 26–30, and p. 32 note 57.

either favorable (*damqat*) or unfavorable (*ḫaṭât, laptat*), *is* added. No reference is made to personal predictions in either rev. ii 1–21 or obv. ii 11–28.

The section immediately following the procedural paragraph (concerning the DUR) on obv. col. ii does not mention the DUR, but concerns the positions of planets in the zodiac and whether they are bright or faint. These situations are interpreted in terms of whether the enemy will attack or not and whether booty will be taken. The section has the subscript UD.DUG$_4$.GA ZI KÚR "appointed time of the enemy attack" (obv. ii 29). The term *adannu* (UD.DUG$_4$.GA) has two usages in astrological omina: 1) in planetary omina, *adannu* refers to the specified time of appearance of a planet or fixed star derived from knowledge of its periodicity,[6] and 2) the length of time between the occurrence of a sign and its predicted consequence, which is to say the lapse between events of the omen protasis and those of the apodosis.[7] If the second usage pertains here in the subscript of TCL 6 13, i.e., that at a specified time after the occurrence of the celestial sign, the enemy would attack, why then is no reference made to the length of that specified time? Such references are found in eclipse omina where *adannu* is clearly not an astronomical period, e.g., UD.DUG$_4$.GA AN.GE$_6$ EN.NUN AN.USAN *ana* ITI.3.KAM UD.10.KAM "period of an eclipse of the evening watch is 3 months and 10 days (= 100 days)."[8]

The single most significant contribution to our understanding of Babylonian astrology derived from this text is that the standard Seleucid order of planets can now be explained in terms of the benefic or malefic status assigned to them.[9] TCL 6 13 presents a system in which benefics (Jupiter, Venus, and Mercury) are enumerated first and malefics (Mars and Saturn) following. In Seleucid Babylonian astronomy (as well as in the horoscopes)[10] the order by benefic and

---

[6] BPO 2, 16 sub 2.2.1.1.

[7] CAD A/1 s.v. *adannu*, mug. 2a–2' and see ABCD, ch. 4, sub IC "Periodicity," for its application to lunar eclipse omina.

[8] For three eclipse *adannu*'s (100, 200, and 300 days), see ABCD, EAE 20 recension B note 9, EAE 20 text e: 14 and note 3; EAE 20 text g: 10 and note 9 and ACh. Supp. 2 19:10–11.

[9] See below, Chapter Six. F. Boll was the first to note the particular arrangement of the planets in astronomical texts, see sub "Hebdomas" in RE (1912), cols. 2561–2564, and "Neues zur babylonischen Planetenordnung," ZA 28 (1913), pp. 350–351.

[10] See Sachs, "Babylonian Horoscopes," JCS 6 (1952), p. 64.

malefic status is preserved, except that the malefics change position, so that we have Jupiter, Venus, Mercury, Saturn, Mars. The system ascribing benefic and malefic identifications is clear in TCL 6 13 obv. ii 1–4, which refers to nativity omens, as well as in obv. ii 11–28, which contains *Enūma Anu Enlil*-type omens. In the first four lines, the benefic planets (Jupiter, Venus, Mercury, and moon) are correlated with good personal predictions, the malefics (Mars, Saturn, eclipsed moon and sun) with bad, and in the latter section (lines 11–28), a schema emerges in which brightness or dimness of planets is correlated with positive and negative apodoses regarding the attack of the enemy and whether booty will be taken (see Table 1). A benefic planet when bright indicates a good omen, when dim a bad one. Conversely, a malefic when bright signals a bad prediction, and when dim a (relatively) good one. Later, in Hellenistic Greek astrology, these identifications (as ἀγαθοποιοί and κακοποιοί) become commonplace, except that Mercury takes an ambiguous status, sometimes considered benefic sometimes malefic.[11] The Greek theory of the benefic and malefic natures of planets, while no longer determinant of their sequence (this becoming a cosmological one, determined by distance from the earth), is nevertheless still related to the order of the planets and their proximity to either sun or moon. The Greek planetary order, followed from the time of Eudoxus (4th century B.C.), is Saturn, Jupiter, Mars, Sun, Venus, Mercury, Moon.[12]

Table 1. Scheme for Brightness/Dimness and DUR

DUR ♃♀☽ eclipsed
DUR ☽ eclipsed ♃
DUR ♄♂☉ eclipsed
DUR ♃♂ Sirius ☉ eclipsed
DUR ♂♄ Sirius bright
DUR ♃♀ bright
DUR ☽ eclipsed ♃ faint
DUR ☽ or ☉ eclipsed
DUR ☿♂ bright
DUR ♀♂ bright

[11] See Ptolemy, *Tetrabiblos* 1.5–7 (ed., F.E. Robbins, Loeb Classical Library, 1980, 38ff.), and A. Bouché-Lerclercq, *L'Astrologie grecque*, (Paris, 1899, Scientia Verlag Aalen, 1979[2]) 101 note 2. See also D. Pingree, *The Yavanajātaka of Sphujidvaja* (Harvard Oriental Series 48, 1978) vol. II 214.

[12] See Bouché-Leclerq, *L'Astrologie grecque*, pp. 107–108; also Neugebauer, *Exact Sciences in Antiquity* (1969), pp. 168f.

Table 1. (*cont.*)

DUR ♀ Sirius bright
DUR ♂☿ bright
DUR ♂♄ bright
DUR ☽ or ☉ eclipsed ♃ faint
DUR ☽ or ☉ eclipsed ♃ not present
DUR ☽ eclipsed ♃ not present
DUR ☽ eclipsed ☉ eclipsed
DUR ♃
DUR ♄ (?)
remainder broken

II. TCL 6 13: Edition and Commentary

obv. col. i
1' [...*an-n*]*a-a-ti* ⌜ana$^{?}$⌝ DUḪ.LÀL
2' [...N]A_{4}.GIŠ.NU_{11}.GAL

These lines are followed by a ruled section with space for approximately 5 lines, of which none are preserved, and the half-broken last signs of 3 lines.

rev. col. i (left side)
3' [...] x GAL
4' [...]-*šú* GAL.MEŠ
5' [...*šu-ut*$^{?}$] ^{d}DIŠ DU-*zu*
6' [...]-*ba* DINGIR.MEŠ GAL.MEŠ

7' [...] x
8' [...] x.⌜GÁ$^{?}$⌝
9' [...] x
remainder broken

Written at 90° running the length of the right edge of col. i around to the reverse is the following:

[...*nis*$^{?}$]-*ḫa* SU x [...(destroyed for approximately 20 signs)]
x KI$^{?}$ KAL É.GAL MAḪ ^{d}LUGAL.GÌR.RA

Written at 90° outside the right edge of col. i (also continuous from rev. to obv.) are two lines:

1 [… 12 MUL.MEŠ *šu-ut*] ⌜^{d}40⌝ DU.MEŠ MUL.*Dil-bat* MUL. ŠU.GI MUL.⌜UR.GU⌝.LA MUL.MAŠ.TAB.GAL.GAL. MUL.⌜UGA⌝ M[UL.*Ẓi-ba-n*]*i-tu*$_4$ MUL.GÍR.TAB MUL.UD.KA.<DUḪ>.A MUL.AL.LUL MUL.SIM.MAḪ MUL.KA$_5$.A 12 MUL.MEŠ *šu-ut* ^{d}DIŠ DU.MEŠ

2 MUL.APIN MUL.*A-nu-ni-tu$_4$* MUL.MUŠ MUL.AL.TAR MUL. MAR. GÍD.DA MUL.ŠU.PA ⌜MUL.EN.TE.NA.BAR⌝.ḪUM MUL.LUGAL MUL.ÙZ MUL. Á.MUŠEN MUL.*Da-mu* MUL. ^{d}*Marduk* 12 MUL.MEŠ *šu-ut* ^{d}50 DU.MEŠ

obv. col. ii

1 DIŠ MUL.SAG.ME.GAR GI-*át* DI-*át* NÍG.TUG U$_4$.GÍD.⌜DA DIŠ⌝ ^{d}[*Dil-bat pa-áš-ḫat at-rat e-ma* GIN-*ku* ŠE.GA U$_4$ GÍD.DA]

2 DIŠ ^{d}GU$_4$.UD *qar-da-át e-tel-let e-mu-qan pu-ug-lu* DIŠ ^{d}[*Ṣal-bat-a-nu pít-ru-us na-an-ziq ḫa*]-⌜*an-ṭu-su*⌝

3 DIŠ ^{d}SAG.UŠ MI.MI *dal-ḫat* GIG-*at u si-qát*

4 DIŠ ^{d}30 ZALÁG-at SIG$_5$ *ki-na-at* u GÍD.DA // DIŠ AN.GE$_6$ 30 *ek-let dal-ḫat* NU
ZALÁG-*at* ⌜KIN NU GI DIŠ⌝ AN.GE$_6$ 20 *par-sat pár-da-<at>*

5 DIŠ KI ^{d}*Ṣal-bat-a-nu* BAD GIG BAD UR.MAḪ *ú-lu* BAD GIŠ. TUKUL LUGAL// DIŠ KI MUL.PA.ME.GAR NÍG.TUK DUGUD M⌜U⌝-*šú* SIG$_5$ KIN GI UGU UN DÙG.GA AN LUGAL BE […]

6 DIŠ KI ^{d}*Dil-bat* DUMU.MEŠ *u* DUMU.SAL.MEŠ UN.MEŠ BI DIŠ KI ^{d}UDU.IDIM.SAG.UŠ BAD *ár-nu* GAR NU SI.[SÁ] KI ^{d}GU$_4$.UD *e-tel-liš* DU.DU É.MEŠ ŠEŠ.MEŠ-*šú* BE-*el*

7 *ina* 1 DUR GABA.RI DU.ME 1-*ma* // *ina* 1 KI 2 *ú*-⌜*lu*⌝ 3 DU.ME ⌜1-*ma*⌝

8 3-*šú-nu ina* 1 DUR DU.ME 1-*ma* // *e-nu-ma iš-te-niš* GUR$_4$.ME 1-*ma*

9 ZI KÚR *it*-<<*id*>>*pit-qat* KI.<<1>>.ME ZI KÚR KIN.KI⌜N *u*⌝ UD.DA ZI KÚR ŠEŠ

10 UD.15.ME *u* UD.16.ME *ina* ITI EN.NUN-⌜ka⌝ ŠEŠ

11 BE ^{d}*Ṣal-bat-a-nu* SAR-*ma ina* MÚL.LÚ.ḪUN.GÁ UŠ *u* ^{d}SAG. ME.GAR *ina* MÚL.UR.A ⌜*ú-lu ina*⌝

12 MÚL.AŠ.GÁN *ú-lu ina* MÚL.GÍR.TAB *ú-lu ina* NA.BI *un-nu-ut* ZI KÚR *ana* KUR.URI.⌜KI GÁL⌝

13 BE-*ma ana tar-ṣi* GISKIM *an-ni-tu*$_4$ UD.15.ME UD.16.ME 30 *ina* IGI.GUB.MEŠ ⌜x x x⌝

14 *ina* KI KUR.URI.KI 30 *u* 20 ÍR.MEŠ BE-*ma* ^{d}SAG.UŠ *u* ^{d}⌜GU$_4$.UD x⌝ [x] ⌜GUR$_4$⌝.ME
15 KÚR ZI-*ma* NAM.RI È BE-[*ma ana*] GABA.RI GISKIM.MEŠ *an-na-a-tú* ^{d}SAG.ME.GAR
16 *ma-gal* GUR$_4$ 30 *u* 20 *ina* K[I KUR.U]RI.KI NU ÍR.MEŠ KÚR ZI-*ma* NAM.RI NU È
17 KI.MIN KÚR 50.MEŠ *ina* MI-[*šú* ŠUB]-*ut*//^{d}*Ṣal-bat-a-nu ina* GÍR.TAB UŠ-*ma* GUR$_4$ ZI *Su-tí-i*
18 BE-*ma* ^{d}SAG.ME.GAR *ana* GABA.RI-*šú lu ina* AŠ.GÁN *lu ina* NA.BI GUR$_4$ KÚR ZI-*a mim-ma* NU TI
19 BE-*ma* ^{d}*Ṣal ina* UR.A *lu ina* GÍR.TAB *lu ina* MAŠ.TAB.GAL.GAL *lu ina* ALLA UŠ-*ma* GUR$_4$ *u* ^{d}GU$_4$UD
20 *ina* ŠU$^{!}$.GI *lu* AŠ.GÁN GUR$_4$ ZI KÚR *ana* KUR GÁL BE-*ma* ^{d}SAG.ME.GAR SIG NAM.RI È
21 BE-*ma* ^{d} *Ṣal* GUR$_4$-*ma ina* ŠÀ AB.SÍN *lu ina* GU$_4$ UŠ ZI KÚR *ana* KUR NIM GÁL-*ma*
22 BE-*ma* ^{d}*Dil-bat* SIG NAM.RI È BE-*ma* ^{d}KAK.SI.SÁ BE-*ma* ^{d}*Ṣal* GUR$_4$-*ma*
23 *ina* ŠÀ RÍN *lu ina* GU.LA *lu ina* ŠU$^{!}$.GI UŠ KÚR *ana* KUR MAR ZI-*a* BE ^{d}KAK.SI.SÁ
24 *ú-lu* ^{d}SAG.ME.GAR SIG NAM.RI È BE-*ma* BE-*ma* ^{d}SAG.ME.GAR *ú-lu* GU. ⌜x x⌝
25 *ina* ALLA *lu ina* KUN UŠ-*ma* GUR$_4$ ^{d}*Ṣal ina*$^{!}$ GÍR.TAB *lu ina* MÚL.MÚL *lu ina* NA.BI ⌜x x x⌝
26 ZI KÚR ZI-*ut* URI.KI *ana* KUR SU *u* GU GÁL ⌜x KUR$^{?}$ SU x x *ma*⌝ UD.16.MEŠ ⌜x x⌝
27 BE-*ma* ^{d}*Ṣal lu* ^{d}*Dil-bat ina* NAM.RI UŠ-*ma* GUR$_4^{?}$ ZI [KÚR] *ana* KUR GÁL
28 ^{d}SAG.ME.GAR SIG-*ma* [x (x)] ^{d}SAG.UŠ GUR$_4$

UD.DUG$_4$.GA ZI KÚR

rev. col. ii

1 DUR ^{d}SAG.ME.GAR *u* ^{d}*Dil-bat* DU.MEŠ-*ma* 30 ÍR GISKIM.BI *ana* KUR KÚR SUM
2 DUR ^{d}30 ÍR ^{d}SAG.ME.GAR *ana* IGI-*šú* DU-*za* GISKIM.BI TAK$_4$ *ana* KUR ⌜*dam-qa-at*⌝ *ana* KUR KÚR *ḫa-ṭa-*⌜*at*⌝
3 DUR ^{d}SAG.UŠ *u Ṣal-bat-a-nu ú-lu* ^{d}GENNA *ina* ŠÚ DU-*ma ana* 30 ÍR GISKIM.BI TAG-*át* KUR ZÁ URU *ina-qar* LUGAL.BI LAL-*mu*
4 DUR ^{d}SAG.ME.GAR *ú-lu* ^{d}*Dil-bat* DU.MEŠ 20 ÍR GISKIM.BI *ana* BAD LUGAL ⌜x-*át*⌝ NUN BAD BE-*ma* ÍD *is-sek-kir* BE-*ma* URU *DIB-bat*

5 DUR ^{d}SAG.UŠ ^{d}*Ṣal ú-lu* MUL.KAK.SI.SÁ DU.MEŠ 20 ÍR GIS-KIM *ana* BAD ⸢x-*át*⸣
6 DUR ^{d}*Ṣal-bat-a-nu* ^{d}SAG.UŠ *ú-lu* MUL.<KAK>.SI.SÁ DU.MEŠ-*ma* GUR$_4$ ZI KÚR *ana* ⸢KUR⸣
7 DUR ^{d}SAG.ME.GAR *u* ^{d}*Dil-bat* DU.MEŠ-*ma* GUR$_4$.ME KI.MEŠ SIG$_5$.MEŠ ana KUR.⸢BI⸣
8 DUR ^{d}30 ÍR ^{d}SAG.ME.GAR *un-nu-ut* KUR.BI ZÁ LUGAL.BI LAL-*mu*
9 DUR ^{d}30 *u* ^{d}20 ÍR ^{d}SAG.UŠ *u* ^{d}*Ṣal-bat-a-nu* DU.MEŠ ZÁ [(3 signs)] 30 3,20 LAL-*mu* É.GAL NUN *kar-mu-*⸢*tú*⸣ [GIN]
10 DUR ^{d}GU$_4$.UD *u* ^{d}*Dil-bat* DU.MEŠ GUR$_4$.ME ŠÈG.ME *u* A.⸢KAL.ME⸣
11 DUR ^{d}*Dil-bat u* ^{d}*Ṣal-bat-a-nu* DU.MEŠ-*ma* GUR$_4$.ME ZI KÚR *ana* KUR.BI
12 DUR ^{d}*Dil-bat u* MUL.KAK.SI.SÁ DU.MEŠ-ma GUR4.ME ZI KÚR *ana* KUR.BI
13 DUR ^{d}*Ṣal-bat-a-nu u* ^{d}GU$_4$.UD DU.MEŠ-*ma* GUR$_4$.ME ZI KÚR SAL.KÚR.MEŠ
14 DUR ^{d}*Ṣal-bat-a-nu u* ^{d}SAG.UŠ DU.MEŠ-*ma* GUR$_4$.ME MEŠ BE NU
15 DUR ^{d}30 *u* ^{d}UTU ÍR.MEŠ-*ma* ^{d}SAG.ME.GAR *un-nu-ut* BE ⸢BAL⸣
16 DUR ^{d}30 *u* ^{d}UTU ÍR.MEŠ-*ma* ^{d}SAG.ME.GAR NU DU BE BA [L x x]
17 DUR ^{d}30 ÍR ^{d}30 ÍR ^{d}SAG.ME.GAR NU DU BE x [...]
18 DUR ^{d}30 ÍR ^{d}20 ÍR BAD ⸢LUGAL⸣ ZÁ [...]
19 DUR ^{d}SAG.ME.GAR [x x x] [ ].MEŠ SIG$_5$ [...]
20 DUR ^{d}SAG.X [LUGAL].BI LAL-*mu*
21 [ ] x ⸢ZI KÚR⸣ [...]
remainder broken

Translation to col. ii:
Obv. ii
1 (If) Jupiter: (The sign is) favorable;...; wealth (and) long days (are in store). (If) Ve[nus: (the sign is very calm, wherever he goes good fortune and long days.]
2 (If) Mercury: (The sign is) heroic, lordly; (he will have) great strength. (If) [Mars: (the sign is) ambiguous; (he will be) qui]ck [to anger.]
3 (If) Saturn: (The sign is) dark, disturbed; sick and constrained.
4 (If) the moon: (The sign is) bright, good; true and long(lived)//If

the eclipsed moon: (the sign is) dark, disturbed, not bright; [no true omen. If] the eclipsed sun: (the sign is) divided, confused.

5 If the place of Mars: Death by illness, death by lion(s), death by the weapon of the king.// If] the place of Jupiter: wealth, his name will be good; a true omen; good with respect to the people;....

6 If the place of Venus: Sons and daughters of that people. If the place of Saturn: death by misdeed; not favorable. (If) the place of Mercury: he will go around proudly and dominate his brothers' households.

7 In 1 DUR, they (the planets) stand opposite(?)....// In 1 region, two or three (planets) stand....

8 Three of them stand in 1 DUR....// When they all shine brightly....

9 attack of the enemy. Pay attention(?). Be careful. You look for the places of the enemy attack and you watch for the time(?) of the enemy attack.

10 In the month of your watch, you observe the 15th and 16th days.

11 If Mars rises and its stationary in Aries and Jupiter in Leo or in

12 Iku (= Pisces) or in Scorpius or in its position is faint: There will be an attack by the enemy on the land of Akkad.

13 If at the time of this sign, on the 15th and 16th days the moon in the positions [...]

14 Moon and sun will be eclipsed in the place of Akkad. If Saturn and Mercury [...] are bright:

15 The enemy will attack and take booty. If opposite these signs Jupiter

16 is very bright: Moon and sun will not be eclipsed in the place of Akkad; the enemy will attack but will not take booty.

17 Ditto, fifty of(?) the enemy will fall in its....// (If) Mars is stationary in Scorpius and is bright: Attack of the Suteans.

18 If Jupiter to its opposite(?) is bright either in Iku or in its position: The enemy will attack, but will not take anything.

19 If Mars is stationary in Leo or in Scorpius or in Gemini or in Cancer and is bright and Mercury

20 is bright in Perseus or Iku: There will be an attack by the enemy on the land. If Jupiter is faint: Booty will be taken.

21 If Mars is bright and is stationary within Virgo or in Taurus: There will be an enemy attack on Elam.

22 If Venus is faint: Booty will be taken. If Mars (is faint?): It will go well. If Mars is bright and becomes stationary

23 in Libra or in Aquarius or Perseus: The enemy will attack the land of Amurru. If Sirius
24 or Jupiter is faint: Booty will be taken. If <<If>> Jupiter or.... [...]
25 is stationary in Cancer or in Pisces and is bright, Mars [...] in Scorpius or in Taurus or in its position...
26 Attack of the enemy; attack of Akkad on the land of Subartu and Guti....and the 16th days....
27 If Mars or Venus are stationary and bright in....: There will be an attack [by the enemy] on the land.
28 Jupiter is faint and [...] Saturn is bright.
Term of the enemy attack.

rev. col. ii
1 DUR—Jupiter and Venus are present and the moon is eclipsed: Its sign is given for the enemy land.
2 DUR—Lunar eclipse; Jupiter stands before it: Its sign....is good with respect to the land, is evil with respect to the enemy land.
3 DUR—Saturn and Mars or Saturn in setting are present and the moon is eclipsed: Its sign is bad, the land will be ruined, the city will be razed, its king will be captured.
4 DUR—Jupiter and Venus are present, sun is eclipsed: Its sign for the death of the king, is [bad?], a prince will die, either the river will be silted up or the city will be taken.
5 DUR—Saturn, Mars or Sirius are present; sun is eclipsed: Its sign, for the death of....
6 DUR—Mars, Saturn or Sirius are present and bright: Attack of the enemy on the la[nd],
7 DUR—Jupiter and Venus are present and bright: The positions are favorable for that land.
8 DUR—the moon is eclipsed, Jupiter is faint: That land will perish, its king will be captured.
9 DUR—Moon or sun eclipsed, Saturn and Mars are present: Destruction [...] the moon, the king will be captured, the palace of the prince [will turn] to ruins.
10 DUR—Mercury and Venus are present and bright: Rains and high waters.
11 DUR—Venus and Mars are present and bright: Attack of the enemy on that land.
12 DUR—Venus and Sirius are present and bright: Attack of the enemy on that land.

13 DUR—Mars and Mercury are present and bright: Attack of the enemy; hostilities.
14 DUR—Mars and Saturn are present and bright:....
15 DUR—Moon or sun are eclipsed and Jupiter is faint: End of a reign.
16 DUB—Moon or sun are eclipsed and Jupiter is not present: End of a reign.
17 DUR—Moon eclipsed, sun (text: moon) eclipsed, Jupiter not present: End [of a reign?]
18 DUR—Moon eclipsed, sun eclipsed: Death of the king; destruction [...]
19 DUR—Jupiter [...]'s: Favorable [...]
20 DUR—Sa[turn?...] that [king] will be captured.
21 [...] Attack of the enemy [...]
remainder broken

Textual Commentary

obv. col. i

1' [... *an*]*nâti* ⸢ana?⸣ *iškuri* "these...⸢to⸣ wax..." Cf. in medical texts *šammī annûti ina* DUḪ.LÀL LÁ-*ma* "you bandage him with these drugs in wax," AMT 75 iv 9. Here, the noun in the break must be feminine, as the demonstrative appears to be fem. pl. (*annâtu*). There is insufficient context to determine what substance was to be used with wax, or if this were possibly a section containing a ritual.

2' *gišnugallu* "alabaster," also among magic stones for the (micro-) zodiacal signs, see TCL 6 12 r. iv 4 in E. Weidner, Gestirn-Darstellungen (1967) 30.

Edge: The list of stars (and planets Venus, Jupiter, and Mars) is that of the "astrolabe," in accordance with the Pinches Astrolabe (LBAT 1499), see Walker and Hunger, "Zwölfmaldrei," *Mitteilungen der deutschen Orient-Gesellschaft* 109 (1977), pp. 27–34. No obvious connection may be found between the astrolabe and the text on obv. and rev. ii. Perhaps the astrolabe list was included in reference to something now lost from col. i.

obv. col. ii

1. The first statement, namely, DIŠ MUL.SAG.ME.GAR followed by several stative verb forms and an omen apodosis, is seen elsewhere in astrological texts in a somewhat fuller form. The passage can be identified in the nativity omens TCL 6 14:29, see JCS 6 (1952) 66 (I quote the translation of A. Sachs): LÚ.TUR *a-lid-ma* ^{d}SAG.ME.GAR

È-*a* GI-*át* NÍG.TUK SUMUN-*bar* U_4 GÍD.DA "If a child is born when Jupiter has come forth: regular, well, he will become rich, he will grow old, (his) days will be long," and in a horoscope for the year −234 (MLC 2190: 7f), see JCS 6 60 (again, I quote Sachs' translation): KI MUL.BABBAR GI-*át* DI-*át* NÍG.TUK SUMUN-*bar* U_4 MEŠ GÍD.DA.MEŠ "Place of Jupiter: regular, well, riches, he will grow old, (his) days will be long." TCL 6 13 can be seen to reflect a fixed tradition, associating the planet Jupiter with these particular attributes. The subject of the stative verbs is lost by ellipsis. A feminine noun is required by the many feminine statives (*kēnat, šalmat, dalḫat, marṣat, sīqat*, etc.), thus eliminating *šerru* "the child", or indeed, the planets, from consideration as the subject. I suggest supplying *ittu* "the sign" as the subject of the feminine statives, since the same phraseology occurs in this text on the reverse, col. ii, e.g., line 3: GISKIM.BI TAG-*át* "its sign is bad." See also rev. ii 2: GISKIM.BI TAK_4 *ana* KUR ⌜*dam-qa-at*⌝ *ana* KUR KÚR *ḫa- ṭa-*⌜*at*⌝.

For the position of Venus, which follows immediately after Jupiter, the character of the sign and the personal predictions of the native are broken, but can be fully restored by parallels in the horoscope MLC 2190:9, see JCS 6 60 and TCL 6 14:30, see JCS 6 66. In noting these parallels, Sachs quotes the first four lines of TCL 6 13, see JCS 6 73f.

2. The statement about Mercury is paralleled in TCL 6 14 obv. 31, see JCS 6 66 and in the horoscope MLC 2190: 11 f., see JCS 6 60. Here, *qardat* is a feminine stative constructed from the adjective *qardu* (from *qarādu* II "to be heroic, warlike"). The parallel passage JCS 6 66: 31 is cited in AHw. sub *qardu*, p. 903 b and in CAD Q sub *qardu* adj. usage e, but neither lexicon clarifies the reason for the feminine, which, by analogy with the preceding lines, is probably to be accounted for by *ittu* "sign."

The statement for Mars is broken, but fully restored from the parallel in TCL 6 14:32, see JCS 6 66. For *nazāqu ḫanṭu* "quick to anger," see A.L. Oppenheim, *Dreambook*, p. 314 ii 12 and CAD N/2 sub *nazāqu* mng. 2 d.

3. See TCL 6 14:33 and JCS 6 66 for parallel.

4. See TCL 6 14:33–34. For discussion of the arrangement of the planets in this first section, see below, "Benefic and Malefic Planets in Babylonian Astrology," pp. 0000.

KIN NU GI: *têrtu la kīnat* has no exact parallels, but *kīnu* "true, reliable," occurs often with words for speech (e.g., *awatu, dibbu*). A similar phrase is found in divination—*pûm kīnum* "a reliable decision" YOS

10 44:63, and written KA GI.NA in TCL 6 3:7. For other references, see CAD *K kīnu* mng. 1 a. For KIN = *têrtu* in astrological contexts, see KIN.MEŠ-*šu te-re-tu-šú* TCL 6 17:10 (EAE comm.).

pardat "confused," (said of a sign [*ittu*]) is also found qualifying dreams (*šuttu*), as in LKA 50:6, KAR 286:11, and BMS 12:57, and oracles (*têrtu*), as in KAR 26:41.

5. Cf. LBAT 1597:1ff. (medical astrological text) for the KI (q*aqqaru*) "region" of the planets. For a parallel to the apodoses *mūt murṣi, mūt neši*, and *mūt kakki šarri*, see the nativity omens of TCL 6 14:22–25, in JCS 6 66.

6. Another construction with *mūtu* is given for the place, or region of Saturn. *mūt ar-nu* occurs elsewhere in late Babylonian astrology, see LBAT 1593 r. 4 and other references cited in CAD M/2 sub *mūtu* usage f3'.

7. DUR = *riksu* "bond," but its usage in the present context is obscure, For further discussion, see Appendix III.1. It would appear that this DUR is not the same as the DUR in the celestial omen [DIŠ 3]0 IGI.BAR-*ma* TA AN.ÚR EN KI.GUB-*šú* DUR GAR "If the moon is seen(?) and establishes a DUR from the horizon to its position," STT 329:3. In astronomical texts, DUR is also attested in the meaning "node", as in JCS 21 (1967) 208 (Text F): 1, 2, and 5 (see below, note 18).

GABA.RI: *miḫirtu(?)* I am uncertain as to how this term, which should mean "counterpart" or "opposite," is used here. In the following two sentences, the subject of the verb DU (*izzuzzu*) is the planets. GABA.RI may in that case be adverbial, although there are no parallels for such a usage. Its prepositional usage is limited either to the construct *miḫrit* + object, or after another preposition, see CAD M/2 *miḫirtu* A, mng. 4.

9. Cf. Borger Esarh. 83 r. 26: *šuḫmiṭ it-id pít-qád* "do (it) quickly, pay attention and be careful," as quoted in CAD sub *ḫamāṭu* A mng. 4b. Cf. also *it-i-id la te-eg-gi* in the "Diviner's Manual," JNES 33 (1974) 200:71. This procedural paragraph also seems to share some additional terminology with that of the "Diviner's Manual," for example, *šite'û* (KIN.KIN) may have the meaning "to look up (in tablets)," as in Oppenheim, JNES 33 (1974) 210, as well as UD.DA, possibly an abbreviation of the UD.DA.ZAL.LA in the "Diviner's Manual," which Oppenheim translates as "timings," JNES 33,205. Cf. also the UD.DA in LBAT 1593 (SSB 148 and Tf. III Nr. 4) rev. 12–16, where the UD.DA GÍD.DA "long period" and UD.DA LUGUD.DA "short period" for the five planets occur.

12. NA.BI = *manzāzišu* "its position," is presented as an alternative to the position of the planet in a number of signs of the zodiac. E.g., in lines 11f., "(if when Mars rises and becomes stationary in Aries) Jupiter is faint in Leo or Pisces or Scorpius or 'in its position'..." One reading of this may be that if Jupiter is seen in any of the named zodiacal signs, or indeed in whatever sign it happens to be in at the same time that Mars is stationary in Aries, then the recorded apodosis may be predicted, but this is highly conjectural.

13. *ana tarṣi* in the temporal meaning "at the time of," see AHw. 1332 a.

14. ÍR = *bakû* "to cry, mourn," metaphoric for "to be eclipsed." A parallel expression is found throughout the canonical eclipse omens: *ina lumun libbi* "in grief," as a metaphor for "eclipse." The expression may be traced to Old Babylonian eclipse omens, see [AN.TA.L]Ù ITI.BÁRA.ZAG.GAR UD.16.KAM GAR DINGIR-*lum i-na lu*-[*m*]*u-un* ŠÀ *it-ba-al* ["An ecl]ipse occurs on the 16th of Nisannu; the god (= moon) disappeared in grief (= eclipse)." BM 22696:21. In later omens, for example, see *ina* ŠÀ.ḪUL-*šú* IM.MAR.TU ZI-*ma* "during his (the moon's) grief (= eclipse) the west wind rose," see ABCD, EAE 20 Recension A § I (3).

In late Babylonian astronomy, ÍR has a more technical meaning of "maximal phase (of eclipse)," or "totality." See for example in the eclipse reports, 20 GAR Í[R *u* ZÁLAG] "20° onset, maximal pha[se and clearing]," LBAT 1417 obv. iv 5; 25 ÍR *ina* 18 ZÁL[AG] "25° maximal phase, in 18° it cleared," LBAT 1421 ii 6'; [...]+8 *al* ½ ḪAB *i* ŠÚ (*katim*) 10 UŠ ÍR "[...]+8° a little over ½ disk was covered. 10° maximal phase," LBAT 1426 i 6'; *ina* 22 2 si *ana* TIL TAK_4 5 ÍR "after 22° 2 fingers remained to totality; 5° maximal phase," LBAT 1426 ii 2' and [...] *ana* ZÁLAG 2 DANNA GAR ÍR [*u* ZÁLAG] "[it] cleared to the north, 2 *bēru* onset of eclipse, totality [and clearing]," LBAT 1427 obv. 4'. It is likely that in TCL 6 13, ÍR means simply "to be eclipsed." For a similar occurrence in late astrological (eclipse) omens, see JNES 43 (1984) 135 (BM 36746+) r. 13.

15. NAM.RI = *šallatu* "booty" occurs relatively frequently in omen apodoses, both in Boğazköy (KUB 4 71 right line 3, KBo. 7 7:2a, KBo. 9 58:3) and in late texts, see AHw. 1148b.

GABA.RI here in prepositional use, to be read *ana miḫirti*, "opposite," see CAD M/2 *miḫirtu* A, mng. 4

19. ^{d}*Ṣal* = *Ṣalbatānu* "Mars." Also in lines 21, 22, 25 and 27. This abbreviation is attested elsewhere, as for example in BM 92684 rev. 6', see Hunger, AOAT 1, 145 (cryptographic astrol.).

22. SIG = *un-nu-tu* (or, *un-nu-šu*) "faint," Tablet Funck 2 r. 16 (*ālu* comm.); note that on the reverse, *unnutu* is spelled syllabically.

rev. 2. For a parallel to GISKIM TAK_4, see LBAT 1599 obv. i 9' GISKIM.BI ÍB.TAK_4 *šá* KUR KÚR.

rev. 3. Note variation in spelling of Saturn in the same line: ^{d}SAG.UŠ (= *kajamānu*), followed by ^{d}GENNA, explained in the astrological commentary K.4166 (Meissner Supp. 7, and AfO Beiheft 22 EAE 22 Text c) r. 4 as GENNA // *ka-a-a-nu*. The adverb *kajānu is* not normally taken to be the name of Saturn, rather the standard reading of GENNA in astronomy is *kajamānu* "steady."

rev. 9. 3,20 = *šarru* "king" is the spelling used in the literary texts from Susa, see R. Labat, MDP 57, p. 4. Cf. the astrological commentary containing readings of typically Susite spellings, K.4166 (Meissner Supp. 7, also ABCD, EAE 22 Text c): 3' 3,20 // *šar-rum*.

The Technical Term DUR

The term DUR occurs elsewhere in astrological contexts, e.g., in the nativity omens of TCL 6 14, published by Sachs.[13] There, DUR occurs with two other astrological terms, *tallu* and *miḫru*, which evidently have to do with the relative positions of planets.[14] The terms occur in the following formulation: (*šerru alidma*) planet_{1-5} stands to a DUR (or, in a *tallu*, to a *miḫru*)." This section occupies eight lines, listing each planet in turn standing in the *tallu*,[15] to the DUR, and to the *miḫru*. The planets are listed in the same sequence found in TCL 6 13. No predictions are given for any of these statements. This section is followed by similar statements about a birth at the time of a planet's heliacal setting, e.g., *šerru alidma* ^{d}*Dilbat* ŠÚ "a child was born and Venus set heliacally," (TCL 6 14 rev. 5, and other planets in lines 5–6) again with omission of the predictions.

---

[13] Sachs, "Babylonian Horoscopes, " JCS 6 (1952), pp. 65ff.

[14] See TCL 6 14, where *miḫru is* written syllabically *mi-ḫir* in the prepositional phrase *ana miḫir*, as though it were a status absolutus.

[15] Sachs suggested that *tallu* points to a dividing line or cross-piece of some sort (JCS 6, p. 74). This is the meaning of *tallu* that seems to occur in the "gnomon" text LBAT 1495: 4, 5, 9, 10, 13, 14, and 20, where there are instructions to draw (*teṣṣir*) a dividing line. Reference is also made to the dividing line of Cancer (*tallu* [written DAL] ALLA), which is the position of the sun in month IV, the month of summer solstice when the noon shadow will be at its shortest, as well as that of Capricorn (*tallu* MÁŠ).

DUR also occurs in an iatro-astrological text (LBAT 1596).[16] In this text, a sick man's chances of getting well are determined by which of the planets are present in the configuration termed DUR or *miḫru.* E.g., lines 11–12: BE-*ma* MÚL.BABBAR *u Dil-bat ina* DUR *lu ina mi- ir* DI (*išallim*) "If Jupiter and Venus (stand) in the DUR or in the *miḫru*, he will recover." And lines 13–14: BE-*ma* GU_4.UD *u* GENNA *ina* KI.GUB *lu ina* DUR *lu ina mi-ḫir* DI(?)-*ma*(?) "If Mercury and Saturn (stand) in the *manzāzu* or in the DUR or in the *miḫru*, he will recover."[17]

An entire section of TCL 6 13 is devoted to the interpretation of various combinations of planets, sometimes qualified as bright or faint, which are enumerated following the sign DUR. E.g., rev. ii 1: DUR ᵈSAG.ME.GAR *u* ᵈ*Dilbat izzuzzuma Sin adir ittu šī ana māt nakri nadnat* "(In a) DUR Jupiter and Venus stand and the moon is eclipsed: that sign is given with reference to the enemy land." TABLE 1 tabulates this section (rev. ii 1–20). It is clear that at least two planets are involved at a time, but sometimes three or four. It would be tempting to posit some fixed relation (*riksu* meaning "bond"), such as one finds in astrological aspect, where planets assume particular geometrical configurations in the zodiac. However, TCL 6 13 does not mention zodiacal signs at all in the section that refers to the DUR. The statements are confined to the presence or absence of the planets (including eclipsed moon and sun) and whether they are bright or faint. The immediately preceding section (obv. ii 11–28*)* locates the planets in zodiacal signs with an occasional reference to the stationary point, but there seems to be no direct connection between these two sections, only that they are similarly concerned with brightness and faintness of planets in connection with the attack of the enemy.

I can offer no cogent definition for the term DUR (*riksu*) in astrological contexts. In astronomy, DUR seems to be the term for "node," with respect to planetary latitudes, and occurs in an "atypical" astronomical text, the only known text in fact to attest to a theory of planetary latitude, which does not exist in ACT material.[18] On the sole basis of TCL 6 13 rev. ii, my view is that the *riksu* "bond" between planets seems to be a term for a configuration of two or more planets visible simultaneously. Each *riksu*-configuration, regardless of which planets

[16] Sachs, "Babylonian Horoscopes," p. 74.

[17] Ibid.

[18] See Neugebauer and Sachs, "Some Atypical Astronomical Cuneiform Texts," JCS 21 (1967), p. 208, Text F (BM 37266): 1, 2, and 5.

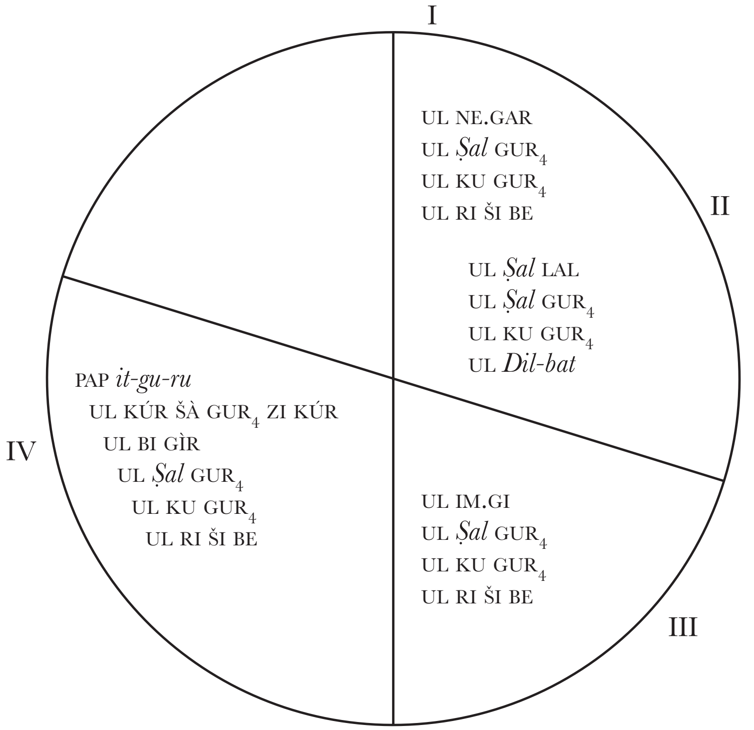


Figure 1. Brightness of stars/planets

were involved or where they were located, constituted an omen (*ittu*), interpreted as favorable or unfavorable on the basis of whether the participating planets were benefics or malefics, bright or dim.[19] The occurrences of *riksu* elsewhere in the context of the other terms for planetary positions (or relationships) points, however, to some specific planetary relationship which perhaps can eventually be identified when more late Babylonian astrological texts are analyzed. One of the irregular quadrants of this diagram (Figure 1) contains the heading PAP *it-gu-ru*, which probably refers to the cross-shape of the diagram itself. Although the circle is divided in four sections, and there are four lists of stars inscribed within the circle, these lists are not placed in each

[19] Note the following additional references to DUR in astrological texts: LBAT 1599 obv. i 22 [. . .]⸢DUR⸣-*šú* MÚL.UR.A (broken context); LBAT 1589 ii 5 and 10 LÚ.TUR *re- i* GU$_4$.UD [*ina*] DUR-*šú* "a child is conceived (and) Mercury (is present) in its DUR," and [LÚ].TUR *re-ḫi ina* DUR-*šú Dil-bat* ŠÚ "a child is conceived (and) Venus sets helically in its DUR."

Table 2. Planetary Positions with Positive/Negative Predictions

Obv.ii 11–28	Planetary Positions and Phenomena	Prediction (+, −)
(11–12)	♂ rises, is stationary in ♈. ♃ faint in ♌, ♓, ♏, or "its position"	−
(13–14)	☽ or ☉ eclipsed	−
(14)	♄ ☿ bright	−
(15–16)	♃ bright; ☽ or ☉ not eclipsed	+
(17)	♂ stationary in ♏ and bright	−
(18)	♃ bright in ♓ or "its position"	+
(19)	♂ stationary in ♌ or ♏ or ♊ or ♋ and bright and	
(19–20)	☿ bright in Perseus or ♓	−
(20)	♃ faint	−
(21)	♂ bright, stationary in ♍ or ♉	− (for Elam)
(22)	♀ faint	−
(22–23)	Sirius or ♂ bright in ♎, ♒, or Perseus, stationary	− (for Amurru)
(24)	♃ faint	−
(24–26)	♃ stationary in ♋, or ♓, and bright; ♂ in ♏, ♉, or "its position"	−
(27)	♂ or ♀ stationary and bright in . . . (?)	−
(28)	♃ faint ♄ bright	[−]

of the four sections, but rather in only three, so that one section contains two lists. The diagram must complement the list of omens of the obverse of the tablet (see synopsis of obv ii in TABLE 2), which refer repeatedly to the brightness (GUR_4 = *ba'ālu*) of the stars named.

Unfortunately, the only planet names recognizable on the diagram are UL.*Dil-bat* (Venus) and UL.*Ṣal* (Mars). The following represents a partial translation of the four lists inscribed in the circle:

I NE.GAR	II Mars LAL (weak?)	III Rebel star?[20]	I . . . cross-shaped
Mars bright KU bright RI ŠI BE	Mars bright KU bright Venus	Mars bright KU bright RI ŠI BE	Star of the enemy? . . . bright; attack of the enemy; that star . . . Mars bright; KU bright; RI ŠI BE

---

[20] Reading UL.IM.GI as *Ḫammā'u*, not an otherwise attested star name.

A suggestion for UL.KU might be to read UL.ḪUN (Aries), and MUL.LÚ.ḪUN.GÁ occurs in obv. 11 as the position of the stationary point of Mars. UL.RI-ŠI-BE is obscure. As a star name it is hitherto unattested, and indeed, it is uncertain whether it should be read as a star name. Note too that MUL is used in the main body of the text, while its variant UL is found in the diagram. The meaning and use of this diagram remain frustratingly opaque.

Diagram on the Reverse

The remarkable feature of this diagram is its form (fig. 2)—a circle within which 12 points are related to one another by means of four triangles that connect points 120° apart in the circle.

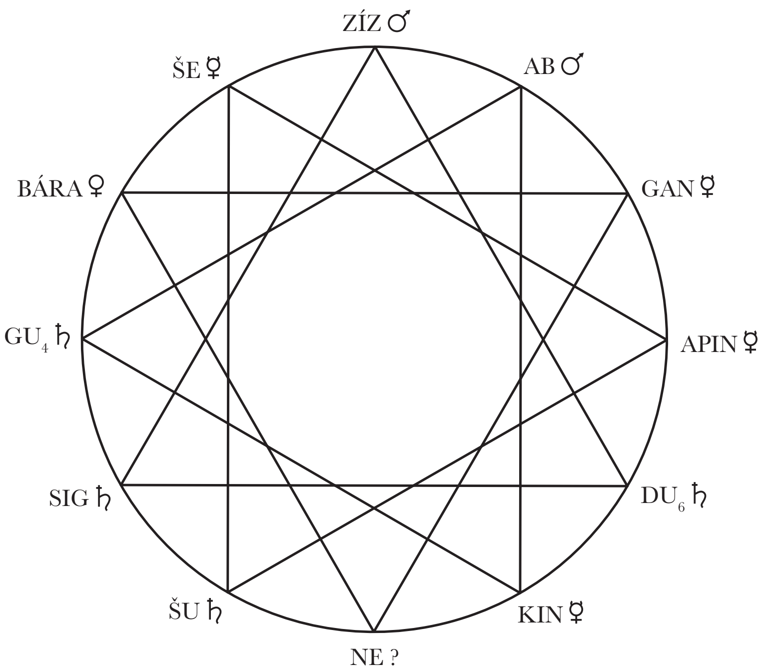


Figure 2. Months and planets in a “trine” arrangement

This produces four groups of three (as in TABLE 3) and is structurally identical to the Greek astrological doctrine of trine aspect.[21] The diagram designates each point around the circle with the name of a month and the name of a planet. We obtain the following correspondences: BÁRA (I) ♀; GU4 (II) ♄; SIG (III) ♄; SU (IV) ♄; NE (V)?; KIN (VI) ☿; DU6 (VII) ♄; APIN (VIII); GAN (IX) ☿; AB (X) ♂; ZÍZ (XI) ♂; ŠE (XII) ☿.

It seems curious not to find Jupiter (or moon, or sun) included among the planets designated on the figure. The distribution of planets among the months is also (seemingly) quite irregular, and even if the arrangement in triplicities is considered (as in TABLE 3), the schema does not emerge any clearer. No clear relationship can be established between the figure and the planets named on it and the omens beside it in rev. ii, which do mention Jupiter, as well as moon and sun (while eclipsed). The omens of rev. ii mention 2, 3, or even 4 planets in a group (see TABLE 1), which obviously cannot be brought into congruity with the links made in the diagram between only three points at a time.

Evidence from celestial omens has shown that the Babylonians employed the same arrangement of four groups of three, e.g., for the months, where four groups of months were arranged for purposes of correlation with eclipsed quadrants of the moon, that were in turn associated with the four quarters of the inhabited world.[22] But nowhere

Table 3. (based on Figure 2)

I	♀	–	☿
II	♄	☿	♂
III	♄	♄	♂
IV	♄	☿	☿

[21] For aspect in Greek astrology, see Bouché-Leclercq, *L'Astrologie grecque*, pp. 165–179, also F. Boll, C. Bezold, and revised by W. Gundel, *Sternglaube and Sterndeutung: Die Geschichte und das Wesen der Astrologie*. (Leipzig and Berlin: Teubner, 4th ed. 1931, reprinted 1977), p. 63. That something analogous to trine aspect was used in Babylonian celestial omens was noted by A. Schott and J. Schaumberger, "Vier Briefe Mar-Is'tars an Asarhaddon über Himmelserscheinungen der. Jahre –670/668," ZA 47 (1941), p. 109 note 1, and see above, Chapter Two, pp. 42–3.

[22] See above, Chapter Two, pp. 39 and 46, note 39. The "triplicities" of months are also attested in the late horoscopic astrological text LBAT 1593, where the odd numbered months are said to be "male" (UŠ) and the even numbered ones "female" (SAL):BAR NE *u* GAN UŠ// GU_4 KIN *u* AB S[AL// SIG DU_6 *u* ZÍZ UŠ//] ŠU APIN *u* ŠE SAL "months I, V, and IX (are) male; II, VI, and X fe[male; III, VII, and XI male;] IV, VIII, and XII female," LBAT 1593 obv. 6'–7'.

has there ever been evidence to suggest that this was anything other than an abstract schema without a corresponding geometrical representation. The fact that the designation of planets and months around the circle are unclear with respect to what is known about trine aspect places considerable doubt as to whether the diagram is meant to depict aspect (as we know it in Greek sources) at all.

CHAPTER SIX

BENEFIC AND MALEFIC PLANETS IN BABYLONIAN ASTROLOGY

In Babylonian astronomical literature of the Seleucid period, the five planets are enumerated in the following sequence: ♃♀☿♄♂.[1] The same sequence is found in many astrological texts of the period, notably in the horoscopes.[2] This arrangement has nothing to do with a spatial arrangement of the planets in the cosmos, in contrast to the following planetary arrangement in Greek astronomy and astrology: ♄♃♂♀☿. The Greek model represents the order of the planets in depth according to their periods of sidereal rotation. No such "natural" explanation can be offered for the Babylonian sequence.

Boll noted the parallelism between an older (Neo-Babylonian) arrangement of planets—♃♀♄☿♂—and a Greek astrological doctrine of "terms" (ὅρια), or sections of zodiacal signs associated with planets, attributed to "Chaldeans" in the *Tetrabiblos* I, 21, 12–19.[3] But an explanation of the standard Seleucid enumeration of planets in terms of astrological doctrine was rejected by Neugebauer for lack of cuneiform sources to document the existence of such a doctrine.[4] Pingree, however, assumed the connection between the Babylonian sequence and astrology, and identified it with the attribution of benefic and malefic status to the planets, a theory well entrenched and abundantly documented in Hellenistic Greek (and Indian) astrology.[5] I present, in what follows, evidence from a Seleucid Babylonian astrological text, which leaves little doubt that a theory of benefic and malefic planets,

[1] This sequence was discovered by F. Boll; see *Paulys Realencyklopädie der classischen Altertumswissenschaft* 14 (1912) 2561 sub b, and id., "Zur babylonischen Planetenordnung," ZA 25 (1911), pp. 372–377, and "Neues zur babylonischen Planetenordnung," ZA 28 (1913), pp. 350–51.

[2] See BH for horoscope texts.

[3] See Boll, *Paulys Realencyklopädie* 14 (1912) 2561–64.

[4] O. Neugebauer, *The Exact Sciences in Antiquity* (Providence, RI, 1957, 1969²), p. 169, and HAMA, p. 604

[5] D. Pingree, *The Yavanajātaka of Sphujidhvaja* 2, Harvard Oriental Series 48 (Cambridge, MA: Harvard University Press, 1978), p. 214.

similar in its main outlines to that in Hellenistic astrology, underlies the sequence in which the planets are enumerated in both Babylonian astrology and astronomy.

Explicit reference to the benefic and malefic natures of the planets in Babylonian astrology is provided in TCL 6 13, a Seleucid tablet from Uruk.[6] The relevant lines (obv. ii 1–4) are quoted below. Sachs drew attention to this particular section of TCL 6 13 since it closely parallels a number of nativity omens in TCL 6 14, which he discussed,[7] and further parallels are to be noted in a horoscope as well.[8]

TCL 6 13 ii

1 DIŠ MUL.SAG.ME.GAR GI-*át* SILIM-át NÍG.TUK U4.GÍD.[DA DIŠ] ^{d}[*dil-bat pa-áš- ḫat at-rat e-ma* GIN-*ku* ŠE.GA U_4 GÍD.DA]
2 DIŠ ^{d}GU$_4$.UD *qar-da-át e-tel-let e-mu-qan pu-ug-lu* DIŠ ^{d}[*Ṣal-bat-a-nu pít-ru-us na-an-ziq ḫa*]-⌜*an-ṭu-su*⌝
3 DIŠ ^{d}SAG.UŠ MI.MI *dal-ḫat* GIG-*at u si-qát*
4 DIŠ ^{d}30 ZALÁG-*at* SIG$_5$ *ki-na-at u* GÍD.DA//DIŠ AN.GE$_6$ 30 *ek-let dal-ḫat* NU ZALÁG-*at* ⌜KIN NU GI DIŠ⌝ AN.GE$_6$ 20 *par-sat pár-da*-<*at*>

Judging by the parallels, the protasis of TCL 6 13 has been abbreviated to DIŠ planet x, "if planet such-and-such," from an originally longer version, "if a child is born when planet such-and-such comes forth."[9] The apodosis contains a series of feminine statives describing the "sign" (*ittu*);[10] although no birth is mentioned in the abbreviated

---

6 For the edition of this text, see above, Chapter Five.

7 Sachs, "Babylonian Horoscopes," pp. 73–74; parallels found in TCL 6 14 obv. 19–33, see below, note 10.

8 MLC 2190 (dated to –234) and below, note 10.

9 Cf. TCL 6 14:27–38, see JCS 6 (1952), p. 66.

10 The first statement, namely DIŠ MUL.SAG.ME.GAR followed by two feminine statives and an omen apodosis, can be seen elsewhere in astrological texts in a fuller form. The passage can be identified in nativity omens, TCL 6 14:29, see Sachs, "Babylonian Horoscopes," p. 66 (translation of Sachs is quoted here): (LÚ.TUR *a-lid-ma* ^{d}SAG.ME.GAR È-*a* GI-*át* DI-*át* NÍG.TUK SUMUN-*bar* U_4 GÍD.DA, "If a child is born when Jupiter has come forth: regular, well, he will become rich, he will grow old, (his) days will be long," and in a horoscope for the year –234, MLC 2190: 7f., see "Babylonian Horoscopes," p. 60 (translation Sachs): (KI MÚL.BABBAR GI-*át* DI-*át* NÍG.TUK SUMUN-*bar* U_4.MEŠ GÍD.DA.MEŠ, "Place of Jupiter: regular, well, riches, he will grow old, (his) days will be long." The text in question (TCL 6 13) is clearly a repetition of the same omen, which associates Jupiter with particular predictions. The subject of the stative verbs seems to have been lost by ellipsis, but it should

form preserved here, the apodoses continue with predictions which must refer to the life of the native. I have translated as follows:

1 If Jupiter: (the sign) is favorable (*šalāmu*),[11] . . .; wealth and long days (are in store).
If Venus: (the sign) is calm, . . .; wherever he goes good fortune, and long days (are in store).
2 If Mercury: (the sign) is heroic, lordly; great strength[12] (is in store).
If Mars: (the sign) is ambiguous; (he will be) quick to anger.
3 If Saturn: (the sign) is dark, disturbed; sick and constrained.
4 If the moon: (the sign) is bright, good; true and long (lived?).
If the eclipsed moon: (the sign) is dark, disturbed, not bright; no true omen.
If the eclipsed sun: (the sign) is divided; confused; longevity (is in store).

The system represented here identifies the planets Jupiter, Venus, and Mercury as benefic (lines 1–2), and Mars and Saturn as malefic (lines 2–3).[13] The moon is considered benefic, but when eclipsed it is malefic (line 4). The sun is mentioned only as eclipsed, in which case it is said to be "divided" (*parsat*) and no personal predictions are associated with it (line 4). In addition to the explicit designation of the planets as benefic or malefic in the section obv. ii 1–4, the theory is integrated with a simple binary schema which determines a good prediction

be feminine in agreement with the many feminine statives that occur in this section (e.g., *šalmat, dalḫat, marṣat, sūqat*). Since the same phraseology with the subject expressed occurs on the reverse of the tablet (see e.g., rev. ii 3: GISKIM.BI TAG-*át*, "its sign is bad"), I suggest supplying *ittu* "sign" as the feminine subject. Thus, the apodoses describe first the nature of the sign (when a child is born and a certain planet is seen) and then personal predictions follow.

[11] Note the parallels in which "omen" is expressed by *têrtu: têrtum šalmat* (written syllabically) JCS 11 (1957) 95b passim (OB) and *têrtum* (*ul*) *šalmat* (written GI-*at*) *CT* 20 44/8 passim). And also [ḪAR].MEŠ-*šú* (*têrētišu*) *dalḫa*, "his (the sick man's) omens are confused (BAM 318 ii 11).

[12] Perhaps emend to *pu-uq-*<*qu*>*-lu*, since the adj. is derived from the D-stem of *paq/kālu*, see AHw 2 875a. See *CAD emūqu* 1c for this expression, frequently said of gods.

[13] The Greek astrological tradition also takes Jupiter and Venus as benefics, and Mars and Saturn as malefics. Mercury, however, is viewed as having ambiguous status, as it can sometimes be benefic, sometimes malefic. See Ptolemy, *Tetrabiblos* 1.5–7, ed. F.E. Robbins; Loeb Classical Library, 435 (Cambridge, MA, Harvard University Press, and London, William Heinemann, 1980), pp. 38–39. See also Bouché-Leclercq, *L'Astrologie grecque* (Paris, 1899; repr. Scientia Verlag Aalen, 1977[2]), p. 101 n. 2. The same is found in Indian astrology, see Pingree, *Yavanajātaka* 2, p. 109 and pp. 241–42.

if a benefic shines brightly and a bad prediction if a malefic shines brightly. Conversely, a bad prediction is made if a benefic is dim. The following examples serve to illustrate the schema: TCL 6 13 ii 15–16 (benefic, bright = favorable): BE-[*ma*] *ana* GABA.RI GISKIM.MEŠ *an-na-a-tú* dSAG.ME.GAR *ma-gal* GUR4 30 *u* 20 *ina* KI KUR.URI.KI NU ÍR.MEŠ KÚR ZI-*ma* NAM.RI NU È, "if opposite these signs, Jupiter is very bright, neither moon nor sun will be eclipsed in the place of Akkad; the enemy will attack but will not take booty";[14] obv. ii 17 (malefic, bright = unfavorable): d*Ṣal-bat-a-nu ina* GÍR.TAB UŠ-*ma* GUR4 ZI *su-tí-i*, "Mars is stationary in Scorpius and is bright: Attack of the Suteans."[15] The last example, obv. ii 20, shows an unfavorable outcome when a benefic is dim: dSAG.ME.GAR SIG NAM.RI È, "Jupiter is dim: booty will be taken."[16] There are no exceptions to the schema in any omens of the text.

Similarly, in reverse ii, when the benefics are standing in the "DUR"[17] and are bright, it is favorable "for the land," that is, Babylonia, as in line 7, while when benefics are not present (or are faint) the outcome is negative, as in lines 8, 15, and 16. When malefics are present and bright, the omen is unfavorable, as in lines 5 and 6.[18] The last section of the text (rev. ii 11–28) demonstrates the systematic association of good or bad signs with certain planets. Further reference to the pairing of the benefics Jupiter and Venus, and the malefics Saturn and Mars, but without specific reference to their benefic or malefic association, is found in other late Babylonian zodiacal omens.[19]

[14] Cf. also obv. ii 18.

[15] Cf. also ii 19f. and 22f.

[16] Cf. also ii 22 and 24.

[17] DUR (*riksu*) "bond" is a technical term found in late Babylonian astrological texts dealing with planets. Nativity omens for a child born when a planet stands "*ana* DUR" are attested in TCL 6 14 (see JCS 6, pp. 65ff.). For other occurrences of DUR in astrological texts, see LBAT 1589 ii 5' and 10' (nativity omens based on planetary phenomena at the time of conception of a child, for example, [line 10] *šerru reḫi ina* DUR-*šu Dilbat rabi*, "a child is conceived; Venus sets heliacally in its DUR"); LBAT 1596:11–14; TCL 6 13 rev. passim. In light especially of TCL 6 13, DUR may mean some configuration or relation involving several planets (usually 3), but this is still highly uncertain. More contexts in which DUR is used are required for a better understanding of the meaning of the term.

[18] See Chapter Five, p. 114. The binary schema of interpretation based on brightness (GUR4) and dimness (SIG) is seen elsewhere in late Babylonian astrology as well.

[19] See above, Chapter Two, p. 39 and table 2.

The evidence of TCL 6 13 strongly supports the explanation, assumed by Pingree,[20] which attributed the Babylonian planetary sequence to the grouping of benefics Jupiter and Venus (and, in TCL 613, Mercury is also apparently considered benefic) on the one hand, and malefics Saturn and Mars on the other. TCL 6 13 does not reproduce the standard Seleucid arrangement exactly, but reverses the order of the two malefics as follows: ♃♀☿♂♄.[21]

Many examples of the enumeration of planets and their positions in the zodiac are to be found in horoscopes, which aimed to determine planetary positions on a given birthdate. An inspection of the sequence in which planetary positions are given in roughly thirty horoscopes, spanning the fifth to the first centuries B.C., shows that after ca. 250 B.C. the planetary sequence employed in these texts is that of the standard Seleucid arrangement (♃♀☿♄♂).[22] Only one horoscope, for the year 288 B.C.E., uses the NA/NB sequence (♃♀♄☿♂).[23] The sequence of the fifth century example[24] is difficult to identify, since Mercury is recorded as "not visible (NU IGI)," causing its displacement to the end. The practice of writing the invisible planets at the end following the zodiacal positions of the others continued throughout the Seleucid period. Another variation of the standard sequence resulted if two planets occupied the same zodiacal sign, in which case they would be written together as a pair. The standard order of enumeration was altered only in accordance with the two conventions just described.

Unfortunately, the connection between the order of planets and their identification as benefic or malefic cannot be shown in horoscopes. Since no personal predictions are given, such correlations cannot be made. Based on the dependence of horoscopes upon other astronomical records (especially almanacs) for their planetary (and lunar) data, it seems to me that horoscopes follow the standard enumeration sequence simply because that is the convention followed in their astronomical sources.

Some additional support for the Babylonian association of planets with particular "qualities" such as beneficence or maleficence may

[20] Pingree, *Yavanajātaka* 2, p. 214, and compare p. 241.
[21] The same sequence as in TCL 6 14 (see JCS 6 (1952) 66:29–33, 37–39, and passim), whenever the planets are enumerated.
[22] This applies to all the horoscope texts, see BH.
[23] BM 33382 (= LBAT *1459).
[24] Horoscope for the year –409, AB 251, published JCS 6 (1952), pp. 54f.

be adduced from the celestial omen series *Enūma Anu Enlil* and its Old Babylonian forerunners. The evidence is convincing in the case of Mars, which appears in the apodosis of lunar eclipse omens as a maleficent planet, responsible for the death of cattle. Whether it is even possible to derive a profile of the other planets will depend upon detailed study of the apodoses of planetary omens. For the present, the following examples for Mars must suffice: OB text A (= BM 22696) obv. 23, (lunar eclipse on the 16th of Nisannu): [*Ṣa-al-b*]*a-ta-nu-um i-ta-ab-bi-am-ma bu-lam ú-*[*ḫal-la-aq*]*-ma*, "Mars will rise and destroy the herd" (dupl. BM 86381 i 23: *Ṣa-al-ba-ta-nu i-ta-bu-ma bu-lam ú-ḫal-la-aq*.) This omen enters the canonical tradition in *Enūma Anu Enlil* 17 as follows: ([DIŠ UD.15.KAM AN.GE$_6$ GAR…]) [^{d}*Ṣal-bat*]*-a-nu* SAR-*ma bu-lum* ZÁḪ.[25]

The question remains, however, why the "astrological" arrangement of planets was ever adopted in the astronomical texts. The astronomical sources in which the standard planetary sequence is found are the non-tabular astronomical texts, which were classified by Sachs into the groups Goal-Year texts, Almanacs, Diaries, and Excerpts.[26] This vast body of material, numbering approximately 1400 tablets, is sometimes referred to with the abbreviations NMAT (non-mathematical astronomical texts, to distinguish them from ACT ephemerides and procedure texts)[27] and sometimes GADEx (after Sachs' typology).[28] Among the GADEx texts, the Goal-Year texts and Almanacs are the text types which rigorously employ the planetary sequence seen in the horoscopes.[29] A Goal-Year text concerns a given year (the "goal-year"), and provides data based on the periods of each planet and the moon. For the prediction of planetary and lunar phenomena in the goal year, the text provides phenomena which occurred one period (appropriate to the particular celestial body) preceding the goal year, so that for Jupiter, the data precede the goal-year by 71 years, or for the moon, by 18 years. The periods used in Goal-Year texts are the

[25] *Enūma Anu Enlil* 17 source E r. 4, dupl. source G 13, and cf. source D ii 5; see ABCD.

[26] A. Sachs, "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2 (1948), pp. 271–90.

[27] A. Aaboe, "Observation and Theory in Babylonian Astronomy," *Centaurus* 24 (1980), p. 15.

[28] HAMA, p. 351.

[29] For texts, see LBAT.

well-known synodic periods of the planets.[30] One paragraph is devoted to each planet and the arrangement of the paragraphs is in accordance with the Seleucid order of planets. Goal-Year texts appear to be intimately related to the Diaries, which probably provided the ultimate observational data.

Almanacs exhibit less of a connection to Diaries; indeed, the planetary data are entirely computed and contain no observational remarks such as are occasionally found in Goal-Year texts.[31] Almanacs provide information on the location of the planets in the zodiac at the beginning of each month for one Babylonian year, and the dates of their entries into the next sign. Such data is extremely useful for the construction of horoscopes, which require the location of planets in the zodiac on an arbitrary date (the date of birth), not necessarily corresponding to a date of a synodic appearance (which is what is predicted in the ephemerides.)

Clearly, the technical terms and orthography of horoscopes, diaries, almanacs, ephemerides and procedure texts, and also of celestial omens of the late period, have a common base. It is also well-known from the colophons of ephemerides (in ACT) that some copyists of astronomical texts bore the professional title "scribe of *Enūma Anu Enlil*" (LÚ.UMBISAG DIŠ.U$_4$.DIŠ.*En-líl-lá*).[32] The shared technical terminology and even professional title suggest that despite the rigorous adherence to and maintenance of separate genres of astronomical (and astrological) records, the training and interests of the scribes in both these areas very likely stemmed from one intellectual tradition. In view of this, it should come as no surprise to find the same convention for enumerating planets in astronomical as in astrological texts.

But with regard to the two attested planetary sequences, Neo-Babylonian and Seleucid, it is worth mentioning in addition that these conventions also occur in contexts neither strictly astrological nor astronomical. In the seventh century, for example, the invocation

[30] HAMA, p. 554 and n. 8.

[31] Diaries are not exclusively observational in character either; see Sachs, "A Classification," p. 287 sub 53.

[32] See Neugebauer, *Astronomical Cuneiform Texts* (Princeton and London, 1955), pp. 13–15. This, however, is not proof that the two disciplines astrology and astronomy should be conflated as being one and the same; and I reiterate Neugebauer's observation that "the appearance of a scribe called 'astrologer' in the colophon of a tablet does not necessarily determine its content as astrological or astronomical" (ACT, p. 14).

of planets in oaths, as attested in the vassal treaties of Esarhaddon,[33] occurs as ♃♀♄☿♂, which is the Neo-Babylonian arrangement discovered by Boll. In the Seleucid period, a ritual requires that a libation of water for washing the hands be offered to Jupiter, Venus, Mercury, Saturn, Mars, Moon, and Sun, as soon as they appear.[34] Lastly, the tablet expressing celestial omens in numbers appends a section listing the five planets in the standard Seleucid order.[35] The date of this text (or its source) is somewhat in doubt.

Regardless of textual genre, therefore, the planets were enumerated by convention, a convention that was originally shaped by an underlying astrological schema identifying planets as either benefic or malefic. The evidence from TCL 6 13 offers strong support for the existence of such a schema in the late period, the bare traces of which are already found in apodoses of *Enūma Anu Enlil* and its Old Babylonian forerunners. The astronomical texts in which the "astrological" planetary sequence is employed simply use the conventional "astrological" sequence, just as they use the same spellings of the planets' names. The relationship between astronomical and astrological texts must be seen rather as one defined in terms of goals and methods. For the same reasons that it became necessary for the ancients to differentiate astrological and astronomical textual genres, historians can similarly differentiate between the specific goals and methods of these two ancient scholarly disciplines without commiting the historical anachronisms implied by viewing them as representing competing or discrepant world-views.

---

[33] D.J. Wiseman "The Vassal Treaties of Esarhaddon," *Iraq* 20 (1958), pp. 13ff. Cf. the oath in Parpola, *Letters from Assyrian Scholars to the Kings Esarhaddon and Assurbanipal*, part 1: Texts, AOAT 5/1, rev. 18–19 and 13:11–11. And see above, n. 3.

[34] TCL 6 41:23f.; see Thureau-Dangin, *Rituels accadiens*, pp. 68 and 119, also translated by Sachs in *ANET*², p. 338.

[35] H. Hunger, "Kryptologische astrologische Omina," in M. Dietrich and W. Röllig eds., *Lišan mithurti. Festschrift Wolfram Freiherr von Soden zum 19. VI. 1968 gewidmet von Schülern und Mitarbeitern*. AOAT 1, (Neukirchen-Vluyn : Butzon und Bercker Kevelaer), pp. 139ff.

CHAPTER SEVEN

ELEMENTS OF THE BABYLONIAN CONTRIBUTION TO HELLENISTIC ASTROLOGY

In the scientific literature of the Hellenistic period, references to "Chaldeans" in connection with astrology and astronomy are numerous. The implications of such references, for the history of astrology, however, depend on a closer assessment of the nature and extent of the Babylonian contribution to that branch of Hellenistic science, but an assessment based on cuneiform sources. Three elements which are demonstrably Babylonian in origin yet form basic and integral parts of Greek astrological doctrine provide the focus of discussion here. They are: l) planetary exaltations, 2) the micro-zodiac, and 3) trine aspect. The differences between the Babylonian and Greek use of these three elements are exemplary of the fact that despite the incorporation of Babylonian elements at the inception of Greek astrology, the overall character and rationale of Greek astrology remains entirely a Hellenistic Greek product.

The current general impression that astrology originated in Babylonia may be credited to the Greeks of the Hellenistic age who often cited generic ancients, such as "Chaldeans" or "Egyptians" when some authoritative source on astrology or other esoterica was needed.[1] Momigliano has evaluated the references to older eastern traditions found in some Greek authors this way:

> If we have to resort to a generalization about the fortunes of Oriental thought in the Hellenistic world and in its Roman prolongation, we must say that the mass of writings claiming to be translations from Oriental languages were mainly forgeries by writers in Greek. What circulated in Greek under the names of Zoroaster, Hystaspes, Thoth, and even Abraham was quite simply faked, though no doubt some of the writings contained a modicum of 'Oriental' thoughts combined with Greek ideas.[2]

---

[1] The putative "debts of Greek wisdom to the East" claimed by Greek authors is reviewed in G.E.R. Lloyd, *Magic, Reason and Experience*: *Studies in the origins and development of Greek science* (Cambridge: Cambridge University Press, 1979), p. 237f., note 39.

[2] A. Momigliano, "The Fault of the Greeks," in Momigliano, *Wisdom, Revelation and Doubt: Perspectives in the first millennium B.C., Daedalus* 104 (1975), p. 17.

What is of interest for the present investigation, however, is not so much the Greeks' obtuseness to ancient Near Eastern tradition and thought, but the mere fact of their exposure to it, the results of which can be observed in the history of astrology.

Despite the general awareness of the "Orient" on the part of the Greeks from about the eighth century B.C.E.,[3] evidence for a genuine Greek knowledge of Babylonian history or culture before the Hellenistic period is exceedingly slim. But in the later Hellenistic period, an intensified Greek interest in the ancient scientific traditions of Babylonia begins to be in evidence. The connections made between "Chaldeans" and astrology may represent the continuation of what Momigliano has suggested was a new direction already apparent in the fourth century in which Greeks took a new interest in the East, for example, in Zoroaster, the Magi, or the Egyptian traditions later compiled under the fictitious authorship of Hermes Trismegistus, all of which eventually became associated in the same way with all sorts of speculation having to do with astrology.[4]

But the vague attributions of occasional "theories" to "Chaldean astrologers" that may be found in a number of Hellenistic scientific works do not in and of themselves provide reliable historical sources for the determination of the origins and sources of astrology.[5] What must be assessed in the light of cuneiform evidence is the degree to which the Greeks understood Babylonian celestial divination as well as astronomy. The adaptation and transformation of several elements from each of these Babylonian traditions (divination and astronomy) to the new science of astrology provides the means for such an assessment.

Before discussing selected examples of some elements of Greek astrology traceable in cuneiform texts, a number of fundamental distinctions between Babylonian celestial divination and Greek horoscopic astrology should be clarified. It is only in the light of these significant differences that the parallels between the two systems may be put in proper perspective.

---

[3] See A. Kuhrt, "Assyrian and Babylonian Traditions in Classical Authors: A Critical Synthesis," in *Mesopotamien and seine Nachbarn*, Berliner Beiträge zum Vorderen Orient Bd.I Teil 2 (Berlin, 1982), pp. 539–40.

[4] See Momigliano, "The Fault of the Greeks," p. 16, and see also id., *Alien Wisdom The Limits of Hellenization* (Cambridge: Cambridge University Press, 1975), pp. 143–47.

[5] HAMA, pp. 607–10.

In Mesopotamia, the prediction of future events from celestial phenomena was obtained not on the presumption of stellar influence, but rather, celestial phenomena were regarded as signs which could indicate impending mundane events. In the technical terminology of divination, *ittu* (GISKIM) "sign" refers to the phenomenon that forms the protasis of the omen and had a neutral connotation, rather like Latin *omen*, which could mean either a foreboding or a sign of fortune.[6] Other words for "omen" that refer more specifically to the apodosis or prediction associated with the sign, often indicate some verbal utterance, as for example, *purussû* "(divine) decision," *qību* "prognostication," or *têrtu* "(divine) order," also translated "liver omen" or "oracle." It is clear from such terminology that the meaning of a sign was held to be a communication from a divine source.[7] Signs indicated events in a variety of ways, mostly by means of schematic symmetries, association, and analogy. The relationship between the sign (*ittu*) and its prediction (*purussû*) had no component of causation, nor necessarily of any particular temporal relation, be it synchronistic or sequential.

Greco-Roman astrology set up an opposition between celestial and terrestrial realms, in accordance with its underlying Aristotelian cosmology. The Babylonians, however, seem not to have had a dualistic cosmic scheme. Evidence from some of the major literary works points to a tendency to divide the cosmos into levels of heavens and earths, forming a generally symmetrical picture in which particular deities are assigned to particular levels or realms.[8] But generalizing statements concerning Babylonian cosmological speculation as a whole are to be avoided, and it is not at all clear if the world-picture which emerges from Babylonian mythology and literature can be assumed to apply equally well to divination. The omen texts of *Enūma Anu Enlil*, of course, offer no formal statement of a cosmology. But it may be

[6] Lewis and Short, *A Latin Dictionary*, s.v.

[7] The nature and history of Mesopotamian divination techniques are discussed in the section "The Arts of the Diviner," in A.L. Oppenheim, *Ancient Mesopotamia* (Chicago and London: University of Chicago Press, 1977²), pp. 206–27.

[8] The Sumero-Babylonian cosmology is described by W.G. Lambert in "The Cosmology of Sumer and Babylon," in *Ancient Cosmologies*, C. Blacker and M. Loewe, eds., (London: Allen and Unwin, 1975), pp. 42–62, where primarily its theological aspect is discussed. Lambert derives his evidence for the plurality of heavens and earths from the major literary works Enūma Eliš, Atra-ḫasīs, Gilgamesh, *bīt mēseri*, and two late scholastic compilations, for which see *KAR* 307:30–38 and AfO 19 110 (= AO 8196) iv 20–22. See also my remarks in "Stellar Distances in Early Babylonian Astronomy," JNES 42 (1983), p. 213f.

argued on the basis of the omen literature, that nature was not considered as disassociated from the gods, and that the theory of celestial divination therefore presupposed no notion of a mechanistic cosmos.

On the other hand, the cosmological underpinnings of Greek astrology are clear, and derive from the Aristotelian scheme in which the eight celestial spheres belonging to the seven planets and the fixed stars were set above and around the earth. The sublunar realm, consisting of earth and the four elements, was placed at the center of the whole structure. The celestial bodies were considered eternal and perfect, as indicated by their circular motion, and were set in opposition to the earth, which by contrast was subject to corruption and change, and produced only the rectilinear motions of the elements (earth, air, fire, and water), thereby adding weight to the argument for the dualistic opposition between earth and heaven. The motion of the ether, as explained by Ptolemy, was held to directly affect the sublunar elements, and in this way he physically grounds the claims for direct stellar influence. The mechanistic universe underlying astrology can be seen as a logical extension of the apparent influence of the position of the sun in the zodiac on the seasons and weather on earth,[9] where the mechanism of causation can be explained in terms of Aristotelian physics, not the will of gods. Astrology's claim that the motions of the celestial bodies were not only indications but actual (efficient) causes of change on earth shows astrology to be antithetical to divination, which depends solely on the will of the deity to provide signs.[10]

The fact that the theories, methods, and underlying philosophical rationale of Hellenistic astrology do not resemble those of Babylonian celestial omens raises the question as to the nature and extent of Babylonian influence. Certainly, the many references to the Chaldeans by Greek and Roman writers suggest that the impetus for Greek developments in astrology derived from Babylonia, but the cuneiform evidence to support such a statement, at least for the celestial omens as a source, is strictly limited. At present, a small number of substantive connections between Hellenistic astrology and Babylonian celestial omens are

---

[9] Ptolemy, *Tetrabiblos* 1.2, ed., F.E. Robbins, Loeb Classical Library, 435 (Cambridge, MA, Harvard University Press, 1980).

[10] For an incisive discussion of the philosophical postulates of astrology and the sceptical attitudes that developed toward these ideas in later Greek philosophy, see A.A. Long, "Astrology: Arguments pro and contra," in *Science and Speculation: Studies in Hellenistic theory and practice*, J. Barnes et al., eds., (Cambridge: Cambridge University Press, 1982), pp. 165–92.

known, suggesting that in a number of instances, Babylonian celestial omen schemata did directly influence the shaping of Greek astrological doctrine.[11] As far as the late Babylonian astrological material (such as nativity omens, astrological procedure texts, and horoscopes) is concerned, additional elements can be pointed to which carried over into Greek horoscopic astrology. Systematic study of this late corpus will have much to contribute to the problems under discussion here.[12]

We may now turn to some specific elements which may be cited in defense of the claim for the Greek dependence on Babylonian traditions. I will discuss three examples, two of which are attested in some form in pre-Seleucid celestial omen texts (examples 1 and 3) and one which stems from texts dating after the fifth century B.C.E. (example 2). These are 1) the planetary hypsomata, or exaltations, 2) the dodekatemoria, literally, the "twelfth parts," or micro-zodiac, and 3) trine aspect. These three examples will illustrate with particular cogency the origin of certain elements of Hellenistic astrology in Babylonian tradition. An important point of qualification however, must be noted, that within the total frame of Greek astrology, these elements of demonstrable Babylonian origin constitute only a relatively small part. The elaborate theoretical structure of Greek astrology as a whole, whose complete outlines are known to us primarily through late treatises (2nd century C.E. onward), remains a Hellenistic Greek product.

1) Planetary Exaltations (*hypsomata*)

In the planetary omens of Enūma Anu Enlil, as well as in late Babylonian astrological texts, a term is found which seems to represent a particularly propitious appearance for a planet. The term *bīt* (É)/ KI (*ašar*)[13] *niṣirti*, means literally "house" or "place of the secret." Its

[11] See above, Chapter Two.

[12] See A. Sachs, "Babylonian Horoscopes," JCS 6 (1952), 49–74; see also above, chapter V.

[13] As the term KI *niṣirti* varies freely with É *niṣirti*, the equivalence of *ašru* and *bītu* given in the synonym list Malku (Malku I 259, also Explicit Malku II 108, both cited *CAD* s.v. *ašru* A lexical section) seems to favor the reading *ašar niṣirti* for the spelling with KI. However, since KI, in the meaning "region, location in the sky (*CAD qaqqaru* A mng. 5b), is common in astronomical usage, one may question whether the reading *qaqqar niṣirti is* not also possible. Weidner established the identification of Akkadian KI *niṣirti* and Greek hypsoma in "Beiträge zur Erklärung der astronomischen Keilschrifttexte," OLZ 1913, 208–10, and "Babylonische Hypsomatabilder," OLZ 1919, 10–16. See also Ungnad, AfO 14 (1942), p. 257f., Schaumberger, *Sternkunde and Sterndienst in*

mantic character is suggested by the designation of the planets as *bēlē niṣirtu ša Elamti* (*Akkadi*) "lords of the secret of GN,"[14] where perhaps the "secret" is the knowledge of omens guarded by the deities, just as the *niṣirtu* of a given scribal discipline is the secret lore possessed by its scholars.[15]

The term *bīt* or *ašar niṣirti* also suggests that the "place of secret" be interpreted as a position in the sky that a planet can reach (*kašādu*) or not. The *ašar niṣirti* of Venus (but not of the other planets) occurs in the planetary omens of Enūma Anu Enlil:

[DIŠ MU]L *Dil-bat* KI *ni-ṣir-ti* KUR-*ud* SIG_5 GAR MUL.UR.GU.LA KUR-*ma ana* 2/3 DANNA *i-šaq-qam-ma*
"If Venus reaches the place of the *niṣirtu*, there will be good luck; (comm.) it reaches Leo, it is 2/3 *bēru* high."[16]
[DIŠ MU]L *Dil-bat* KI *ni-ṣir-ti* KUR-*ud-ma u it-bal* KUR *ut-ta*[*ḫ-ḫas*]
"If Venus does not reach the place of the *niṣirtu* but disappears, the land will grieve."[17]
[DIŠ MUL *Dil-bat ina* IM.MAR].TU IGI-*ma* KI *ni-ṣir-ti* KUR-*ma u* TÙM [DINGIR.ME]Š KI KUR.MAR.KI SILIM.MA T[UK.MEŠ]
"If Venus is seen in the west and reaches the place of the *niṣirtu* and disappears, the gods will be reconciled with Amurru."[18]
[DIŠ MUL *Dil-bat ina* IM.MAR].TU IGI-*ma* KI *ni-ṣir-ti la* KUR-*ma u* T[ÙM DINGIR.ME]Š KI KUR.MAR.KI *i-šab-bu-s*[*u*]
"If Venus is seen in the west and does not reach the place of the *niṣirtu* and disappears, the gods will be angry with Amurru."[19] The apodoses indicate clearly enough that reaching the *ašar niṣirti* was favorable, while not reaching it was unfavorable.

When Esarhaddon called attention to the auspicious omens that appeared at the beginning of his reign, the *ašar niṣirti* of both Venus and Jupiter were mentioned.[20] The constellations (not yet zodiacal signs) within which the *ašar niṣirti* of these planets were thought to be

---

Babel, 3. Ergänzungsheft (Münster: Aschendorff, 1907), p. 311f., and Schnabel, ZA 35 (1924), p. 311.

[14] STC 2 pl. 69:25f., cited *CAD* sub *niṣirtu* mng. 1a.
[15] See the references quoted in *CAD* sub *niṣirtu* mng. lel', 2', and 3'.
[16] ACh Supp. 34:27 (= K. 3708:3).
[17] ACh Supp. 34:28, see *CAD* s.v. *naḫāsu* B.
[18] ACh Supp. 34:29ff. (= K. 3708:10–11).
[19] ACh Supp. 34:31–32 (= K. 3708:12–13).
[20] Borger Esarh. 2 ii 4; 17:39.

located, however, are not identified. In the passage concerning Jupiter, however, the month in which Jupiter reached the *ašar niṣirti is* given, thereby fixing the corresponding longitude of the planet. Without repeating the variants (for which, see Borger Esarh. p. 2), the Venus passage is the following:

i 39	[M]UL.*Dilbat nabât kakkabāni*	Venus, brilliant one of (all) stars
40	*ina amurri*	appeared in the west
ii 1	[*ina ḫarrān šū*]*t* ᵈ*Ea*	in the path of Ea.
2	*innamirma ša kunnu*	In order to appease
3	*māte* [*ša*] *sulum*	the gods she reached
4	*ilānіša niṣirtu*	the hypsoma and (then)
5	*ikšudamma itbal*	disappeared.
6	MUL *Ṣalbatānu pāris*	Mars, who decides
7	*purussê māt Amurri*	the decisions concerning Amurru,
8	*ina ḫarrān šūt* ᵈ*Ea*	shown brightly in the path of Ea.
9	*ib'il sindašu*	He showed his charter,
10	[*š*]*a danān malki u mātišu*	for the strengthening of king and his lands
11	*ukallim iskimbuš*	as his sign.
...		
23	*ittât dumqi*	When I saw these
24	*šuātina āmurma*	favorable omens,
25	*libbu arḫuṣma*	I took courage in my heart
26	*iṭṭib kabatti*	and felt confident.

The astronomical data for Venus obtained from Esarhaddon's inscription (Ass. A 8 39-ii 8) is as follows.[21] 1) Venus appeared in the west in the path of Ea: On 29 Jan. –679, Venus had its first visibility in the west in the constellation GU.LA (Aquarius), assigned to the path of Ea in MUL.APIN. 2) Venus reached the *niṣirtu*: One cannot obtain the longitude of Venus at the *ašar niṣirti* directly from the Esarhaddon text, since no date is given. But if one assumes, on the basis of the later Greek tradition, that the *niṣirtu* of Venus is located within Pisces (Greek tradition places the hypsoma of Venus in 27° Pisces), then Venus reached the *ašar niṣirti* (some location in Pisces) on 8 March –679. 3) Venus disappears: Last visibility of Venus in the west was on 5 Oct. –679, with a longitude of 204° (in the constellation Scorpius).[22]

[21] Data given here follows Hunger-Dvorak, *Ephemeriden von Sonne, Mond und hellen Planeten von –1000 bis –601* (Vienna: Verlag der Österreichischen Akademie der Wissenschaften, 1981) and Parpola, LAS II Appendix C "Heliacal Phenomena of Mercury, Venus, Mars and Jupiter."

[22] For boundaries of the ecliptical constellations appropriate for the Sargonic period, see Parpola, LAS II Appendix B, p. 385. The constellation Scorpius had boundaries 210°–224°.

4) Mars is in the path of Ea: In −679, Mars is at 237° (end of Sagittarius)[23] on 29 Jan. (at the time of Venus' first visibility) and at 325° (in Pisces)[24] on 5 Oct (at the time of Venus' last visibility). Therefore, during the entire time referred to in the inscription, Mars remained in the path of Ea (both Sagittarius and Pisces are assigned to the Ea stars in MUL.APIN).[25]

The Jupiter passage (Borger Esarh. 17 11 Episode 13: A, B, and C, p. 17):

34	MUL.SAG.ME.GAR *muttanbiṭu*	Jupiter, the one who shines brightly,
35	*pāris purussî māt Akkadi ina Simāni*	The decider of decisions for Akkad in Simānu
36	*uqarribma ašar Šamaš*	approached the place where the sun
37	*uštappâ izziz ba'il*	appears,[26] stood and was bright.
38	…	
39	*ina* ITI Pet-*bābi ašar niṣirti*	In the month Pet-bābi he reached
40	*ikšudamma ina šubtišu*	the hypsoma and established his position
41	*ikūn*	there.

The astronomical data for Jupiter is: 1) Jupiter approached the area of the sun in Simānu (30 May/29 June): The sun had longitudes 57°.93 −86°.52 (i.e., end of Taurus to end of Gemini) during Simānu of −679, while Jupiter occupied longitudes 67°.98–74°.68 (within Gemini). 2) In Pet-bābi Jupiter reached the hypsoma. The Elamite month name Pet-bābi is identified, according to the most recent study,[27] with Simānu. A number of exemplars of the month lists, however, equate Pet-bābi with Du'ūzu.[28] If the Esarhaddon passage (11.39–41) which states that the *niṣirtu* was reached in Pet-bābi refers to Simānu, then Jupiter occupies the same region of the ecliptic as the sun, as stated in lines 35–37, which places Jupiter in the constellation Gemini (between 67°.98 and 74°.68). If, on the other hand, one permits the equation Pet-bābi =

[23] Boundaries of Sagittarius, according to Parpola (see above note 22) are 230°–251°.
[24] Boundaries of Pisces (see above note 22) are 313°–353°.
[25] See E. Reiner and D. Pingree, *Enūma Anu Enlil, Tablets 50–51*, BPO 2, Table IV, p. 8.
[26] Read Št-stem of (w)apû "to become visible." Cf. Borger Esarh., p. 17 note to line 37.
[27] See E. Reiner, "Inscription from a Royal Elamite Tomb," AfO 24 (1973), 97ff., "Excursus: The names of the months in Elam," especially p. 100 Table 3.
[28] For example, Sp. II 381 (Pinches, PSBA 34 [1912], p. 293) [ITU *Pi-it*]-KÁ = ITU ŠU.NUMUN.NA, f. also AHw s.v. *pītu I.*

Du'ūzu, Jupiter would then have moved to longitudes 74°.68 –81°.08, leaving it between the constellation Gemini (Gemini's boundaries are 54°–75°) and Cancer (87°–92°). In either case, perfect agreement with Greek tradition is not obtained, i.e., to place Jupiter in Cancer (Cancer 15°), although the second alternative, in which Jupiter reached the hypsoma one month after its first visibility, fits slightly better. The value of the data in the Esarhaddon inscription does not lie solely in whether the NA locations of the *bīt niṣirti* agree with later Greek tradition, since, as we have seen, the ecliptical position of the *bīt niṣirti* of Venus cannot be determined at all, and for Jupiter, we have been able only to show two possible positions, one in the constellation Gemini, the other "between" Gemini and Cancer, as determined by the NA boundaries of these stars. The text does, however, confirm the meaning of the planetary omen when located in the *bīt niṣirti* as particularly favorable.

The locations of the *bīt niṣirti* of the planets are enumerated in a later astrological/theological commentary of the first century.[29] The language and orthography of the text are late (use of MÚL, as determinative; aleph written at the end of plural verb forms, e.g., *ú-kal-lim-u'* [1.27] and *in-nam-mar-ru-u'* [rev. 6]). Landsberger considered the original composition to be not much older than the Arsacid copy.[30] Lines 24–32 are relevant for the positions assigned to the *bīt niṣirti*, and represent the section for Du'ūzu.

Transliteration

24 *ina* ITI.ŠU *šá né pi-šú šá sa-kap* LÚ.KÚR *ina* E.KI *i pu-uš*

25 *ina* ŠÁ-*bi šá* ^{d}*Ṣal-bat-a-nu u* ^{d}30 EN.MEŠ *ni-ṣir-tu*$_4$ *šá* KUR.NIM.MA.KI

26 NIM DIB.MEŠ ^{d}SAG.ME.GAR *u* ^{d}UTU EN.MEŠ *ni-ṣir-tu*$_4$ *šá* KUR.URI.KI

27 ⸢*šu-pul*⸣ DIB.MEŠ GISKIM.[MEŠ?] *šá nu-uk-ku-ri* BAL E.KI *u'-ú-kal-lim-u'*

28 NAM.BÚR.BI *ina* URU *i-te pu-uš* KI *ni-ṣir-tu*$_4$ *šá* ^{d}30

29 MÚL.ŠU.GI *u* MÚL.MÚL MÚL *šá* [KUR?].NIM.MA.[KI]

30 KI *ni-ṣir-tu*$_4$ *šá* ^{d}UTU MÚL.LÚ.ḪUN.GÁ AN-*e* [...]

[29] See King, STC I, p. 212; II pl. 69; translation and philological commentary by Landsberger, "Ein astralmythologischer Kommentar aus der Spätzeit babylonischer Gelehrsamkeit," AfK 1 (1923), pp. 69–82, and see Weidner, OLZ 1913, 208f.

[30] AfK 1 (1923), p. 69.

31 KI *ni-ṣir-tu*$_4$ *šá* ^{d}*Ṣal-bat-a-nu* MÚL.Ù[Z…]
32 KI *ni-ṣir-tu*$_4$ *šá* ^{d}SAG.ME.GAR MÚL.[…]

Translation

24 in Du'ūzu (the month in) which he performed in Babylon the ritual that drives back the enemy,
25 by means (of the fact) that Mars and the moon, lords of the secret of Elam
26 passed above the ecliptic (and) Jupiter and the sun, lords of the secret of Akkad
27 passed below, they (the planets) showed (a) sign(s) of a change in the reign of Babylon.
28 He has performed the ritual in the city. The place of secret of the moon (is)
29 Perseus and Taurus, star of Elam.
30 The place of secret of the sun (is) Aries of the sky(?) […]
31 The place of secret of Mars (is) [Capricorn?…]
32 The place of secret of Jupiter (is) […]

Indirect evidence from a Seleucid Babylonian planetary text (LBAT 1591:5–7)[31] supports the identification of the Babylonian *bīt niṣirti* in the same zodiacal signs as the Greek hypsomata. The text lists the signs in which the planets rise heliacally, and in each case there is agreement with the Greek hypsomata: Jupiter rises heliacally in Cancer; Venus in Pisces; Mars in Virgo; Saturn in Libra;[32] Mars in Capricorn.

In a third century "Festkalendar" dated to year 65 of Antiochus (–246), the *bīt niṣirti* of Mercury is also assigned to Virgo: (K.3753:5) ^{d}GU$_4$.UD *ina qaqqar* MÚL.AB.SÍN *ú-šar-ši-du* É *ni-ṣir-ti-šú* "Mercury established position in the region of Virgo, his place of secret."[33] Additional references to planetary hypsomata can be obtained from the (mostly 3rd–2nd century) Babylonian horoscopes which sometimes report that the child was born "in the *bīt niṣirti*" of a particular planet.

---

[31] F.X. Kugler, *Sternkunde and Sterndienst in Babel* (Münster: Aschendorff, 1907), vol. 1, pp. 39–41 and pl. 2 Nr. 2.

[32] The writing ZIB is an abbreviation of Zibanītu (Libra), not of ZIB.ME (*zibbātu*, Pisces). See Weidner, OLZ 1919, 15, where he cites the text without comment on the reading of ZIB as Libra.

[33] Weidner, *Gestirn-Darstellungen auf babylonischen Tontafeln* (Graz, Vienna, Köln: Böhlau in Kommission, 1967), p. 11 (lines 1–6) and photo on pl. 11/12, and a complete transliteration in G. McEwan, *Priest and Temple in Hellenistic Babylonia*, Freiburger Altorientalische Studien 4, (Wiesbaden: Steiner, 1981), pp. 174–76.

The following summarizes the evidence from the horoscopes: 1) BM 47721:4', dated −250, *ina* É *ni-ṣir-tu*$_4$ *šá* GU$_4$.UD *a-lid* "he was born in the house of secret of Mercury."[34] We know from the planetary data of this horoscope that Mercury was not visible on this date: GU$_4$.UD *šá* [ŠÚ-*ú* NU] I[GI] "Mercury, which had set, was not visible."[35] Mercury was therefore in the same sign as the sun, but the position of the sun is not only no longer preserved on the tablet, but not anywhere near Virgo on the date of this birth (Month 11.8).[36] 2) BM 47642 r. 6, dated −223, *ina* É *ni-ṣir-tú šá* MÚL.BABBAR [(x)] [*a*]-*lid* "in the house of secret of Jupiter [(maybe nothing missing)] (the child) was born." This horoscope reports that the child was born "in the *bīt niṣirti* of Jupiter (= Cancer)," but, according to the planetary data given, none of the planets were located in Cancer on the date of the birth. The position of Jupiter given in the horoscope was Scorpius (obv. 6–7 MÚL.BABBAR *u* GENNA *ina* GÍR.TAB). 3) LBAT *1466 r. 3–4, dated −201, *ina* É *ni-ṣir-tu*$_4$ *šá* «*šá*» MÚL.BABBAR LÚ.TUR X X X X "the child [was born?] in the house of secret of Jupiter." When the position of Jupiter is given in obv. 6, Jupiter is said to be *ina* TIL A "at the end of Leo," which does not concur with our identification of the hypsoma of Jupiter in Cancer. The horoscope is datable to 4 Feb. −201 (109 S.E.9 Addaru). On this date, Jupiter was in 26° Virgo (a position possible for the hyposoma of Mercury). Again, we find a discrepancy between the statement that the child was born in the hypsoma of a particular planet and the given location of that planet in the zodiac. 4) BM 36943 r. 2–3, date uncertain, *ina* É *ni-ṣir-tu*$_4$ *šá Dil-bat* LÚ.TUR *a-lid.* The position given for Venus (obv. 7) appears to be Scorpius, rather than the expected Pisces (ZIB.ME) if Venus was supposed to be in the *bīt niṣirti.* Jupiter, however, was located in Pisces (obv. 6 MÚL.BABBAR *ina* ZIB.ME). 5) BM 32376:4', date uncertain, *ina* É *ni-ṣi*[*r-tu*$_4$...], is simply too fragmentary to warrant further comment. Our understanding of the Babylonian *bīt niṣirti* and its application in late Babylonian astrology is unfortunately still quite poor, as the evidence from the horoscopes raises more questions than it answers.

According to Greek astrology, the exaltations are located in the zodiacal signs in which the planets have their most potent influence

[34] See BH.

[35] BM 47721:2'.

[36] Longitude of the sun on −250 II.8 (= May 6) was Taurus 11°, using M.A. Houlden and F.R. Stephenson, *A Supplement to the Tuckerman Tables* (Philadelphia: American Philosophical Society, 1986).

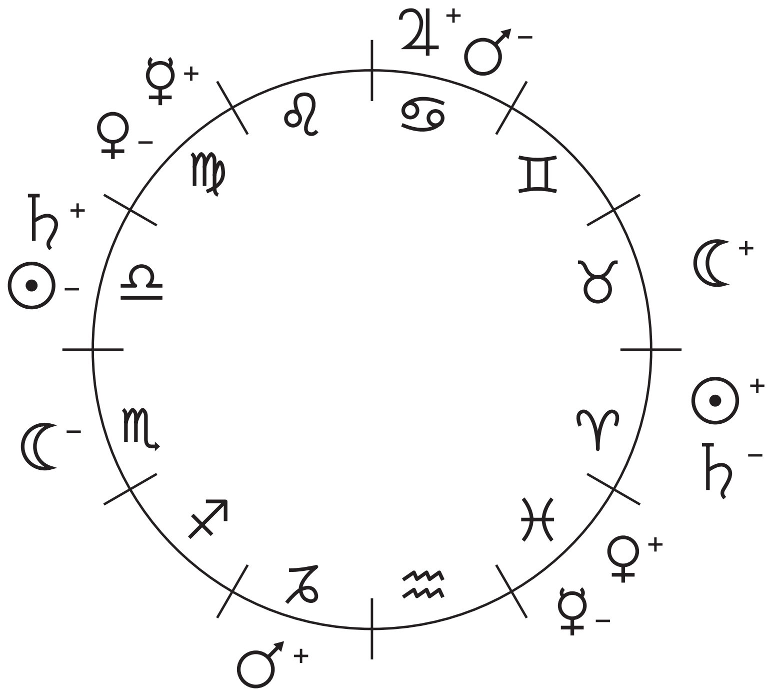


Figure 1. Exaltations (+) and depressions (–)

(see fig. 1). The meaning of the hypsoma in the Greek view, presupposes waxing and waning influence: the hypsoma is the point of greatest influence and the opposite point, 180° from the hypsoma, called the tapeinoma or "dejection," is the point of weakest influence.[37]

In the second century C.E., Ptolemy (Tetr. 1.19) offered a rationale for the hypsoma and tapeinoma which may be paraphrased as follows: When the sun is in Aries (at the vernal equinox) it makes its transition to the northern and higher arc of the ecliptic and in Libra (autumnal equinox) passes into the southern and lower arc. As the length of the day begins to increase at Aries, so does the power of the sun's basic nature to produce heat. Aries, therefore is the sign of the sun's exaltation. For the opposite reasons, Libra is assigned as its depression. Similarly, Jupiter was thought to produce the beneficial north wind and reaches farthest north when it is in Cancer, so Cancer is the hypsoma of Jupiter.

[37] See A. Bouché-Leclercq, *L'Astrologie grecque* (Paris: E. Leroux, 1899), pp. 192–99.

Table 1. Exaltations of the Planets

planet	Babylonian *bīt niṣirti*	Greek hypsoma
Sun	Aries	Aries 19°
Moon	Taurus	Taurus 3°
Saturn	Libra	Libra 21°
Jupiter	Cancer	Cancer 15°
Mars	Capricorn	Capricorn 28°
Venus	Pisces/Leo	Pisces 27°
Mercury	Virgo	Virgo 15°

In the fourth century, Firmicus Maternus refers to a Babylonian tradition of planetary exaltations: "The Babylonians called the signs in which the planets are exalted their 'houses'..."[38] The terminology echoes the *bīt niṣirti*, although perhaps there was confusion with the Greek "houses" of the planets, a doctrine not yet found in cuneiform material.[39] When the Babylonian evidence for planetary *bīt niṣirti is* collected (see table 1), a direct correspondence between Babylonian *bīt niṣirti* and Greek hypsomata is evident in five cases, for the sun, moon, Jupiter, Mars, and Mercury, as Weidner has shown.[40] The original reasons for choosing the specific positions of the planets' *bīt niṣirti*, or hypsomata, remain obscure, but the hypsomata of the sun in Aries and the moon in Taurus, suggest some underlying calendaric rationale, since these "planets" occupy these signs at the beginning of the year. The differences between the (Babylonian) *bīt niṣirti* and the (Greek) hypsoma consist in the fact that 1) the Babylonians designated the general regions (*qaqqaru*) of a particular constellation as the location of the *bīt niṣirti*, since the origin of the doctrine precedes the invention of the zodiac, whereas the Greek hypsoma was a single point of longitude, specified in degrees within a zodiacal sign (see table 1), and 2) the concept of the *bīt niṣirti* is to be understood with reference to planetary omens as distinct from hypsomata, which refer to astrological (planetary) influence.

[38] Firmicus Maternus, *Mathesis* 2. 3. 6, ed. W. Kroll, F. Skutsch, and K. Ziegler, 2 vols. (Leipzig, 1897–1913).

[39] D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, Massachusetts and London, England, 1978), vol. II, p. 208 sub 32–33.

[40] Weidner, OLZ 1913, 210; OLZ 1919, 10–16; Schaumberger, *Sternkunde und Sterndienst in Babel*, 3. Ergänzungsheft (Münster: Aschendorff, 1935), p. 311f.

2) Micro-Zodiac (*Dodekatemoria*)
Dodekatemoria represent 2 1/2° segments of the zodiac. These are the result of a subdivision of each zodiacal sign into twelve equal parts each given the name of a zodiacal sign, beginning with the name of the sign being divided and continuing throughout the other eleven sequentially (see fig. 2). Each zodiacal sign therefore contained a micro-zodiac within its own 30° span. Textual evidence for the micro-zodiac does not antedate the sixth century, since it obviously is dependent upon the existence of the zodiac.

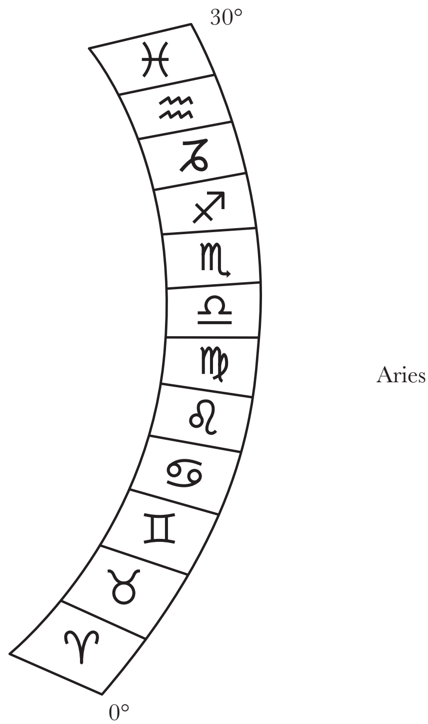


Figure 2. Dodekatemoria

To date, the earliest textual evidence for the zodiac is found in the two extant horoscopes from the fifth century.[41] Extant "micro-zodiac texts" are all Seleucid.

[41] A. Sachs, "Babylonian Horoscopes," JCS 6 (1952), pp. 54f. (AB 251, –409), and J.M. Durand, *Textes babyloniens d'époque récente* (Paris, 1981), pl. 52 (AO 17649, –410/409).

The Akkadian term for the parts of the microzodiac is *zittu* (ḪA.LA) meaning "share" or "part," but within this context understood to be 1/12th part: ḪA.LA *šá* MÚL "the (1/12th) part of the zodiacal sign" (TCL 6 14:15).[42] The use of dodekatemoria in Babylonian astrological texts is relatively well attested. A graphic representation may be seen in a number of Seleucid tablets from Uruk, referred to above.[43] In these tablets, for example, an omen concerning a lunar eclipse in Virgo is followed by the iconographic representation of some elements relevant to the omen and below the drawing is a register divided into twelve parts in which the names of the zodiacal signs have been inscribed.[44] The twelve parts begin with Virgo on the left and end with Leo on the far right. Each part is therefore 1/12th of the zodiacal sign Virgo, and the parts are further associated with a city, some plants, trees, and stones, written in corresponding registers below those of the dodekatemoria. Some of the same associations of celestial with terrestrial elements can be found in Hellenistic Greek astrology, as well as in later celestial magic.[45]

In other sources in which the connection between astrology and magic is documented, incantations (inim.inim.ma) are assigned to the twelve *zittu* of the zodiac.[46] As shown by Neugebauer and Sachs,[47] these two texts provide further evidence that the Greek method of computing dodekatemoria was based on the method reflected in the cuneiform material. The method may be formulated in the following way: Given a position in the zodiac (longitude $(\lambda)_1$) expressed in degrees (n) of a zodiacal sign (z), a second position in the zodiac (λ_2) may be obtained by multiplying the degrees n by 12 and adding the result to the first longitude: $\lambda_2 = 12\ n+n°$ of z. This may be seen in operation in BRM 4 19 simply by examining the first few lines, which are tabulated in table 2.

[42] See A. Sachs, "Babylonian Horoscopes," p. 65, nativity omen text.

[43] Weidner, *Gestirn-Darstellungen*, pls. 1, 6, 8 and photo on pls. 9–10.

[44] See Weidner, *Gestirn-Darstellungen*, p. 29.

[45] Pingree, "Some of the Sources of the Ghāyat al- Hakīm," *Journal of the Warburg and Courtauld Institutes* 43 (1980), p. 5. See also Weidner, *Gestirn-Darstellungen*, p. 17 note 40 and p. 49, where a passage is cited from "Hermes Trismegistus" in which each of the three decans of each zodiacal sign is assigned a stone and a plant.

[46] A. Ungnad, "Besprechungskunst und Astrologie in Babylonien," AfO 14 (1944), pp. 251–84.

[47] Neugebauer and Sachs, "The 'Dodekatemoria' in Babylonian Astrology," AfO 16 (1952–53), pp. 65–66.

Table 2. BRM 4 19:1–4 Schemata

λ_1	λ_1	λ	Dodekatemorion	Translation
1) I 10	I 10	V 10	UR.A. šá ḪUN ZI	♈ 10° ♌ 10° ♌ of ♈ is the distance
2) I 24	I 24	XI 12	GU šá ḪUN ZI	♈ 24° ♒ 12° ♒ of ♈ is the distance
3) II 10	II 10	VI 10	KI.DIL.DIL šá MÚL.MÚL ZI	♉ 10° ♍ 10° ♍ of ♉ is the distance
4) II 21	II 21	XI 3	GU šá MÚL.MÚL ZI	♉ 21° ♒ 3° ♒ of ♉ is the distance

In line 1, the position given is I 10 (= Aries 10°). Aries 10° is associated with Leo 10°, which is called "Leo of Aries." Following the abovementioned method of computing dodekatemoria, we multiply 10° (the degrees of Aries) by 12 and travel that many degrees (120°) along the zodiac from Aries to the sign Leo. Adding n degrees of the zodiacal sign, here 10, we reach Leo 10°, as given in BRM 4 19:1 the same procedure yields the second position from the first position in the remainder of the text. The term ZI which occurs frequently in Seleucid astronomical texts in the meaning 'travelled distance," or "velocity,"[48] here refers to the fact that a distance has been travelled from position 1 to position 2.

Another group, comprised of three late Babylonian astronomical texts, refers to the subdivision of zodiacal signs into twelfths. These texts are concerned with the problem of the "rising times" of the 1/12th parts of zodiacal signs.[49] Rising times (*anaphora*) relate to the problem of the variation of daylight length. In early Babylonian astronomy this was perceived as a calendaric matter, but later, in the Hellenistic period, daylight length was treated as an astronomical matter, i.e., as a function of the sun's position in the zodiac. A "rising time" is the time required for a 30-segment of the ecliptic to rise above the horizon. Because both horizon and ecliptic are great circles on the celestial sphere, at any moment one-half of the ecliptic or six zodiacal

[48] ACT glossary, sub ZI, also AfO 16 (1952–53), p. 65.

[49] Schaumberger, "Anaphora and Aufgangskalender in neuen Ziqpu-Texten," *ZA* 51 (1955), pp. 237–51, for A 3427 (238f.) and LBAT 1499 (= SpII 202+) (p. 245f.). To these can be added a third source, LBAT 1503, see below, Chapter Fourteen.

signs is above the horizon and other half is below. Therefore, during the interval of sunrise to sunset, 180° of the ecliptic will have crossed the eastern horizon.

The length of a day for a given position of the sun in the ecliptic can then be expressed as the sum of the rising times of the 180° of the ecliptic beginning with the sun's position (i.e., the rising time of the semicircle of the ecliptic from $\lambda_{\odot}$ to $\lambda_{\odot}$ +180°), that crossed the horizon from sunrise to sunset. It follows that if the time of rising of each individual zodiacal; sign is known, the length of day for any day of the year is also known (C[daylight length] = $\alpha_1 + \alpha_2 + \alpha_3 + \ldots + \alpha_6$). Neugebauer showed that this theory underlies "col. C" of the Seleucid astronomical ephemerides. The actual values of the rising times, however, are not attested in the ACT material.[50]

The new "rising times" texts present a schema for the rising times not of zodiacal signs, but of twelfths of zodiacal signs, i.e., of dodekatemoria, or 2 1/2° segments of the ecliptic. The reference to dodekatemoria is explicit: ḪA.LA *reš-tú šá* MÚL.GÍR TAB MÚL.GÍR.TAB *šá* MÚL.GÍR.TAB "first portion (dodekatemorion) of Scorpius (is called) Scorpius of Scorpius." (A 3427:2)[51] These texts give the values of the rising times of the dodekatemoria in UŠ (degrees). The time intervals of the rising of dodekatemoria are, however, not expressed directly, but in terms of meridian crossings by *ziqpu* stars. The *ziqpu* stars are defined as a group of stars that may be seen to pass directly or nearly directly overhead, which is to say, they "culminate," or reach the meridian.[52] The distance covered by a *ziqpu* star in crossing the meridian is termed ZI (analogous to the use of ZI in BRM 4 19). It is reasonable to express horizon crossing (rising times) of zodiacal signs in terms of meridian crossings of *ziqpu* stars because there is a fixed relation between ecliptical longitudes (degrees on the ecliptic) and right ascension (degrees on the equator), produced by the angle at which the ecliptic is inclined to the equator. The manner in which the texts give rising times of the dodekatemoria in terms of meridian crossings in fact represents a pre-trigonometric attempt to solve the problem of

[50] Neugebauer, "On some Astronomical Papyri and Related Problems of Ancient Geography," TAPS 32 (1942), 253–55; also id., "The Rising Times in Babylonian Astronomy," JCS 7 (1953), pp. 100–102.

[51] See Schaumberger, "Anaphora," p. 238.

[52] Schaumberger, "Die Ziqpu-Gestirne nach neuen Keilschrifttextten," ZA 50 (1952), 214–29.

the relationship between longitude (degrees on the ecliptic) and right ascension (degrees on the equator).[53] The values of rising times of all twelve dodekatemoria are provided for a number of zodiacal signs (expressed as ZI PAP n UŠ "the distance a total (of) n degrees"). These totals represent the value of the rising time of an entire zodiacal sign. In a few cases, the totals (PAP n UŠ) concur with the values of rising times (of "System A") which occur in Greek sources.[54] The three cuneiform texts concerned with the rising of dodekatemoria are the only extant Babylonian sources in which actual values of rising times are given. In ACT tables and procedure texts the same values can be demonstrated to underlie the schema for variation in daylight length, as Neugebauer has shown,[55] but the values themselves are not stated there.

In Greek astrology the dodekatemoria had the function of further modifying the influence of a planet, its influence being determined not only by its location in a particular sign of the zodiac, but also by its location in the sign of the dodekatemorion.[56] Further developments in Hellenistic astrology resulted in the subdivision of zodiacal signs into additional portions, such as 1/3's of signs (10° segments), called decans after the Egyptian usage.[57] In this way, the 36 decans of Egyptian star-clocks were brought into a fixed relation with the 12 Babylonian zodiacal signs.

A great many more subdivision of signs are found in Indian astrology. A total of 19 different portions of varying orders of magnitude, from halves of signs (15° segments) to the so-called *liptika* (1/60° segment, from Greek *lepton* "minute") of which there were 1800 per zodiacal sign.[58]

[53] See Neugebauer, "On some Astronomical Papyri," p. 262. Note that "trigonometry" was not unknown to Babylonian mathematics, see Neugebauer MKT I, p. 180 for some trigonometric topics in OB math ("chord and arrows"). But as Neugebauer points out (HAMA, p. 772 note 2), no trigonometry has yet been found in Babylonia in the solution of astronomical problems.

[54] See the references in Neugebauer, "On some Astronomical Papyri," p. 257 note 37 [Vettius Valens 1, 7 ed. Kroll (Berlin, 1908), p. 23], and p. 258 note 45 [Firmicus Maternus II, 11 ed. Kroll and Skutsch (Leipzig: Teubner, 1907), p. 53f.].

[55] Neugebauer, "The Rising Times," pp. 100–102, also HAMA, pp. 368f.

[56] Bouché-Leclercq, *L'Astrologie grecque*, p. 299–304, and sources on p. 299 note 1 and 216 note 3.

[57] O. Neugebauer and H.B. van Hoesen, *Greek Horoscopes* (Philadelphia: American Philosophical Society, 1959), p. 5f.

[58] Pingree, *Yavanajātaka* II, p. 208.

3) Trine Aspect

As shown in figs. 3–6, geometrical relationships between signs of the zodiac were established by grouping signs in twos, threes, fours, and sixes. By means of geometrical figures-diameter, triangle, square, hexagon-planets located in certain signs could be said to be related by the aspects termed opposition, trine, quartile, or sextile, Aspect functioned as one of the chief theories for interpreting relative influence of celestial bodies in the zodiac and for determining the situation of the heavens as a whole at the moment of birth.[59]

Only the trine aspect has appeared thus far in cuneiform sources. The evidence for this is found in omen protases with the following data: the position in the zodiac of the eclipsed moon, and in the same sign also the planets Venus and Jupiter, grouped with the positions of Saturn and Mars in two other zodiacal signs. In each case, the three signs stand in relation to each other precisely in the manner of the Greek trine.[60] Indeed, the groups of three related in this particular way are identified as "Chaldean" by Geminus.[61] The Babylonian grouping of three signs seems to be the result simply of the schematic arrangement of twelve elements (here zodiacal signs) into four groups of three elements each, rather than the result of some geometrical or spatial relation. The Babylonian version shares with the Greek counterpart the form of a schematic arrangement of twelve zodiacal signs in four groups of three where the first group contains signs 1, 5, and 9 (where 1 = Aries) in the series, the second group contains signs 2, 6, and 10, and so on. But the schematic arrangment is found applied to the twelve months of the schematic (solar) year in a seventh century celestial omen commentary.[62] Clearly, the Babylonian version does not depend on a geometrical relationship, indeed was not exclusively applied to the zodiac, but seems rather to have been based on purely schematic correspondences and associations between elements in a series of twelve.

A final piece of evidence can be adduced, which unfortunately obscures rather than illuminates the picture of how the Babylonians might have viewed "trine aspect." In a late planetary astrological text,

[59] Bouché-Leclercq, *L'Astrologie grecque*, pp. 165–79.

[60] See above, Chapter Two, pp. 39–43.

[61] Geminus, *Isagoge*, ch. 2, 5–11, see ed., Manitius, *Gemini Elementa Astronomiae* (Leipzig, 1898).

[62] ACh Supp. 2 118 rev. 2–3, see above, Chapter Two, note 50.

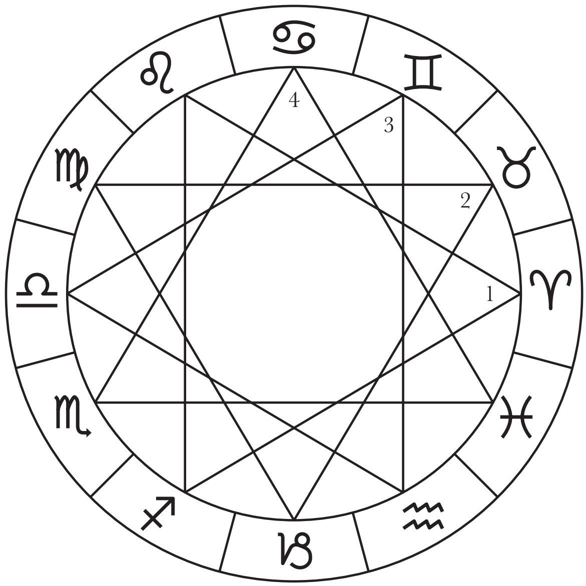


Figure 3. Trine aspect

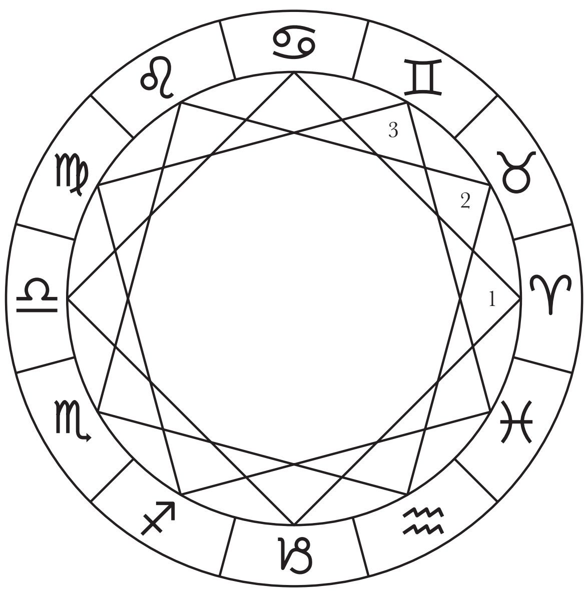


Figure 4. Quartile aspect

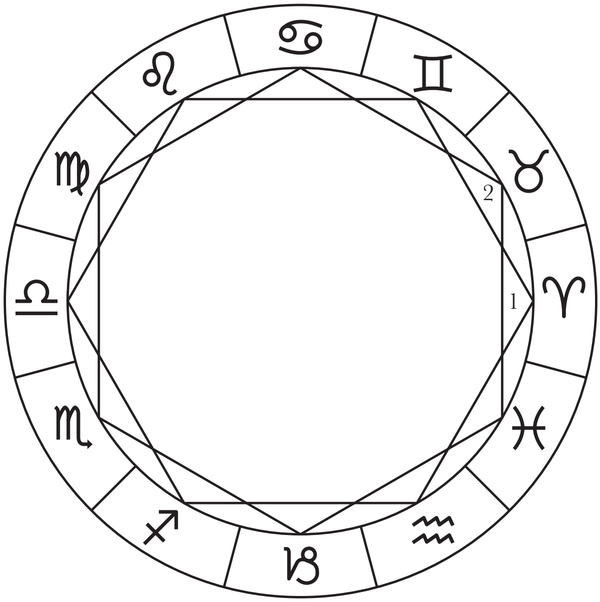


Figure 5. Sextile aspect

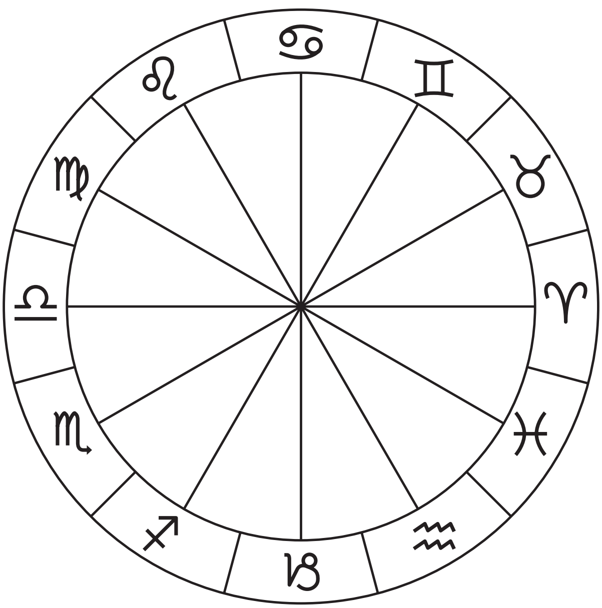


Figure 6. Opposition

TCL 6 13, a diagram, formally identical to that of the Greek trine, is drawn. The diagram shows a circle into which four triangles are inscribed. Around this circle (rev. of tablet) twelve points are designated with the names of the twelve months. In addition, names of planets (Jupiter is omitted) are inscribed beside each month name, in an apparently irregular sequence. The planets do not assume configuration in accordance with trine aspect, although the geometrical design is in fact identical to the representation of the triplicities in Greek astrology. With no clues from the accompanying text, the significance of the diagram remains obscure.[63]

As indicated by the examples discussed above, the evidence for substantive Babylonian influence on the astrology of the Greeks derives largely from the later periods of cuneiform tradition, i.e., the Achaemenid and Seleucid periods. The most fundamental tool for Greek astrology, the zodiac, is of Babylonian origin in the fifth century.[64] Not only is the Babylonian origin of the zodiac assured on the basis of cuneiform documentation, but, as Neugebauer has demonstrated from the deviation (≈5°) between modern longitudes and those given in Greek horoscopes, the astrological literature of the hellenistic and Roman period continued to use the norming point of the Babylonian zodiac (Aries 8° or 10°).[65] In two cases, the exaltations (hypsomata) and the forerunners of trine aspect, textual evidence traces the origins of these doctrines to the seventh century and even earlier traditions in the celestial omens of *Enūma Anu Enlil*. The Babylonian elements which can be pinpointed as direct contributions to Greek astrology, specifically, the planetary exaltations, the dodekatemoria, and trine aspect, represent significant features of the later system.

We may conclude that the claim often made since the Hellenistic period for the Babylonian origin of astrology is admissible, but with important qualifications. This claim can be supported in the most general way for the original impetus for prognostication on the basis of

[63] See above, Chapter Five.

[64] See note 41 above, and add the following references for Achaemenid period astronomical texts in which a zodiac of 12 fixed-length (30') signs is attested (note that these texts compute phenomena dated to the Achaemenid Period, but the tablets were written at a date sometime *later*): Neugebauer-Sachs, "Some Atypical Astronomical Cuneiform Texts," JCS 21 (1967), p. 197f. (≈ –430); Aaboe-Sahhs, "Two Lunar Texts of the Achaemenid Period from Babylon," *Centaurus* 14 (1969), p. 3f. (≈ –400), and 17 Text B obv. col. v (with heading lu-maš, records phenomena for –474).

[65] See HAMA, p. 594; also Neugebauer-van Hoesen, *Greek Horoscopes*, p. 180ff.

astronomical phenomena, but cuneiform evidence confirms the transmission of only a very few "doctrines" of Babylonian celestial omen astrology to the Greeks. The evidence for the means of transmission remains exceedingly limited; indeed, the burden of proof rests on the attested parallels. The differences between the perception and understanding of celestial phenomena between the two cultures cannot be overestimated. The Babylonians regarded celestial phenomena as potential signs (as they did all natural phenomena) in accordance with a view of nature as inseparable from the divine. Adherents of Greek astrology, on the other hand, saw the celestial phenomena as causes in accordance with a view that physical events had determinate natural causes, disassociated from gods (often, however, retaining the belief in the possibility of divine intervention).[66] For this reason, in the later astrology, elements common to both systems took on radically different character and function. Despite the presence of "Babylonian" elements, the philosophical rationale of Greek astrology and its doctrine of interpretation are all Hellenistic Greek in origin and explainable only in terms of Greek tradition itself.[67]

[66] This is true of "hard" astrology, which, however, was the extreme deterministic position on a continuum from those who regarded the heavenly bodies as mere signs of human affairs (Plotinus, see A.A. Long [above p. 146, note 10], p. 187f.) to the hard determinists and astral fatalists. My point is not meant to over-generalize about Greek astrological thought, but to contrast with ancient Mesopotamia, the view reflected in varying degrees in Greek astrology, of nature as separable from divine action. See the discussion of nature and cause in G.E.R. Lloyd, *Magic, Reason and Experience*, pp. 49–58.

[67] This view is in agreement with that expressed in HAMA, p. 613; see also Neugebauer, *The Exact Sciences in Antiquity* (New York, 1969), p. 170.

CHAPTER EIGHT

BABYLONIAN SEASONAL HOURS

The solar day (from one sunset to another), the lunar month (from one new moon to another), and the solar year (the period of the return of the sun to the same fixed star)[1] were the basic facts of nature upon which the Mesopotamian civil calendar was based. Numerical parameters associated with the recurrence and relations of the natural periods—day, month, year—lay the foundations for the development of astronomical theory, at least with reference to lunar and solar motion, with great consequences for control of the calendar. Evidence in Babylonian astronomical and astrological texts belonging to the period after ca. 600 B.C.E., the Babylonian horoscopes of the Seleucid period (ca. 300–50 B.C.E.), and the (undated) procedures for construction of a gnomon (sundial), affords further insight into a particular aspect of ancient time reckoning, namely the division of the day into hours. As examples of cuneiform evidence for the measurement of time not belonging to the sphere of theoretical astronomy, the horoscopes and sundial procedures provide a rare view of the practical application of seasonal hours and thereby add an important dimension to our understanding of Babylonian time-reckoning practices, but more specifically, of the division of the Babylonian day.

In classical antiquity[2] and the middle ages, "hour" meant the twelfth part of the actual length of daylight from sunrise to sunset. No matter

[1] The Babylonian year was always "sidereal", but at the same time no distinction between sidereal, tropical, and anomalistic years is in evidence in Babylonian astronomical texts. See ACT, pp. 76 and 71, also id., *The Exact Sciences in Antiquity*, Providence R.I., p. 140. Such a distinction would imply a knowledge of precession, which is known not to belong to Babylonian astronomical theory. For exposition, see O. Neugebauer, "The Alleged Babylonian Discovery of the Precession of the Equinoxes," JAOS 70 (1950), pp. 1–8.

[2] The circumstances of the introduction of this practice are not known. One can only cite the earliest attested use of "hours" in Greek, and these are early Hellenistic, first traceable in a primary source in the Papyrus Hibeh 27 (Neugebauer dates to ca. 300 B.C.E., see HAMA, pp. 687 and 706, and Grenfell, B.P. and Hunt, A.S., *The Hibeh Papyri*, Part I: London. 1906, pp. 152f.). Later literature also suggests the early Hellenistic period as the introduction of "hours", e.g., Geminus (ca. 50 C.E.), quoting Pytheas (time of Alexander the Great), in *Isagoge* 6.9 (ed. Manitius, p. 70: 23ff.), apud

how long or short the daylight was in duration, there were always twelve "hours". The length of such "hours" then necessarily varied through the seasons as well as varying with geographical latitude, and are consequently termed "seasonal hours". The same division of the day into 12 + 12 parts (representing day and night) was known in Egypt from the second millennium onward; the first evidence, according to the reconstruction of Neugebauer and Parker is seen in a cenotaph of Seti I (1303–1290 B.C.E.).[3] It was the combination of the Egyptian seasonal hours with the sexagesimal reckoning of Babylonian time that produced the 24 equal (equinoctial) hours of Hellenistic astronomy which we continue to use. While quite impractical for use in astronomical computation, seasonal hours represented natural time intervals of eminent practicality for civil life.

In Mesopotamia, direct evidence for seasonal hours is not at all common. Most designations for time of day or night in cuneiform sources indicate that a homogeneous time-scale evolved, in which the period from sunset to sunset (night + day) was divided into 12 constants units of distance called *bēru* (Sumerian DANNA). Originally a distance measurement, *bēru* also represented the time taken to travel such a distance, so we translate "double hour" as each *bēru* is roughly the equivalent of two of our hours, and was independent of the seasonal variation in length of daylight. In this way, a day, defined as one revolution of the sky from sunset to sunset, always contained 12 *bēru*. Neugebauer places the period when *bēru* "mile" became a constant unit of time "double hour" in the first part of the first millennium.[4] This is also the period of the appearance of the first astronomical texts, both observational and schematic. Since a *bēru* was subdivided into 30 UŠ or "degrees" (1 UŠ = 4 minutes of time), the circle of the sky contained

---

Neugebauer, *Astronomy and History: Selected Essays* (Berlin, Heidelberg, and New York: Springer Verlag, 1983), p. 7f. note 8. It should also be noted that earlier Hellenistic observations (via Hipparchus?) recorded in the Almagest, e.g., those of Timocharis in Alexandria (295 B.C.E.), are reported with seasonal hours, see Almagest VII.3, transl. Toomer 1984, p. 336f. In Latin sources, see especially Vitruvius, *De Architectura* 9.1.1, and Manilius *Astronomica* 3.238ff.

[3] O. Neugebauer and R. Parker, *Egyptian Astronomical Texts* 3 vols., Providence, R.I.: Brown University Press, 1960, 1964 and 1969), pp. 116–121, and O. Neugebauer, "The Egyptian 'Decans'," in A. Beer ed., *Vistas in Astronomy* Vol. I, (London, New York: Pergamon Press, 1955), pp. 47–51.

[4] O. Neugebauer, *Astronomy and History: Selected Essays*, (Berlin, Heidelberg, and New York: Springer Verlag, 1983), p. 8 note 10.

12 · 30 UŠ, or 360°. Here in fact, as Neugebauer explained,[5] lies the origin of the 360° division of the circle and the practice in modern astronomy of measuring time and arcs in degrees.[6]

From the seventh century onward, in both scientific and non-scientific contexts, Babylonian time was designated by means of the number of *bēru* elapsed with respect to sunrise or sunset. The 12-*bēru* system is thus found in royal inscriptions, letters, ritual texts, astrological reports and scientific procedure texts.[7] In the late (i.e., Achaemenid and Seleucid period) non-tabular astronomical texts, however, UŠ (30 UŠ = 1 *bēru)* is favored as the unit of time, and *bēru* occurs only rarely. Eclipse reports reflect this change in terminology when giving the time of the beginning of a lunar eclipse, as in *ina* 1 *ana* ŠÚ ŠAMAŠ "at 1,0° (= 60 UŠ [instead of writing 2 *bēru*]) before sunset" (LBAT 1417 obv. iii 4) or *ina* 40 ME NIM "at 40° after sunrise" (LBAT 1417 obv. ii 4). Only a few texts of this genre still use *bēru.* The following examples are typical: (1) report of an eclipse from the seventh year of Cambyses (10 Jan. −521) AB GE_6 14 2½ DANNA GE_6 *ana* ZALÁG *i-ri-ḫi* 30 (= *Sin*) AN.GE_6 TIL GAR "Ṭebētu.14, 2½ double hours remaining before sunrise, the moon makes a total eclipse" (Strassmaier 1890, text no. 400 rev. 21, see Kugler SSB I, p. 70). (2) An earlier report (5 Oct −600) [MU 4 B]AR 13 [MU] RUB_4 3 KAS 5 UŠ GE_6 GIN "[Year 4] Nisannu.13 [mid]dle watch, 3 double hours 5 UŠ after sunset" (LBAT *1420 obv. i 8), and (3) the eclipse of 26. Mar -395 ŠE 14 *šá* DIB *ina* 1/3(?) KAS(?) *ana* ŠÚ ŠAMAŠ "Addaru. 14 which passed, at 1/3 double hour before sunset" (LBAT 1415 rev. ii middle).[8]

---

[5] Ibid., p. 8.

[6] On the Babylonian origin of the sexagesimal system and the sexagesimal division of the circle (and sky), see F. Thureau-Dangin, "Numeration et Métrologie Sumériennes," RA 18 (1921), p. 123; id., "La Division du cercle," RA 25 (1928), pp. 187–8, and "Encore un mot sur la division du cercle," RA 27 (1930), pp. 53–4; D. Sidersky, "La division de la circonférence en 360 parties," RA 26 (1929), pp. 31–2.

[7] See for example, in the instructions for a ritual performed while making glass (a sacrifice to the dead master of glass-makers) within the glass recipe text: *ina ālaku 2 bēr* *ᵈKūbe tušeššib* "(when they tell you the time is right) within 2 double hours you set up the images of the Kubu-deities" Oppenheim, *Glass and Glassmaking in Ancient Mesopotamia: The Cuneiform Texts*, (New York: Corning Museum, 1970), p. 52 L:34', and see CAD s.v. *bēru* mng. 2a and b; also sub *alāku* mng. 3j 2'c'.

[8] Eclipse dates are according to Meeus-Mucke, *Canon of Lunar Eclipses −2002 to +2526*, (Vienna: Astronomisches Büro, 1983).

It is clear, however, that the reports of eclipses before the Seleucid period (or before ca. 250, such as LBAT 1415–1417) are preserved in later compilations, and may or may not reflect actual observations. This is especially problematic in the case of the statements of time of the beginning of an eclipse, which is always reported, even when it would have been invisible in Babylon. These could well represent the results of later computations or interpolations from other recorded eclipses. Whether the use of *bēru* or UŠ in the reports of eclipses occurring during the pre-Seleucid period then reflects observational practice, or the conventional terminology of computational texts is impossible to judge.

Sporadic attestation of *bēru* may be found in Seleucid texts as well, as for example in a goal-year text (so-called because it provides data for making lunar and planetary predictions for a particular year), with reference to a solar eclipse: (Sept. –162) MU 1 ME 49.KAM [I]AN LUGAL NE GE_6 29 AN.GE_6 ŠAMAŠ *šá* DIB *in* 1 DANNA GE_6 *ana* ZALÁG "Year 149 An(tiochus) the king, Abu night of the 29th, solar eclipse which passed. At 1 double hour before sunrise" (LBAT 1264 rev. 10'–13'). Also in the same text (rev. 17'f.) one finds *in* 30 DANNA ME NIM-*a* "at 30° (= 1) double hour after sunrise". The use of *bēru* in expressions for the temporal duration of an eclipse is also attested, as in this fifth century eclipse report (21/22 Dec. –409) [...] *ana* SI ZALÁG 2 DANNA GAR ÍR [u ZALÁG (?)] "to the north it becomes clear, 2 double hours (is the duration of) onset, totality, [and clearing(?)]" (LBAT 1427:4'. Note the same terminology in LBAT *1420 obv. i 3ff., a report of the eclipse of 28. Oct. –602).

Even though sunrise and sunset are used as reference points, designations of time are based on fixed equidistant, not seasonally varying, intervals. As illustrated in the examples cited above, the late Babylonian non-mathematical astronomical texts established a system of four parts or intervals of the day and expressed time as the number of UŠ (occasionally *bēru* and UŠ) "after sunset" (GE_6 GIN, period between sunset and midnight), "before sunrise" (GE_6 *ana* ZALÁG, period between midnight and sunrise), "after sunrise" (ME NIM-*a*, period between sunrise and noon), and "before sunset" (*ana* ŠÚ ŠAMAŠ, period between noon and sunset) (Neugebauer and Sachs 1967, p. 212f.). The division of the day thus into four intervals, while preserving the basic reference to sunrise and sunset, certainly reflects a homogeneous time-scale which divided the period from sunset to sunset, not the variable periods of daylight and nighttime.

The units of the homogeneous time-scale established by *bēru*, UŠ, and NINDA[9] functioned in the same way as the time degrees (or, equatorial degrees) of Hellenistic astronomy, and therefore constitute the Babylonian counterpart to the equinoctial hours. The equinoctial hours that we inherited from Hellenistic astronomy form a highly artificial system which divides an artificial or ideal day into 24 equal hours. An ideal day is defined from one meridian-passage to another of the ideal or mean sun, which moves with the constant mean solar velocity. This is in fact the definition of the "mean sun" in ancient terminology, i.e., an ideal body traveling along the ecliptic (path of the observable sun) with average constant velocity. We therefore count our days in 24 equal hours beginning at noon, where "noon" is defined as the crossing of the meridian not of the true observable sun which does not move with constant velocity, but of the "artificial" or mean sun.[10] A homogeneous time-scale such as the one just described may seem more convenient (to us), but in fact introduces difficulties when one wants to express natural unequal time intervals (like the period from sunrise to sunset) in terms of the units of constant time intervals, like degrees or Babylonian *bēru*.

The expression of natural time intervals, specifically the length of daylight, in units of constant time intervals is precisely what is accomplished in Babylonian astronomy. One such case is found in a Neo-Babylonian report, in which an arithmetical scheme is generated for the variation in length of daylight.[11] Similar numerical schemes for length of daylight in premathematical astronomy were already known (ca. 1100 B.C.E.), which determined the varying length of the day in terms

---

[9] The reading of the sign GAR has been established as NINDA(N) (to be read in Akkadian as *nindanu* [?], see CAD Vol. 11 pt. II s.v.) for the metrological unit of length equivalent to 12 cubits. See the discussion in CAD sub *akalu*, p. 245 and M. Powell, "Sumerian Area Measures and the Alleged Decimal Substratum," ZA 62 (1973), pp. 199–201. In astronomical usage, however, GAR (or NINDA) represents 1/60 of the time degree, termed UŠ, and 1/15 cubit. For these metrological equivalences, see ACT vol. I p. 39. I cannot find proof of the reading NINDA for astronomical texts, or how this unit relates to the one equivalent to 12 cubits.

[10] See HAMA, p. 60 note 2: Mean sun in modern astronomy moves in the equator and coincides with the true sun at longitude 0. "Mean sun" in ancient terminology, Neugebauer explains, is "an ideal body which moves in the ecliptic with mean velocity about 0 [the observer] and coincides with the true sun S in A [apogee] and Π [perigee]". (HAMA, p. 60) The difference between true and mean solar time is the "equation of time".

[11] E. Reiner and D. Pingree, "A Neo-Babylonian Report on Seasonal Hours," AfO 25 (1977), pp. 50–55.

of the measurement of a watch (of the day or night) by the waterclock, where the length of day was reckoned in *mana*, the weight of water (Neugebauer 1947, pp. 37–43). This so-called astrolabe text contains three such schemes in the numbers given without accompanying units of measure on the three "rings" of the circular inscription, or columns in the case of the astrolabe in list form.[12] All that can be determined from the astrolabe texts directly is that these numbers reflect zigzag functions having a period 12, with the maximum being reached in place 3, the minimum in place 9, and the mean values in places 12 and 6. On this basis, the hypothesis was made that these numbers represented lengths of watches throughout the 12 months of the year, the maximum and minimum representing solstices, the means representing equinoxes, and therefore the increase and decrease of the length of daylight throughout the seasons.[13] This interpretation was confirmed by the fact that the key numbers (maximum and minimum) of the "outer ring" occur in MUL.APIN and other texts as values for the length of a night watch in units of *mana*.[14] The three series of numbers then could be explained as full, half, and one-quarter watches. Since three watches were assigned to both day and night, the division of the daylight (or night) into 12 is implicit in the third series, which gives numbers representing 1/4 watch. The astrolabe schemes are based on the ratio 2:1 for longest to shortest daylight, i.e., the longest daylight is twice as long as the shortest daylight.

The Neo-Babylonian report cited above was new in that it gave values in UŠ and NINDA representing the length of one subdivision of the day such that when multiplied by 12 the values gave the length of daylight for every 15th day of a schematic 360 day (solar) year. Clearly the values represent 1/12 of the length of daylight, which is the definition of a seasonal hour. Moreover, the Neo-Babylonian scheme was based on the parameter, well-known from the astrolabe,

[12] For extant circular exemplars, see CT 33 11 [= Sm. 162] and 12 [= K14943+]; in list form: KAV 218 [= VAT 9461], LBAT 1499 [= BM 34713] and 1500 [= BM 34387], see C.B.F. Walker and H. Hunger, "Zwölfmaldrei," *Mitteilungen der deutschen Orient-Gesellschaft* 109 (1977), pp. 28–9 [= BM 82923]).

[13] B.L. van der Waerden, "Babylonian Astronomy. II," JNES 8 (1949), p. 18 and 1950, p. 21f.

[14] MUL.APIN I ii 43 4 MA.NA EN.NUN *u_4-me* 2 MA.NA EN.NUN GE6 "(in Month IV [Du'ūzu]) 4 mina (is the duration of) a day watch, 2 mina for a night watch"; ibid. iii 9 2 MA.NA EN.NUN *u_4-me* 4 MA.NA EN.NUN GE_6 "(Month X [Abu]) 2 mina for a day watch, 4 mina for a night watch". See also Tablet II ii 21, 25, 31, and 35.

2:1 for the ratio of longest to shortest daylight: Longest daylight = 8 *bēru*, shortest daylight = 4 *bēru*. So, for example, the smallest value in the scheme is 10 UŠ; multiplied by 12 = 120 UŠ, or 4 *bēru*, which is in fact the value given as the duration of daylight on the shortest day of the year. As Reiner-Pingree pointed out,[15] the Neo-Babylonian report provided not only the "first undisputable evidence" for seasonal hours in Babylonia, but also the confirmation of the analysis of the controversial Ivory Prism (faces C and D) which attests to the division of daylight and night into 12 seasonal hours during the same period (seventh century).[16]

The Neo-Babylonian report and the Ivory Prism both provide daylight length schemes in terms of the duration of seasonal hours. Now, new evidence may be adduced for Babylonian seasonal hours, which points to their actual application. The most convincing evidence is found in the late Babylonian horoscopes, which occasionally state the particular seasonal hour of birth. More conjectural and problematic, but nevertheless worth mentioning here, is a late Babylonian procedure text for constructing a sundial in which the 12 subdivisions (12 TA.ÀM ḪA.LA.MEŠ) that are mentioned are tentatively to be regarded as hour-lines indicating seasonal hours.

What is of particular interest is that in both cases, i.e., the horoscopes and the sundial texts, the 12 subdivisions of the day are termed *simanu*. The word *simanu* has been known to mean "season", "period (of time)," "time interval," or "duration," and has a rather flexible usage, denoting either periods of time in general, or quite specific periods of computed duration, such as are used in the Seleucid astronomical procedure texts.[17] The specific meaning "seasonal hour", however, has not previously been attested; moreover, an Akkadian word for "hour" has otherwise not been known heretofore.[18]

[15] Reiner and Pingree, "A Neo-Babylonian Report on Seasonal Hours," p. 54.

[16] S. Langdon, *Menologies* (London: published for the British Academy by H. Milford, Oxford University Press, 1935), pp. 55–64, and S. Smith, S., "Babylonian Time Reckoning", *Iraq* 31 (1969), pp. 74–81.

[17] The term SI-MAN is found in the context of the division of the day in four, as for example the evening epoch "before sunset". See ACT 200 Section 13: 28–rev. 1 *si-man ana* ŠÚ ŠAMAŠ *ana* DU-*ka si-man qa-tu-ú* TA *s*[*i-man ana* ŠÚ ŠAMAŠ LÁL] "in order for you to compute the time before sunset (*siman ana* ŠÚ ŠAMAŠ): the complete duration [subtract] from [the time before sunset]". This, however, reflects equinoctial, not seasonal time reckoning.

[18] In Rabbinic Hebrew, one-twelfth of the period of daylight, the civil day, is termed sa'ah zemanit, see W.M. Feldman, *Rabbinical Mathematics and Astronomy* (New

In only five horoscopes is the specific *simanu* of birth stated (BM 33018, 35515, 38104, 41301 [contains two horoscopes]); and from this small group, two occurrences will be presented here (section 4) to confirm the interpretation of *simanu* as "seasonal hour". Before discussing this evidence, however, some general remarks are in order: All the Babylonian horoscopes give computed (not observed) zodiacal positions of the seven planets, sun, moon, Jupiter, Venus, Mercury, Saturn, and Mars. The planetary data follows the adverbial phrase *ina simanišu* "in his *simanu* (Jupiter was in zodiacal sign X, Venus was in zodiacal sign Y, and so on)". Because the adverbial *ina simanišu is* replaced in a few horoscopes with *inūšu* "at that time", *ina simanišu* has traditionally been considered a straightforward variant of *inūšu* and translated accordingly "at that time."[19] In the light of the texts to be discussed here, however, I propose that the adverbial phrase with *simanu* has a more restricted meaning, namely, "in his hour (of birth)". The five horoscopes all designate the particular *simanu* of birth, e.g., *ina* 6 SI-MAN *šerru alid* (also attested are 7, 9, 11, and 12 SI-MAN). These numbers must be ordinals, hence "in the 6th (or 11th or 12th) *simanu*, the child was born". An additional feature to note, in support of the identification of the term *simanu* as seasonal hour, is that no ordinal greater than 12 hours occurs.

To demonstrate that the *simanu* intervals are seasonal hours, it must be shown that they (the *simanu*) are not the same as the division of the day into 12 *bēru*, and it must also be clear that both day and night are

York: Hermon Press, Inc., 1978, 3rd Edition), p. 100. No etymological reasons to connect Hebrew zmn, which is attested in the Old Testament as well as in mishnaic Hebrew and the Talmud, to Akkadian *simanu* have been shown. In Brown, Driver, Briggs, *A Hebrew and English Lexicon of the Old Testament* (Oxford, 1975, 2nd Edition) s.v. zmn, all occurrences of this word in other Semitic languages (e.g., Aramaic, Syriac, Ethiopic) have /z/. But the meaning of zmn, "appointed time", and its use in late Hebrew as a term for seasonal hour suggests some connection with Akkadian *simanu.* (I thank Jack Sasson and Roger Brooks for guidance with the Hebrew.)

It is interesting to note in addition, as pointed out to me by B.R. Goldstein, that the Greek word *ὥρα* "hour" or "seasonal hour" had much the same semantic range as Akkadian *simanu*, meaning "any period" (determined by natural cycles, e.g., year, month, or day) or "the fitting time or season for a thing" (Liddell-Scott s.v.). In Homer *ὥρα* meant part of the year, or "season" (usually plural, seasons) and only later became the word for the 1/12th part of the actual daylight. In the Hellenistic period, the seasonal, or civil, hours were termed *ὧραι καιρικαί*, see G.J. Toomer, *Ptolemy's Almagest* (New York, Berlin: Springer Verlag, 1984), pp. 23, 99, 104, and Appendix A.

[19] Texts with *inūšu* are Sachs 1952, p. 54 AB 251:3 and ibid. 57 MLC 1870:3 (wr. U$_4$.BI). See CAD s.v. *inūšu* and *simanu* for the interpretation of both as "at that time".

divided into 12 parts. Texts A and B, both horoscopes, contain sufficient data to fix the *simanu* or seasonal hour with respect to daylight or night, and thereby serve to establish the meaning of the term *simanu* as "seasonal hour", as well as its independence from the 12 equal divisions of the nychthemeron (night + day).

Text A
BM 33018 = 78-7-30,12 (L*1468) 187 SE = 1 Oct. −124

u.e. [ina a-mat ^{d}E]N u ^{d}GAŠAN-iá liš-lim
obv.
1 [MU.1.M]E.1,27.KAM ^{I}Ar-šá-kam LUGAL
2 ITI.KIN 1 22 ina ZALÁG 24 ALLA
3 U$_{4}$ 22 ina 11 si-man LÚ.TUR a-lid
4 ina si-ma-ni-šú 30 ina SAG A 20 ina RÍ[N]
5 MÚL.BABBAR ina ḪUN Dil-bat ina A GENNA ina ZIB.ME
6 AN ina MAŠ.MAŠ GU$_{4}$.UD šá ŠÚ-ú NU IGI
7 ITL.BI 15 NA 17 LAL-tim
8 27 KUR MU.B[I]

rev.
1 [ITI.NE 13.KAM AN.GE$_{6}$ 30]
2 ina ZIB.ME al-la x x [ ]
3 ḪAB-rat DIR GAR-an
4 28 AN.GE$_{6}$ 20 ina AB.SÍN
5 KI PAP NU IGI

6 22 ina ZALÁG 24 ALLA
7 23 ina ZALÁG 9 A

Translation
u.e. [By the command of B]ēl and Bēltīja may it go well.
obv.
1 Year 187 (S.E.), Arsaces (is) the king.
2 Mo. Ulūlu, 1, on the 22nd before sunrise (the moon was) 24° in Cancer;
3 day 22 in the 11th hour, the child was born.
4 in his (seasonal) hour (of birth), the moon was in the head of the Lion (= Normal Star ε Leonis), the sun was in Li[bra]
5 Jupiter in Aries, Venus in Leo, Saturn in Pisces,
6 Mars in Gemini, Mercury, which had disappeared, was not visible.

7 That month, moonset after sunrise (full moon) was on the 15th (of Ulūlu), fall equinox was on the 17th (of Ulūlu)
8 Last lunar visibility before sunrise was on the 27th. That year,

rev.
1 [on the 13th of Abu a lunar eclipse]
2 in Pisces, beyond…
3 in excess of the disk it made.
4 On the 28th (of Abu) an eclipse of the sun in Virgo;
5 when watched for (it) was not observed.
6 On the 22nd before sunrise (the moon) 24° in Cancer,
7 On the 23rd before sunrise (the moon) 9° in Leo.

Commentary
As is standard format, the date of birth is given in the first line, here S.E. 187 Ulūlu (Mo. VI Sept., i.e. close to the equinox) the 22nd (Oct. 1 −124 in the Julian calendar).

Line 2 gives the location of the moon just before sunrise on the day of the birth as Cancer 24°. Because it is likely that the terminology of the horoscopes accords with that of the non-mathematical astronomical texts of the Seleucid period, the term ZALÁG (Text A obv. 2, rev. 6–7) is probably to be understood as an abbreviated form of the second division of the day termed GE_6 *ana* ZALÁG "(period of) night (remaining) to sunrise". The variations in terminology for the divisions of the day have been discussed.[20] In earlier (seventh century and before) non-technical contexts, ZALÁG is the logogram for the Akkadian verb *namāru*, "to be bright", or "to dawn", and is given the synonym *šêru* "to become morning", in a synonym list.[21] In the infinitive absolute, *namāru* is used frequently as a time indicator with the meaning "dawn," but in its restricted sense of day-break or first light, not the entire interval from first light to sunrise. This is the sense in which it is used in the astrological omina concerning lunar eclipses, where for example the moon remains eclipsed "until daybreak (EN ZALÁG = *adi namāri*)".[22]

Line 3 says "on the 22nd day, in the 11th *simanu*, the child was born". At the end of the horoscope, after a slight space (see rev. 6–7),

[20] O. Neugebauer and A.J. Sachs , "Atypical Astronomical Cuneiform Texts" JCS 21 (1967), pp. 212–213.
[21] Malku, see CAD vol. 11 pt. I, s.v. *namāru*.
[22] For further discussion, see ABCD, p. 45 note 60 and p. 85 note 5.

are two statements concerning the position of the moon just before sunrise on the morning of the birth and again for the morning following the birth, giving degrees within the zodiacal sign: rev. 6–7. "On the 22nd just before sunrise (the moon) was in 24° Cancer; on the 23rd just before sunrise (moon) in 9° Leo". According to this text, then, the moon progressed 15° from the 22nd to the 23rd of the month Ulūlu; this daily progress is 2° more than the moon's average 13° per day, and 1° more than its actual progress that day, according to computation using P. Huber's program.

In the actual hour of birth (line 4), the moon's location is given with respect to SAG A "the head of the Lion", the name for the fixed star ε Leonis.[23] This reflects the other major Babylonian "celestial coordinate" system which was established with respect to a select group of fixed stars distributed unevenly around the ecliptic, falling within a band of latitude between +10° and −7;30°. Some 32 of these ecliptical reference stars are known primarily from the non-mathematical astronomical texts; no complete list as such is attested in an ancient source. Epping gave these stars the name *Normalsterne*, which has carried over in English usage as "normal stars."[24] According to our text then, the moon had moved from the end of Cancer (Cancer 24°) where it was just before sunrise on the 22nd, to a longitude somehow marked by the star ε Leonis near the ecliptic in the hour of the birth, sometime later in the 22nd day. On the basis of the three lunar positions given in the text, the approximate time of the 11th *simanu* can be determined with the result that the birth can certainly be placed in the daylight hours. Precisely where the moon was in relation to ε Leonis is difficult to determine from the statement "*ina* SAG A" in the text (further discussion of the nature of normal star longitudes is given below). For the purpose of establishing the time of birth in the horoscope in question, however, it is sufficient to note that if one interpolates a lunar position for the 11th seasonal hour of this day (22. Ulūlu = 1. Oct) on the basis of the two longitudes given in the text (sunrise on the 22nd and sunrise on the 23rd), the result agrees satisfactorily with the lunar longitude predicted (with parallax) by modern computation (according to the program of P. Huber) which shows the moon to have been at longitude 115° by 5 PM local time (Babylon).

---

[23] SAG A is also interpretable as "the beginning of Leo". Cf. A.J. Sachs, "Babylonian Horoscopes," JCS 6 (1952), p. 62f., BM 35516 obv 5. This alternative would support our conclusion equally well.

[24] J. Epping, *Astronomisches aus Babylon*, (Freiburg: Herder, 1889), p. 115. See also

Table 1. Lunar Data for BM 33018[25]

Text (date: 22 Ulūlu S.E. 187)		Modern Computation (Jul. date: 1 Oct −124)	
Longitude	time	Longitude	time
Cancer 24° (= 114o)	sunrise	109.12°	3 UT/6 AM Babylon
ε Leonis[26]	11 *simanu*	114.97°	14 UT/5 PM Babylon
(date: 23 Ulūlu S.E. 187)		(Jul. date: 2 Oct −124)	
Leo 9° (= 129°)	sunrise	123.31°	3 UT/6 AM Babylon

This is approximately where one would expect the 11th seasonal hour to fall. The data from this horoscope text supports the hypothesis sufficiently well to conclude that *simanu*, as a term for a subdivision of daylight (or night), into 12, conforms precisely to the definition of seasonal hours.

A separate problem from establishing the time of the birth in the late afternoon, however, is correctly interpreting the meaning of the normal star position of the moon at the time of birth. In the Seleucid period, the use of ecliptical longitudes is standard in the lunar and planetary ephemerides (ACT), normed either at Aries 10° (System A) or Aries 8° (System B), and in the text group termed almanacs, belonging to the non-mathematical astronomical texts. In general, however, the non-mathematical astronomical texts (diaries, goal-year texts and normal star almanacs) use the other reference system defined with respect to the 32 ecliptical normal stars. The way in which the two reference systems were commensurable is not yet fully understood, because the terminology used in the normal star references has not been absolutely clarified in modern terms.[27]

In this connection a fragmentary late Babylonian text (BM 46083) is of interest for preserving part of a list of normal stars and their longitudes converted to degrees with the zodiac.[28] While the zodiac, first attested in the late fifth century as the twelve equal divisions of the ecliptic, was of value as a standard mathematical reference system for

[25] Using longitudes 108.9° in –300 and 112.9° in 0, given by Sachs 1974, p. 46, I have interpolated the longitude of ε Leonis to be 111.4°. How the Babylonians would have converted it to a zodiacal longitude is not known.
[26] Sunrise on this date, according to P. Huber's program, was 2.98 UT.
[27] See HAMA, pp. 545–47.
[28] A.J. Sachs, "Babylonian Horoscopes", JCS 6 (1952), pp. 146–50.

prediction of astronomical phenomena, greater accuracy of observation would have been obtained using normal stars, simply by virtue of the fact that one system uses abstract numerical points of reference (the 360° degrees of the zodiac) which themselves are not "visible" while the other uses something visible as a reference point (a selected group of ecliptical stars). Normal stars are attested as early as the diary No. –651 iv 15' mentioning α Scorpii (SI_4)[29] and No. –567 mentioning β Virginis (GÌR *ár šá* UR.A) obv. 3[30] and thereby seem to antedate the zodiac by (at least) 150 years. The star catalogue, which Sachs dated to the end of the Persian period, attests to the fact that at some point the Babylonian astronomers found it desirable to correlate the two "coordinate systems" and express normal star longitudes in terms of the 30° signs of the zodiac. Aside from this, the purpose of the star catalogue is not known, nor is the subject matter of the other equally fragmentary lines left in the text ascertainable, beyond being possibly "astrological", according to Sachs.[31]

For planetary positions, normal star terminology is not found in the horoscope texts, as it is in the diaries. The more usual method of giving positions of planets in horoscopes is with respect to the zodiac, usually simply the zodiacal sign alone, less often in the number of degrees within a zodiacal sign. This would seem to be confirmation in itself that the planetary longitudes were not obtained for horoscopes by observation. However, when it comes to the moon, normal stars are frequently used. It is entirely possible that this is a result of the use of astronomical diaries as a source for horoscopes, rather than a result of direct observation. In the diaries, the position of the moon with respect to a normal star is regularly observed and recorded. The moon is observed to pass either in front (to the west of the normal star) or behind (to the east of the normal star, in accordance to the direction of the rotation of the celestial sphere from east to west) or above and below the normal star (the precise meaning of which remains obscure). As reflected in the terminology, what is observed is the proximity of, e.g., the moon to one of the normal stars, measured not in UŠ as with zodiacal coordinates, but in cubits or, for distances less that 1/2 cubit,

[29] See A.J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia* Vol. I, (Vienna: Österreichische Akademie der Wissenschaften, 1988), p. 44.

[30] Sachs and Hunger, *Astronomical Diaries and Related Texts from Babylonia* Vol. I, p. 46.

[31] Ibid. p. 149.

in fingers. We have therefore come to associate normal star references with observations, although as used in horoscopes, this cannot be true in every case (perhaps not in any case). But even if horoscopes derived normal star positions of the moon from the diaries, in the many cases where the moon was not above the horizon, I fail to see the sense in citing such a position with respect to a normal star—unless the conversion to zodiacal longitudes would have been immediately known to whomever consulted the text. That these data were included because of some astrological significance associated with the moon passing by a normal star, is a possible interpretation, but one which has yet to find confirmation in late Babylonian lunar omen texts.

Astronomical diaries do not provide the time of night of the normal star observations of the moon with any precision. The time is stated only in terms of a night watch or an expression like "beginning of night."[32] Therefore, for determining time of night, a lunar position with respect to a normal star such as that found in the present horoscope has inherent difficulties. Moreover, in the present horoscope (Text A), the laconic "*ina*" plus normal star is quite abbreviated in comparison with the usual terminology in the diaries which states by how many cubits or fingers the body passed by the star and from what direction. The preposition *ina* could mean "at" or "near", so that the moon's actual location is not clear from this statement. A survey of the horoscope corpus reveals that the bulk of the normal star references read more like those of the diaries, i.e., where the moon "passes by" a normal star and specifies the direction "in front", "behind", "above" or "below", and by how many cubits. If the normal star position was obtained simply by quoting from a diary for the date of the birth, the lunar longitude at the time of birth (11th *simanu* or approximately 5 PM) need not have been exactly that of the star ε Leonis, but rather in some relation to it, which is not ascertainable from the text or from comparison to other expressions of normal star positions. Again, the difference between a system designed for observation vs. one for mathematical prediction is a factor here, since the moon was not visible at the stated time of birth.

If the normal star position was not extracted from a diary, another possibility is that some computational scheme led to the determination

[32] A.J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia* Vol. I, p. 22.

of ε Leonis as the position of the moon at the time of birth. The fact that the lunar positions before sunrise of the morning before and after the birth are given offers the possibility that interpolation was used. One would however not expect the result to be stated by means of a normal star, but rather a zodiacal sign (see note 16). This however is the kind of speculative question that will have to be investigated on the basis of more texts.

Regarding the planetary positions, table 2 summarizes the data as given in the text with correlations to modern computed longitudes for 14.0000 UT (= 5 PM Babylon), the relevant time of the horoscope. There is excellent agreement between the text and the computation. The only planets that were above the horizon at this time were the sun, Mercury (which, however, was in conjunction with the sun and could not be seen) and Saturn was very close to the horizon (altitude .51). The remark in the horoscope that Mercury "had set" (GU_4.UD *ša rabû*) does not mean it was below the horizon, but that it had "disappeared" behind the sun.

Five additional astronomical data are given following the positions of the planets. There are 1) NA, the interval of visibility of the full moon between sunrise and moon set, which occurred on the 15th of Ululu; 2) the date of fall equinox; 3) the date of the last lunar visibility before sunrise of the month; 4) solar eclipse during the year; 5) lunar eclipse during the year. Why these data were included in horoscopes is not known. Presumably they were taken into account in the astrological interpretation of the horoscope, although the evidence for how this may have been done is not found in the horoscope documents themselves. Perhaps further study of other late Babylonian astrological texts (omina, procedures and commentaries) will shed light on this. In the meantime, all that can be established is that the data themselves were excerpted from available astronomical records.

Table 2. Planetary Data for BM 33018

Planet	Text (22 Ululu S.E. 187, 11 SIMAN)	Modern Computed Longitudes (1 Oct. −124, 14 UT)
sun	Libra	185.63° (= Libra 6°)
Jupiter	Aries	11.35° (= Aries 11°)
Venus	Leo	139.27° (= Leo 19°)
Saturn	Pisces	342.74° (= Pisces 13°)
Mars	Gemini	58.46° (= Taurus 28.5°)
Mercury	(Libra)	198.29 (= Libra 18°)

Analysis of horoscope A also confirms another important aspect of the genre in general, namely, that the lunar positions were not observed, but obtained from other astronomical documents, or directly from a computational scheme (which we have not yet identified). In the case of our present horoscope, this is certain for the moon in the 11th seasonal hour of the 22nd of Ulūlu. The rising and setting times of the moon throughout the synodic cycle determine that on the 22nd–23rd day, the moon is in its last quarter, which rises around midnight, crosses the meridian around sunrise and sets at noon. In the late afternoon of the 22nd, therefore, when the birth occurred, the moon was already well below the horizon. That this was indeed the case is confirmed from Huber's computer generated data for altitude (degrees above [+] or below [−] the horizon) showing the moon on 2 Oct. −124 at 14.0000 UT to have had an altitude of -23.82. That the horoscopes in general do not contain observations, and were not dependent on what was above the horizon or visible, is demonstrable in other ways as well. Whether astronomical data was ever computed directly by casters of horoscopes or not remains to be demonstrated. A more plausible scenario, as suggested above, is that the scribes extracted the relevant data from already existing tables or almanac-type texts. Such documents are well attested for the Seleucid period, and the number of parallels between them and the horoscopes strongly suggests that the non-mathematical astronomical texts, especially almanacs and diaries, comprised the likely source material for the planetary and lunar positions, as well as for the dates of various other phenomena (solstices, equinoxes, and eclipses) that are regularly found in horoscopes.

Text B
BM 38104 = 80-10-12,6 (L*1475) 243 S.E. = 15 Apr. -68

obv.
1 MU.2.ME.43.KAM [ITI].BAR
2 U$_4$.20.KAM ina 9 si-man LÚ.TUR a-lid
3 ina si-man-šú 30 ina TIL MÁŠ ina 18
4 20 ina TIL ḪUN ina 30 MÚL.BABBAR
5 ina PA ina 24 Dil-bat ina MAŠ.MAŠ
6 ina 13 GENNA ina GU ina 15
7 AN ina RÍN ina 1$_4$ GU$_4$.UD šá ŠÚ-ú NU IGI
8 [ITI].BAR x x x [ ]* *expect date of equinox

l.e. (perhaps erased)
1 x x x

rev.
1 14 NA 27 KUR
2 MU.BI ITI.NE 28.KAM!
3 AN.GE$_6$ 20 KI PAP NU IGI
4 ina TIL A
5 ITI.KIN 13 KI ŠÚ 20
6 AN.GE$_6$ 30(wr.20) al šal ḪAB-rat
7 DIRI GAR-an ád È-a
8 ina ZIB.ME

lo.e.
1 LÚ.TUR BI MÁŠ x x x
2 MÁŠ LA x

Translation
obv.
1 Year 243, Nisannu
2 the 20th, in the 9th hour, the child was born.
3 In his (seasonal) hour (of birth), the moon was at the end of Capricorn in 18°,
4 the sun was at the end of Aries in 30°, Jupiter was
5 in Sagittarius in 24°, Venus in Gemini
6 in 13°, Saturn in Aquarius in 15°,
7 Mars in Libra in 14°, Mercury which had set was not visible.
8 Nisannu [... (was the equinox)]
l.e.
1 ...

rev.
1 Moonset after sunrise was on the 14th, last lunar visibility before sunrise was on the 27th.
2 That year Abu the 28th day(?),
3 solar eclipse when watched for (it) was not observed
4 in the end of Leo.
5 Ulūlu the 13th near(?) the setting of the sun,
6 a lunar eclipse exceeding 1/3 disk

7 occurred; (the moon) was eclipsed when it rose
8 in Pisces.

u.e.
1 That child Capricorn...
2 Capricorn...

Commentary
In this document, the datum which enables the time of birth to be fixed in the daylight hours is the lunar longitude given in obverse line 3, viz. Capricorn 18°. On this basis it may be argued that the 9th *simanu* refers to mid-afternoon, approximately 2:30 PM local Babylon time. Table 3 summarizes the astronomical data both from the text and according to modern computation. The longitude of the moon at the time of birth was obtained ultimately by computation as the moon was below the horizon at that time (altitude −66.68).

For use of seasonal hours in Babylonia one may also provisionally count as evidence two late Babylonian procedure texts for constructing, or, as the texts say, "drawing" a sundial (LBAT 1494 [= BM 34719] and 1495 [= BM 34067] + BM 35010 [unpublished join made by Sachs subsequent to LBAT].

Time measurement with the sundial is indicated already much earlier in Mesopotamia (end of second millennium) by shadow tables found in the 2nd tablet of the astronomical series MUL.APIN "the Plow-star" (MUL.APIN II: 108–128). These assign shadow lengths for a gnomon at intervals of the day on the equinoxes (15.Nisannu and 15.Tašrītu) and solstices (15.Du'ūzu and 15.Ṭebētu) of the schematic calendar year. The variation in shadow lengths follows a numerical scheme, consistent with the known ratio of the length of daylight for

Table 3. Planetary Data for BM 38104

Planet	Text (20 Nisannu, 9th SIMAN)	Modern Computation (Jul. date 16 Apr. −68, 14 UT)
moon	end Capricorn 18°	295.51 (= Capricorn 25°)
sun	end Aries 30°	23.62 (= Aries 24°)
Jupiter	Sagittarius 24°	257.91 (= Sagittarius 18°)
Venus	Gemini 13°	68.80 (= Gemini 9°)
Saturn	Aquarius 15°	310.21 (= Aquarius 1(°)
Mars	Libra 14°	185.70 (= Libra 6°)
Mercury	with the sun	11.02 (= Aries 11°)

Babylon, where M:m = 3:2. The difficulty with interpreting the MUL. APIN shadow scheme and consequently with reconstructing for it a corresponding sundial is that the noon shadow remains the same length (5/6 cubit) throughout the year. See HAMA, pp. 544f. for discussion, and for bibliography on the shadow tables, ibid. note 17.

The late sundial procedure texts are no less difficult to interpret, not only because there are few complete lines in either text but also because of our ignorance of some of the technical terminology which seems to be used only here. Nevertheless, some cautious remarks can be made by way of general description of their contents which will add to our picture of the practical application of seasonal hours. The obvious question of whether the horoscopes' use of seasonal hours implies use of a sundial (which would then lead to some tentative dates for the Babylonian sundial) is, in my view, not yet answerable on the basis of our extant material. It is of some interest to point out, in connection with the question of whether the horoscopes refer to time as given by a sundial, that the horoscope texts which refer to a birth occurring during the daylight hours have numbered *simanu*'s (i.e., *simanu* 1 through 12) while those in which the birth occurred at night express the time either by night watches (USAN "evening watch" and MURUB_4 "middle watch" [BM 34003] are attested) or in terms such as SAG GE_6 "beginning of night" or *mišil* GE_6 "middle of the night" (BM 77265:3). In these nighttime horoscopes, the expression *ina simanišu* "in his hour" normally precedes the enumeration of planetary positions. In other words, *simanu* means "hour" of day or night, but the horoscopes which specify the ordinal number of the hour seem without exception to refer to hours of the day.

The following description is based on the two extant procedure texts (LBAT 1494 and 1495+) for the construction of a sundial. A gnomon, called the stylus (*qan ṭuppi*), is set up on a stone slab (*agurru*), and the shadow which it produces for morning (GIŠ.MI *šá šēri*) and noon (GIŠ. MI AN.NE) is mentioned in connection with the drawing of various lines: There are two "dividing lines" (*tallu*), one for Cancer and one for Capricorn, presumably the solsticial curves for summer solstice and winter solstice respectively, and a number of "cross-wise drawings" (*uṣurāti parkēti*) are also mentioned. It seems that the Babylonian sundial marked at least the basic elements associated with observing the shadow of a gnomon, namely noon, or the shortest daily shadow, and the solstices, indicated by the longest and shortest noon shadows in the course of a year. Beyond assuming that the "stone slab" lay in a horizontal plane, we do not yet know what form to assign the Babylonian sundial.

The final step in both procedures seems to be constructing the hour-lines, but neither text is sufficiently well preserved in this section for one to do more than infer how this might have looked on the basis of much later Hellenistic (or Arabic) dials. One text introduces the section with SI.MAN.MEŠ *ana epēšika* "in order for you to make the intervals" (LBAT 1494 rev. 2, cf. rev. 7 UGU *a-ṣu-ú šá* IV(ŠU) GIŠ. ḪUR.MEŠ *u* SI.MAN.MEŠ UGU *a-gu*[*r-ri-ka*...]). The other refers to 12 parts (12 TA.ÀM ḪA.LA.MEŠ) into which "you divide" (*tuzâz*) the dial (LBAT 1595 rev. 5 and 12). If the 12 divisions represent areas through which the shadow would pass as the day progressed, then by definition, the intervals would be seasonal hours.[33] At sunrise the gnomon's shadow would be infinitely long, pointing to the west. The higher the sun rose the shorter the shadow would become until it reached the first line (or first "division" *zittu*/ḪA.LA). This then, would represent 1 seasonal hour after sunrise throughout the year. The shortest shadow obtained each day would represent the noon line, or 6th seasonal hour, at which point the sun is on the meridian. Thereafter as the afternoon progressed, the shadow would grow longer until it reached the last demarcation, one seasonal hour before sunset. Then the shadow would once again be infinitely long, pointing to the east.

The eventual reconstruction of the Babylonian sundial would shed interesting light on an oft quoted statement of Herodotus (2.109) to the effect that the Greeks received the "polos and gnomon" from Babylonians, as well as the "division of the day into 12." The polos with gnomon constitute a concave hemispherical sundial, representing half of the celestial sphere. Since the sphere played no role in any stage of Babylonian astronomy, it seems a priori unlikely that such an object would be of Babylonian origin. Neither does the little that can be derived from the extant sundial texts indicate a bowl-shaped or

---

[33] Equinoctial hours are out of the question, unless we can demonstrate that the Babylonian dial (assuming a planar form) lay in the plane of the celestial equator and that the gnomon was in line with the celestial pole (i.e., parallel to the earth's axis). The latter would require knowledge of geographical latitude, a concept not attributable to the Babylonians. In fact, the ratio of longest to shortest day (for Babylon eventually 3:2) took the place of geographical latitude in ancient astronomy. Finally, the hour lines would have to be spaced 15° apart (15° arc = 1 hour time). Only under these conditions will a sundial show equinoctial hours.

hemispherical object. Regarding the division of the day into 12, as far as whether Herodotus referred to seasonal hours or to the 12 *bēru* which divided the whole day (day + night), not just the period of daylight, simply cannot be decided given the presently available evidence (Babylonian and Greek). The fact that the Babylonian time distances *bēru* appear again in later Greek astronomical sources of Hellenistic date (for example, Manilius, *Astronomica* 3.275–300, where a stade is 1/60 of a *bēru*, and in Michigan Papyrus 151)[34] could support an identification with *bēru* rather than *simanu*. But however the problematic passage in Herodotus is to be interpreted,[35] the existence of seasonal hours in Mesopotamia from the seventh century onward is no longer in any doubt. We may therefore affirm the independent existence of two ways of dividing the day in ancient Mesopotamia, each suited to a particular purpose: the 12 *bēru*, meaning "double hour" of 30° duration used for computation with respect to the period from sunrise to sunrise, and the 12 *simanu*, meaning "(seasonal) hour", whose duration varied according to the seasons of the year, used for reporting the time with respect to the periods of daylight or night.

[34] O. Neugebauer, "On Some Astronomical Papyri and Related Problems of Ancient Geography", *Transactions of the American Philosophical Society* 32 Pt. II (Philadelphia: American Philosophical Society, 1942), p. 261.

[35] See Neugebauer, *Astronomy and History: Selected Essays* (Berlin, Heidelberg, and New York: Springer Verlag, 1983), p. 8.

CHAPTER NINE

BABYLONIAN HOROSCOPY: THE TEXTS AND THEIR RELATIONS

Since the end of the second millennium B.C.E., the reading and interpretation of celestial signs in the form of omens became a major feature of the learned culture of Mesopotamia, and soon began to extend beyond the Babylonian scribal centers to those of the bordering states of Hatti and Elam. The history of Babylonian astrology begins with the earliest attestation of the reading of celestial omens in Mari letters[1] and late Old Babylonian omen texts (ca. 1800 B.C.E.), continues through the Middle Babylonian and Middle Assyrian periods (ca. 1200 B.C.E.) with forerunners to the canonical celestial omen series *Enūma Anu Enlil*,[2] reaches something of a peak in the seventh century as evidenced by the activities of the Sargonid court astrologers,[3] and ends with a wide variety of celestial as well as nativity omens and horoscopes in the Achaemenid, Seleucid, and Arsacid periods (ca. 500 to 50 B.C.E.).[4]

Historically the most recent form of astrology to develop in Babylonia, horoscopy was the form that would be decisive for the further development of Western genethlialogy through Greek, Islamic, Jewish and Christian channels. The appearance of horoscopes after 500 B.C.E. is evidence that the situation of the heavens at the time of a birth had come to be regarded as significant for the future of an individual. Before this time, little evidence supports the idea that the individual had a place in the scope of traditional celestial divination, though there had been divination which derived predictions for individuals based on date of birth and on physiognomy.[5]

[1] See G. Dossin, *Syria* 22 (1939), p. 101 and id., *Seconde Rencontre Assyriologique* (Paris, 1951), pp. 46–48.

[2] For the omens of *Enūma Anu Enlil*, see above, Chapter Two, note 6.

[3] These texts are in the form of letters, for which see S. Parpola, LAS I and II, and so-called reports, for which, see H. Hunger, *Astrological Reports to Assyrian Kings*, SAA 8 (Helsinki: Helsinki University Press, 1992).

[4] See Pinches-Sachs, LBAT 1458–1476, 1521–1577, and 1588–1593.

[5] A late Babylonian commentary text from Kutha (R.D. Biggs, "An Esoteric Babylonian Commentary," RA 62 (1968), pp. 51–58) relates a number of omen series to

The relationship between personal piety and personal happiness within the divine scheme of the universe is a subject of concern in the Babylonian "wisdom" literature, and although the relationship is viewed with a certain skepticism in some ancient sources, the idea that an individual's life, as all other things, is affected by the gods seems to be a basic assumption.[6] If, as is evidenced by the celestial omen texts such as in *Enūma Anu Enlil*, celestial phenomena had been taken to indicate the future for the king and the state of affairs in the country at large, it seems *a priori* possible that such a belief could be carried over and applied to the life of an individual. Unfortunately, the laconic nature of the horoscope texts themselves frustrates attempts to penetrate the philosophical or religious commitment behind these texts. In particular, what the appearance of horoscopes may tell of a change in the relation conceived between the individual and the cosmos, or between the individual and the gods, after the mid-first millennium, is an aspect which remains strictly inferential and speculative.

The appearance of horoscopes also coincided with a marked growth of astronomy in the direction of abstract mathematical description and refined computation of planetary and lunar appearances. Identifying the cultural impetus for the development of the mathematical astronomy of the fifth century and its relation to the forms of celestial inquiry that existed before it, i.e., celestial observation and divination,

---

astrological elements, referring to the medical diagnostic omen series SA.GIG "symptoms," the physiognomic omen series *Alandimmû* "form," as well as the malformed birth omens *Izbu*, as a group termed "secret of heaven and earth." And, as was the case for the celestial omens, authoriship of the physiognomic (and medical) omens was attributed to the god Ea. Perhaps this evidence reflects the change in Babylonian divination sciences following the development of genethlialogy.

For omens from the date of birth of a child, see from the series *iqqur īpuš*, R. Labat, *Un Calendrier Babylonien des Travaux des Signes et des Mois* (Paris: H. Champion, 1965), pp. 132–134 64 (K.11082). A Hittite fragment, translated from an Old Babylonian text and which derives predictions from the date of a child's birth, is cited by Oppenheim in "Man and Nature in Ancient Mesopotamia," DSB 15, p. 644; see B. Meissner, "Über Genethlialogie bei den Babyloniern," *Klio* 19 (1925), pp. 432–434; also K. Riemschneider, *Babylonische Geburtsomina in hethitischer Übersetzung, Studien zu den Boğhazköy-Texten* 9 (Wiesbaden: O. Harrassowitz, 1970) p. 44 n. 39a; and for an Egyptian parallel, see Abd el-Mohsen Bakir, *The Cairo Calendar* No. 86637 (Cairo: General Organisation for Govt. Print. Offices, 1966), esp. 13–50. For the physiognomic texts, see for example, YOS 10 54, and F.R. Kraus, *Texte zur babylonischen Physiognomatik*, AfO Beiheft 3, (Osnabrück: Biblio-Verlag, 1967), and B. Böck, *Die Babylonisch-Assyrische Morphoskopie*, AfO Supplement 27 (Vienna: Institut für Orientalistik der Universität Wien, 2000).

[6] See for example, the Babylonian "Poem of the Righteous Sufferer" and the *Theodicy* in Lambert, *Babylonian Wisdom Literature* (Oxford: Clarendon Press, 1960), pp. 21–91.

has been of interest to Assyriologists for many years. At the 14th Rencontre Assyriologique Internationale in Strassbourg (July 1965),[7] A. Leo Oppenheim raised the issue of the role of celestial divination in the history of Babylonian astronomy. He said, "Any serious investigation of the history of Mesopotamian civilization has to face the problem of the sudden emergence of mathematical astronomy about 400 B.C. To put it somewhat bluntly, the question is whether there exists a direct relationship between this development and the evolution within Mesopotamian divination, to be exact, within astrology, or whether the genesis of Mesopotamian science, that is, of mathematical astronomy, was released by other still unknown factors."[8]

The phenomena upon which the divination series *Enūma Anu Enlil* is based bear relation to those of the mathematical astronomy, in that they may be defined predominantly by the horizon phenomena of the moon and planets. As reasons for observing the heavens, celestial divination—the importance of which was not only intellectual but political, considering the dangers the omens portended for the state—certainly established considerable motivation for the development of a predictive astronomy. But the content of the mathematical astronomy that emerged around 500 B.C.E. cannot be justified solely on the basis of the needs of the omens attested in the canonical tradition. Even if the impetus for the development of the particular mathematical branch of Babylonian astronomy were "astrological," the level of sophistication of the mathematical astronomy, in terms of its predictive range and underlying conceptual grasp of phenomena, far exceeds anything reflected in the omen literature. A disparity between the astronomy of the horoscopes and that of the contemporaneous mathematical astronomy must also be acknowledged, although the gap appears to have narrowed when compared with the relatively primitive astronomy of celestial omens.

Despite the difficulties in relating methods and parameters of mathematical astronomy to those of the non-mathematical classes of astronomical texts, mathematical astronomy can no longer be singled out when asking historical questions such as Oppenheim's "whence the

[7] The proceedings were published as *La Divination en Mésopotamie Ancienne et dans les Régions Voisines* (Paris: Presses Universitaires de France, 1966).

[8] A.L. Oppenheim, "Perspectives on Mesopotamian Divination," in *La Divination en Mésopotamie ancienne et dan les régions voisines*, CRRA 14, (Paris: Presses Universitaires de France, 1966), p. 40.

origin of astronomy," but has to be recognized as necessarily part of a coherent piece, inclusive of all the aspects of Babylonian astronomical, or celestial, science. Any study of the cultural history of science in late Babylonia needs not only to take into account all the forms of astronomy, but also the relation of the various branches of astronomy to astrology, whether omen or horoscopic.

A descriptive analysis of the astronomical content of the small corpus of Babylonian horoscopes serves to show how interconnected all the parts of late Babylonian astronomical science were. Following some general introductory remarks I will confine my discussion to elements of the Babylonian horoscopes' astronomical content, and to the derivations of these elements from diverse astronomical sources. In discussing the connections between horoscopes and other classes of astronomical texts I will utilize the now standard classification and nomenclature established by A.J. Sachs, of which the major categories are non-tabular or non-mathematical texts, including diaries, goal-year texts and almanacs,[9] and tabular or mathematical ephemerides, also termed simply ACT after the publication of Otto Neugebauer.[10] In the following brief description of the astronomical data recorded in the horoscopes I hope to show that the horoscopes draw upon a variety of astronomical sources that include most of the classes of astronomical texts, both non-mathematical and mathematical. The implications are that the astronomical methods underlying Babylonian horoscopy do not stem from only one tradition, but include observation as well as computation, and non-mathematical as well as mathematical methods.

The discovery of the first cuneiform horoscope came as part of the general decipherment of astronomical cuneiform texts in the late 19th century by Frs. J. Epping, J.N. Strassmaier, and F.X. Kugler. Only twenty-eight Babylonian horoscope tablets are now extant, but make up a well-defined class of texts belonging to the Achaemenid, Seleucid, and Arsacid periods, or roughly between the fifth and first centuries B.C.E. The chronological range is from the oldest at 410 B.C.E.[11] to

[9] Sachs, "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2 (1948), pp. 271–290.

[10] O. Neugebauer, *Astronomical Cuneiform Texts* 3 vols. (London, 1955).

[11] See AB 251, published Sachs JCS 6, pp. 54–57 (transliteration, translation and commentary), and AO 17649, published D. Arnaud, TBER 6 52 (copy).

the youngest at 69 B.C.E.[12] With five documents from the first century B.C.E., these are among the youngest cuneiform texts known. The youngest horoscopes, dating between 89 and 69 B.C.E., and all from the city of Babylon, come from the period in which Babylon's major temple, the Esagila, or Marduk temple, begins to appear moribund.[13] A connection between astronomers, designated in the texts as "astrologers," i.e., scribes of *Enūma Anu Enlil*, and the Esagila temple is supported in administrative temple texts,[14] and we may be sure that at least some of the astronomers were temple scribes.[15]

The Babylonian horoscopes were all dated to the birth of an individual. Since three texts contain more than one horoscope, it cannot be the case that a horoscope was written on the date of the birth. In no case has the writing of a horoscope tablet been dated by means of a colophon. The dates are found at the beginning of the text and refer exclusively to the birth date. Given the existence of birth notes, recording dates and times of births apparently for the purpose of later casting a horoscope, it is clear that horoscopes could have been prepared well after such dates. In the single birth note preserved with more than one birth record, two of the dates are spaced 36 years. The evidence that data were excerpted from other astronomical texts further precludes the possibility that a horoscope represents some observation, or even computation, of heavenly phenomena at the time of birth.

The purpose of the Babylonian horoscope document was to record positions of the seven planets in the zodiac on the date of a birth. Following a loosely standardized formulation of the date and time of birth, the astronomical data were given. Text A (below) is a good

[12] See BM 38104 (LBAT *1475), unpub.

[13] See the discussion in J. Oelsner, *Materialien zur Babylonischen Gesellschaft und Kultur in Hellenistischer Zeit*, Assyriologia 7 (Budapest: Eötvos University, 1986), p. 118 and note 451. Among the youngest texts from the Esagila, according to J. Oates, *Babylon* (New York, N.Y.: Thames & Hudson, 1986), p. 142 and note 36, is a document from 93 B.C.E. concerning the cult at Esagila, and another text (Rm 844) dated to 88 B.C.E., published in Epping and Strassmaier, ZA 6 (1891), pp. 226 and 230 (see also ZA 61 [1971], p. 165).

[14] CT 49 144, CT 49 186, and BOR 4 (1890), pp. 132ff. See the discussion in G.J.P. McEwan, *Priest and Temple in Hellenistic Babylonia*, Freiburger Altorientalische Studien 4, (Wiesbaden: Steiner, 1981), pp. 18–20, review of van der Spek, "The Babyonian Temple During the Macedonian and Parthian Domination," *Bibliotheca Orientalis* 42 (1985), pp. 547–562, and F. Rochberg, "The Cultural Locus of Astronomy in Late Babylonia," in H. Galter ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Beiträge zum 3. Grazer Morgenländischen Symposion (Graz: GrazKult, 1993), pp. 31–47.

[15] See below, Chapter Twelve.

representative text, although it contains a reference to the position of the moon with respect to a normal star (obv.3), a datum found in several horoscopes, but by no means regularly included. The horoscope texts are only in the weakest possible sense "standardized"—certain data come to be expected but, aside from one text with a known duplicate,[16] each horoscope is unique and presents different problems of dating and interpretation. Two texts (A and B) are provided here.[17]

Text A: (BM 36620 =80–6–17,350 [L*1464]) Date: 92 S.E. VII. 12(?) = –219 Oct. 21
Transcription
obv.
upper edge
ina a-mat ^{d}EN u GA[ŠAN-ía liš-lim]
1 MU.1,32.⸢K⸣[AM ^{I}An LUGAL]
2 ITI.DU$_6$ 30 GE$_6$ 1[2(?) ina SAG GE$_6$ sin]
3 SIG MÚL ár šá SAG ḪUN
4 sin 1/2 KÙŠ ana NIM DIB U$_4$(?).[...]
5 LÚ a-lid ina si-ma-ni-[šú sin ina ḪUN(?)]
6 šamáš ina GÍR.TAB MÚL.BABBAR [ina ḪUN]
7 dele-bat u GENNA i[na(?) PA(?)]
8 GU$_4$.UD u AN [šá ŠÚ-ú NU IGI.MEŠ]
9 KI šamáš šú-nu [ITI.BI(?)]
rev.
1 14 NA 2[7 KUR]
2 ITI.GAN 20 [šamáš GUB]
3 ITI.ŠE GE$_6$ 1[4 AN.GE$_6$ sin]
4 ina RÍN TIL-tim GAR-a[n]
5 U$_4$.28 AN.[GE$_6$ šamáš]
6 ina ḪUN BAR DIB [ ]
ca. 2 lines to bottom of rev., uninscribed.

[16] The two texts are from Uruk, MLC 2190, published in Sachs, JCS 6, pp. 60–61 and the unpublished W 20030/143, included as texts 10 and 11 of BH.
[17] These are texts 14 and 20 respectively in BH.

Translation

upper edge

By the command of Bēl and B[ēltīja may it go well].

obv.

1 Year 92 [(S.E.), Antiochus (III) was king.]
2 Tašrītu 30, night of the 1[2th(?), first part of night, the moon was]
3 below "the rear star of the head of the Hired Man (= α Arietis).
4 The moon passed 1/2 cubit to the east (of α Arietis).. [..]
5 the child was born, in [his] hour, [the moon was in Aries(?),]
6 the sun was in Scorpius, Jupiter [was in Aries],
7 Venus and Saturn (were) i[n Sagittarius],
8 Mercury and Mars [which had set were not visible.]
9 They were with the sun. [That month(?),]

rev.

1 moonset after sunrise was on the 14th, [last lunar visibility before sunrise on the] 2[7th.]
2 [Winter solstice (was)] on the 20th of Kislīmu.
3 Addaru, night of the 1[4th a lunar eclipse,]
4 Totality occurr[ed] in Libra.
5 On the 28th day an ecl[ipse of the sun]
6 in Aries, one-half month having passed (since the previous eclipse).

Text B: (BM 78089) Date: SE 186 V.24 = –125 Aug.16

Transcription

obv.

1 ⌜MU.1.ME.22.KAM šá ši-i⌝
2 ⌜MU.1.ME.1,26.KAM⌝ ᴵAr-šá-ka-a LUGAL
3 ITI.NE 30 15 NA
4 GE_6 24 ina ZALÁG LÚ.TUR a-lid
5 ina si-man-ni-šú sin ina MAŠ.MAŠ
6 šamáš ina A MÚL.BABBAR u GENNA
7 ⌜ina ZIB⌝.ME dele-bat ina A
8 GU_4.UD u AN šá ŠÚ-ú
9 NU IGI.MEŠ erasure

lower edge uninscribed

rev.

1 ITI.BI ⌜20+x⌝ KUR
2 MU.BI ŠU.⌜3⌝ šamáš GUB
3 ITI.KIN 14 AN.GE_6 sin ina ZIB.ME
4 BAR DIB 28 AN.GE_6 šamáš
5 ina TIL ABSIN 5 SI GAR-an

ca.3 blank lines to bottom of rev.

Translation

1 Year 122 (A.E.), which is
2 Year 186 (S.E.) Arsaces was king.
3 Abu, 30. Moonset after sunrise on the 15th.
4 Night of the 24th in the last part of the night, the child was born.
5 At that time, the moon was in Gemini,
6 sun in Leo, Jupiter and Saturn
7 in Pisces, Venus in Leo,
8 Mercury and Mars which had set
9 were not visible.

rev.

1 That month, last lunar visibility before sunrise was on the 20+[...]th.
2 That year, (summer) solstice was on Du'ūzu the 3rd.
3 Ulūlu the 14th a lunar eclipse in Pisces.
4 One-half (month) passed by. (Then,) on the 28th, a solar eclipse
5 at the end of Virgo; it made 5 fingers.

As is clear from the examples provided, the longitudes of the planets (Jupiter, Venus, Mercury, Saturn, Mars, as well as the sun and moon) are the principal data collected in horoscopes. Since the date of birth is of primary concern, the planets are for the most part between synodic appearances. When, however, a planet happens to be in the same sign as the sun on the date of birth and is in or near a synodic phase, sometimes the date of the synodic phenomenon will be mentioned in the text. On the whole, the longitudes are given with respect to the names of the zodiacal signs. Degrees of longitude are not common, but do occur in eight horoscopes, five of which are from Uruk.

A comparison of the Babylonian planetary longitudes against those computed by modern methods on the various dates of these eight horoscopes gives striking evidence for the excellence of the methods which underly the Babylonian data. The first two tables summarize these data.

Table 1 lists by text number the date and time of birth given in the text, the longitudes found in the text, then the modern computed longitudes with the time corresponding approximately to that of the time of birth stated in UT (equivalent to GCT). The last column shows the differences between the Babylonian and modern longitudes, and in most cases, the difference is between 0° and +/–3°. The modern longitudes tabulated in col. 5 ("longitude computed") reflect an

Table 1. Planetary Data from Babylonian Horoscopes

Text	Date	Time	λText	λComp	Time	Δλ (λBab.-λmodern)
5–262	Apr. 4	(last part	13.5°	16.28	4 UT	+2.5° of night)[18]
9–248	Dec. 29	evening	9.5°	281.8°	16 UT	+2.5°
			12°	315.39°		+3°
10–234	Jun. 2/3	dawn	12.5°	73.49°	1 UT	+0.5°
			18°	260.05°		+2°
			4°	27.85°		–6°
			6°	90.48°		–6°
			24°	115.6°		+2°
16b–199	Jun. 5	dawn	15°	118.61°	1.75 UT	+14°
			26°	237.85°		+2°
			5°	62.37°		–3°
			27°	84.4°		–3°
			10°	157.23°		–3°
			10°	38.28°		–2°
16a–198	Oct. 31	dawn	10°	275.29°	3 UT	–5°
			4°	267.39°		–7°
			8°	227.67°		+10°
			3°	183.11°		0°
			10°	248°		–2°
21–124	Oct. 1	dawn	24°	113.53°	2 UT	0°
–124	Oct. 2		9°	127.69°		–1°
23–87	Jan. 5	midnight	5°	32.94°	21 UT	–2°
			27°	25.9°		–1°
			1°	330.77°		0°
			26°	266.39°		0°
			[20°]	79.39°		–1°
			20°	141.07°		+1°
27–68	Apr. 16	9th hr.	18°	297.83°	11.5 UT	+10°
			30°	27.54°		–2°
			24°	261.93°		–2°
			13°	72.72°		0°
			15°	314.23°		–1°
			14°	189.76°		–4°

[18] ACT, p. 279.

adjustment[19] by means of which the systematic deviation in longitudes that results from the different methods of counting longitude, modern tropical versus Babylonian sidereal, can be corrected. The adjustments to the modern longitudes, taking into account the effect of precession on the sidereally normed Babylonian zodiac, enable a more direct comparison between the data found in the texts and that produced by modern computation.

Table 2 presents the values from the last column of Table 1 in columns according to the planet. Errors of plus or minus 1 or 2° may be considered irrelevant in this context, particularly as we do not know precisely what ancient methods were used to obtain them.

Within our material, no other source but the mathematical ephemerides provides longitudes in degrees within a zodiacal sign. But the relationship between the horoscopes' longitudes and those available in ACT tables is complicated by the fact that the ephemerides usually generate longitudes of consecutive synodic phenomena not positions on arbitrary dates (for example, ACT 600 is for first stationary points, 601 for second stationary points, 604 for oppositions, and 606 for last visibilities, and so on, as can easily be seen by looking at the catalogue in ACT). Rules for subdividing the synodic arc, passing, e.g., from first

Table 2. Errors in Planetary Longitudes Given in Babylonian Horoscopes

Date	Text	Moon	Sun	Jupiter	Venus	Mercury	Saturn	Mars
−262	5	/	+2.5	/	/	/	/	/
−248	9	+3	+2.5	/	/	/	/	/
−234	10	/	+0.5	+2	−6	/	−6	+2
−199	16b	+14	/	+2	−3	−3	−3	−2
−198	16a	/	/	−5	−7	+10	0	−2
−124	21	0	/	/	/	/	/	/
−124	21	−1	/	/	/	/	/	/
−87	23	−2	/	−1	0	0	−1	+1
−68	27	+10	−2	−2	0	/	−1	−4

[19] This most useful method of comparing ancient and modern data was suggested to me by J.P. Britton. Babylonian (sidereal) longitudes may accordingly be compared against modern computed (tropical) longitudes by means of a correction factor which takes into account the constant of precession and the date of the data to be compared. Therefore, λ Babylonian = λ tropical + $\Delta\lambda$, where $\Delta\lambda = 3.08° + 1.3825° \times$ year date number. 3.08° is the correction factor for the year 0 and 1.3825° is the constant of precession per 100 years.

visibility to first station or first station to last visibility, are given in a number of procedure texts of System A (such as ACT 801 for Mercury and Saturn, 812 for Jupiter, 811a Section 10 for Mars), and can be uncovered in some table texts as well (for example ACT 611 for Jupiter [System A']). Some procedure texts, such as ACT 810 and the similar 813 for Jupiter (in System A'), state the daily progress of the planet in degrees per day. Finally, there are a very few ephemerides, in the true sense of giving daily positions of the planets, such as ACT 310 for Mercury. These employ refined non-linear interpolation schemes to obtain positions between the synodic phases.

It is clear that producing daily longitudes was not the primary focus of the Babylonian mathematical astronomy, but analyses by Neugebauer, Aaboe, and Huber, of the true ephemerides within the ACT corpus giving positions from day to day within actual lunar months[20] show that though of a secondary nature in the context of the total production of tables, they were mathematically quite refined. But finally, any meaningful connection between the ephemerides and the horoscope's planetary longitudes falls between gaps in evidence.

For one thing, no direct comparison is possible since there are simply too few horoscopes which cite longitudes with degrees, and none that correspond to the years for which our extant true ephemerides apply. More serious, though, are the questions attending the possible practical aspects of these ephemerides, given the nature of the variants permissible (e.g., in the size of the retrograde arc of Jupiter, which Aaboe has discussed).[21] Therefore, even were there an example of a value in a horoscope directly comparable with an ephemeris in which the corresponding date and phenomenon was preserved and could be checked, a discrepancy would not necessarily rule out the possibility of the astrologers' use of mathematical astronomical methods.

---

[20] ACT 310 for Mercury, 654 and 655 for Jupiter.

[21] The subdivision of the synodic arc of Jupiter in ACT Nos. 654 and 655 produces a retrograde arc of 8;47°. This is smaller than any of the known Babylonian Jupiter tables, such as System A or A', and 1° less than the actual value of the retrogradation for the date of the table (9.8° in −163), as pointed out by Aaboe, unpublished ms V p. 17. In his excursus (ibid. V p. 19) on the third order scheme for Jupiter's daily motion, Aaboe said, "The motivation of this fine scheme cannot, then, be based in practical astronomy, for if the observational acumen of the Babylonian astronomers was dull enough to allow them to tolerate an error of one degree in the length of the retrograde arc, it was also too dull to enable them to detect the need for so elaborate a scheme to account satisfactorily for Jupiter's daily motion." I would like to thank Prof. Aaboe for allowing me to quote from his unpublished ms.

Regardless, I do not find the excellence of the horoscopes' longitudes to be a compelling argument in and of itself that daily motion schemes of the type represented by ACT 654–655 were employed by the astrologers—they may indeed have been, but this would have to be argued on some other basis. I have as much hesitation to see those schemes as having been created to serve astrological purposes. We may well be seeing in the horoscopes rounded values obtained from ACT schemes. We know the astrologers were not a different group from the astronomers, so we are not troubled by a question of privileged knowledge. But again, we lack the evidence needed to conclude in any positive way that ACT tables or methods were used by the scribes who prepared horoscopes. More importantly, the evidence we do have points toward the negative conclusion that the methods and results of the daily motion schemes, which according to Aaboe are among the most sophisticated application of mathematics to the resolution of astronomical problems in Babylonian astronomy,[22] are not reflected in the data of the horoscopes.

With the exception of one of the two fifth century horoscopes, synodic appearances are mentioned in horoscopes only on the occasion of a planet's occupying the same zodiacal sign as the sun on the birth date. Only rarely is the date of the synodic appearance given, when it comes within a day or two of the birth date. When the birth occurs during the planet's invisibility, the text expresses this with the remark "planet(s) such-and-such is(are) with the sun" as in Text A line 9 above, or with the phrase found in the diary texts "planet such-and-such, which had set, was not visible" as in Text B lines 8–9 above.

As far as synodic phenomena are concerned, the horoscopes are interested only in first and last visibilities. A single exception to this may be seen in the fifth century horoscope just mentioned, which records the dates of the stationary points as well as opposition, actually the rising at sunset, for the planet Saturn. Otherwise, attestations of synodic phenomena are limited to first and last visibility as evening star and first and last visibility as morning star for Mercury, and only last visibility for Venus, Mars, and Saturn.

In addition to the positions of the planets on the date of birth, other astronomical events of the month or even the year in which the birth occurred are regularly included. Horoscopes from Babylon record three

[22] Ibid. V p. 11.

additional lunar phenomena termed collectively the "lunar three" by Sachs.[23] These are: Whether the previous month was full (30^d) or hollow (29^d), the date of the time interval around full moon termed *na* which measured the interval between sunrise and moonset, and the date of another time interval termed KUR which was the interval between moon rise and sun rise on the day of last lunar visibility.[24] The length of the month, *na* and KUR are found in each monthly paragraph of an astronomical almanac, as well as being obtainable in diaries and other types of non-mathematical texts of the Seleucid period. The lunar three data appear to be essential for all the horoscopes from Babylon. The tradition from Uruk appears to be different, as none of the Uruk horoscopes includes the lunar three.

Statements about lunar latitude are included in three horoscopes, all from Uruk.[25] These statements use the terminology for latitude that is known otherwise only in the ACT vocabulary, namely, the technical terms, NIM "positive latitude," SIG "negative latitude," and MURUB_4 "node." The lunar procedure text for System A, ACT 200,[26] contains a section for lunar latitude, referring to column E of the lunar ephemeris, the first line of which reads: *epēšu ša* nim *u* sig *ša sin* ab *ana* ab 12 dagal *malak* ^{d}*sin* 2,24 *qabalti qaqqar kiṣari* "procedure for latitude of the moon month by month. 12 (degrees is) the width of the road of the moon. 2,24 (from) the middle is the 'nodal zone'." Here, as Aaboe has pointed out,[27] the technical term for latitude is actually the phrase "nim *u* sig," which literally means "positive and negative (latitude)." The Uruk horoscopes recall the language of the astronomical procedure text with the statements 1) "The moon keeps going with (increasing) positive latitude." (Text 10:4 *sin* TA MURUB_4 *a-na* NIM *pa-ni-šú* GAR.MEŠ), 2) "The moon keeps going from negative latitude toward

[23] Sachs, "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2 (1948), p. 278.

[24] The oppositions (computed by means of *na*) and conjunctions (computed by means of KUR), for which the length of the month would be needed, might be the data needed for computing the time of conception (D. Pingree, personal communication). Further research is needed before the use of the date of conception versus that of birth in Babylonian astrology is understood. It is clear though that omens for the date of conception were compiled, see for example, LBAT 1588 and 1589 (*šumma*…LÚ. TUR *re-ḫi*).

[25] See BH Texts 10 and 16a and 16b.

[26] See Neugebauer, ACT, Vol. I, pp. 186–211, and Aaboe-Henderson, "The Babylonian Theory of Lunar Latitude," pp. 208–211.

[27] Aaboe, "The Babylonian Theory of Lunar Latitude," p. 209.

the node." (Text 16a:9 *sin* TA SIG KI(?) *pa-nu-šú ana* MURUB$_4$ GAR.MEŠ), and 3) "The moon keeps going from positive latitude toward the node." (Text 16b r.10 *sin* TA LAL *ana* MURUB$_4$ *pa-nu-šú* GAR.MEŠ). Why the lunar latitudes are found only in Uruk texts and what their meaning is in this context remains quite puzzling.

Horoscopes regularly record lunar and solar eclipses, even when their occurrences did not coincide with the birth dates.[28] As illustrated by the horoscopes quoted above, the majority of horoscopes in which eclipses are preserved mention both lunar and solar eclipses, in particular, those which occur one-half month apart, the lunar in mid-month followed by the solar at month's end (Texts A rev.3–6 and B rev.3–5). In the vocabulary of the Babylonian astronomical texts, a distinction between predicted and observed lunar eclipses is conveyed in the writing of "lunar eclipse," as AN.GE$_6$ *sin* when predicted and *sin* AN.GE$_6$ when observed.[29] The eclipses recorded in the horoscopes are exclusively expressed with AN.GE$_6$ *sin*, and indeed these passages all represent predictions. That furthermore, the zodiacal sign in which the eclipse occurred, or, specifically, in which totality occurred, is cited, points definitively toward a prediction. Table 3 lists the lunar eclipses predicted in the horoscopes. I have listed the dates of birth and the eclipses given with their Julian dates. In each case (but one) the eclipse's occurrence is confirmed by the modern computation, either by Oppolzer's *Canon*,[30] or P.Huber's pc-program LUNEC.

When one considers the content of the *Enūma Anu Enlil* lunar eclipse omens, a great many aspects of eclipses appear to have become astrologically significant at a relatively early date, since the series as a whole was formed by the Neo-Assyrian period. "Astrologically significant" means that some event of social, political, or economic significance to the state (of Assyria or Babylonia) and its population was associated with some aspect of an eclipse such that the occurrence of that eclipse phenomenon would be regarded as portending some specific mundane event. In the protases of these eclipse omens are included the date of occurrence (month, day), the time (watch of night), the magnitude (in fingers), direction of eclipse shadow, and color of the eclipse.[31] One

[28] Texts 3, 4, 13, 14, 19, 20, 21, 22, 23, 24, 25, and 26 of my forthcoming edition.
[29] See Sachs-Hunger, Diaries I, p. 23.
[30] Th. von Oppolzer, *Canon der Finsternisse*, Denkschriften der Kaiserlichen Akademie der Wissenschaften Mathematisch-Naturwissenschaftiche Classe, 52, (Kaiserlich-Königlichen im Hof- und Staatsdrukerei Vienna, 1887).
[31] See ABCD, pp. 36–57.

Table 3. Lunar Eclipses Predicted in the Horoscopes

Text	Birthdate (Julian)	Lunar Eclipse date (Julian)
3:5'	–297 Feb. 2–5(?)	undatable due to broken context
4 r. 3–4	–287 Sep 1	–287 Nov 22
13 r.5	–223 Jul 29	undatable due to broken context
14 r.3–4	–219 Oct 21	–218 Mar 20
20 r.3–4	–125 Aug 16	passed by
21 r.1–3	–124 Oct 1	–124 Aug 24
22a r. 8'	–116 Jul 15	–116 Sep 24
22b r. 14'	–114 Jun 30	–113 Jan 29
23:10–12	–87 Jan 5	–87 Mar 11
24:9–10	–82 Dec 20	
25:6–7	–80 Apr 22/23	–80 Apr 21
26 r. 3–5	–75 Sep 4	–75 Jul 24
27 r. 5–8	–68 Apr 16	–68 Sep 3

can only speculate that in a manner similar to the celestial omens, the eclipses cited in horoscopes were incorporated for what this data might have contributed to the interpretation of the heavens on or around the birth. The details of eclipses, however, are not so prominent in the horoscope texts.

Only three of the thirteen preserved eclipses include data for magnitude, given in fingers in two instances (Texts 21 rev. 1–3 and 26 rev. 3–5) or in the fraction of the disk covered in another example (Text 27). Only one horoscope (Text 27 rev. 5–8) states the time of the eclipse, noting that the moon was already eclipsed when it rose. In these features, i.e., date, zodiacal sign in which the moon was positioned when eclipsed, magnitude and time, the manner in which the eclipses are presented in the horoscope texts are not paralleled by those found in the observational genres such as diaries, goal-year texts, or the observational eclipse report compendia.[32] In the eclipse reports that reflect observations, the zodiacal sign is never mentioned, instead, we find the *ziqpu*-star that was culminating at the beginning of the eclipse, and other data relevant to the time and duration of occurrence that never find their way into horoscopes, whose eclipse passages bear resemblance to those of the predictive texts such as the almanacs.

[32] Such as in LBAT 1413, *1414, 1415+1416+1417, *1419, *1420, 1421, 1426, 1427, 1437– *1450, see Peter J. Huber and Salvo De Meis, Babylonian Eclipse Observations from 750 BC to 1 BC (Milan: IsIAO-Mimesis, 2004).

Table 4. Solstice/Equinox Dates in Relation to Birthdates

Text	Birthdate	Date of Sols/Equ.	months apart
1	Dar (II) X.24	WS X.9	0
4	S.E. 24 V.19	AE VI.16	1
6	S.E. 54 IX.8	WS IX.20	0
	(conception date: S.E. 53 [XII_2] with VE [XII_2].12)		
8	S.E. 61 IX.8	WS X.8	1
13	S.E. 88 V.4	SS III.30	2
14	S.E. 92 VII.12	WS IX.20	2
15	S.E. 109 XI.9	WS IX.28	2
18	S.E. 169 XII.6	VE I.4	1
19	S.E. 172 [VI].13	EA VII.2	1
20	S.E. 186 V.24	SS IV.3	1
21	S.E. 187 VI.22	AE VI.17	0
22	S.E. 195 IV.2	SS III.13	1
22	S.E. 197 IV.7	SS IV.5	0
23	S.E. 223 X.9	WS IX.28	1
25	S.E. 231 I.14/15	SS III.21	2
26	S.E. 236 V.25	SS III.16	2

Most horoscopes will also include the date of the solstice or equinox closest to the birth date. In fact, no solstice or equinox date is more than 2 months before or after a given birthdate, as can be seen at a glance in Table 4.

This makes the solstice/equinox data useful as a limiting factor for the dating of texts in which the birth date is not well preserved. Due to the chronology of the extant horoscopes, according to which all belong to the period after the introduction of the nineteen-year cycle, the method of obtaining the relevant equinox or solstice date was in each case that of the so-called Uruk Scheme,[33] which computed the cardinal points of the year on the basis of the rule that the year was 12 lunar months plus 11;3,10 tithis or 12;22,6,20 months, the value of the year underlying the 19-year cycle.

[33] For the literature on the scheme, see Neugebauer, "A Table of Solstices from Uruk," JCS 1 (1947), pp. 143–148; Neugebauer, "Solstices and Equinoxes in Babylonian Astronomy," JCS 2 (1948), pp. 209–222; Neugebauer, HAMA pp. 357–363; and A. Slotsky, "The Uruk Solstice Scheme Revisited," in H. Galter, ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Beiträge zum 3. Grazer Morgenländischen Symposion (Graz: GrazKult, 1993), pp. 359–366.

There is no question that horoscopes cannot contain observations made at the time of the writing of the text. In drawing on various reference sources, however, it is possible that an observation, such as from a diary or other observational text, could later be incorporated into the body of the horoscope text. This is evident in a number of references to the position of the moon in the ecliptic, which is given not with respect to the zodiac, but by the ecliptical normal stars, whose use is best known from the astronomical diaries.

The importance of the normal stars in the horoscopes is exclusively in its application for citing the position of the moon.[34] In these few horoscopes, the position of the moon seems to be given with respect to a normal star when it is above the horizon at (or near) the time of the birth. The normal star reference does not replace the zodiacal one, rather it supplements it. (See Text A:2–5, above) I cannot account for the occasional inclusion in horoscopes of a normal star position for the moon in addition to the lunar longitude given with the enumeration of planetary zodiacal positions. Since the normal procedure was to obtain positions in the ecliptic regardless of which heavenly bodies were above the horizon and visible at the moment of birth suggests that visibility was not a consideration. On the basis of the phraseology and terminology used, and after comparing the lines in the horoscopes referring to the normal star positions of the moon with corresponding statements in diaries, it is a fair assumption that the horoscopes quote these normal star positions from diaries. Such quotations, however, cannot be directly substantiated as the desired diaries from corresponding dates to these particular horoscopes are no longer extant. The surviving material is more than sufficient, though, to support the connection.

With regard to the possibilities for deriving the planetary data found in horoscopes, much of the data provided by the diaries is not ideally suited to horoscopes. Horoscopes never record when a planet passes above or below a normal star. This is limited to the occasional lunar positions just mentioned. The date of a planetary phase as often given in diaries, together with the zodiacal sign in which the planet was located at the time, would be useful for a horoscope only if the date

[34] Texts 2, 4, 6, 7, 8, 13, 14, 15, and 17 of BH.

of the phenomenon should coincide with a birth date.[35] On the other hand, at the conclusion of the day-by-day entries of a diary's month section, the summary of the zodiacal signs in which the planets were found throughout the month would be of great use to an astrologer.

The class of texts which recorded the monthly progress of the planets through the zodiac is the almanacs. The few examples of horoscopes and almanacs where dates can be matched indicate that almanacs provided a very good source of astronomical data for Babylonian horoscopes.[36] As illustrated in Table 5, a simple inventory of the general content of the almanacs as compared with that of the horoscopes shows that horoscopes contain most or all of the available data in an almanac, derived from the appropriate month of the birth, or any other month paragraph containing astronomical data of importance to horoscopes, such as lunar and solar eclipses or solstice and equinox dates.

Table 5. Data Comparison in Horoscopes and Almanacs

Horoscope	Almanac
Date of birth, year S.E.	year S.E.
month 30/1	month 30/1
day, time	
longitudes of planets in zodiac	longitudes of planets in zodiac at beginning of months
	dates of entries of planets into zodiacal signs
dates of synodic phenomena	dates of synodic phenomena
date of moonset after sunrise (*na*)	date of moonset after sunrise (*na*)
date of last lunar visibility (KUR)	date of last lunar visibility (KUR)
date of equinox or solstice nearest birthdate	date of equinoxes or solstices in that month
dates of eclipses	dates of eclipses in that month

[35] For the form of a diary entry, see Sachs, JCS 2 285–6, and id., "Babylonian Observational Astronomy," in F.R. Hodson ed., *The Place of Astronomy in the Ancient World*, Philosophical Transactions of the Royal Society of London A. 276 (London: Oxford University Press for the British Academy, 1974), pp. 43–50. For texts, see Sachs-Hunger, *Diaries* Vols. I–III.

[36] For details, see F. Rochberg, "Babylonian Horoscopes and Their Sources," OrNS 58 (1989), pp. 102–123.

The only data which appear occasionally in horoscopes but not in almanacs are the normal star positions of the moon. And the only datum that appears as something of an organizing principle in horoscopes but not in almanacs is the specific day or date in the month, the almanacs being arranged by months, not days, and giving dates in reference to phenomena of interest. The astronomical texts organized by days of the month were, of course, the diaries. Even with the general compatibility shown above, data from almanacs seem to have been used selectively by astrologers. One example may be cited in which the planetary and lunar three data in several lines of a horoscope (Text 26 obv.4–8) are duplicated in an almanac (LBAT 1174:10), but where the eclipse data is entered (Text 26 rev.3–5), the reports differ. The horoscope gives the month, day, zodiacal sign, and magnitude (1 finger) whereas the almanac gives month, day, the exact time (stating 8° before sunrise and that the moon set eclipsed) and the magnitude is given as over 4 fingers. The zodiacal sign for the eclipse does not appear in the almanac.

The content of the Babylonian horoscopes requires that the astrologer have access, either directly or by inference, to the location of planets in the zodiac on an arbitrary date. As described above, these data could have been drawn from a variety of elements collected in a diary, viz., the occasional date and position of a planetary synodic appearance, or the zodiacal signs in which the planets were located during the month tallied at the end in the planetary summary section. The requisite data could equally well have come from almanacs. In view of the various ways in which elements of non-mathematical astronomical texts appear in horoscopes, we may conclude that the astrologers used a variety of these texts as reference works, and used the data from them selectively.

The fact that one can demonstrate dependence of horoscopes upon texts in which astronomical phenomena are predicted—i.e., almanacs, diaries, and possibly ephemerides, as we have seen in the horoscopes which give degrees within signs—raises the question of the astrological motivation for such predictions as well as for the creation of these particular classes of astronomical texts. To what extent was the demand for astronomical data by astrologers a factor in the growth of astronomical methods or the scholastic decisions to create the various classes of astronomical texts as we have them? I think in one sense, the same evidence which raises the question also answers it, by showing the great degree to which astrology was an integral part of astronomical interests in the period after 500 B.C.E.

There remains, however, Oppenheim's question of whether indeed there was some catalytic effect on the growth of theoretical astronomy that stemmed from the practice of astrology. As I understand it, horoscopic astrology does not give rise to astronomy. When we take account of the textual evidence for the interdependence between the two over the long parallel histories of both disciplines, the question of which gave rise to which becomes unintelligible. The computational systems of the Babylonian mathematical astronomy, which emerged at about the same time as did horoscopic astrology cannot be accounted for by reason of their serving astrological purposes. While it is true that the goals of the mathematical astronomy seem to converge with those of horoscopy to produce zodiacal longitudes, the schemes known to us from Babylonian ephemerides and procedure texts[37] are of a complexity and produce results not evidenced in any direct way in the horoscope texts.

Such a discrepancy between the schemes available in mathematical ephemerides on the one hand and the evidence of the astrological texts on the other is paralleled in Greco-Roman astrology. In the *Anthology* of Vettius Valens and the *Tetrabiblos* of Ptolemy, Neugebauer and van Hoesen pointed out that simple arithmetical schemes are used "which belong to a period of astronomical theory which had been long surpassed at that time."[38] They go on to say, "the cliché which is so popular in histories of astronomy about the stimulating influence of astrology on exact astronomy is nowhere born out where we are able to control the details."[39] The cuneiform evidence appears consistent with the picture derived from the Hellenistic Greek sources, and further supports the view that the necessary connections between astronomy and astrology in no way need be seen in terms of linear development, either from astrology to astronomy or the other way around.

In view of this, it seems that the more productive cultural question becomes, not did or did not astrology—omens as well as horoscopy—

[37] Neugebauer, ACT.
[38] Neugebauer and H.B. van Hoesen, *Greek Horoscopes* (Philadelphia: American Philosophical Society, 1959), p. 185.
[39] Ibid.

spark the development of astronomy at any point in its history, but in what precise ways did the interests and goals of astrology and astronomy converge and diverge and how did this relationship change over the course of the immensely long lifespan of Babylonian science from 2000 B.C.E. to the beginning of our own era.

CHAPTER TEN

CONTINUITY AND CHANGE IN OMEN LITERATURE

In her 1985 monograph on Babylonian poetry, Erica Reiner said, "the Assyriologist knows that it is too early to attempt to write a history of Babylonian literature. In fact, he has so often said it—invoking the force of tradition responsible for preserving and perpetuating texts over hundreds, and possibly thousands, of years and thus allowing no real development—that he has been generally believed. Yet Babylonian literature is not as static and immutable as might be suggested by finds of nearly identical copies of some composition written down hundreds of years apart—a frequent phenomenon that is the despair of the historian but a boon to the philologist who can use similar exemplars to reconstruct a fragmentary text. In what measure identical exemplars reflect the immutability of tradition and, conversely, in what measure changes observed between an earlier and a later exemplar are indicators of a change in taste and interest are important questions for the interpretation of Babylonian literary history that only much painstaking philological work will elucidate."[1]

The divination corpus is aptly characterized by Reiner's statement, and in my view, omen texts are the equal of other more "literary" genres for examining aspects of construction such as authorship, stabilization of a *textus receptus*, transmission, and the limits of textual variation. In short, divination provides a rewarding context for examining the tensility of Babylonian traditionalism. In the following discussion, I will focus on the celestial omen texts, approaching this corpus from two sides, so to speak, from outside and inside. By "outside" I mean the history of the celestial divination tradition as we have reconstructed it, based upon the literary product of that tradition, the text *Enūma Anu Enlil*. Such an "external history," outlines the chronological development of its manuscript tradition, as far as we can establish it on the basis of extant texts. The "origins" of formal written celestial divination,

---

[1] Erica Reiner, *Your Thwarts in Pieces Your Mooring Rope Cut: Poetry from Babylonia and Assyria* (Ann Arbor, Michigan, University of Michigan Press, 1985), pp. x–xi.

according to our external history, are to be placed in the Old Babylonian period. If we look, however, at the origin of the discipline as well as of the text, from the scribes' own "internal" perspective, we enter the hoary age of the gods themselves; or in another version, we look back to prediluvian times, when gods communicated directly to the *apkallu*-sages, such as the famous fish-man, Oannes. I will, therefore, consider whether the notion of "divine authorship" presumed by some for *Enūma Anu Enlil* is relevant to the origins of the text according to its internal literary history. Finally, I will consider whether the idea of the divine origin of celestial divination was in fact relevant to the scribes' commitment to the basic permanence and unalterability of the content of the omen series, that is, their commitment to textual continuity over change.

External Literary History of Celestial Divination

The literary history of Mesopotamian divination has not yet been examined in any detail, either on the basis of a single series, much less in any comprehensive study. The obstacles to such research are easy to enumerate. On the one hand, the relatively small number of extant Old Babylonian omen texts as against the voluminous mass of later sources make a "history of Babylonian scholarly divination" difficult to formulate; on the other hand, because sources for omen collections in Middle Babylonian and Middle Assyrian periods are equally if not more limited than their Old Babylonian relatives, the continuity of tradition from Old Babylonian versions to the standardized recensions preserved in seventh century copies is not always apparent. Moreover, whether the various compositions comprising the core of the scholarly divination can be said to have shared in a common process of literary/textual development beginning in the Old Babylonian period is extremely difficult to assess since extispicy, for example, apparently had an extensive Old Babylonian tradition, while *šumma izbu*, *šumma ālu*, and the celestial omina seem to be poorly represented in Old Babylonian sources.[2]

[2] It is noteworthy that Old Babylonian celestial omens not identifiable in the standard Neo-Assyrian edition are known, for example those published by W. Šileiko, "Mondlaufprognosen aus der Zeit der ersten babylonischen Dynastie," *Comptes-Rendus de l'Academie des Sciences de l'URSS* (1927), pp. 125–8 and republished by Th. Bauer in

Until relatively recently, Old Babylonian sources for celestial omina were practically unknown. In the absence of evidence to the contrary, Weidner thought that the series *Enūma Anu Enlil* was a composition from the end of the second millennium or beginning of the first, without any clear Old Babylonian antecedents.[3] Four unpublished Old Babylonian celestial omen tablets, identified by Douglas Kennedy in the British Museum, form a small corpus of lunar eclipse omens which stand in a direct relation to part of the canonical series, specifically the lunar eclipse section *Enūma Anu Enlil* 15–22.[4] Because the lunar eclipse section of the series *Enūma Anu Enlil* also has a number of Middle Babylonian and Middle Assyrian exemplars,[5] we can examine the continuity of textual tradition and address the question of the development of the astrological series in general. In the light of the new corpus, Weidner's statement that *Enūma Anu Enlil* was likely to be a composition of the end of the second or beginning of the first millennium can be revised. Certainly however, if Weidner meant the composition of the standard 70-tablet series, this recension was indeed a product of the Middle Assyrian/Middle Babylonian period, as the non-standard character of the Old Babylonian texts confirms. Kassite compilers also must have formalized the bilingual introduction to the celestial omens, from which we derive the title "When Anu and Enlil" or *Enūma Anu Enlil*, after its three opening words, and from whence generations of scholars who transmitted the celestial omen series and who practiced celestial divination, derived their professional title "scribes of *Enūma Anu Enlil*."

Three of the four Old Babylonian tablets comprise a single corpus of eclipse omens, albeit not a fully standarized corpus. Textual variants are numerous, but only within the framework of the fixed set of omens (protasis + apodosis) representing the systematic organization of phenomena observed during lunar eclipses. The fourth text is an excerpt from Months XI–XII_2 of the other three texts. In the Old Babylonian texts the foundation can be seen for practically all the later lunar eclipse omens, including those attested in Middle Babylonian

ZA 43 (1938), pp. 308–17, as well as the fragmentary text VAT 7525 (line 12: [...] *ḫu-ut ka-ka-bi-im*), reference to which is made by Weidner in AfO 14, pp. 173–4.

[3] E. Weidner, "Die astrologische Serie Enûma Anu Enlil," AfO 14 (1941–1944), p. 174 note 7, and B. Meissner, BA III 245.

[4] See ABCD, pp. 9 and 19–22.

[5] See ABCD, pp. 23–25.

and Middle Assyrian, those in peripheral sources to some degree,[6] and those of the canonical tablets EAE15–22. The thematic elements and organization of the protases of the four Old Babylonian eclipse omen texts are seen to continue throughout the later recensions of the series. A comparison between the apodoses of the Old Babylonian texts and those of *Enūma Anu Enlil* proper further serves to specifically identify the tablet(s) of which the Old Babylonian exemplars are forerunners. The results of such a comparison are that EAE17–18 are in fact Old Babylonian, and in virtually every detail except orthographic style.

A continuous literary history, characterized by a progression toward greater standardization, can therefore be demonstrated for this corpus, beginning already in the Old Babylonian period, becoming further expanded and standardized in the Middle period (ca. 1100), and attaining a kind of "final" version in the *Enūma Anu Enlil* represented by the texts found in the library of Assurbanipal (7th century B.C.), and reflected in the many citations from that work in the reports and letters from the Neo-Assyrian scholars to Esarhaddon and Assurbanipal.[7] Such a reconstruction modifies to some extent the current modern consensus on Babylonian canonization, i.e., as the activity of Kassite period scribes who gathered traditional materials (mostly of Old Babylonian origin), catalogued and fixed the content. This reconstruction would see a tendency toward standardization already manifest in the Old Babylonian exemplars of the limited material under investigation. The Kassite activity certainly produced a widespread and thoroughgoing standardization of many literary and scientific genres, but as viewed through the narrow lens of celestial omens, it appears as though some notion of uniformity was already applied to the texts' content and organization, if not the orthography.

From the point of view of external literary history, the obvious major change within the text can be identified in the Kassite period when expansion and stabilization of a formal text took place. These changes are a measure of the intense scribal activity attested for the Kassite period in many texts and series. The character and assumptions of the various disciplines of divination were not altered by this period of comprehensive scribal redaction. With regard to celestial

[6] For example EAE 22 from Susa (MDP 18 258), ABCD, pp. 30–35.

[7] Cf. the summary in 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), chapter 1 "Mesopotamian Celestial Omens."

divination, the connection with the past as represented by the Old Babylonian lunar eclipse omens was rigorously maintained, and the corresponding nature of the textual changes can be defined more in terms of evolution and outgrowth from what went before, certainly not in terms of alteration or rejection of the previous stage of development. After approximately 500 B.C.E. when personal astrology was introduced, appearing in two new text genres, horoscopes and nativity omens, I would still argue that no fundamental alteration of the tradition occurred. *Enūma Anu Enlil* was not only intact, but the "new" forms of celestial divination were based on the same principles as before.[8]

Internal Perspective: Literary Origins according to the Scribes

Turning from the external textual history of *Enūma Anu Enlil* pieced together by modern Assyriology, we may also obtain a kind of internal perspective on the origins and development of celestial divination literature according to the scribes themselves. Ascription of, for lack of an accurate term, "authorship" for the series *Enūma Anu Enlil* appears, together with other omen, incantation, and ritual texts in a catalogue of texts and "authors" edited by Lambert.[9] There we read: "[The Exorcists'] Series (*ašipûtu*), The Lamentation Priests' Series (*kalûtu*), The Celestial Omen Series (*Enūma Anu Enlil*), [(If) a]Form (*alamdimmû*), Not Completing the Months, Diseased Sinews; [(If)] the Utterance [of the Mouth], The King, The Storm(?), Whose Aura is Heroic, Fashioned like An: These (works) are from the mouth' of Ea." The selection of Ea as the ultimate source for the collections about exorcism, incantations, and celestial divination, is fitting, because he was the god associated chiefly with magic and *arcana mundi*. He was considered, as the creator of humankind, to be the divine figure with special sympathy for human beings, and, therefore, would be the likely candidate to make messages or warnings available for the benefit of the human race.

But the fact that Ea is the single divine name to appear in the list, and that moreover the text does not say Ea "wrote" *Enūma Anu*

[8] See BH, pp. 13–16.

[9] W.G. Lambert, "A Catalogue of Texts and Authors," JCS 16 (1962), pp. 59–77, for the text see p. 64 I (K.2248):1–4.

Enlil (using the verb *šaṭāru*) but rather that it was "of the mouth of" (*ša pî*) that god, raises a serious question about divine authorship in the context of Mesopotamian literature. Lambert observed that, "the relationship of the texts to the authors is expressed in most instances by *ša pî*, "of the mouth." Previously we hesitated to decide if this indicated authorship or editorship. In view of the occurrence on one of the newly found fragments (I 4), where various works are said to be "of the mouth" of Ea, authorship must certainly be indicated. No one would have described Ea as the editor of another's works."[10] But what if we consider that authority can stem from authorship, but need not presume authorship. If Ea were regarded as the authority for the texts of *ašipūtu, kalûtu*, and *Enūma Anu Enlil*, because the knowledge contained in these corpora originated with him, it does not necessarily follow that he *wrote* the text. Indeed, when authorship is attributed it seems to be stated by a construction with *šaṭāru*.[11] In the Neo-Assyrian scholars' letters, a statement of authority, or simply origin, is sometimes given as *ša pî ummâni* "according to the masters,"[12] and certainly in these cases, the phrase *ša pî* does not imply anything written. In fact, the point of *ša pî* in the letters seems to be to contrast an oral with a written source of authority. Hence the phrase is now generally taken to refer to oral lore as opposed to written tradition, but with the added connotation that the oral lore had validity on a par with the text. On this basis, I regard x *ša pî DN* in the catalogue of texts as evidence not for authorship, as we understand it, but for authority. In this same "Catalogue of Texts and Authors," Ea is followed by Umanna-Adapa,[13] literally "Umanna, the Wise," who is there assigned two series, "The Lunar Crescent of Anu and Enlil (ud.sar an ^{d}en.lil.la)," and "I, even I, am Enlil (ma. e.me.en.nam ^{d}en.lil.la)," neither of which are extant. The particular texts associated with Adapa aside, this legendary figure is seen as a recipient and transmitter of knowledge or texts of divine origin. The transmission is defined as his "recitation" (*dabābu* "to speak"),[14] and recalls the passage from the Erra Epic that names Kabti-ilāni-Marduk

---

[10] Lambert, "A Catalogue of Texts and Authors," p. 72.

[11] For example, [... *a-da*]-*pà ina pi-i-šú iš-tu-ru* JCS 16, p. 66: 16.

[12] As in S. Parpola, LAS 13 rev.2; cf. AfO 20 118:54, see also Y. Elman, "Authoritative Oral Tradition in Neo-Assyrian Scribal Circles," JANES 7 (1975), pp. 19ff.

[13] Lambert, "A Catalogue of Texts and Authors," p. 64 line 6 reads ^{m}*uma*(UD)-*anna a-da-p*[*a*].

[14] Lambert, "A Catalogue of Texts and Authors," the Adapa section, p. 64 lines 6–7.

as the recipient and transmitter of that poem revealed to him by a god.[15] In one other place, Adapa is the "compiler(?)" of the series "the lunar crescent of Anu and Enlil," expressed with the verb *kaṣāru* "to collect."[16] Umanna-Adapa is also known from another source as the first antediluvian sage, the Oannes of Berossus. Originally, Adapa seems to have been the epithet of Oannes, an epithet meaning "wise," and only secondarily became a name itself.[17] Adapa, the *išippu* or purification priest of Eridu, who ascended to heaven, is also one of the famous *apkallu* or sages, and is frequently associated with the mythic time before the Flood.

According to the texts referring to the "seven sages,"[18] the *apkallu* were mythological entities, only partly human, and had a magical apotropaic function. Like Ea, they were identified with special wisdom, wisdom of crafts and of magic. And like Ea, Anu, and Enlil, in the introduction to EAE, the *apkallu*'s were considered to play a role in the maintainence of the "designs of heaven and earth," (*uṣurāti šamê u erṣēti*).[19] In the Epic of Erra, the seven sages (*apkallu*) are described as "the pure *purādu*-fish, who, just as their lord Ea, have been endowed with sublime wisdom" (*purādi ebbūti ša kīma Ea bēlišunu uzna ṣīrtu šuklulu*).[20] Indeed, the term *apkallu* varies freely with the term *ummânu*, "expert," or "master." In the case of Adapa, he is sometimes given the epithet *apkallu*, sometimes *ummânu*.[21] According to another tradition, the *apkallu*'s function was to transmit special knowledge from the divine realm to the world of men, as in the case of the revelation of oil, liver, and celestial divination by Šamaš and Adad to the sage Enmeduranki:[22] "Šamaš in Ebabbarra [appointed] Enmeduranki, kg of Sippar, the beloved of Anu, Enlil, [and Ea]. Šamaš and Adad [brought him in] to their assembly, Šamaš and Adad honored him, Šamaš and Adad [set him] on a large throne of gold, they showed him how to observe oil on water, a mystery of An, [Enlil and Ea], they gave him the tablet of the gods, the liver, a secret of heaven and [underworld], they put in

[15] Erra Tablet V:42–44.
[16] Smith, BHT pl. 9 v 12; see ZA 37, p. 92.
[17] W.G. Lambert, "A Catalogue of Texts and Authors," p. 74.
[18] LKA 76 and parallels, see E. Reiner, "The Etiological Myth of the 'Seven Sages'," OrNS 30 (1961), pp. 1–12.
[19] K 5119 rev. 5, see E. Reiner, "The Etiological Myth," p. 4.
[20] Erra Tablet I: 162.
[21] E. Reiner, "The Etiological Myth," p. 8.
[22] W.G. Lambert, "Enmeduranki and Related Matters," JCS 21 (1967), pp. 132f.

his hand the cedar-(rod), beloved of the great gods."[23] Then Enmeduranki does likewise with the "men of Nippur, Sippar, and Babylon," bringing them in, honoring them, placing them on thrones, and showing them lecanomancy, extispicy, and then the text says (line 18),"that (text) with commentary, 'When Anu, Enlil'; and how to make mathematical calculations."[24] Clearly there were variant traditions on the line of authority behind the *Enūma Anu Enlil* corpus.

The linking of literary, magical, and divinatory traditions either to gods or to some mythic time before the Flood recurs in other passages of Akkadian literature, for example Gilgamesh, who "brought knowledge from before the Flood,"[25] Assurbanipal's reference to difficult inscriptions on "stones from the prediluvian times,"[26] or the attributions of the medical text tradition to the sages Lu-Nanna of Ur and Enlil-muballiṭ of Nippur.[27] This theme is not without parallel elsewhere in Mesopotamian culture, for example, the idea expressed in the Sumerian King List of the divine origin of the institution of kingship. According to the Sumerian King List, kingship had been "lowered" from above, i.e., from the cosmic heavenly domain. In addition, continuity between the "present" and the distant past of antediluvian times, is made in the Sumerian King List with the addition of the section of antediluvian kings. But, as was noted by Jacobsen, the antediluvian section of the Sumerian King List was not limited to the king list, but was also found independently as a self-contained *topos*.[28] Jacobsen cited a Sumerian literary work[29] which begins "when the crown of kingship was lowered from heaven, when the scepter and the throne of kingship were lowered from heaven," and continues with a list of the five antediluvian cities, beginning with Eridu, and an account of the Flood. In this piece, EN.KI is the hero god, playing the role of creator of humankind (with Enlil and Ninhursag), as well as savior of human beings threatened with extinction by the Flood.

[23] K 2486+ ii 1–9.

[24] See Lambert, "Enmeduranki and Related Matters," p. 133.

[25] Thompson Gilg. I i 6.

[26] Streck, Asb II VII 2 (Leipzig, 1916), p. 256:18.

[27] See W.G. Lambert, "Ancestors, Authors, and Canonicity," JCS 11 (1957), pp. 7–9.

[28] Thorikild Jacobsen, *The Sumerian King List*, Assyriological studies 11 (Chicago: Oriental Institute of the University of Chicago, 1939, 2nd Edition), p. 57.

[29] Poebel, *Historical and Grammatical Texts*, PBS V no. 1; see Poebel's translation and commentary in PBS IV 1, pp. 9–70 and King's discussion in *Legends of Babylon and Egypt*, pp. 41–101.

The provenance of such a tradition, as indicated by the prominent role of EN.KI, is the city Eridu, assigned by this tradition first place in line to receive kingship from heaven. The Babylonian chronicle known as the Dynastic Chronicle (chron.18) preserves the same tradition of the descent of kingship from heaven first to Eridu and then to Bad-tibira and the other three cities before the Deluge. A late bilingual copy of the Dynastic Chronicle provides the opening line of the text. It says: [When Anu], Enlil, [...]; Anu, Enlil, and Ea [...]; [They established?] kingship for/in the land, etc.[30]

The aetiological function of Anu, Enlil, and Ea is similarly found in the opening lines of *Enūma Anu Enlil*, although what is of central interest is not kingship, but cosmic order and regularity in the heavens. This introduction begins: (Akkadian version) "When Anu, Enlil, and Ea, the great gods, established by their true decision, the designs of heaven and earth, the increase of the day, the renewal of the month, and the appearances (of celestial bodies), (then) humankind saw the sun going out from his gate and (the celestial bodies) regularly appear in the midst of heaven and earth."[31] The divine authority of the text *Enūma Anu Enlil* (as of the others mentioned as originating with Ea) is consistent and compatible with the notion of the divine establishment of order and regularity in the world. And because omens were meant to benefit humankind by providing special knowledge of the future to those who learned to interpret the divine order of things, the diviner represented the one specially privileged by education to participate in the contact between divine and human. The diviner-scholar is sometimes referred to, especially in omen colophons, as *mūdû* "the one who knows," or "the initiated," as in *mūdû mūdâ likallim* "the initiated may show (the tablet) only to the initiated (but not to the uninitiated)."[32] Whether the designation *mūdû*, "the initiate," suggests a person having secret knowledge of the actual signs as well as the relevant textual corpus as a result of study, or as a function of special intimacy with

[30] I. Finkel, "Bilingual Chronicle Fragments," JCS 32 (1980), pp. 66:1–3.

[31] STC I 124; II pl. 49:9–14. Note also the related bilingual introduction to an incantation text in Finkel, "Bilingual Chronicle Fragments," JCS 32 (1980), p. 67, BM 41328:1 (Sum.) EN u an ^{d}en-líl-la ^{d}en-ki-ke giš-hur-hur an-ki-ke mu-un-gi-na-es-a-ba? (Akk.) UD ^{d}*a-num* ^{d}*en-líl u* ^{d}*e-a uṣ-ṣu-rat* AN-*e* KI-*tim uk-tin-nu* "when Anu, Enlil, and Ea established the designs of heaven and earth."

[32] AMT 105:25; KAR 307 rev. 26; LKA 72 rev.20; TCL 6 32 rev. 7.

the god, parallel with that of the wise *apkallu*'s of literary tradition, is an intriguing question.[33]

The association of the content of a text with a divine source has another corollary in the incantation literature with the formula "the incantation is not mine, it is the incantation of DN (and DN...)" (*šiptu ul iattun šipat*...) EN.KI/Ea is often, but by no means exclusively encountered as the deity whose incantation is identified. Lambert, who did not consider these references in terms of divine authorship, but rather of revealed knowledge,[34] contrasted the allusion to gods in incantations with that of the catalogue of "authors." I would instead understand both as consistent, and both as related to the role of the gods as providers of signs in the natural world and to their place in the cosmos itself.

Relationship between the Histories

The Babylonian understanding of the divine origin and hence divine authority of the *Enūma Anu Enlil* text seems to be a scholarly derivation from the role of the gods in the system of Mesopotamian divination as of their place in the cosmos in general. A connection may therefore be made between the practical understanding of omens, i.e., that they were messages from gods containing clues to change in the future, and the claim that the written omen had validity because it was divine in origin. I do not believe this is tantamount to a claim that the text was authored by a god. But I do think that all this has much to do with the issue of tradition and change in the text, namely that the divine

---

[33] As far as the claim to the divine source of its knowledge is concerned, a certain generic relation can be seen between Babylonian celestial divination and later Greco-Egyptian astrology. The priest Petosiris, whose name was attached to a 2nd century B.C. hellenistic astrological compendium, addressed to king Nechepso (ruled at Sais 663–525 B.C.), was said to have "met every kind of rank of gods and angels." See Proclus RP 2, p. 345, apud Arthur Darby Nock, *Essays on Religion and the Ancient World*, 2 vols. (Oxford: Clarendon Press, 1972), p. 496. A much later hellenistic papyrus (A.D. 138) claims that Nechepso-Petosiris based their "teachings" on the god Hermes. See CCAG 8 4, 95, see Pingree *Yavanajātaka*, p. 430. The reference here is to texts of the "Hermetic" corpus, so-called because the Thrice-Greatest Hermes (Hermes Trismegistus) was the divinity associated as the source of revelation for an enormous variety of occult and philosophical literature, some of which was astrological, and some of which bears a relation to Babylonian celestial omen texts.

[34] Lambert, "A Catalogue of Texts and Authors," pp. 72–3.

origin, and therefore the revealed character of its knowledge, made the text fundamentally unalterable.

Our external textual history provides some insights into the development of the system of celestial divination as a body of knowledge about the physical world derived from observation and systematic thinking over a very long period from Old Babylonian to Kassite times. The scribes who maintained the tradition of *Enūma Anu Enlil*, however, represented the text not as the final product of centuries of accretion of data organized within the vast system of celestial omens by successive generations of scribes, but as a body of revealed knowledge. The collection and systematization of celestial phenomena as omens contained within the 70 tablets of *Enūma Anu Enlil* was the product of an intellectual tradition that assumed the gods were inseparable from phenomena by virtue of their cosmology, were responsible for the associations between phenomena in nature and events in human society, and were the authorities behind the text which contained all the divine decisions. Well into the Seleucid Era, as long as there were scribes of *Enūma Anu Enlil* alive to copy that text, they preserved it in much the same form and content as it had in the earliest exemplars known to us.

The Babylonian scribe, whether a writer of omens, historical texts, or some other genre, is aptly described—however unintentionally—by Arnaldo Momigliano, in a characteristically penetrating essay on classical historiography, in which he talked about what the classical historian was *not*. He said, "the Greek and Roman historians were not supposed to be the keepers of tradition. They were not assumed to register events in terms of conformity to, or deviations from, the norm. They were not supposed to succeed each other in a profession supported by the State or by religious institutions, nor were they concerned with keeping change under control.... There is nothing in Greece or Rome comparable with the traditionalist approach of an Al-Tabari with his report on the chain of authorities. There is nothing like Chinese official historiography with its minute registration of isolated facts...There is nothing like the *Heimskringla* by Snorri Sturluson, who had old stories written down as told by intelligent people about chieftains who spoke the Danish tongue."[35] I would add here

[35] A. Momigliano, "Tradition and the Classical Historian," in *Essays in Ancient and Modern Historiography* (Middletown, CT: Wesleyan University Press, 1977), p. 166.

that neither is there anything like the Babylonian Dynastic chronicle or the Sumerian King List which trace kingship from heaven through the antediluvian sages to the first cities after the Flood. The motif of the introduction of the tradition of kingship from the gods to the king-sages of remotest antiquity and from there to the present (and assumed to the future) harmonizes with the Babylonian scribes' own derivation of divination as well, expressed in the ascription of the cosmic designs and portents to Anu, Enlil, and Ea, and of the series *Enūma Anu Enlil* itself to the god Ea.

While the traditionalism of the *Enūma Anu Enlil* text continued to be upheld, no constraints seem to have been correspondingly placed on the techniques developed to predict mathematically the phenomena regarded as divine signals. In the sphere of the inquiry into nature, it is not the case that ancient Mesopotamian intellectual culture was so constrained by traditionalism that there was any lack of an effort to come to terms with the physical world. What separates the history of celestial divination as preserved in *Enūma Anu Enlil* from that of the history of mathematical astronomical techniques as we have them in the corpus of ephemerides,[36] is the traditionalist attitude toward the text itself. While mathematical astronomy evolved together with new forms of texts to accommodate the treatment of its subject matter, and as well, personal astrology with its own specialized text genre, the horoscopes,[37] the text of *Enūma Anu Enlil*, some of which remained essentially Old Babylonian in form and content if not orthography, continued as an unalterable literary embodiment of a divinely inspired tradition.

[36] ACT.
[37] See BH.

CHAPTER ELEVEN

THE BABYLONIAN ORIGINS OF THE MANDAEAN BOOK OF THE ZODIAC

A review of the publication of E.S. Drower's *The Book of the Zodiac*[1] appeared in the premiere journal for the history of science in the United States, *Isis* vol. 41 of 1950, written by George Sarton, the founder and editor of that journal from 1913–1952. The review probably would no longer be remembered, but for Otto Neugebauer, who contributed a now famous one-page reaction in *Isis* vol. 42, entitled "The Study of Wretched Subjects." There, Neugebauer said, "when the recognized dean of the History of Science disposes of a whole field with the words 'the superstitious flotsam of the Near East,' he perhaps does not fully realize how much he is contributing to the destruction of the very foundations of our studies: the recovery and study of the texts as they are, regardless of our own tastes and prejudices."[2] Indeed, the content of the Mandaean *Asfar/Sfar Malwašia* (henceforth SM) bears rich testimony to many astrological doctrines widespread wherever Hellenistic astrology held currency, and in some areas, preserved long after the Greco-Roman period.

While the historical significance of astrology in the Hellenistic, late Antique, and Mediaeval periods may have been seen primarily in terms of its role as the major vehicle for the transmission of astronomy, its intrinsic interest and importance as a source for ancient cultural belief systems is equally significant. The extraordinary longevity of the acceptance of astral influence as a law of the cosmos and the fluidity of the cultural transmission of forms of this belief is demonstrated by the fact that originally Mesopotamian elements may be traced in a work such as the SM, whose own origins seem to be Sasanian, although to my knowlege no extant copies antedate the 19th century. The earliest copy used by Lady Drower is a manuscript in the Bibliotheque

[1] Oriental Translation Fund Vol. 35 (London: Royal Asiatic Society, 1949).
[2] *Isis* 41(1950), p. 374. See also in G. Sarton, *A History of Science*, Vol. 2 (New York, 1959), p. 341 and note 112, where the Mandaeans are defined as "a tribe of Gnostic Christians."

Nationale dated to 1212 A.H., but her major source was completed in 1247 "according to the computation of the Arabs," as it is stated in the text, or 1869 C.E. The manuscript concludes with the statement of the date of copy and the note that the text is a "compilation from a Greek miscellany (of) calculations about the stars and horoscopes and information about what there is in the heavens according to days, months, and years."[3] As Drower observed, "Arabic, Greek, Persian, and Pahlevi writers probably drew upon older material. In some passages references to the 'King of kings' and mention of certain place-names indicate a Sasanian epoch, and much of the folklore and magic is a heritage from Babylon."[4] This paper discusses in a most preliminary way some Babylonian astrological and divinatory elements in the Mandaean SM. Before proceeding to Babylonian parallels and sources, however, it will be useful to outline the contents of the SM, and to say something about other influences evidenced in this work.[5]

The SM is a compilation from various sources of astrological and divinatory content and arranged in two major parts. Generally speaking, Part I, in 20 chapters, presents a guide to astrological analysis of human beings, that is, their physical attributes, abilities and weaknesses, as well as the various activities undertaken by people (marriage, travel, etc.). In addition, there are spells against demons and guidelines for illnesses occuring throughout the year (with respect to the calendar and the zodiac), horoscopes and much general astrological instruction representing standard Greek astrological doctrine. Chapter 14 is an example of "historical astrology," a Sasanian theory that important historical and religious moments, such as the Flood, or the coming of a prophet, can be predicted (or reconstructed) on the basis of astrological indications, such as planetary conjunctions or cycles of years.[6] In SM, predictions for "the world" are presented parallel to those of the individual person, e.g., in the first line of that section, "When the beginning of the year comes to 'the life' of the world and falls in Aries, with Mars as ruling star, this is predicted about it," and so on (SM 179). The last five chapters of Part I collect various omens which may be described as meteorological, astral, and at the end, a few

[3] SM 238, Drower p. 197.
[4] Drower, p. 2.
[5] It should be clear that I have relied entirely upon Drower's translation of SM.
[6] D. Pingree, *From Astral Omens to Astrology, From Babylon to Bikaner* (Rome: Istituto Italiano per l'Africa e l'Oriente, 1997), pp. 44, 58, and 83.

"terrestrial" omens similar to those of the Babylonian series *Šumma ālu*,[7] with subjects such as crows or noises made by fire or doors. Part II, as Drower noted, was "in reality a separate collection, but has become permanently attached to the *Sfar Malwasia*."[8]

Celestial science is perhaps the one cultural phenomenon through which Mesopotamian civilization had its broadest impact on other cultures. The astronomical achievement of Babylonia was well-known to Hellenistic Greek intellectuals, and their adaptation and incorporation of certain Babylonian astronomical concepts, parameters, and computational schemes assured a position for Babylonian civilization in the intellectual history of the West. Also known to Hellenistic Greeks, and through them Romans, Indians, Iranians, and Arabs, was that aspect of Babylonian astronomy which prognosticated human events from celestial phenomena, i.e., celestial divination, both public (omens) and private (horoscopes). A pre-Hellenistic transmission from Mesopotamia to Egypt during the Persian empire also occurred, as evidenced by Demotic astrological texts.[9] As a consequence of these various stages and modes of transmission, the Egyptian, Greco-Roman and Indian astrological systems bear the traces of Babylonian tradition. As evidenced by these widespread inheritors of Babylonian astrology, a cultural transmission, facilitated by the Hellenistic *oikoumene*, effected the spread of Babylonian tradition via Greek astrology wherever it took hold. However, as suggested by Christa Müller-Kessler,[10] in the area of southern Mesopotamia, continuous preservation of Babylonian culture in cities such as Babylon, Borsippa, and Kutha may have made direct contact possible between various population groups of the area

[7] See Sally M. Freedman, *If A City is Set on a Height: The Akkadian Omen Series Šumma Ālu in Mēlê Šakin*, Vol. 1: Tablets 1–21, Occasional Publications of the Samual Noah Kramer Fund 17 (Philadelphia: Babylonian Section, University Museum, 1998).

[8] Drower, p. 158. While Drower inferred a late date for this part, she noted that this part included place names of "considerable antiquity." Christa Müller-Kessler has concluded that the second part is in fact the older of the two, as it consists almost entirely of omens of celestial, hemerological, and medical diagnostic content, all of which point to an ultimately Mesopotamian origin.

[9] R.A. Parker, *A Vienna Demotic Papyrus on Eclipse- and Lunar-Omina*, Brown Egyptological Studies Vol. II (Providence, R.I.: Brown University Press, 1959).

[10] Christa Müller-Kessler, "Aramäische Beschwörungen und astronomische Omina in nachbabylonischer Zeit. Das Fortleben mesopotamischer Kultur im Vorderen Orient, in: J. Renger (Hrsg.), *Babylon: Focus Mesopotamischer Geschichte, Wiege früher Gelehrsamkeit, Mythos in der Moderne*. 2. Internationales Colloquium der Deutschen Orient-Gesellschaft 24.–26. März 1998 in Berlin (Saarbrücken: SDV, Saarbrücker, Druckerei und Verlag, 1999), pp. 427–443.

during the late Seleucid, Parthian, even Sasanian periods. The question is therefore raised whether the Babylonian "origins" of the Mandaean *Book of the Zodiac*, were the result of a direct transmission, or were carried back to Mesopotamia through the medium of Hellenistic science in the specific form of Greek astrology. This is more a question of means rather than date of transmission, since the possiblity of a direct transmission, such as was posited by Müller-Kessler, could have occurred well after the Hellenistic period itself.

Two of the major sources for the Babylonian origins of SM are the great compilation of celestial omens *Enūma Anu Enlil*[11] and its hemerological companion entitled *Iqqur Ipuš* (IqIp).[12] As just mentioned, the terrestrial series *Šumma ālu* seems to have been of some influence as well. A number of omens at the conclusion of Part I have ancestors from Tablet 7 of this series of "daily life" omens in which, for example the "voice" (*rigmu*) or noise (*ikkilu*) of a house is ominous.[13] SM refers to the murmurring of fire, similar to tablets 91–93 of *Šumma ālu*, which have fire omens and an omen in which a torch light makes noise. SM's omen for a door squeaking can be compared with *Šumma ālu* tablet 2:68–69[14] and the omen from the cawing of a crow has well-attested parallels, e.g. the omen protasis "If a crow caws plaintively at the right of a man.[15]

The divinatory elements referring to celestial phenomena, such as the lunar eclipse omens of Pt. I ch. 18, trace back to the Mesopotamian tradition of celestial divination, the earliest attested texts of which date from the second millennium B.C.E. in Old Babylonian collections of lunar eclipse omens. In its complete and fully elaborated form, preserved in copies from the 7th century B.C.E., *Enūma Anu Enlil* comprised 70 tablets devoted to the interpretation of the signs derived from any visible (or anticipated) phenomenon occurring in the sky during the day or night. As such, weather phenomena, especially

[11] For bibliography on editions, see above, Chapter Two, note 6.

[12] See R. Labat, *Un calendrier babylonien des travaux des signes et des mois (séries iqqur îpuš)* (Paris: H. Champion, 1965).

[13] See *Šumma Alu* Tablet 10:183–210, see Freedman, *If A City*, pp. 170f., and see lines 211–212, referring to the brickwork of a house making sounds.

[14] See Freedman, *If A City*, pp. 68–69.

[15] R. Labat, *Traité akkadien de diagnostics et pronostics médicaux* (Paris: Académie internationale d'histoire de sciences, 1951) No. 8:13, 14ff., CT 41 1 r.1ff., and other refs.

cloud formations and other features of the daytime sky such as lightning and rainbows counted as celestial phenomena.

Of somewhat secondary importance in terms of direct textual borrowing within the SM are the cuneiform horoscopes,[16] but of course the very idea of applying the situation of the heavens at the moment of birth to the life and fortune of an individual originates with these late Babylonian documents (all dating to the second half of first millennium). From this branch of Babylonian astrological practice developed Hellenistic Greek genethlialogy, which, of course, is the basic fund of astrological doctrine for SM. The Babylonian horoscopes represent a significant departure from Babylonian celestial divination, as neither the zodiac as the reference system for celestial positions, nor the personal predictions from celestial phenomena at the time of birth are found in the omen series *Enūma Anu Enlil*, whose concern was strictly public, i.e., matters of importance for the king and the state as a whole. Few personal predictions, however, are found in the Babylonian horoscopes, and those few are given in the form of omen apodoses familiar from nativity omens. The subjects of such apodoses are generally concerned with family and fortune, such as: "he will be lacking in wealth," "his days will be long," "he will have sons," or, "he will have sons and daughters."[17]

The scholarly tradition underlying the development of horoscopy, therefore, can be seen as a combination of the tradition of celestial divination as represented first by the omen series *Enūma Anu Enlil*, which always retained its concern with public matters (king and state), second, the tradition of birth omens, in which the birth had mantic significance in the way of any action occurring on a certain month and day, just as is seen in menologies and hemerologies (*IqIp* ¶64), and finally, the personal divination such as is represented by the physiognomic series. In this way, the Babylonian "horoscope" may be seen as an outgrowth from a complex foundation of interrelated mantic forms: the date-of-birth omen, the personal omen, the celestial omen and the nativity omen. The resemblance of cuneiform horoscopes to Greek horoscopes is quite superficial, although the basic idea of predicting an individual's life based on the positions of planets in the hour of birth is essential to each. The Babylonian horoscopes do not attest to

---

[16] See BH.
[17] See BH, pp. 50, 67, 80, 84.

the Greek idea of the "*horoscopus*," or rising point of the ecliptic at the moment of birth. By extension neither do they attest to the recognition of the other so-called "centers" (κέντρα), such as the setting point, midheaven or lower midheaven, all of which appear in SM.[18]

The contents of Part I of SM abundantly attest to the adoption of Greek astrology, and imply the Aristotelian-Ptolemaic cosmology necessitated by astrological doctrine. The celestial sphere with the earth in the center and the ecliptic divided into twelve 30-degree signs of the zodiac rotating from west to east is primary. It must be stressed that this cosmology is not shared by the omens of *Enūma Anu Enlil*. That SM is dependent upon the Aristotelian-Ptolemaic cosmos of Greek astrology is demonstrated, for example, by the use of the centers or "cardines" marked in four places, the rising point or *horoscopus*, the setting point, the point of midheaven (point of the ecliptic culminating or on the meridian at the moment of birth) and the lower midheaven 180 degrees away, below horizon. These cardinal points fall in certain places or signs of the zodiac counted from the first place, which is the ascendant or rising point of the ecliptic, in the direction of increasing longitude, i.e., the direction opposite to the daily rotation. Therefore, if the ascendant or *horoscopus* is 1, the setting point is 7, midheaven is 10, and lower midheaven is 4.

The division of the ecliptic, or zodiac, into the so-called "houses" or places (τόποι, *loci*) is another clear example of an underlying Hellenistic tradition. This practice remains one of the most common in the construction of horoscopes both western (i.e., Greek, Latin, European) and eastern (i.e. Indian and Arabic) from antiquity to the Renaissance. According to this doctrine, the 12 houses of the zodiac are each assigned special significance. The life of the native is affected by the first house, counted from the horoscopus, the second place affects money or business, the third siblings, the fourth parents, followed in order by children, illness, mariage, death, travel, honors, friends and enemies.[19] SM Ch. 1 presents the houses of each of the zodiacal signs,

---

[18] For the definition of the centers, see O. Neugebauer and H.B. Van Hoesen, *Greek Horoscopes*, Memoirs of the American Philosophical Society 48 (Philadelphia: American Philosophical Society, 1959), p. 3 and A. Bouché-Leclercq, *L'astrologie grecque* (Paris: Leroux, 1899), pp. 258ff.

[19] Bouché-Leclercq, *L'astrologie grecque*, p. 276ff. and p. 415f.; Tetr. III, 10; CCAG 8, 1, p. 221ff. (Rhetorius) and P. Mich. 149 col. ix, cited by Neugebauer and Van Hoesen, *Greek Horoscopes*, p. 7. See the discussion in J.D. North, *Horoscopes and History* (London: Warburg Institute, University of London, 1986), pp. 1–9.

first for men, then for women. As the text is a general qualitative guide to interpretation, and not a collection of horoscopes, the computational method of finding the houses is entirely unspecified. This is unfortunate, as particular quantitative methods can indicate both date and an indication of the line of transmission to the text.[20] The beginning of this section [SM 1] (with ellipses) reads (paraphrasing Drower's translation):

> He who is born under the sign of Aries, this is what will become of him. He will be tall and handsome and wise, and his mouth and lips will be large, his hair straight, his eyes big and his eyebrows fine.... He will bring trouble to his father and mother: they should suckle him with mixed milk and take him out of thehouse. If they omit to do this to him the house in which he is will be ruined. Good fortune will come to him from noblemen and kings. He will do good to mankind, and get a fair reputation in the cities. He will acquire property, have children, and found a family. He will have love towards all humanity.
>
> In reference to money or business ("with a money-bag"), Taurus. It is decreed that he will acquire property,.... he shall become great,...., he will acquire land and water, and will plant plantations and build buildings....
>
> In reference to siblings ("with brethren"), Gemini. So he will be oppressed by his brethren and it will warp his disposition, etc.

Another example of the underlying Greek cosmology is the sequence of the planets in order from least to greatest synodic cycles, i.e., the moon followed by Mercury, Venus, the sun, Mars, Jupiter, and Saturn. This is evident in Part II (p. 194) where the characteristics of the "seven stars," i.e., the five naked-eye planets plus sun and moon, are spelled out in terms of Aristotelian essenses (cold, hot, dry or moist), gender (masculine or feminine), "sect" (αἵρεσις) or whether a planet belongs to either the diurnal or nocturnal sect (to the day belong: sun, Jupiter, Mercury as morning star, and Saturn, to the night belong moon, Venus, Mercury as evening star, and Mars), among other things, ending with the designation of their "orbits," from Saturn as the seventh to the moon, identified as the "lowest orbit," i.e., nearest Earth which sits stationary at the center of the Aristotelian-Ptolemaic universe. The four elements, earth, water, air, and fire, belong to the sublunar realm, and the correlations between the zodiacal signs and the four elements are set out in Part I chapter IV (p. 70), in a scheme

[20] See discussion in J.D. North, *Horoscopes and History*.

which assigns each of the triplicities (zodiacal signs being 120 degrees apart) to an element, hence, Aries, Leo, Scorpius are fiery, Taurus, Virgo, Capricorn are earthy, Gemini, Libra, Aquarius are airy, and Cancer, Sagittarius, Pisces are watery (Figure 1).

When it comes to the divinatory sections of the work underlying sources are of pre-Hellenistic Babylonian origins. In addition to the celestial omens discussed briefly above, the hemerological omens of *Iqqur īpuš* "he tears down, he rebuilds," give predictions for phenomena occurring or activities undertaken in the twelve months of the year. Some of the omens from the other major Babylonian omen series are found excerpted in *Iqqur īpus*, and part of it may well be a kind of calendrical supplement to *Šumma ālu* and *Enūma Anu Enlil*. Traces of the belief in the significance of days is also evident in *Šumma ālu*. The

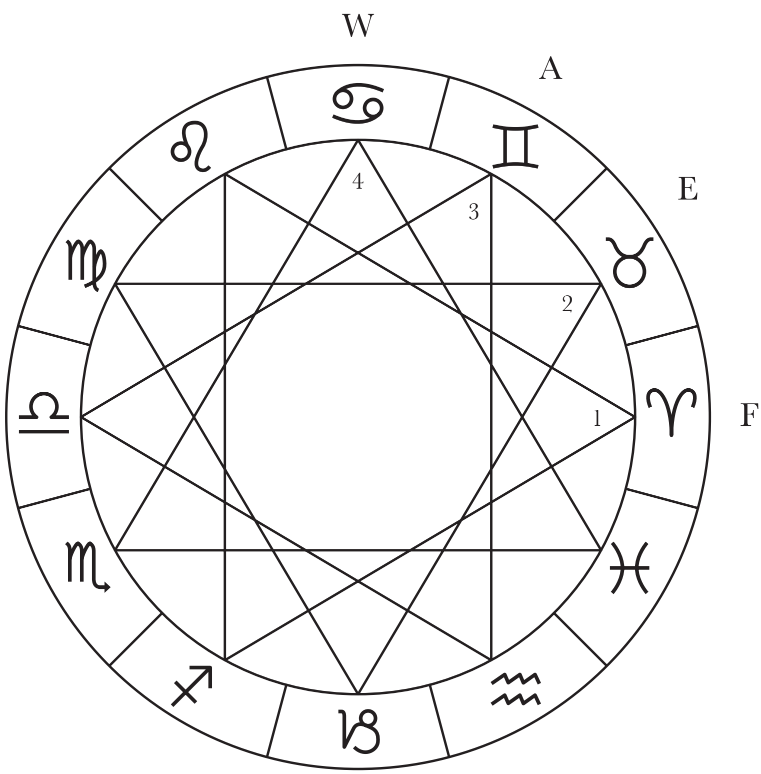


Figure 1. Correspondence between the four triplicities and the four elements

principle of this hemerological tradition is not only embedded in SM, but some sections contain what appear to be partial translations from the Akkadian, as in ch. 18 of Part I, following a series of omens from wind, red dust, and fire. The following section of lunar halo omens (SM 210) is compared against ¶ 77:1–6 of IqIp.

IqIp ¶ 77:1–6[21]	SM 210
1. If in Nisan the moon is surrounded by a halo (lit. a “drawing” *uṣurtu*): There will be an eclipse; (one) king will conquer (another) king.	If in Nisan the moon sits within an enclosing line*(ṣurta)*: war, or else a king will kill the king of kings.
2. If in Ajaru: (Floodwaters(?)) will carry away the barley ready for shipment.	If in Ayar the moon sits within an enclosing line: they will lose all the crops and produce of the summer, and there will be marauders and tumult.
3. If in Simānu: Fungus will affect the fruit.	If…in Siwan.: rain and water will come down, a fine dust will fall, and the date palm will shed its burden and be lacking, (but) there will be peace in the world.
4. If in Du’uzu: Fungus will affect the sesame.	If….in Tammuz: Nothing will happen, (but) there will be raiding in the world, or else the sesame crop will fail completely and the date palm will shed its fruit (untimely).
5. If in Abu: The produce of the palm will diminish.	If…Ab: the date palm will shed date and shake off its fruit (untimely).
6. If in Ulūlu: The produce of the sea will diminish.	If…Ellul: Fish will be reduced and extirpated (for) there will be little water.

[21] The Akkadian text reads:
1 DIŠ *ina Nisanni* ^{d}*Sin* GIŠ.HUR NIGIN AN.GE$_6$ GAR-[*a*]*n* LUGAL *ana* LUGAL KUR-*ád*
2 DIŠ *ina Ajari* ŠE BÚR-*tú* TÙM
3 DIŠ *ina Simāni* GURUN *qu-ma-nu* DIB-*bat*
4 DIŠ *ina Du’uzi* SE.GIŠ.Ì *qu-ma-nu* DIB-*bat*
5 DIŠ *ina Abi* GIŠ.GIŠIMMAR GUN-*sà* LAL
6 DIŠ *ina Ulūli* A.AB.BA MA.DAM-*šá* LAL

This evidence supports the possibility of a direct transmission, in so far as it is clear that SM represents a partial translation of *Iqqur īpuš*. Other parallels worthy of mention here are to be found in the omens of *Enūma Anu Enlil* as well as *Iqqur īpuš* concerning the subjects rain, lightning, thunder, and earthquake, as for example:

IqIp ¶88:12 If in Šabāṭu (Adad thunders): an invasion of locusts in the land.[22]	SM 266 If in the month of Šabat there is a rumbling, there will be much cloud, beasts will perish . . . many locusts will come.

The fairly lengthy section on lunar eclipse omens (SM, pp. 128–134) also bears the traces of lunar eclipse material known from *Enūma Anu Enlil* and *Iqqur īpuš*. SM, however, gives lunar eclipses only by month, followed by a section in which the time of the eclipse is of interest, such as: "If the moon is in eclipse in the month *Nisan*, turbulent folk will make raids at the end of the year, . . .," and "If the moon be eclipsed in *Nisan* from eventide, two kings will not agree amongst themselves and will fight, . . ." As in most of the lunar eclipse omens of *Enūma Anu Enlil*, whether the eclipse is full or partial is never indicated, but neither is the day of the month given or other eclipse phenomena (such as the color of the eclipsed moon), which are included in *Enūma Anu Enlil*. As in the case of the lunar halo omens, a closer parallel to the lunar eclipse omens of SM may be found in IqIp ¶69:71–73 (eclipses in the three watches of night). The following will suffice as illustration.

IqIp ¶69:7[23]	SM 212–213
7. If in Ulūlu (Sin AN.GE$_6$ GAR-un): There will be a rebellion against the king.	If the moon is eclipsed in Ellul, ... the king will have war in his realm, will be killed by treachery, and his city will be taken by the sword.
8. If in Tašrītu: Downfall of an army . . .	If the moon is eclipsed in Tišrin, there will be war in the cities and destruction, . . .

[22] TheAkkadian text reads: DIŠ *ina Šabāṭi* ZI-*ut* BURU$_5$. ḪI.A *ana* KUR.

[23] The Akkadian text (lines 7, 8, and 10) reads:
7 DIŠ *ina Ulūli* LUGAL HI.GAR BAL-[*su*]
8 DIŠ *ina Tašrīti* ŠUB-*ti* ERÍN *ina* [. . .]
10 DIŠ *ina Kislimi* ^{d}IM RA-*iṣ* KUR TUR-*ár*

10. If in Kislīmu: Rains will diminish the land.	If the moon is eclipse in Kanun, there will be heavy rains and calamities and turmoil in Fars.

It must be noted that even when protasis and apodosis do not closely parallel one another between the Babylonian omen series and SM, a general similarity in the subjects and phraseology of apodoses reflects acquaintance with more than simply the idea of these omens, but the omens in their actual written form. For example, SM has predictions such as "pregnant women will not carry their unborn to term,"[24] "the poor will become rich, the rich poor," both well attested in the cuneiform corpus.[25] Also in ch. 18 are omens for eclipses when the moon is in the various signs of the zodiac. This finds a parallel in a Persian period cuneiform text which is not derived from *Enūma Anu Enlil*, but must be post-*Enūma Anu Enlil*, given the presence of the zodiac.[26] One section from this text (BM 36746 obv. 5'–9') can be paralleled with SM 221–2 (p. 135).

BM 36746	SM 221–2
5' If the moon is eclipsed in Leo… Saturn and Mars stand in Aries or in Sagittarius,…The king of Akkad experience experience severe *šibbu*-disease,…and in a revolt they will oust him from his throne; people will experience great famine; brother will kill his brother, friend his friend, in battle.	If the moon is eclipsed Leo: pestilence among men and young female animals,…If Sagitarrius and Mars are predominant, there will be war and pestilence among the Hudeans, locusts will come and will work destruction, and a man will rise to kingly power.

The selected passages presented here are only a brief indication of what seems to be rich evidence for the reception of Babylonian divination and astrology into Mandaean culture. To explain how aspects of ancient Babylonian religious and intellectual culture, particularly astrology, came to be incorporated within late antique Mandaic texts, it would be very interesting to determine whether the Babylonian traditions traceable in Mandaean astrology are to be identified as a

---

24 See *The Assyrian Dictionary* Š Part III, s.v. *šuklulu*, meaning 1 g (Chicago and Glückstadt, Germany, 1992).

25 See *The Assyrian Dictionary* Š Part II, s.v. *šarû*, meaning 1 a 2' (Chicago and Glückstadt, Germany, 1992).

26 See above, Chapter Two.

product of eastern Hellenism, or as a result of Mandaean contact with a living albeit atenuated Babylonian scribal culture during the first century C.E. and possibly later.[27] In terms of its astrological content, SM would seem to go back to a Sasanian original (224–651 C.E.), based on some elements of Pahlavi astrology preserved and known from Arabic translations. One unmistakeable indication of a Sasanian date is the appearance in SM ch. 14 of the ascending and descending nodes of the moon as planets, termed the Head and Tail of the Dragon (*Talia*).[28] David Pingree has shown not only that the lunar nodes were included as planets in Indian astrology from the 4th or 5th century,[29] but that the assignation of exaltation and depression signs, or zodiacal signs in which the planet has greatest or least influence, represents a Sasanian innovation. This would help to date the original text of SM to the period after the 4th or 5th century, which is consistent with the dating of Mandaic magical bowls (ca. 600 C.E.).[30] Of course, Pre-Islamic Iranian astrology has its roots in Hellenistic Greek astrology, in the works of such authors as Dorotheus of Sidon (ca. 75 C.E.) and Vettius Valens of Antioch (ca. 175 C.E.). SM then seems to be datable to the period after the development of Indian astrology, but prior to the development of Arabic astrology. If, indeed, the text were much later, one might perhaps expect to find more in common with Arabic astrology. Certainly Western astrology of the mediaeval period is heavily influenced by Arabic astrology of the 9th C.[31]

---

[27] Arguing for the latter is Christa Müller-Kessler, "Aramaische Beschwörungern und astronomische Omina in Nachbabylonischer Zeit." For additional evidence, see B. Funck, Uruk zur Seleukidenzeit (1984), and Epilogue to F. Millar, *The Roman Near East: 31 B.C.–A.D. 337* (Cambridge, MA and London: Harvard University Press, 1993).

[28] Just as for the standard seven planets, the Head and Tail of the Dragon are assigned zodiacal signs in which the planet has its greatest and least influence. Such signs are the exaltation and depression, here Gemini and Sagittarius for the Head, Sagittarius and Gemini for the Tail. Ch. 10 of SM, pp. 95–96; also in ch. 14, pp. 111, 115–117, *Riš Talia* functions as a planet which "governs" e.g., the sun (p. 115) or the year (p. 116).

[29] D. Pingree, *Babylon to Bikaner*, p. 40 and note 5 referring to Pingree, *Jyotihsastra: Astral and Mathematical Literature*, A History of Indian literature v. 6, fasc. 4 (Wiesbaden: O. Harrassowitz, 1981), p. 83.

[30] E.M. Yamauchi, *Mandaic Incantation Texts* (New Haven, CT: American Oriental Society, 1967), p. 2. Note that there the earliest known Mandaic text (Text 22, a lead amulet) is dated to ca. 400 A.D. The religious mss, however, seem to date to the 8th century at the earliest.

[31] Abu Ma'shar (in Baghdad, d. 886), Abu ʿUthman Sahl ibn Bishr (in Khurasan, fl. first half of 9th C) and Abu ʿAli al-Khayyat (d. ca. 835), see North, *Horoscopes and History*, p. 75f.

The Mandaean *Book of the Zodiac*, however, preserves earlier traditions, namely Mesopotamian and Hellenistic Greek with an admixture of Indian material.

The question is, did the Mesopotamian elements enter apart from and possibly before the Hellenistic Greek transmission? Or only by means of the vehicle of Hellenistic astrology? On the basis of the preliminary examination of the sources presented here, I lean toward the position of Müller-Kessler and find that the nature of the parallels points to a more direct availability of certain cuneiform scholastic texts. The striking parallels between SM and IqIp suggest that IqIp was one such available text, but a better idea of the extent of such a possible available corpus requires closer study. Of course the presence of terrestrial omens identified above as of the "*Šumma Alu* type" cannot be accounted for by appeal to Hellenistic astrology, adding one more indication of an inheritance from Babylonia more diverse than simply by means of Greek astrology.

CHAPTER TWELVE

SCRIBES AND SCHOLARS: THE *ṬUPŠAR ENŪMA ANU ENLIL*

While the term "*ṭupšar Enūma Anu Enlil*," means literally "scribe of (the celestial omen series entitled) *Enūma Anu Enlil*," its definition in cultural terms is more complex. The translation "astrologer," does not adequately define the field of expertise of the *Enūma Anu Enlil* scribe as it implies an anachronistically sharp distinction between astrologer and astronomer. Erica Reiner suggested the freer translation "expert in celestial matters."[1] The translation problem is partly a function of our modern understanding of the relationship between astrology and astronomy, not paralleled by the ancient terminology, on one hand, and, on the other, the need to establish what such a scribe referred to as such actually did, as well as how that changed over the course of the five hundred year span from the Neo-Assyrian to Arsacid periods. Although the term occurs in texts over the course of this long period, Babylonian celestial sciences of the last three centuries B.C.E. differ substantially from those of the seventh century B.C.E. The training and activities of a *ṭupšar Enūma Anu Enlil* must necessarily differ over this stretch of time. Finally, there is the question whether *ṭupšar Enūma Anu Enlil* is a term for a distinct scholarly profession or a title held by certain members of the profession *ṭupšarru* "scribe."

If textual sources from which one could piece together the range of responsibilities and expertise of a *ṭupšar Enūma Anu Enlil* were limited to those on which the title appears, very little could be said, as such sources are surprisingly rare. In the Neo-Assyrian period, there are four available texts: one letter,[2] mentioning the "reports of the *ṭupšar Enūma Anu Enlil's* (*u'ilāti ša* LÚ.A.BA UD.AN.^{d}EN.LÍL); another letter in which two particular scribes are designated as LÚ.A.BA UD-*mu* AN

---

[1] E. Reiner, *Astral Magic in Babylonia*, TAPS 85/4 (Phila.: American Philosophical Society, 1995), p. 63.

[2] LAS 60 = ABL 1096:13, also Parpola, SAA 10 76.

EN.LÍL, who "look day and night at the sky";[3] one report in which the title of Šumāia is the "scribe of *Enūma Anu Enlil* from the new team" (LÚ.DUB.SAR UD.AN.^{d}EN.LÍL *ša kiṣri eššu*);[4] and one administrative document,[5] listing the employees of the court in which seven *ṭupšar Enūma Anu Enlil*'s head the list, two of whom are well-known from the Sargonid royal correspondence and astrological reports (Ištar-šumu-ēreš, known elsewhere as a *rab ṭupšarri* "chief scribe,"[6] and Balasî).[7]

According to the designations of scribes found in colophons, the canonical *Enūma Anu Enlil* texts do not refer to the copyists as *ṭupšar Enūma Anu Enlil*. Even though the celestial omen series represented the basic part of an "*Enūma Anu Enlil* scribe's" knowledge, and mastery of that text was obviously the chief defining feature of such a scribe, quotations of celestial omens from this series do not necessarily indicate that the writer of the text was an "*Enūma Anu Enlil* scribe." Evidence that scribes not holding this title could quote celestial omens (or hold private copies of the series, e.g., the 4th century scribe Iqīšâ, see below) is common, as seen in the letters and astrological reports of the exorcist Adad-šumu-uṣur,[8] or the priest Akkullānu,[9] who was an *ēreb bīti* or "Enterer of the Temple of Assur."[10] Akkullānu carried out celestial observation and research in the *Enūma Anu Enlil* series, counselled the

[3] S. Parpola, "A Letter from Šamaš-šumu-ukīn to Esarhaddon," Iraq 24 (1972), p. 22 rev. 24–25. On the particular spelling of the title of the celestial omen series, see p. 26 note to line rev. 24.

[4] H. Hunger, *Astrological Reports to Assyrian Kings*, SAA 8, (Helsinki: Helsinki University Press, 1992), 499 rev. 5. See also Oppenheim, *Centaurus* 14 p. 99.

[5] ADD 851 obv. i 8 [PAP 7 A.BA]-UD-AN-BE, see SAA 7 1.

[6] See H. Tadmor's discussion of Ištar-šumu-ēreš as the author of the Synchronistic King List, "History and Ideology in the Assyrian Royal Inscriptions," in F.M. Fales ed., *Assyrian Royal Inscriptions: New Horizons in Literary, Ideological, and Historical Analysis* (Rome: Istituto per l'Oriente, 1981), pp. 31–32. The "chief scribe," (*rab ṭupšarri*, written LÚ.GAL.DUB.SAR or GAL.A.BA), for example, was a title associated with celestial omen scribes from the time of Sargon II. One such chief scribe was Gabbi-ilāni-ēreš, ancestor of Nabû-zuqup-kēna. For colophons of the latter, from texts ranging in type from literary to astronomical and divination, both celestial and terrestrial, see Hunger *Kolophone* Nos. 293–312.

[7] Parpola LAS I–II and Hunger SAA 8.

[8] See LAS 119 and 120 and the astrological reports in Hunger SAA 8 160 and 161.

[9] See LAS 298–302 and many reports, for which, see Hunger SAA 8 100–112.

[10] ABL 539 rev. 14–15, see LAS II App. N 56. Cf. ACh Supp. 2 33:8–11, the colophon of which identifies the scribe as belonging to the Aššur Temple, as restored by Hunger *Kolophone* No. 518.

king on this basis and personally supervised the apotropaic rites necessitated by celestial omens which he recommended be performed.[11]

Not even in the body of texts termed "reports of the scribes of *Enūma Anu Enlil*" (*u'ilāti ša* LÚ.A.BA UD.AN.[d]EN.LÍL), is a scribal author identified as a *ṭupšar Enūma Anu Enlil.*[12] Moreover, *Enūma Anu Enlil* was not the only source of omens utilized by the scribes who made these reports to the king. It appears that the profession "scribe" ([LÚ]A.BA = *ṭupšarru*) applied generally to specialists in scholarly divination, both celestial and terrestrial (*šumma ālu* and *šumma izbu*), as well as the hemerological omens (*iqqur īpuš* and *inbu bēl arhim*).[13] These works constituted the literature of the scholarly field referred to by the abstract noun *ṭupšarrūtu*. Much scholarly divination was therefore included under the general field of "omen science," with the exception of the extispicy series *bārûtu*. The series *Enūma Anu Enlil* ("canonical" and "non-canonical") is found within a list of scholarly works belonging to the library of Assurbanipal that included lexical lists (*nabnītu*), lamentations (*eršahunga*), terrestrial omens (*šumma ālu*), and commentaries to a number of the omen series, as well as to the literary text *Enūma Eliš*.[14] Celestial omens belonged to a classification of scholarship whose various aspects were divination (celestial and terrestrial), lamentation literature, lexical literature and commentaries.

In Oppenheim's study of the Neo-Assyrian scholar scribes, derived mainly from an analysis of the astrological reports,[15] he called attention to the fact that, "the same experts report on and 'interpret' celestial events as well as such ominous occurrences as the birth of abnormal animals, or incidents which are typical of the sort dealt with in the compendium called *Šumma-ālu*," and that this "should prevent us from talking of them as 'astrologers.' They are simply experts in all

---

[11] See LAS 298 on lunar eclipse omens and the substitute king ritual; also LAS 110 + 300 (= Parpola, SAA 10 100) on Mars omens and solar eclipse.

[12] For text editions, see Hunger, SAA 8. For the single example of a scribe identified with the title *ṭ.EAE* in the reports, see above note 9.

[13] See Parpola, SAA 10 p. xiii and note 1.

[14] W.G. Lambert, "A Late Assyrian Catalogue of Literary and Scholarly Texts," B. Eichler ed., *Kramer anniversary volume: Cuneiform Studies in Honor of Samuel Noah Kramer*, AOAT 25, (Kevelaer: Butzon & Bercker, 1976), p. 314 (K.14067+). This list is associated with the scribal name Aplāia, a name seen in SAA 10 289 (LAS 224) rev. 16' and (surely a different person) Aplāia of Borsippa, known from the celestial omen reports SAA 8 Nos. 356–368.

[15] A.L. Oppenheim, "Divination and Celestial Observation in the Last Assyrian Empire," *Centaurus* 14 (1969), pp. 97–135.

those fields of divination which are outside extispicy."[16] That this is the case is perhaps nowhere more clearly articulated than in a letter of Marduk-šāpik-zēri to Aššurbanipal,[17] in which he reviewed for the king the extent of his learning: (quoting Parpola's translation) "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, Alandi*]*mmû* and *Nigdimdimmû*, [...and the (terrestrial omen series) *Šum*]*ma ālu*."[18] The scribe then enumerated by name twenty other learned experts (PAP 20 UM.ME.A.MEŠ), two of whom specifically were competent in celestial divination and extispicy ("[NN] has crossed over from Elam; [he fully masters extispicy and is an expert in [*Enūma A*]*nu Enlil*, ancient and Sumerian hermeneutics [and the secrets of heaven and e]arth," lines rev. 1–3 and "Kudurru is proficient in extispicy and has read *Enūma Anu Enlil*," line 31). The correspondence between Assyrian and Babylonian scholars and the kings Esarhaddon and Assurbanipal attests to the expertise of the diviners not only in the celestial and other omen literature, but also in incantations, rituals, and sacrifices necessitated by ominous signs. As portrayed in the Neo-Assyrian royal correspondence, such scribes not only knew what to watch for in the heavens and when, as well as where to find the corresponding prognostication in the compendium *Enūma Anu Enlil*, but also knew what to do in magical or cultic terms about one's findings in the text, and to advise the king accordingly. It is clear that scribes could be trained in the reading and application of *Enūma Anu Enlil* without their necessarily being identified as *ṭupšar Enūma Anu Enlil*.

Since the term "scribe" had the particular meaning "expert in omen sciences," the closest approximation to a general term for "*literatus*" might be *ummânu* (^{LÚ}UM.ME.A), in accordance with its usage in the letter of Marduk-šāpik-zēri cited above. The word *ummânu* is normally

---

[16] Oppenheim, "Divination and Celestial Observation," p. 99.

[17] CT 54 57+, edited H. Hunger, in F. Rochberg-Halton ed., *Language, Literature and History: Philological and Historical Studies Presented to Erica Reiner*, American Oriental Series vol. 67, (New Haven, CT: American Oriental Society, 1987), pp. 157–166; with join, Parpola, SAA 10 160.

[18] SAA 10 160:36–42.

translated into English as "master" or "scholar," as in the expression frequently found in the *mukallimtu* omen commentaries, "according to the scholars" (*ša pî ummâni*).[19] This statement has been interpreted as an expression meant to differentiate omens in "canonical" written series from those not recorded in the standard or "canonical" series. Colophons of some commentaries, for example the question-answer type, or *maš'altu*, sometimes identified their content as derived from ("the mouths of") scholars, e.g., *maš'altu ša pî ummâni*.[20] Whether the force of the expression *ša pî* "according to (the mouth)" is to convey the orality of the tradition, or to establish a text as stemming from an authoritative source, i.e., the masters, or indeed both, is very difficult to nail down.

In a text concerning the training of a diviner, the transmission of a variety of divination techniques, called "secrets of heaven and earth" and "secrets of the great gods," referred to the scholar as "learned" or "knowing" (*ummânu mudû*) and as "the one who guards the secrets of the great gods" (*nāṣir pirišti ilāni rabûti*).[21] The qualification of the scholar as *mudû* is of interest, since it raises the question of the nature of the knowledge of the Assyro-Babylonian scholar. The same designation is found in colophons which indicate the exclusivity of scholarly knowledge, as in "the knowing (one) may show (the tablet) only to the knowing, not to the 'un-knowing.'[22] Or, equally explicit, "the 'unknowing' (i.e., unitiated) may not see the secret of the sage" ([*niṣi*]*rti apkalli mudû la immar*).[23] The exclusivity of the scholars' knowledge, not to be disclosed to the "one who does not know," demarcates that body of knowledge, including divination, incantations and magic, from other fields.

There are isolated references to the revelation (*šubrû*) of texts from a god to a scribal "author," the clearest being that of the Erra Epic having been revealed to Kabti-ilāni-Marduk "in the night" (meaning in a dream?).[24] It is not clear, however, which god has done the

[19] See LAS 13 r. 1–2. Note the parallel to the expression *ša pî apkallē labīrūti* "according to the (oral tradition of the) ancient sages," cited CAD s.v. *apkallu* 2a1'.
[20] See CAD s.v. *maš'altu* mng.2, with examples from medical texts, *iqqur īpuš*, diagnostic omens, *izbu*, celestial omens, and see Hunger *Kolophone* Nr. 333.
[21] W.G. Lambert, "Enmeduranki and Related Matters," JCS 21 (1967), p. 132 (K 2486+): 19.
[22] See CAD s.v. *kullumu* mng. 4b, and Hunger *Kolophone*, index s.v.
[23] CT 25 50:20 + CT 46 54:20, cited CAD s.v. *mudû* in *la mudû* mng. 1.
[24] Erra Epic V 43, see CAD s.v. *barû* A mng 5b. Kabti-ilāni-Marduk's name has been restored in one of the fragments included in Lambert's study, "A Catalogue of Texts and Authors," JCS 16 (1962), p. 64 Text III K.9717+:1–2, which gives the

revealing. The ascription of the celestial omen series *Enūma Anu Enlil* (as well as the exorcists' corpus [*āšipūtum*] and the lamentation singer' corpus [*kalûtum*]) to the god Ea in a catalogue listing authors of scientific and literary texts means that the origins of certain textual corpora of the scribal repertoire were thought of as divine. The catalogues in which texts are ascribed to authors, both divine and human, uniformly express "authorship" by means of the expression *ša pî*, literally "of the mouth," but meaning "according to," or, as Lambert translated, "by."[25] Yet, the case for revelation of these corpora, hence of the corresponding disciplines themselves, is less clear. For the divination sciences, called the "secrets of Anu, Enlil, and Ea" (*niṣirti* ^{d}Anu ^{d}Enlil u ^{d}Ea"), a text concerning the revelation of these bodies of knowledge, interestingly enough not from Ea, but from Šamaš and Adad to the sage Enmeduranki, explains the revelation of knowledge from the gods to the sage and then from the sage to "the men of Nippur, Sippar, and Babylon" (*mārī Nippuri*^{ki} *Sippari*^{ki} u *Bā*]*bili*^{ki}).[26] Each time, revelation is expressed by means of the verb *šubrû*, as in the passage in the Erra Epic.[27] The disciplines of lamentation and incantation are not included in this text, whose purpose is specifically to define the qualifications (physical and in terms of descent) and requirements of a "diviner" (*mār* ^{LÚ}*bārî* [ḪAL]). The diviner must be without physical blemish, must be considered a descendant of Enmeduranki the sage, who received divine revelation of the divination sciences, and must be sworn by an oath "on tablet and stylus before Šamaš and Adad"[28] before being instructed (*šūḫuzu*) in the discipline by an *ummânu*.

It is not at all clear that the designation *ummânu* consistently implies one who possessed a body of knowledge by virtue of special communication with a god, as opposed to by rational inquiry and hermeneutics. Though the contents of the texts are frequently referred to as "secrets" (*niṣirtu, pirištu*), no testimony to the necessity of divine revelation as the

incipit of the epic and refers to the passage in Tablet V 42–44 where it states the scribe compiled the tablets which were "revealed to him in the night," and which then "he spoke." Lambert points out (p. 70, note to III 1–2) that there is no clear subject of the verb *ušabrīšūma* "he revealed it to him."

25 W.G. Lambert, "A Catalogue of Texts and Authors," JCS 16 (1962), pp. 59–77.

26 JCS 21 132 K.2486 + ii 10–11.

27 JCS 21 132 K.2486 + ii 7 and 13.

28 JCS 21 132 K.2486 + ii 20–21, and note the parallel BBR No. 24:22, also ibid. No. 1–20:13, also concerning the instruction of a scholar in the series "When the Diviner."

method of access to the "secrets" is extant for the Mesoptamian diviners and scholars such as one can find in Greco-Roman antiquity. For example, a first century C.E. account of the search for knowledge of the universe by the medical student Thessalos of Tralles is preserved in the form of an autobiographical letter forming the preface to a treatise on astrological medicine attributed to Nechepso, the 26th Dynasty pharaoh who allegedly received divine revelation from Hermes, and to whom the priest Petosiris addressed his astrological work.[29] Here the desire for natural knowledge was not satisfied by rational inquiry, i.e., merely by studying the treatise on astrological medicine of Nechepso, but only through direct communication with and revelation from the god of medicine Asclepius himself. And when Thessalos received his revelation of the iatromathematical secrets, the god instructed him not to "reveal [the secret] to any profane person who is a stranger to our art."[30] The outward manifestation of parallelism here in the proscription against outsiders to the discipline is not an argument for interpreting the Assyrian and Babylonian evidence of the scholars in the same way. The cautionary remark not to reveal secrets to the "one who does not know," in the cuneiform texts is not in fact the same as that which refers to the unknowing person as "profane."

Access to the careers of scholars in the Neo-Babylonian period, who flourished during the sixth century B.C.E., is difficult, as a correspondence between them and the Chaldean dynasts, comparable to that between Sargonid kings and their scholars, apparently did not develop. Five Neo-Babylonian "letter orders," in this case from the temple archive at Sippar,[31] record royal orders (three from

---

[29] A.-J. Festugière, "L'expérience religieuse du médicin Thessalos," *Revue Biblique* 48 (1939), pp. 45–77. This text has been analyzed as a clear example of the understanding of magic as religion in this period, even as a necessary replacement of traditional temple cults, see J.Z. Smith, "The Temple and the Magician," in Jacob Jervell and Wayne A. Meeks, eds., *God's Christ and His People: Studies in Honour of Nils Alstrup Dahl* (Oslo: Universitetsforl., 1977), pp. 233–247, and A.F. Segal, "Hellenistic Magic: Some Questions of Definition," in R. van den Broek and M.J. Vermaseren, eds., *Studies in Gnosticism and Hellenistic Religion Presented to Gilles Quispel on the Occasion of His 65th Birthday* (Leiden, 1981), pp. 371–372.

[30] Festugière, "L'expérience," p. 67 apud W. Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994), p. 20.

[31] From the Ebabbar temple, cited by P.-A. Beaulieu, *Reign of Nabonidus King of Babylon: 556–539 B.C.*, Yale Near Eastern Researches 10, (New Haven, CT: Yale University Press), p. 8. Also W.W. Hallo, "The Neo-Sumerian Letter Orders," BiOr 26 (1969), pp. 171–176, and A.L. Oppenheim, review of Figulla, UET IV in JCS 4 (1949), p. 195.

Nabonidus[32] and two from Cyrus)[33] to give food and beer rations to Babylonian scholars (*ummânu*) who have been sent to the temple Ebabbar in Sippar in order, as described in building inscriptions referring to the restoration of that temple, to find and excavate the old foundations.[34] Titled solely "scribe" (DUB.SAR/*ṭupšarru*), like his Neo-Assyrian counterparts, one Nabû-zēr-lišir functioned as a royal scholar through the reigns of Neriglissar to the eighth year of Nabonidus.[35] Beaulieu, with Joannès, view this scholar as an *ummânu*, whose training, evidenced in the orthography of the texts written by him, selected him for work in old inscriptions found in the excavations of the *bit akītu* at Agade conducted by Nabonidus.[36] Further evidence of Nabonidus' dependence upon scholars, assembling them before the restoration of sacred buildings to supervise excavation,[37] or to perform other tasks in accordance with tradition,[38] gives the impression that the scholars' workplace was not the palace but the *bīt mummu*. Although the connection of the Neo-Babylonian scribes to temple and cult is evident, texts from the reign of Nabonidus are lacking which attest to the scholars' dealings with celestial divination, and so the title *ṭupšar Enūma Anu Enlil* is not found. The often quoted inscription concerning the "request of Sin" in the form of a celestial omen apodosis for consecration of an *entu* priestess at Ur[39] reflects the desire of Nabonidus to verify celestial signs by means of extispicy.[40] But here no scholars are mentioned. The result of the evaluation of both celestial and liver divination was the consecration of Nabonidus' daughter as priestess at Ur and a reorganization of the cult,[41] suggesting at least an intersection of the two domains of divinatory science and cultic matters in this period.

---

[32] Nbn 56 (second year of Nbn), 407, and 409 (both tenth year), see Beaulieu, *Reign of Nabonidus*, pp. 7–11.

[33] Cyr 103 and CT 55:321.

[34] See Beaulieu, *Reign of Nabonidus*, p. 7, inscription 5:32–37, which refers to "many wise scribes who dwell in the temple academy" ([LÚ]DUB.SAR *mi-na-a-ti en-qu-ú-tu a-šib* É *mu-um-mu*).

[35] Beaulieu, *Reign of Nabonidus*, p. 142, and F. Joannès, "Un lettre neo-babylonien," N.A.B.U. (1988), p. 55, apud Beaulieu.

[36] Beaulieu, *Reign of Nabonidus*, p. 142.

[37] Beaulieu, *Reign of Nabonidus*, pp. 7–12.

[38] E.g., the fashioning of a tiara as in former times (*kīma labīrimma*), Beaulieu, *Reign of Nabonidus*, p. 9 col. ii 1.

[39] YOS 1 45, see P.R. Berger, AOAT 4/1 (1973) Zylinder II 7.

[40] See the discussion in Reiner, *Astral Magic*, pp. 76–77.

[41] YOS 1 45 col. ii 18–33, see Beaulieu, ibid., p. 131.

In the Achaemenid period, evidence for the milieu of the *ṭupšar Enūma Anu Enlil* is exceedingly limited. Letter orders of the period concerning the intercalation of months point toward the association of the scholar-scribes, such as the *kalû* "lamentation singer," with the temple.[42] Colophons of late Babylonian copies of *Enūma Anu Enlil* indicate that a scribe writing celestial omen texts could be part of the temple personnel, e.g., the Urukian scribe Labāši-Marduk, whose title was *mār* $^{\text{LÚ}}$*šangî* $^{\text{d}}$*Ea*, "priest of Ea."[43] The job of celestial diviner as royal counsellor as in the Sargonid context, and the practical application of the celestial omen compendium *Enūma Anu Enlil*, which had focussed traditionally upon the king, is no longer attested. With the appearance of mathematical astronomical texts in the Seleucid period, the use of the term *ṭupšar Enūma Anu Enlil* occurs primarily in the colophons of ephemerides, but was not attached to every scribe who wrote or possessed astronomical texts.

Seleucid copies of *Enūma Anu Enlil* are extant, but one can only infer from this the continued copying of *Enūma Anu Enlil* by scholars specializing in celestial divination. What purpose was served by the continued transmission of *Enūma Anu Enlil* is unknown, since sources attest merely to the preservation of the *Enūma Anu Enlil* text, not to its use. It appears, however, that the *Enūma Anu Enlil* text was still not in any way exclusive to scribes designated as *ṭupšar Enūma Anu Enlil*. For example, in the late fourth century,[44] the Urukian scribe Iqīšâ, son of Ištar-šuma-ēreš (not the same man as in the Sargonid letters), was an *āšipu* "incantation sayer," or "exorcist," whose personal "Fachbibliothek" was excavated during the 27th, 29th and 30th campaigns at Uruk.[45] That library consisted of omens, both celestial (*Enūma Anu Enlil*) and terrestrial (*šumma ālu, šumma izbu*, medical diagnostic), commentaries, incantations, lexical tablets (vocabularies and synonym lists, e.g., Hh IX, Erimhus V) and astronomical texts, including an ephemeris computed by a "System A" scheme.[46] Iqīšâ was also the scribe of two

---

[42] E.g., YOS 3 3, see Parpola, LAS II, p. 505, Appendix Q 6.3.

[43] This scribe wrote an "incomplete" (*ul qati*) copy of *EAE*, LKU 117 rev. 2f., see Hunger, *Kolophone* No. 82.

[44] Dated colophons place Iqīsâ during the reign of Philipp Arrhidaeus, between 323 and 316 B.C.E.

[45] For a list of texts and the identification of Iqīsâ's library, see von Weiher, UVB 29/30 96ff., and SpTU II. See also W. Farber, "Neues aus Uruk: Zur Bibliothek des Iqīsâ," WO 18 (1987), pp. 26–42.

[46] The ephemeris is published in Hunger Uruk No. 98.

tablets coordinating dates (months and days),[47] "regions" of zodiacal signs (*qaqqar* MUL. . . .), and magic.[48] Iqīšâ's profession was *āšipu*, yet he read, copied, and owned tablets of astronomical and astrological content.[49] In the colophon of another astrological text copied by him, he is further identified as *ērib bīti* (LÚ.TU É) ᵈ*Anu u Antu* "enterer of the temple of Anu and Antu."[50] The evidence of any exclusivity of this body of knowledge to only one scribal profession is lacking, as is the title *ṭupšar Enūma Anu Enlil* itself.

Similar evidence can be found from colophons of texts copied by a number of Seleucid Urukian *literati*, which show that while they held the professional titles *kalû* or *āšipu*, their scribal work entailed the copying of texts of diverse content. The *kalû* Anu-uballiṭ,[51] for example, wrote the lamentation text TCL 6 54, the astrological procedure TCL 6 11, the copy of EAE 56 TCL 6 16, the mathematical astronomical texts ACT 702, a System B table for Saturn, and TCL 6 27, a Mars table. The *āšipu* Anu-aha-ušabši wrote extispicy tablets, such as the 7th tablet of the series *bārûtu* (*tīrānu* "intestines"omens) BRM 4 13, the 48th tablet TCL 64, a copy of the lexical text *Erimhuš* TCL 6 35, a catalogue of *Enūma Anu Enlil* TCL 6 15+, and the astronomical text ACT 101, a table of new moons.

The implications of the term *ṭupšar Enūma Anu Enlil* regarding the literary and scientific activities of such scribes changed in the Hellenistic period, when the term comes to be associated with scribes who produced mathematical astronomical texts (our dated ephemerides are all Seleucid). However, as in the Neo-Assyrian correspondence, the

---

47 See Neugebauer and Sachs, "The 'Dodekatemoria' in Babylonian Astrology," AfO 16 (1952–53), pp. 65–66.

48 BRM 4 19 and 20 (colophon in Hunger, *Kolophone* No. 118), see Ungnad, "Besprechungskunst und Astrologie in Babylonien," *AfO* 14, pp. 251–284, and note the more complete duplicate STT 300. Erica Reiner discusses one of the text's magical acts, associated with a love charm(?), namely, SAL *šudbubu*, literally "to make a woman talk," in "Nocturnal Talk," T. Abusch, J. Huehnergard, and P. Steinkeller, eds., *Lingering Over Words: Studies in Ancient Near Eastern Literature in Honor of William L. Moran* (Atlanta, Ga.: Scholars Press, 1990), pp. 421–424.

49 How representative the find of a scribe's own tablet collection is, is difficult to judge. Another small collection of tablets in a private residence at Uruk is tentatively identified, on the basis of the colophons, as belonging to the scribe Anu-ikṣur. See J. Schmidt, *Vorläufiger Bericht über die von dem Deutschen Archäologischen Institut und der Deutschen Orient-Gesellschaft aus Mitteln der Deutschen Forschungsgemeinschaft unternommenen Ausgrabungen in Uruk-Warka*, Bd. 26 und 27 (Berlin: Verlag der Akademie der Wissenschaften, 1972) with a contribution on the texts by H. Hunger, pp. 79–87. Iqīsâ's colophons are collected in Hunger WO 6, 164.

50 Hunger, Uruk 94 rev. 56.

51 TCL 6 54 rev. 27 ᴸᵁ́ŠÚ ᵈ60 "*kalû* of Anu."

evidence from colophons of Seleucid astronomical texts, as illustrated above, shows that the scribes who either copied or owned the tablets were not always designated *ṭupšar Enūma Anu Enlil*, but were sometimes identifed by the professions *kalû* or *āšipu*. Anu-aba-utēr, for example, was sometimes identified as a *kalû*. This scribe is well-known from astronomical texts, among which is the Jupiter table ACT 600 (written S.E. 118) in which first stations of Jupiter are computed according to System A. He also wrote the mathematical text TCL 6 33, as well as VAT 7815,[52] an astrological text in which lunar eclipse omens, zodiacal signs and associations with cities, temples, stones, and plants are systematically related.[53] This same scribe is referred to as *ṭupšar Enūma Anu Enlil* of Uruk in another astronomical text, ACT 135 (colophon U), which deals with lunar eclipses.

Anu-aba-utēr's father, Anu-bēlšunu, was also a *kalû*, as noted in two tablets identified as belonging to him (*ṭuppi* PN) but written by his son (ACT colophon D [= ACT 400] and colophon U [= ACT 135]).[54] A text of the *kalû* ritual is also associated with this scribe.[55] A personal horoscope is extant which almost certainly is to be identified as that of this same Anu-bēl-šunu, father of Anu-aba-utēr.[56] The horoscope records the solar and lunar positions on the date of birth giving degrees and fractions of degrees within zodiacal signs, which underscores the close connection of the astronomical and astrological sides of the Babylonian study of heavenly phenomena.

The relationship between astronomy and divination is evident in the most extensive class of astronomical texts of the late period, the Babylonian archive of astronomical diaries.[57] Although ostensibly not at all astrological, the connection between the diaries and divination is supported by internal evidence which reveals that the compilers

---

[52] E. Weidner, *Gestirn-Darstellungen auf Babylonischen Tontafeln*, Österreichische Akademie der Wissenschaften. Philosophisch-historische Klasse. Sitzungsberichte, 254. Bd., 2 (Wien: Böhlau in Kommision, 1967), p. 47.

[53] For the ACT colophons of this scribe, see ACT I pp. 16–20, colophons D, F, H, L, P, Q, U, Y, Zc, Ze, and Zd.

[54] For Anu-bēlšunu's colophons, see ACT I, pp. 16–20, colophons D, H, L, M, Q, R, T, U, Y, Z, Zb, Zc, Zd, and Ze.

[55] See TCL 6 46 rev. 16f., and F. Thureau-Dangin, *Rituels accadiens* (Paris: E. Leroux, 1921), 40ff.

[56] See P.-A. Beaulieu and F. Rochberg, "The Horoscope of Anu-bēlšunu," JCS 48 (1996), pp. 89–94.

[57] A.J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*, 6 vols. (Vienna: Österreichische Akademie der Wissenschaften, 1988–2006).

of the diaries had intimate knowledge of the astronomical contents, the phenomena of interest, and the language used to express these in the omen series *Enūma Anu Enlil*.[58] Nonetheless, the designation *ṭupšar Enūma Anu Enlil* has not appeared in a diary text, but colophons in diaries are in any case rare. A single prosopographical connection between the scribe of a mathematical astronomical text and a scribal name found in the colophon of a diary can be mentioned. A diary of –321 (LBAT 212 and 213)[59] preserves the scribal name Bēl-apla-iddin, son of Mušallim-Bēl, descendant of Mušēzibu. This same Bēl-apla-iddin, son of Mušallim-Bēl, occurs in the colophon of ACT 816, a procedure text for Mercury, the provenance of which is Babylon, and in a text providing a quantitative model for Venus.[60]

As to the employment of the scholars who dealt with celestial sciences, from Achaemenid times onward, we may suppose that they were no longer employed by the king, at least there is no evidence to this effect. On the other hand, whether they were all in the service of the major temples is also difficult to pin down, although the available evidence points in this direction. The scholars producing ephemerides and procedure texts for which colophons remain appear to be working within the temple institution during the Seleucid period.[61] In Babylon, scribal scholarship seems to have been attached to the Marduk temple Esagila, and in Uruk the Anu temple, the so-called Rēš sanctuary.[62] Given this, the invocations to Bēl and Bēltīja in the Babylonian astronomical texts and horoscopes and to Anu and Antu in those from Uruk are understandable.[63]

As Brinkman has pointed out, however, there were private scribes in the first millennium (no evidence, however, for *ṭupšar Enūma Anu*

---

[58] A brief discussion of this connection was given in my review of Vol. I of Sachs-Hunger, *Diaries* in JAOS 110 (1991), pp. 323–332.

[59] Sachs-Hunger *Diaries* I, p. 228 No. 321 rev. 27'.

[60] J.P. Britton and C.B.F. Walker, "A Fourth Century Model for Venus: B.M.33552," *Centaurus* 34 (1991), pp. 110–112.

[61] See F. Rochberg, "The Cultural Locus of Astronomy in Late Babylonia," in H. Galter ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Grazer Morgenländische Studien 3, (Graz: GrazKult, 1993), pp. 31–45.

[62] See Falkenstein TvU p. 4; E.SAG ACT Colophon H:4 and E.ZAG ibid. Colophon V:9.

[63] The invocation is also attested to in an administrative text from Seleucid Uruk, NBC 8456, see P.-A. Beaulieu, "Textes administratifs inédits d'époque hellénistique provenant des archives du bīt rēš," RA 83 (1989), p. 79 Text 5:1.

Enlil's) producing Babylonian chronicles who were not connected to the temple and who held no official titles.[64] Why the *āšipu's* or *kalû*'s, who were also *ṭupšar Enūma Anu Enlil*'s, became functionaries of the temple may be tied to their authority in matters of ritual.[65] While earlier, in the Neo-Assyrian period, *āšipu*'s and *kalû*'s served the king, the association of these functionaries with the temple in this period is also attested. Some Neo-Assyrian *kalû*'s, and possibly also *āšipu's*, were consecrated members of the temple.[66] These Assyrian officials, however did not bear the title "priest" (ᴸᵁ́ŠID = *šangû*). Parpola has argued that in Neo-Assyrian, the writing ᴸᵁ́SANGA (ŠID) = *šangû* is reserved for "priest," while "scribe" is consistently written ᴸᵁ́DUB.SAR or ᴸᵁ́A.BA.[67] It should be noted that in Seleucid texts, the distinction between scribe and priest, both written ᴸᵁ́ŠID, read either SANGA (*šangû* "priest,") or UMBISAG (*ṭupšarru* "scribe"), is often made in translation by context and can be misleading. According to a list of names from late Babylonian Uruk,[68] exorcists were classified as *ērib bīti* "enterers of the temple (Eanna)." Among the exorcists listed in this text, Ekur-zākir and Hunzū both appear in the colophons of astronomical and astrological texts as ancestors of scribes.[69] Ekur-zākir is also found with the title *ṭupšar Enūma Anu Enlil* in a mathematical text.[70] But the relationship to the cult of such exorcists who also engaged in

[64] J.A. Brinkman, "The Babylonian Chronicle Revisited," in T. Abusch, J. Huehnergard, and P. Steinkeller eds., *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. 75 with note 13.

[65] F. Thureau-Dangin, *Rituels accadiens*, 1–59 for the *kalû* ritual.

[66] See Dr. G. van Driel, *The Cult of Aššur* (Assen, 1969), pp. 180–181.

[67] Parpola, LAS II pp. 319–320, commentary to LAS 309, a letter of Akkulānu. It may also be worth noting that in Old Babylonian, ŠID had the reading *ummiānu*, see MSL 13 25:255. See also the remarks of B. Landsberger, *Brief des Bischofs von Esagila an König Asarhaddon* (Amsterdam, 1965), pp. 14–15 and note 8.

[68] VS 15 1, see Lambert JCS 11 (1957) Appendix 2, p. 10, where the *āšipu*'s were counted among a total of 21 enterers of the temple, see col. ii 12 PAP.21.KAM! LÚ.TU.É.MEŠ.

[69] The family of Ekur-zākir occurs in the astrological texts TCL 6 18 and 19, and in ACT colophons R, H, J, Lm M, [N, V, [W, Y, and Z. The family of Ḫunzū is mentioned in the astronomical text TCL 6 11 and in the reciprocal table TCL 6 31. Lambert noted the identification of Ḫunzū's son in a 9th century boundary stone, giving his titles as "*kalû*-priest of Uruk, enterer of the temple of Nanâ, priest (*šangû*) of Usur-amâtsa, and scribe of Eanna," see "Ancestors, Authors, and Canonicity," JCS 11 (1957), p. 4 and note 17.

[70] TCL 6 35.

astronomical activity is not at all clear, as the class *ērib bīti* was rather broad, encompassing any member of the temple personnel who had access to areas of the temple that were closed to others. By itself, the term *ērib bīti* carries no special sacred status, hence the English word "priest," as Brinkman pointed out,[71] implies much more than does the designation *ērib bīti*.

In the Arsacid period, the continued patronage of the astronomer scribes by the Marduk temple Esagila, specifically, an "assembly" of the Esagila governed by a *šatammu* is clear.[72] Only a few extant documents attest to the employment of *ṭupšar Enūma Anu Enlil*'s within the institution of the Arsacid Babylonian Esagila temple of Babylon. They are Pinches, BOR 4 132, CT 49 144, CT 44 186, and AB 247, published by McEwan in *Iraq* 43 (1981), pp. 139–141.[73] CT 49 144 in particular concerns direct temple support of astronomers called *ṭupšar Enūma Anu Enlil*. This document represents the situation of the Babylonian temple ca. 119 B.C.E., roughly fifty years before the last extant astronomical diary (S.E. 251, or 61 B.C.E.). It is a protocol from a session of the temple assembly recording the decision of the assembly and the *šatammu* to transfer the support (silver and arable land)[74] of one *ṭupšar Enūma Anu Enlil* to another, who laid claim to it. Since the parties in question are named, the document furnishes some good prosopographical data on members of the late Babylonian *literati*. Further, this court protocol shows that the variety of astronomical activities of the *Enūma Anu Enlil* scribes each represented separately in astronomical texts together constitute the professional responsibilities of these scholars.

This document has already been the focus of some discussion.[75] The original edition, by G.J.P. McEwan in *Priest and Temple in Hellenistic*

[71] Brinkman review of G.J.P. McEwan, *Priest and Temple in Hellenistic Babylonia*, Freiburger altorientalische Studien 4 (Wiesbaden: Steiner, 1981) in JCS 35 (1983), p. 232.

[72] See R.J. van der Spek, "The Babylonian Temple during the Macedonian and Parthian Domination," BiOr 42 (1985), p. 555.

[73] See the discussion in van der Spek, "The Babylonian Temple," BiOr 42 (1985), pp. 547–554. The letters CT 49 189 and 192 contain references to the title *ṭ.EAE*, but in broken context.

[74] Cf. for the Neo-Assyrian period, in LAS 114, the chief haruspex Marduk-šumu-uṣur is given landed property as support.

[75] See Oelsner review of CT 49 in ZA 61 (1971), pp. 159–170, for text 144, see p. 168.

Babylonia[76] was reviewed by W. von Soden,[77] R.J. van der Spek,[78] and J.A. Brinkman,[79] who offered corrections to McEwan's text. It has further been suggested that the stipulated tasks of the astronomers enumerated in lines 23–24 refer to specific types of astronomical texts which the scribes are contracted to provide.[80] A modern classification of astronomical texts, based on scribal rubrics written at the conclusion of the various texts, was made by A. Sachs in 1948.[81] The classification reflected in the scribal rubrics indicates that different sorts of texts were produced by different sorts of astronomical activity. Some were observational and non-tabular ("astronomical diaries"), some computational and tabular ("ACT" tables), and some required the use of observational records while not being observational themselves ("almanacs, normal star almanacs, goal-year texts").

In the enumeration of the specific scribal duties for which the *ṭupšar Enūma Anu Enlil* is hired, the Arsacid temple protocol utilizes terms which may be identified with a number of astronomical text rubrics. Lines 23–24 of the text make mention of the regular "observation" (*naṣāru*) familiar from the rubrics of the astronomical diaries, as well as the "*tersētu* tablets and almanacs," ($^{\mathrm{IM}}$ *ter-se-e-tú u meš-ḫi*$^{\mathrm{MEŠ}}$), terms also known from the rubrics of mathematical ephemerides and "almanacs," according to Sachs' classification. It appears from this that in this period at least, the *ṭupšar Enūma Anu Enlil* was engaged in astronomical observation for the purpose of writing diaries,[82] preparing tables (ephemerides),[83] and making the derivative texts we refer to as "almanacs" (*mešḫi*).[84] These text types represent the full range of

---

[76] Published in the series Freiburger Altorientalische Studien Bd. 4 (Wiesbaden: Franz Steiner, 1981).

[77] ZA 71 (1981), pp. 294–295.

[78] "The Babylonian Temple during the Macedonian and Parthian Domination," BiOr 42 (1985), pp. 541–562.

[79] J.A. Brinkman, JCS 35 (1983), pp. 229–243.

[80] See Sachs-Hunger, *Diaries* Vol. I, Introduction pp. 11–12, and Rochberg, "The Cultural Locus of Astronomy," pp. 40–42.

[81] A. Sachs, "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2 (1948), pp. 271–290.

[82] The rubric for diaries reads *naṣāru ša ginê ša* TA ITI.x MU.y.KAM EN TIL ITI. z MU.y.KAM "regular watch which covers a period from month x of year y to the end of month z of year y." See Sachs-Hunger, *Diaries* Vol. I, p. 11.

[83] See ACT Vol. I pp. 12–13 and colophons to ACT 123a and 122. CAD s.v. *naṣāru* 5a translates *tersetu* as "computed tables," from BOR 4 132:24.

[84] Almanacs from Babylon have the rubric *meš-ḫi šá* KUR-*ád*$^{\mathrm{MEŠS}}$ *šá* UDU.IDIM. MEŠ *šá* MU … "measurements of the reachings of the planets of year such-and-such." The "reachings" of the planets means the entrances of planets within zodiacal signs.

astronomy in the late period, i.e., observation, mathematical computation and "non-mathematical" obtaining of some phenomena in the form of "almanacs."

Colophons of the scribes named as *ṭupšar Enūma Anu Enlil*'s in the protocols CT 49 144 and BOR 4, show a similar intellectual profile as is evidenced for the Neo-Assyrian scribes, i.e., they wrote texts of diverse disciplines, e.g., astronomy, divination, and literary texts. Bēl-aba-uṣur, for example, is known from the colophon of ACT 23 (new moons System A) and 122 (new moons System B), both called "*tersētu* of Kidinnu," and ACT 123a (new and full moons System B). Itti-Marduk-balāṭu copied MUL.APIN,[85] while his son, Bēl-ahhē-uṣur copied Tablet X of Gilgamesh,[86] and his other son Nabû-mušētiq-uddi copied *Enūma Eliš*.[87] Iddin-bēl, son of Marduk-šāpik-zēri inscribed from a wax tablet ACT 811, a procedure text for the outer planets.[88] These scribes are also found in "atypical" astronomical texts dealing with both lunar and planetary theory.[89] In the astronomical diary of −321 cited above (p. 248), the Mušēzibu who is ancestor of the scribe Bēl-apla-iddin, is probably the same ancestor of the scribal family referred to in the Esagila temple record BOR 4 132.

The astronomical activities of temple scribes and the production of certain types of texts, especially the omens of *Enūma Anu Enlil*, are difficult to understand in functional terms in the context of temple life, at least if we assume a necessary functional relationship. Was astronomy needed for the proper performance of certain rites and celebrations which were to occur on certain dates or at a certain time of day? Was the selection of a propitious moment based on celestial omens a consideration, even if it was no longer on demand from the king? It is difficult to imagine what relevance the content of *Enūma Anu Enlil* omen apodoses could have had for Babylonians in Hellenistic Babylonian society, particularly inasmuch as no evidence that the omens were consulted survives from this period.

Almanacs from Uruk were labelled simply *mešḫi ša* MU... "measurements of year such-and-such."

85 See Hunger-Pingree, *MUL.APIN: An Astronomical Compendium in Cuneiform*, AfO Beiheft 24 (Horn: Ferdinand Berger & Söhne, 1989), source K, p. 123.

86 Hunger, *Kolophone* No. 148.

87 Hunger, *Kolophone* No. 422.

88 See also ACT p. 24, Text 207ca, colophon Zrb.

89 O. Neugebauer and A. Sachs, "Some Atypical Astronomical Cuneiform Texts I.," JCS 21 (1967), p. 202 Text E upper edge 1–2, and p. 208 Text F rev. 8', and idem, JCS 22 (1968), pp. 92ff. Text K.

But perhaps the relationship between the scholars and the temple need not be understood in a utilitarian way, at least with respect to the cult. There is no evidence that the scholars were in fact "priests," with our connotations of holiness and mediation between sacred and profane. Celestial divination constituted a body of knowledge conceived of as "divine," in the sense that the gods both produced the signs in nature and the scribes attributed "authorship" of *Enūma Anu Enlil* to the god Ea. But there seems to me to be a wide gap not bridged by the available evidence between the practice of scholarly divination (and astronomy) and that of religion itself. If the temple became the preserve of cuneiform scholarship, it can be that much of the work of transcribing and preserving of texts had no cultic application, but simply continued because it belonged to the "*traditum*" as a whole. We do not know how or if the celestial omen compendium *Enūma Anu Enlil* was still used. It may simply have been preserved because it was a central part of the scholar-scribes' tradition. Regardless of the way astronomy functioned within the temple institution, association with the temple was without doubt the key to the survival of Babylonian astronomy and celestial divination for so many centuries after it had become defunct in the political sphere. As a further consequence, the maintenance of Babylonian astronomy and celestial divination by the temple scholars made possible its transmission to Greeks, interested, as it is put in one Greek horoscope, in the science of "ancient wise men, that is the Chaldeans."[90] Indeed, the astronomical and astrological sciences of Mesopotamian culture preserved in Hellenistic and Arsacid times were transmitted and became foundational for Greek and later Indian as well as Arabic celestial sciences.

Appendix

Because no published translations of CT 49 144 reflect an understanding of the activities of the *ṭupšar Enūma Anu Enlil*'s in terms of the various texts they were employed to produce, a transliteration and translation are offered again here.

CT 49 144

[90] Horoscope No. 137C col. i 3, see O. Neugebauer and H.B. van Hoesen, *Greek Horoscopes*, Memoirs of the American Philosophical Society 48 (Philadelphia, PA.: American Philosophical Society, 1959), p. 42.

obv.

1 [. . . šatam ($^{\text{LÚ}}$ŠÀ.TAM) É.SAG.GIL . . .]
2 [u] ⸢$^{\text{LÚ}}$Bābili (E.KI)$^{\text{MEŠ}}$ kiništu($^{\text{LÚ}}$UKKIN) šá É.SAG.GIL TA⸣
3 [i]m-mil-ku-ú u iq-bu-ú um-ma ina ITI.AB UD.15.KAM
4 MU.1.ME.29.KAM šá ši-i MU.1.ME.<1>,33.KAM $^{\text{IM}}$ taḫ-sis-tú
5 ina ka-re-e-nu ni-il-ta-kan šá 1 ma-na
6 kaspu (KÙ.BABBAR) manûtu(ŠID-tú) šá Bābili(E.KI) u zēru (ŠE. NUMUN)
šá $^{\text{Id}}$Bēl-aba-uṣur(EN.AD.ŠEŠ)
7 ṭupšar($^{\text{LÚ}}$DUB.SAR) Enūma Anu Enlil(UD.AN.$^{\text{d}}$EN.LÍL.LÁ) apli(A) šá $^{\text{Id}}$Bēl-rimannu(EN.SIPA-man-nu)
8 ṭupšar($^{\text{LÚ}}$DUB.SAR) Enūma Anu Enlil(UD.AN.$^{\text{d}}$EN.LÍL.LÁ) šá ana muḫ-ḫi na-ṣar šá na-ṣar
9 i-kul!-lu! a-na $^{\text{Id}}$Nabû-apla-uṣur(AG.A.ŠEŠ) kalî($^{\text{LÚ}}$GALA) ṭupšar ($^{\text{LÚ}}$DUB.SAR) Enūma Anu Enlil(UD.AN.$^{\text{d}}$EN.LÍL.LÁ)
10 A šá $^{\text{Id}}$Nabû-mušētiq(AG.DIB)-ud-da nu-ul-te-zi-zu
11 u en-na a-ga-a $^{\text{Id}}$Bēl-uṣur(EN.ŠEŠ)-šú ṭupšar($^{\text{LÚ}}$DUB.SAR) Enūma Anu Enlil(UD.AN.$^{\text{d}}$EN.LÍL.LÁ)
12 A šá $^{\text{Id}}$Bēl-aba-uṣur(EN.AD.ŠEŠ) šá ina IGI ⸢šaṭ⸣-ri ⸢it⸣-tal-ku
13 ana gab-bi u-ul-te-me-i-da-na-a-šú šá ma-⸢la⸣ na-ṣar
14 na-⸢ṣar⸣ ma-⸢su⸣-ú ù a-ni-ni-⸢na⸣-am
15 ni-⸢i⸣t(?)-ta-mar(?) ⸢ šá (?)⸣ ma-la <<na>> na-ṣa-ri
16 šá ⸢na-ṣar⸣ [ma-su]-ú u ni-ik-tal-du ana muḫ-ḫi $^{\text{Id}}$Nabû-apla-uṣur(AG.A.ŠEŠ)
17 šá ina pani(IGI) šaṭ-ri šá zēra(ŠE.NUMUN) ù(!) 1 ma-na kaspu(KÙ. BABBAR) kurummata(ŠUK.ḪI.A)
18 šá $^{\text{Id}}$Bēl-aba-uṣur(EN.AD.ŠEŠ).ÀM abi(LÚ.AD)-š[ú šá $^{\text{Id}}$ Bēl-uṣur (EN.ŠEŠ)-šú] rev.
19 šuāti(MU-a-tim!) ú-maš-ša-ri ina pa-ni-šú u un-d[a(?)-ar(?)-raq(?)]
20 ana tar-ṣi erasure $^{\text{Id}}$ Bēl-uṣur(EN.ŠEŠ)-šú šuāti(MU-a-tim) šá ištu(TA) lìb-bi in-da-raq(!?)
21 ina IGI-ni-ni šá 1 ma-na kaspu(KÙ.BABBAR) manûtu(ŠID-tú) šá Bābili(E.KI) u zēra(ŠE.NUMUN)
22 šá ina pani(IGI) šaṭ-ri ištu(TA) šatti(MU)-us-su
23 ištu(TA) kaspi(KÙ.BABBAR) šá hi-šiḫ-ti-ni ni-in-na-an-din-na-a-šú šá na-ṣar
24 i-na-ṣar $^{\text{IM}}$ ter-se-e-tú u meš-ḫi$^{\text{MEŠ}}$ i-nam-din it-[ti
25 $^{\text{Il}}$Labaši $^{\text{I}}$ Mu-ra-an u $^{\text{Id}}$ Marduk-šapik-zēri(ŠU.DUB.NUMUN) A.[MEŠ]

26 šá ^{Id} Bēl-bullissu(EN.DIN-su) ^{Id}Bēl-aḫḫē-uṣur(EN.ŠEŠ.MEŠ.ŠEŠ) ^{Id}Nabû-mušētiq(AG.DIB.)-ud-[di A.ME]Š

27 šá ^{I} Itti-Marduk-balāṭu(KI.^{d}ŠÚ.DIN) u it-<ti> ṭupšarri(LÚ.UMBI-SAG.MEŠ) Enūma Anu Enlil(UD.AN.^{d}EN.LÍL.LÁ)

28 šá-nu-ú-tu$_4$

Translation

1 [On . . . (= date) . . . the *šatammu* official of (the temple) Esagila]

2 [and] the Babylonians of the administrative assembly of Esagila together

3 took council and said the following: "On the 15th of Ṭebētu,

4–5 year 129 (A.E.), which is year 193 (S.E.), we had drawn up a memorandum concerning our common property, (namely) that one mina

6 of silver in the rate of exchange of Babylon, as well as the arable land of Bēl-aba-uṣur,

7 the *Enūma Anu Enlil* scribe, son of Bēl-rimannu,

8–9 the *Enūma Anu Enlil* scribe, which he (Bēl-aba-uṣur) enjoyed (as support) for carrying out celestial observation,

9–10 we had assigned to Nabû-apla-uṣur, *kalû*-priest and *Enūma Anu Enlil* scribe, son of Nabû-Mušētiq-uddî.

11 Now, however, Bēl-uṣuršu, the *Enūma Anu Enlil* scribe,

12 son of Bēl-aba-uṣur who was mentioned before, having come

13–14 before all of us (i.e., appeared in court), persuaded(?) us that he is able to make all the astronomical observations. We

15–16 have seen that he is capable of carrying out the activity of keeping watch (of celestial phenomena) to its fullest extent, and we have approached Nabû-apla-uṣur

17 who was mentioned before, (to the effect) that the arable land and the one mina silver, (which was) the support ration

18–19 of the said Bēl-aba-uṣur, father [of] this [Bēl-uṣuršu], he (Nabû-apla-uṣur) will release before us and will cle[ar (of any claim).]

20 Regarding(?) this Bēl-uṣuršu who brought the claim

21 before us concerning the one mina of silver in the rate of exchange of Babylon and the arable land,

22 which was mentioned before, from this year on, every year from the current one,
23 from the silver of our supplies we shall give him (Bēl-uṣuršu).
23–24 He (Bēl-uṣuršu) will carry out the celestial observation (i.e., produce astronomical diaries).
He will provide the *tersetu*-tablets and almanacs with
25 Lābaši, Muranu and Marduk-šāpik-zēri, sons
26 of Bēl-bullissu, Bēl-aḫḫē-uṣur, Nabû-mušētiq-uddî, descendants
27–28 of Itti-Marduk-balāṭu and with the other *Enūma Anu Enlil* scribes.

CHAPTER THIRTEEN

LUNAR DATA IN BABYLONIAN HOROSCOPES

That the roots of western astrology are traceable to the celestial sciences of ancient Mesopotamia is by now well-known, but our understanding of later astrology's indebtedness to Babylonia and Assyria is deepened every time the cuneiform sources are studied afresh. Two primary genres of cuneiform texts share the goal of prognosticating on the basis of celestial phenomena. They are the celestial omen texts and the horoscopes. A number of superficial differences between these classes of texts can be mentioned, for example, the prodigious numbers of omen texts versus the very few extant horoscopes, the fact that celestial omens antedate horoscope texts by centuries, that horoscopes are directed toward the individual as opposed to the king and the state, and also that they lack the casuistic "if, then" form of omens. Other, more interesting, differences lie in matters of astronomical content. This study of the two genres in terms of their respective astronomical content focuses attention on lunar data, and finds some interesting continuities despite their substantial differences. These continuities afford new insight into the relationship between celestial divination and horoscopy, or genethlialogy, as these disciplines evolved in the Mesopotamian scribal tradition.

It is particularly the lunar phenomena not associated with the date of birth, but regularly included in Babylonian horoscopes, that concerns this paper. I refer here primarily to the dates of syzygies, which are common enough in other genres of late Babylonian astronomical texts such as the diaries or almanacs, but have little or no evident astrological meaning in such texts. We presume that these data somehow aided in the interpretation of the fate of the native, but because so few actual prognoses are preserved in horoscope texts, this presumption cannot be confirmed in any way by the horoscope texts themselves. A number of later Greco-Roman horoscopes, to be mentioned below, indicate that the same sort of lunar data continued to be included, establishing once again continuities from the ancient Near East to hellenistic tradition. Since the presence in Babylonian horoscopes of lunar data not occuring on the date of birth is difficult to explain from within the genre of the cuneiform horoscopes alone, an attempt is made here to find parallels between, on the one hand, lunar phenomena in omen texts that clearly represent features of "astrological," which is to say mantic, significance, and the lunar data included in the Babylonian horoscopes on the other. In addition, my hope is that such connections may prove fruitful for further exploration of the historical development of hellenistic genethlialogy from Babylonian celestial divination.

The first astronomical datum provided in a horoscope is the position of the moon on the date of the birth. This appears in two forms: First, as a position with respect to a normal star, in the manner of the diaries, and second as a position with respect to a zodiacal sign, or occasionally in degrees within a sign. The first form, which is familiar from the daily observation of the moon's position with respect to the stars made systematic in the astronomical diaries, suggests an actual observation.[1] In a horoscope, however, the moon's position is not, as in the diaries, given for the purpose of an observational record, but rather, presumably, for whatever influence that position was thought to have upon the life of the child. Since the horoscope was prepared after the birth, the Babylonian astrologer must have relied either on available records such as diaries, or on computational methods to derive the position of the moon on the date in question, depending on whether a normal star position or a zodiacal sign was desired. The method of direct computation, hypothetically at least, would have derived the zodiacal position of the moon for a particular date by the application of numerical schemes known from the ephemerides. Another possibility would have been to deduce from a normal star position the corresponding zodiacal sign.

Use of the normal star reference system is more characteristic of the earlier horoscopes, in which case the evidence argues somewhat more forcibly for the first method, i.e., excerpting the desired lunar position with respect to a normal star from the appropriate diary text. We have the following from a third century B.C.E. horoscope (Text 7 rev. 1–3, dated –257):"[2] night of the 8th, beginning of night, the moon was 1 ½ cubits below the bright star of the Ribbon) of the Fishes, the moon passed ½ cubit to the east." Similarly, from another third century

[1] A.J. Sachs and H. Hunger, *Astronomical Diaries and Related Texts from Babylonia*, 6 vols. (Vienna: Österreichische Akademie der Wissenschaften, 1988–2006).

[2] Text references refer to text numbers of the edition in BH.

example (Text 13: 2–4, dated –223), we have: "night of the 4th, beginning of night, the moon was below the bright star of the Furrow by 1 $^5/_6$ cubits, the moon passed ½ cubit to the east."[3] This horoscope also gives the zodiacal sign of the moon:[4] "In his hour (of birth), the moon was in Libra." (Text 13:5)

These two forms of expressing the lunar position in Babylonian horoscopes overlap chronologically until about the middle of the second century B.C.E., after which time the zodiacal reference system seems to become the norm. The earliest attested zodiacal position for the moon comes in a horoscope from Uruk, dated to the middle of the third century (–262).[5] Interestingly, the texts prior to −150 (i.e., 9, 10, 12, and 19) that give the zodiacal sign for the moon, with the exception of Text 12, are also from Uruk. The most precise manner of citing the lunar position is, of course, in degrees of ecliptical longitude with respect to a zodiacal sign, in the manner of Babylonian mathematical astronomy. An example is Text 5:4, mentioned above: "(That day) the moon was in 10° Aquarius." Such computed zodiacal positions are attested for the third to the first centuries B.C.E. Unlike the values found in the ephemeris columns, however, degree values, when found in horoscopes, are generally integers without fractions (exceptionally to ½ degree, as in Texts 5, 9, and 10). The use of the ephemerides or their methods to generate degrees of longitude to many fractional places for horoscopes may therefore seem like overkill. However, Neugebauer pointed out with respect to the Greek horoscopes that while the computation of longitudes by means of "perpetual tables" meant that longitudes were computed to three or four sexagesimal places in order to guarantee the period relations, the horoscopes simply used the integer value and dropped the fractions as those fractional places had no practical value for horoscopy.[6] This argument would apply equally well in the case of the Babylonian horoscopes. Such computed longitudes could also have been generated for sets of dates over the course of a number of years, such as in a tablet from Uruk

[3] Other positions of the moon with respect to the normal stars are found in Texts 2, 4, 8, 14, 15, and 18.

[4] See BH, pp. 30–33 and 39.

[5] Other horoscopes giving the zodiacal sign for the moon are Texts 9, 10, 12, 16, 19, 20, 21, 22a and b, 23, 24, 25, 26, and 27.

[6] Neugebauer and van Hoesen, *Greek Horoscopes*, Memoirs of the American Philosophical Society, 48 (Philadelphia, PA: American Philosophical Society p. 24.

(A 3405) discussed by J.M. Steele.[7] Steele's argument in part stems from the unusual feature of that tablet, which is that its content gives, in chronological order, longitudes for synodic phenomena of all the planets as well as the occurrence of eclipses. Of course, horoscopes do not make use of the longitudes of the synodic phenomena, but attested interpolation methods would have provided a means to obtain the longitudes on arbitrary dates on the basis of prepared collections of planetary longitudes such as are found in A 3405.[8]

But what do we know of the significance of the moon for a nativity?[9] And why are the dates of lunar syzygies, not coinciding with the date of birth, also a regular feature of the Babylonian horoscope? That the moon was held to be of utmost importance in pre-horoscopic Babylonian celestial prognostication, is clear in the celestial omens of *Enūma Anu Enlil*. Consideration of the moon's location in the ecliptic, i.e., with respect to fixed stars, is evident in *Enūma Anu Enlil*, although in the non-personal orientation of the omen texts, lunar phenomena were not relevant to the fortunes of the state, the king, or other public concerns. Omens for the position of the moon with respect to fixed stars were part of *Enūma Anu Enlil*, as in Tablet 6 which collects omens for the first visibility of the moon in conjunction with a number of "Astrolabe" stars,[10] mostly those in the "path of Ea," whose stars have

---

[7] J.M. Steele, "A 3405: An Unusual Astronomical Text from Uruk," *Arch. Hist. Exact Sci.* 55 (2000), pp. 103–135, especially pp. 132–135.

[8] The situation is a bit more complicated than this, as Steele has pointed out in his discussion, ibid., pp. 132–133. The Uruk horoscopes do not refer to the Lunar Three, or to eclipses, although they contain remards on lunar latitude. The horoscopes from Babylon, on the other hand, make regular reference to the Lunar Three and to eclipses, but not to lunar latitude. Speculation on the use of a text such as A 3405, obviously, must take account of such discrepancies.

[9] From a late astrological instructional text (LBAT 1593:7'–12'), see Erica Reiner, "Early Zodiologia and Related Matters," in A.R. George and I.L. Finkel eds, *Wisdom, Gods, and Literature: Studies in Assyriology in Honour of W.G. Lambert* (Winona Lake, Indiana: Eisenbrauns, 2000), pp. 422 and 423–424, it appears that the moon related to the sex of the unborn child, conveying its influence through conjunction with the various planets. This idea is more clearly articulated in later astrological systems such as the Greek and Indian, as in Dorotheus, Ptolemy, Valens, and Sphujidhvaja. See D. Pingree, *The Yavanajātaka of Sphujidhvaja* (Cambridge, Massachusetts and London, England: Harvard University Press, 1978), pp. 263–264. This, however, would not reasonably apply in the case of a horoscope, presumably constructed after the birth, when the sex of the child is already known.

[10] For the stars of the Astrolabe, see the discussion of Reiner and Pingree in *BPO 2: Enūma Anu Enlil Tablets 50–51*, Bibliotheca Mesopotamica 2/2 (Malibu: Undena Publications, 1981), p. 3 with Table II. For the text, see E.F. Weidner, *Handbuch der Astronomie* (Leipzig: J.C. Hinrichs, 1915), pp. 65–66, also C.B.F. Walker and H. Hunger,

relatively small declinations.[11] In the first omen of EAE 6 the Pleiades stand at the side of the moon: DIŠ *Sin ina* IGI.LÁ-*šú* MUL.MUL *ina* Á-*šú* DU-*iz* "If in the first visibility of the moon the Pleiades stand at its side." (ACh Suppl. II 9:1) This is followed by omens for the Pleiades standing "within" the moon, i.e., in occultation, for the Pleiades standing in the "horns" or cusps of the crescent, in the right cusp, the left cusp, and finally "in front of" the Moon.[12] This pattern of omens is followed in turn by the same for the True Shepherd of Anu (MUL.SIPA.ZI.AN.NA, Orion), the Bow (MUL.PAN = *Qaštu*), the Arrow (*Šukūdu*, Sirius), and Scorpius (MUL.GÍR.TAB = *Zuqaqīpu*). EAE 8 presents omens for the appearance of the moon with a surrounding halo within which stand various stars or planets, viz., Jupiter, Venus, and the some of the same stars of the Astrolabe as were found in EAE 6: DIŠ-*ma* MUL.AŠ.GÁN(= *Ikû*) *ina libbišu izziz nušurrê šei u tibni* "If (in the moon's appearance it is surrounded by a halo) and Pegasus stands inside it, depletion of barley and straw."(ACh Suppl. II 1 iv 17) The remaining omens in the section (ACh Suppl. II 1 iv 17–35) are arranged by conjunctions of the moon with the Astrolabe stars cited, i.e., Pegasus, Pleiades, Bow, Orion, Crab, Plow, Arrow, and so on. Related texts, such as EAE 2 (ACh Suppl. I 1: 1–8)[13] show that when the moon is eclipsed in various ecliptical stars, i.e., stars in the path of the moon,[14] predictions (literally "verdicts" or "decisions") are given for a variety of subjects:

1 broken
2 [DIŠ *Sin ina* KI MUL.UR.GU.L]A *a-dir* EŠ.BAR LUGAL BE-*ma* UR.A.MEŠ IDIM.MEŠ

"Zwölfmaldrei," pp. 27–34, and V. Donbaz, and J. Koch, "Ein Astrolab der dritten Generation: NV. 10," JCS 47 (1995), pp. 63–84, and Horowitz, W. *Mesopotamian Cosmic Geography* (Winona Lake: IN: Eisenbrauns, 1998), pp. 154–166.

[11] The following declination values are given in Reiner and Pingree in BPO 2, p. 4 Table II: Pegasus –0.3°, Pleiades +8.0°, Orion –0.5°, Bow –26.6°, Arrow –18.2°, and Scorpius –12.2°.

[12] Virolleaud, ACh Suppl. II 9:1–6.

[13] These lines are also found the the text MNB 1849 rev. 37–54, see E. Weidner AfO 20 p. 118. The section begins with a short heading: line 37 *qaqqarē kakkabāni ša ina libbi Sin attalû ištakanu purussû ana alāni ittadanu* "Regions of stars in which the moon becomes eclipsed (for which) a decision is given for cities."

[14] Eighteen stars in the path of the moon are listed in MUL.APIN I iv 31–39, see Hunger, H. and Pingree, D. *MUL.APIN: An Astronomical Compendium in Cuneiform*, Archiv für Orientforschung Beiheft 24 (Horn: Ferdinand Berger & Söhne, 1989), pp. 67–69.

"If the moon is dark in the region of Leo, the decision: the king will die and lions will go wild."

3 [DIŠ *Sin ina* KI MUL.A]B.SÍN *a-dir* EŠ.BAR AB.SÍN AB.SÍN GUN-*sá i-ḫar-ra-aṣ* SU.KÚ ŠE *u* IN.NU

"If the moon is dark in the region of Virgo, the decision is for the furrow: The furrow will cut off its produce (and so) there will be a famine of barley and straw"

4 [DIŠ *Sin ina* KI MUL.MEŠ IGI].MEŠ *šá* MUL.AL.LUL *a-dir* EŠ.BAR ID.IDIGNA ID. IDIGNA A.KAL-*šá i-ma-aṭ-ṭa*

"If the moon is dark in the region of the stars to the west of Cancer, the decision (is for) the Tigris: The Tigris will diminish its floodwaters."

5 [DIŠ *Sin ina* KI MUL].MEŠ EGIR.MEŠ *šá* MUL.AL.LUL *a-dir* EŠ.BAR ID.BURANUN.KI ID.BURANUN.KI A.KAL-*šá i-ma-aṭ-ṭa*

"If the moon is dark in the region of the stars to the east of Cancer, the decision (is for) the Euphrates: The Euphrates will diminish its floodwaters."

6 [DIŠ *Sin ina* KI MU]L.AL.LUL *a-dir* EŠ.BAR ID.BURANUN.KI

"If the moon is dark in Cancer, the decision (is for) the Euphrates.

7 [DIŠ *Sin ina* KI MU]L.*A-nu-ni-tum a-dir* EŠ.BAR ID.IDIGNA *u* A.GA.DÈ.KI *u* EŠ.BAR A.AB.BA.KI KUR « DILMUN ».KI

" If the moon is dark in the region of Pisces, the decision (is for) the Tigris and Akkad and a decision for the sea and Dilmun."

8 [DIŠ *Sin ina* K]I MUL.ḪUN.GÁ *a-dir* EŠ.BAR UNUG.KI *u Kul-la-ba*.KI

"If the moon is dark in the region of Aries, the decision (is for) Uruk and Kullaba.

The correlations between places and the ecliptical stars in the path of the moon is also found in an unpublished tablet from the British Museum (BM 47494:1–15).[15] For example:

[15] I wish to thank C.B.F. Walker for bringing this text to my attention. Thanks are also due the British Museum photographic services for providing the photo, and the Trustees of the British Museum for permission to cite this unpublished text.

DIŠ MUL.AB.SIN KUR.NIM.MA.KI "If Virgo: Elam…"
DIŠ MÚL.GÍR.TAB Dil-mun u bar-x-[…] "If Scorpius: Dilmun and…"
DIŠ MUL.PA.BIL.SAG Tin.Tir.KI Marad.da.KI u x x x x "If Sagitarrius: Babylon and Marad…"
DIŠ MUL.SUḪUR.MÁŠ KUR Su-bar-tu.KI "If Capricorn: Subartu…" (BM 47494: 8–12).

As well, the zodiacal signs came to represent regions of significance for geographical localities, as in the following from the same text just cited, where the traditional second, third, and fourth triplicities associated with the cardinal directions south, west, and east are given:

DIŠ MÚL.GU$_4$.AN.NA MÚL.AB.SÍN u MÚ[L.SU ḪUR.MAŠ] 3 KI.MEŠ a-[na KUR][NIM].M[A.KI]
DIŠ MÚL.MAŠ.TAB.BA.LAGAB.GAL MÚL.ZI.BA.AN.N[A] [u] MUL.GU.LA 3 KI.MEŠ a-n[a KU]R.MAR.TU.KI
DIŠ MÚL.AL.LUL MUL.GÍR.TAB u MÚL.AŠ.GÁN 3 KI.MEŠ [a-na KU]R Su-<bar-tu>KI

"Taurus, Virgo, and Capricorn (are) 3 regions (of significance) for Elam; Gemini, Libra, and Aquarius (are) 3 regions (of significance) for Amurru; Cancer, Scorpius, and Pisces are 3 regions of significance for Subartu" (BM 47494 rev. 17–22).

Overall however, the celestial omen texts display an even greater interest in the moon's position with respect to the sun. From the point of view of celestial divination, the most important synodic moments of the moon's cycle were conjunction, i.e., the day of the first lunar crescent or the first day of the month, and opposition, the day of full moon, considered ideally to fall on the 14th day. The lunar section of *Enūma Anu Enlil* is itself divided into two parts focused on these times in the lunar synodic cycle: Tablets 1–14 deal with the appearance of the moon in its first crescent, termed *tāmarāti* (IGI.DU$_8$.A.MEŠ) *ša Sin* "the visibilities of the moon," and Tablets 15–22 concern the middle of the month when eclipses occur. The dates of opposition were a significant feature of the omen texts, which focused on whether or not the syzygy was timely, early, or late. The 14th and 15th days were considered normal for opposition, hence of good portent, as in the following passages from Neo-Assyrian astrological reports:

> If the moon reaches the sun and follows it closely, and one horn me[ets] the other: there will be truth in the land, and the son will spe[ak] truth with his father.—On the 14th day the moon and sun will be seen with each other. If the moon and sun are in opposi[tion]: the king of the land wil[l widen] his understanding; the foundation of the king's throne will becom[e stable].—On the 14th day one god will be seen with the other. (Report of Nabû-Iqīša, translation of H. Hunger, SAA 8 294)[16]

"If on the 13th day [the m]oon and sun are seen together: unre[liab]le speech; the ways of the land will not be straight; there will be steps of the enemy; the enemy will plunder in the land. If the moon in Ab is not seen with the sun on the 14th or on the 15th day: there will be deaths; a god (i.e. pestilence) will devour." (Report of Zakir, translation of H. Hunger, SAA 8 306)

Of course, the date of the day of the last visibility of the moon (*bubbulu*) was also of importance as it had an impact on the date of the new moon, and indeed, one horoscope (Text 2:8) makes mention of the *bubbulu* date. EAE Tablet 1 concerns the appearance of the lunar crescent between the 27th and 2nd days and whether the moon's appearance and disappearance was *ina la minâtišu* "not according to its (normal) count," the noun *minītu* coming from the verb *manû* "to count."[17] As in the case of the date of opposition, the day of disappearance of the moon was interpreted according to its timeliness, as in the following astrological report:

> "[If the day of disapp]earance of the moon is at an inappropriate time: the ruin of the Gutians will take place. That means the moon disappears on the 27th day. If the day of disappearance of the moon in the third month [...]. there will be an eclipse, and the gods [....] 3 days [it stayed] in the sky. If the moon in Elul [becomes visible] on the 30th day: dispersal of the land [Subartu]. On this 30th day [the moon became visible]. The lord of kings will say: "Is [the sign] not affected?" The moon disappeared on the 27th; the 28th and the 29th it stayed inside the sky, and was seen on the 30th; when (else) would it have been seen? It should stay inside the sky less than 4 days, it never stayed 4 days." (SAA 8 346, Report of Ašarēdu, quoting the translation of H. Hunger)

Conjunctions and oppositions of the sun and moon were clearly of interest to the celestial diviners, but later, several time intervals around

---

[16] See Hermann Hunger, *Astrological Reports to Assyrian Kings*, SAA 8 (Helsinki: Helsinki University Press, 1992).

[17] E.g., Ch. Virolleaud, *L'Astrologie Chaldéenne* (Paris: Paul Geuthner, 1911) Suppl. 2 II, pp. 5–4 lines 9 and 25–31.

the beginning, middle, and end of the month, around conjunction and opposition of the sun and moon, were defined and systematically recorded in non-mathematical astronomical texts such as diaries, almanacs, and goal-year texts.[18] A. Sachs termed these intervals the "Lunar Three" and the "Lunar Six,"[19] depending on which of the data were referred to in a given text. Horoscopes, like almanacs, provide the "Lunar Three," which are: 1) Month name followed by the number 1 or 30 to designate whether the previous month was full (30 days) or hollow (29 days), respectively; 2) The date just after true opposition (when the longitude of the moon is greater than λ_{sun} + 180°) of the interval of lunar visibility between sunrise and moonset, termed *na*; and 3) The date around the end of the month of the phenomenon termed KUR, which measured the duration of visibility of the last lunar crescent in the morning before sunrise, hence the interval between moonrise and sunrise. The study of these phenomena, according to L. Brack-Bernsen,[20] led to the important recognition of the very small difference between the sidereal month (return of the moon to a fixed star) and the anomalistic month (return in oscillation of lunar velocity), important because identification of the anomalistic period is prerequisite to determining the Saros, or eclipse period, that relates synodic to anomalistic months (223 syn. mo. = 239 anom. mo.). How early these lunar intervals were determined is uncertain, but a 6th century diary (No. −567:4) already refers to the mid-month *na*. The earliest extant diaries, e.g., −651 and −567, continue to refer to opposition by the terminology of the omen texts, i.e., "one god was seen with the other," but this expression seems to be quickly replaced by the use of the Lunar Six.

[18] Lis Brack-Bernsen, "Goal-Year Tablets: Lunar Data and Predictions," in N.M. Swerdlow, *Ancient Astronomy and Celestial Divination* (Cambridge and London: The MIT Press, 1999), pp. 149–178.

[19] A.J. Sachs, "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2 (1948), p. 273 and 281.

[20] On the derivation of the lunar anomaly parameter φ, see Lis Brack-Bernsen, "Babylonische Mondtexte: Beobachtung und Theorie," in H. Galter ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Beiträge zum 3. Grazer Morgenländischen Symposion (Graz: GrazKult, 1993), pp. 331–358, and in N.M.Swerdlow, ed., *Ancient Astronomy and Celestial Divination* (Cambridge and London: The MIT Press, 1999), pp. 149–178.

The Lunar Three were regularly included in the horoscopes from Babylon.[21] No astrological indication for these phenomena is evident in late Babylonian astronomy outside the horoscopes. Yet the evidence of the omens concerning the moon at the beginning, middle, and end of its synodic cycle may suggest a foundation for the later genethlialogical application, and the idea that the moon's behavior could be read as positive or negative, lucky or unlucky, for the king or state may have become an indication for the individual as well. What is interesting in the context of horoscopes is the fact that these phenomena, occurring as they do throughout the month, do not belong to the situation of the heavens solely on the date of birth. It is also interesting to note here that syzygies close to the date of birth are included both in the Greek literary horoscopes[22] and in a papyrus horoscope (Pap. Oxy. No. 4282) of the late 3rd or early 4th century. A. Jones points to the fact that this is the first papyrus horoscope that gives the date (and longitude to the degree and minute) of full moon preceding the birth.[23] These horoscopes attest to the same sort of practice seen in the Babylonian horoscopes, i.e., that the moon was viewed as having astrological impact on the birth through other significant moments in the lunar cycle occuring in proximity to the birth.

Another important lunar datum not associated with the date of birth but included in the Babylonian horoscopes is the lunar eclipse. Here the practice seems to have been to include the eclipse which occurred within five months of the birth.[24] This too is paralleled in a papyrus horoscope (Pap. Oxy. 4281), albeit in broken context.[25] Jones surmises that this eclipse, mentioned in the first line of the horoscope, may have occurred within a month of the birthdate.[26] Based on the preponderance of eclipse omens in the lunar section of *Enūma Anu Enlil*, the astrological significance of lunar eclipses in the Babylonian system is a

[21] The Uruk tradition seems to be somewhat different, as none of the extant Uruk horoscopes include the Lunar Three. See Texts 5 and 9–11 in BH.

[22] O. Neugebauer and H.B. van Hoesen, *Greek Horoscopes*, Memoirs of the American Philosophical Society 48 (Philadelphia, Pa.: American Philosophical Society, 1959), p. 174 sub 2. Syzygies.

[23] Alexander Jones, *Astronomical Papyri from Oxyrhynchus* vol. 1, Memoirs of the American Philosophical Society 233 (Philadelphia, PA: American Philosophical Society, 1999), Text No. 4282, p. 288.

[24] See BH, pp. 40–42 and Table 3.1, which tabulates the dates of the eclipses and the birthdates preserved for all the eclipses attested in the horoscopes.

[25] Pap. Oxy. No. 4281:1, Jones, *Astronomical Papyri*, pp. 430–431.

[26] Ibid., p. 288.

given, although the application in an individual's horoscope eludes us. Eclipse omens are built around well-defined aspects of eclipses, such as the date, time, and direction of the shadow, as can be seen in the representative series of omens of EAE 15–22.[27] A commentary text (ACh Suppl. 1 II 19–20) specifies:

19 [If] the moon makes an eclipse, the month, day, watch, wind, path, and regions of stars in which the eclipse occurs are mixed,
20 [the decision] for that of its month, its day, its watch, its wind, its path, and its star is given.

Later developments of eclipse omens include the zodiacal sign in which the eclipse occurred, as in the late Babylonian tablet BM 36746+.[28] These omens follow those of *Enūma Anu Enlil* in every way except the addition of the zodiac:

> If the moon is eclipsed in Leo and finishes the watch and the north wind blows, Jupiter is not present during the eclipse, Saturn and Mars stand in Aries or in Sagittarius or in Pisces (*Ikû*). Variant: In its eclipse [a halo surrounds (the moon) and Regulus stands within it]. For this sign: [The king of Akkad will experience severe hardship/*šibbu* disease; variant, it (*šibbu* disease) will seize him, and they will oust him from his throne in a revolt. (BM 36746+ obv. 5'–7').[29]

The presence of eclipse data in horoscopes, although again not occuring on the date of the birth, can no doubt be accounted for by the interest in lunar eclipses as omens.

The reliability of the eclipse data recorded in horoscopes is predicated upon further developments in methods to make lunar eclipse predictions. Crucial to this development were the definition of the concepts of lunar nodes and latitude, and the derivation of a parameter used to predict the return of the moon to the position of eclipse, the Saros. Both J.P. Britton[30] and S. Parpola[31] have concluded that knowledge of the Saros underlies the eclipse predictions in the Neo-Assyrian

[27] See ABCD.
[28] See above, Chapter Two.
[29] See above, Chapter Two, pp. 53–54 and 57.
[30] J.P. Britton, "Scientific Astronomy in Pre-Seleucid Babylon," in H.Galter ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, p. 64.
[31] S. Parpola, *Letters from Assryian Scholars to the Kings Esarhaddon and Assurbanipal* (Neukirchen-Vluyn: Verlag Butzon & Bercker Kevelaer, AOAT 5/2, 1983), Vol. II, p. xxv and letters 41, 42, 53, 62, and 66.

scholars' celestial reports and correspondence with the kings, although no direct evidence of the Saros, such as is found in texts as the "Saros Canon,"[32] predates the fifth century. In the reconstruction of Britton,[33] work to solve the problem of the variable velocity of the moon (lunar anomaly), the anomaly of solar and lunar longitude at syzygy (zodiacal anomaly), and the theory of eclipse magnitude (to take form eventually as col. ψ) culminated in the fully developed lunar theory of System A by the early fourth century B.C.E. These achievements in astronomical understanding were fruits of a much earlier focus on lunar eclipses, abundantly attested to by *Enūma Anu Enlil* and other texts relating to celestial divination produced by Neo-Assyrian period scribe-scholars.

Statements about lunar latitude using terms consistent with the mathematical astronomical texts concerning lunar latitude occur in three horoscopes from Uruk:[34]

Sin TA MURUB_4 a-na NIM pa-ni-šu GAR.MEŠ "The moon keeps going from the node to (increasing) positive latitude."

Sin TA SIG KI pa-nu-šu ana MURUB_4 GAR.MEŠ "The moon keeps going from negative latitude toward the node."

Sin TA LAL ana MURUB_4 pa-nu-šu GAR.MEŠ "The moon keeps going from positive latitude toward the node."

The terminology MURUB_4 "node," as well as NIM and SIG "positive and negative" latitude, are well known from procedure texts, such as ACT 200 Section 4.[35] Noteworthy here too is the 3rd century papyrus horoscope (Pap. Oxy. no. 4245) that contains a reference to the motion in latitude of the moon.[36]

Lunar latitude was obtained in Babylonian astronomy by finding nodal elongation, or how far the moon was from the node (Akkadian *kiṣru* "knot"). In the lunar ephemeris, column E is a function of the

---

[32] J.N. Strassmaier, "Der Saros-Canon SpII, 71," ZA 10 (1895), pp. 64–9, also published in cuneiform copy in LBAT 1428, and republication with commentary by A. Aaboe, J.P. Britton, J. Henderson, O. Neugebauer, and A.J. Sachs, *Saros Cycle Dates and Related Babylonian Astronomical Texts*, TAPS 81/6 (Philadelphia: American Philosophical Society, 1991).

[33] J.P. Britton, "Scientific Astronomy in Pre-Seleucid Babylon," in H. Galter ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, p. 62.

[34] See BH, Texts 10, 16a and 16b.

[35] See the discussion in BH, pp. 42–43.

[36] Jones, *Astronomical Papyri*, pp. 259 and 382–3.

moon's elongation from the ascending node.[37] The longitude of the ascending node is derived from lunar longitudes at conjunction or opposition,[38] and the moon can be in relation to the nodes in four possible ways: 1) "positive increasing" (LAL LAL), 2) "positive decreasing" (LAL U), 3) "negative decreasing" (U U), and 4) "negative increasing" (U LAL).[39] The concepts of lunar latitude and the lunar nodes are indicative of a finely tuned eclipse prediction method in which the goal was to determine those syzygies on which the moon would be near enough to a node for an eclipse to occur. In this, the astronomical texts obviously outstrip *Enūma Anu Enlil* in understanding the details of lunar behavior, such as why lunar eclipses occur in six-month sequences. Yet the appearance of the lunar node, or of lunar latitude, in horoscopes seems to signal the development of an "astrological" notion, known in later astrology, that the position of the nodes had an impact on the nativity, just as did the positions of the other heavenly bodies. Outside of the appearance of the node in the Uruk horoscopes, late astrological tradition attests to this notion in the 4th or 5th century Indian treatment of the lunar nodes as planets.[40] This practice was carried on in Sasanian and Mandaean astrology where the Head and Tail of the eclipse Dragon became the personified ascending and descending nodes,[41] and, finally, the longitude of the lunar node was also included in Arabic horoscopes.[42]

Although the form in which the lunar phenomena *na*, KUR, and the length of the month previous to the birth, are recorded is influenced by the fact that the data derive from astronomical texts produced on the basis of sometimes quite sophisticated schemes, a continuity with the ominous lunar phenomena enumerated above is also apparent. The evidence supports our claim to a continuity of focus, if not form,

---

[37] Latitude is measured in še; 1 še = 0;0,50° or 1° = 72 še, see O. Neugebauer, *A History of Ancient Mathematical Astronomy* (Berlin, Heidelberg, and New York: Springer Verlag, 1975) Book II B 5.

[38] The procedure for which is explicated in A. Aaboe and J. Henderson, "The Babylonian Theory of Lunar Latitude and Eclipses According to System A," *Archives internationales d'histoire des sciences* 25 (1975), p. 198.

[39] The expression "positive and negative (latitude)" (nim u sig) is also found in lunar procedure texts, see ACT 200 Section 4, and discussion in BH, pp. 42–3.

[40] D. Pingree, *From Astral Omens to Astrology, From Babylon to Bikaner*, Serie Orientale Roma 78 (Rome: Istituto Italiano per l'Africa e l'Oriente, 1997), p. 40 note 5.

[41] See above, Chapter Eleven, p. 234.

[42] See D. Pingree, *The Thousands of Abū Ma'shar* (London: The Warburg Institute, University of London, 1968), pp. 24–25, 51 and 55.

as the importance of dates of the significant lunar synodic moments remains consistent from Babylonian celestial divination to genethlialogy in horoscope form. A principal feature of celestial omens, as of all Mesopotamian omens, is the binary interpretive scheme good/propitious: bad/unpropitious, attached to the many empirical contrasts comprising the omen protases, bright-dark, on time-late, right-left, up-down, fast-slow, etc. One cannot help but wonder whether the inclusion in the Babylonian horoscope of the lunar data for the first day of the month, the day of opposition, and the last appearance before conjunction continued this practice of determining the propitious nature of signs. In a horoscope, of course, the indication would be for the quality of the life of the individual born at the time or in proximity to those significant lunar phenomena. The dates of *na* and KUR as well as the indication of the length of the previous month, while obviously no longer directly parallel in form to protases known from *Enūma Anu Enlil*, nonetheless resonate with such omens for the day of first visibility, the date of opposition, and the day of last visibility. Insofar as the dates of the Lunar Three can be correlated with the earlier and less precisely formulated *Enūma Anu Enlil* omens for these synodic moments, some sense can be made of their incorporation within a horoscope as a contribution to the overall interpretation—lucky or unlucky—of the heavens on, or near, the date of a birth.

CHAPTER FOURTEEN

A BABYLONIAN RISING TIMES SCHEME IN NON-TABULAR ASTRONOMICAL TEXTS

Introduction

One of the elements of Babylonian astronomy adopted in Greco-Roman astronomy and astrology before the first century A.D. was the concept of the rising times of the twelve consecutive 30° signs of the zodiac, the Greek ἀναφοραί (*anaphora*). Neugebauer indicated that

> the historical significance of the Babylonian schemes for the rising times reaches far beyond their applications in the solar and lunar theory. Since Greek mathematical geography characterized the latitude of a locality by its maximum daylight *M* the Babylonian method of finding the function C(λ) of daylight depending on the solar longitude was properly modified, but under preservation of the arithmetical types A or B for the rising times. The geographical system of the 'seven climata' preserved vestiges of the Babylonian oblique ascensions until deep into the Middle Ages. On the other hand one finds the unaltered set of Babylonian rising times of System A in Indian astronomy of the sixth century A.D. without any consideration for India's far more southern position. Rising times and related patterns have thus become an excellent indicator of cultural contacts, ultimately originating in Mesopotamia.[1]

A rising time (α) is the time required for one zodiacal sign to cross the eastern horizon. Since both horizon and ecliptic are great circles on the celestial sphere, at any moment, one-half of the ecliptic (6 zodiacal signs) is above the horizon and the other half is below. During the interval of sunrise to sunset, 180° of the ecliptic will have crossed the horizon. As Neugebauer showed, evidence for the rising times of the zodiac in Babylonian astronomy is embedded in the ephemerides, in the column for generating length of daylight (Column C).[2] The

---

[1] HAMA, p. 371.

[2] O. Neugebauer, "Jahreszeiten und Tageslangen," pp. 517–550, especially p. 530ff. And 544ff. See also Neugebauer's "The Rising Times in Babylonian Astronomy," p. 100 note 4 citing his earlier "On some Astronomical Papyri and Related Problems of Ancient Geography," TAPS N.S. 32 (1942), pp. 251–263.

assumption that if the rising time of each individual zodiacal sign is known, the length of daylight for any day of the year is also known, underlies the computation of daylight length in column C, which derives the length of daylight from the sum of the rising times for the appropriate half of the zodiac that rises on the day in question, beginning with the position of the sun (C_1 [daylight length for a given solar position] $= \alpha_1 + \alpha_2 + \alpha_3 + \ldots + \alpha_6$, $C_2 = \alpha_2 + \alpha_3 + \alpha_6 + \ldots + \alpha_7$, and so on).[3] Cognizance of the connection between the position of the sun in the ecliptic and the length of daylight is expressed in this scheme. Column C in fact presupposes the lunar longitudes of Column B, from which solar longitudes are easily substituted, being either the same at conjunction, or 180° apart at full moon. This notion of the variation of daylight as an astronomical phenomenon is quite different from earlier attested calendaric schemes, such as we find in the Astrolabe texts[4] and MUL.APIN,[5] which account for the change in the length of the day throughout the year strictly as a function of the calendar month. The Babylonian values (α) for the rising times are only implicit in the computed daylight lengths of Column C of the ephemerides, as the values themselves are not found in those texts.

In a group of non-tabular late Babylonian astronomical texts (sources are given below sub II), rising times of twelve micro-zodiac "portions" (ḪA.LA = *zittu*), each representing 2 1/2° of the ecliptic (see Figure 1), are given, as are totals (PAP) for the sign as a whole in a number of instances.[6] That such totals in fact represent values of α is clear, although complete agreement with the System A rising times is not found. The reason for the discrepancy between the rising times scheme underlying System A and that of the "micro-zodiac" texts is clarified below. Suffice it to say here that these texts provide the only direct evidence thus far for values of the rising times of the zodiac in cuneiform sources.

---

[3] Ibid., and see also HAMA, pp. 368–371.

[4] A new edition of the "Astrolabes" is being prepared by W. Horowitz. For now, see Weidner, *Handbuch.* Band I. (Leipzig, J.C. Hinrichs, 1915), pp. 65–66, C.B.F. Walker and H. Hunger, "Zwölfmaldrei," pp. 27–34; V. Donbaz and J. Koch, "Ein Astrolab der dritten Generation," pp. 63–84, and Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, Indiana, Eisenbrauns, 1998), pp. 154–166.

[5] H. Hunger and D. Pingree, *MUL.APIN.*

[6] The rising time for the sign itself is given for Aries (Text B rev. 27 and 29), Scorpius (Text A:14 and 16), and Pisces (Text C:11). See Section II below.

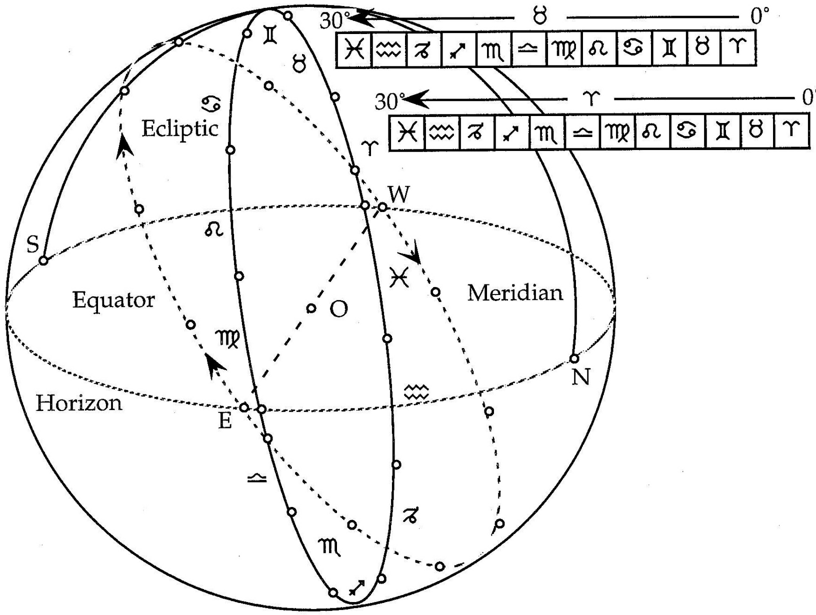


Figure 1. Zodiacal signs divided into twelfths called *zittu* (ḪA.LA) "portion"

The micro-zodiac texts attest to an awareness of the problem of the oblique ascensions of the zodiacal signs in that a determination, however crude, of values for the rising times is developed. Of further interest is the implication of the micro-zodiac rising times scheme for the understanding of the variation in daylight as a function of the position of the sun in the ecliptic, in the manner of late Babylonian mathematical astronomy, but with far simpler parameters. Section II below presents the transliterations and translations of three micro-zodiac texts (A-C, see below). In Section III, the particular values for the rising times of the zodiac from the intervals between meridian crossings of culminating (*ziqpu*) stars are discussed. Further implications of this rising times scheme for a daylight scheme that seems to be a hybrid of the early calendaric method of the Astrolabes and the later astronomical method of the ephemerides' Column C will be drawn.

The micro-zodiac texts have much to contribute to our continuing efforts to understand Babylonian astronomy of the non-ACT type. Here, however, only the analysis of the rising times scheme will be undertaken. Discussion of other elements of these sources, e.g., the lunar KUR and the *mešḫu* stars that flare in each month, must be left for a separate study.

Sources

Text A: A 3427 Previous publication: Schaumberger, "Anaphora." pp. 238–41, without translation.

Text B: LBAT 1499 rev. 10ff. Previous publication: Schaumberger, "Anaphora," pp. 245–47, transliterates lines 10–30 but omits 31–34, and does not include a translation.

Text C: LBAT 1503

Text D: U 196 Previous publication: Schaumberger, "Anaphora," pp. 242–43, without translation.

Text E: BM 77242 See W. Horowitz, "Two New Ziqpu-Star Texts," pp. 97–8. This text is far too fragmentary to add to our understanding of the scheme utilized for the rising times, and will therefore not be included below.

Text A: A 3427

Transcription

obv. Upper edge ina a-mat ^{d}60 u ^{d}An-tum liš-lim

1 [T]A 5 UŠ ár 2 MÚL.ME šá SAG MÚL.A EN 5 UŠ ár MÚL.DELE šá KUN-šú MÚL.[GÍR.TAB TA SAG-šú EN TIL-šú KUR-ma]

2 8 UŠ 20 NINDA ár 2 MÚL.ME šá SAG A KIMIN ḪA.LA reš-tú šá MÚL.GÍR.TAB MÚL.GÍR.TAB [šá MÚL.GÍR.TAB ITI.APIN KUR ina ITI.APIN ina še-rim UŠ.28.KAM]

3 MÚL.UR.IDIM meš-ḫa im-šúḫ ZI 1 UŠ 40 NINDA ár 4 šá GABA-šú KIMIN 2-tú Ḫ[A.LA šá MÚL.GÍR.TAB MÚL.PA šá MÚL.GÍR.TAB ITI.GAN KUR]

4 ina ITI.GAN ina še-rim UD.28 ^{d} Ṣal-bat-a-nu KIMIN 5 UŠ ár 4 šá GABA-šú [KIMIN 3-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.MÁŠ šá MÚL.GÍR.TAB]

5 ITI.AB KUR ina ITI.AB ina še-rim UD.28 MÚL.ALLA KIMIN 8 UŠ 20 NINDA ár 4 šá ⸢GABA⸣-[šú KIMIN(?) 4-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.GU šá MÚL.GÍR.TAB]

6 ITI.ZÍZ KUR ina ITI.ZÍZ ina še-rim UD.28 MÚL.Nu-muš-da KIMIN 11 UŠ 40 NINDA ár 4 [šá GABA-šú KIMIN 5-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.AŠ.GÁN šá MÚL.GÍR.TAB]

7 ITI.ŠE KUR ina ITI.ŠE ina še-rim UD.28 MÚL.KU$_6$ KIMIN ½ DANNA ár 4 šá GABA-š[ú KIMIN 6-tú ḪA.LA šá MÚL.GÍR.TAB LU šá MÚL.GÍR.TAB]

8 ITI.BAR KUR ina ITI.BAR ina še-rim UD.28 <MÚL>. AŠ.GÁN KIMIN 18 UŠ 20 NINDA ár 4 šá GA[BA-šú KIMIN 7-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.MÚL šá MÚL.GÍR.TAB]

9 ITI.GU$_4$ KUR ina ITI.GU$_4$ ina še-rim UD.28 MÚL.MÚL KIMIN 1 UŠ 40 NINDA ár 2 šá GIŠ.K[UN-šú KIMIN 8-tú ḪA.LA šá MÚL.GÍR.TAB MAŠ.MAŠ šá MÚL.GÍR.TAB]
10 ITI.SIG KUR ina ITI.SIG ina še-rim UD.28 SIPA KIMIN 5 UŠ ár 2 šá GIŠ.KUN-[šú KIMIN 9-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.ALLA šá MÚL.GÍR.TAB]
11 ITI.ŠU KUR ina ITI.ŠU ina še-rim UD.28 MUL.KAK.SI.SÁ KIMIN 8 UŠ 20 NINDA ár 2 šá GIŠ.[KUN-šú KIMIN 10-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.A šá MÚL.GÍR.TAB]
12 ITI.NE KUR ina ITI.NE ina še-rim UD.28 MÚL.BAN KIMIN 1 UŠ 40 NINDA ár MÚL.DIL šá KU[N-šú KIMIN 11-tú ḪA.LA šá MÚL.GÍR.TAB MÚL.ABSIN šá MÚL.GÍR.TAB]
13 ITI.KIN KUR ina ITI.KIN ina še-rim UD.28 MÚL.BIR KIMIN 5 UŠ ár MÚL.DIL šá KUN-[šú KIMIN 12-tú ḪA.LA šá MÚL. GÍR.TAB MÚL.RÍN šá MÚL.GÍR.TAB]
14 ITI.DU$_6$ KUR ina ITI.DU$_6$ ina še-rim UD.28 MÚL.NIN.MAḪ KIMIN PAP 1 DANNA 10 UŠ [TA 5 UŠ ár 2 MÚL.ME šá SAG MÚL.A EN 5 UŠ]
15 ár MÚL.DELE šá KUN-šú MÚL.GÍR.TAB TA SAG-šú EN TIL-šú KUR-ḫa 1–et ḪA.LA
[ ]16 2 UŠ 30 NINDA 1–et ḪA.LA šá MÚL.GÍR.TAB KUR-ḫa ina 12 ḪA.LA 1 DANNA 10 UŠ [MÚL.GÍR.TAB]
17 TA SAG-šú EN TIL-šú KUR-ha PAP 2 DANNA ina ziq-pi i-lak-ma MÚL.[GÍR.TAB TA SAG-šú]
18 *EN TIL-šú 1 ½ DANNA KUR NIM.MA SAR*
19 TA 5(?) UŠ ár MÚL.DELE šá KUN-šú EN MÚL na-at-tul-lum MÚL.PA TA SAG-šú [EN TIL-šú KUR-ma ZI *n* UŠ ár MÚL. DELE šá KUN-šú]
20 ana ziq-pi DU-ma ^{d}UTU KIMIN ḪA.LA reš-tú šá SAG MÚL.PA šá SAG MÚL.PA šá MÚL.PA [KUR ina ITI.GAN ina AN.NE UD.29]
21 MÚL.GIR.TAB meš-hi im-šuh ZI 8 UŠ ár MÚL e$_4$–ru$_6$ KIMIN 2-tú ḪA.L[A šá MÚL.PA MÚL.MÁŠ]
22 [šá MÚL.PA ITI.AB KUR ina] ITI.AB ina AN.NE UD.29 MÚL.UD.KA.DU$_8$.A KIMIN 8 UŠ ár MÚL.e$_4$–ru$_6$ [KIMIN 3-tú ḪA.LA MÚL.PA MÚL.GU]
23 [šá MÚL.PA ITI.ZÍZ KUR ina] ITI.ZÍZ ina AN.NE UD.29 MÚL.ALLA KIMIN 8 UŠ 20 NINDA ár e$_4$–ru$_6$ [KIMIN 4-tú ḪA.LA MÚL.PA MÚL.AŠ.GÁN]

24 [šá MÚL.PA ITI.ŠE KUR ina] ITI.ŠE ina AN.NE UD.29 MÚL.NIN.MAḪ KIMIN 11 UŠ 40 NINDA ár MÚL.e_4–ru_6 [KIMIN 5-tú ḪA.LA MÚL.PA MÚL.LU]

25 [šá MÚL.PA ITI.BAR KUR ina] ITI.BAR ina AN.NE UD.29 MÚL.KA_5.A KIMIN ½ DANNA ár MÚL.e_4–ru_6 ⸢KIMIN. . . .]

Remainder broken

Reverse badly damaged, but there appear to be the remains of a four-line colophon following a ruling

A 3427

Translation

upper edge Upon the command of Anu and Antum, may it (the tablet) remain intact.

1 From 5° east of the 2 stars of the head of Leo, to 5° east of the single star of his tail, Scor[pius rises from its beginning to its end and]

2 8;20° after the 2 stars of the head of Leo ditto. The first portion of Scorpius (is called) Scorpius [of Scorpius. Arahsamna (Month VIII): KUR in Arahsamna, morning of the 28th.]

3 Wolf produced a flare. The distance 1;40° east of the 4 stars of his chest ditto. The second po[rtion of Scorpius (is called) Sagittarius of Scorpius. Kislīmu (Month IX): KUR]

4 in Kislīmu morning of the 28th. Mars flared. (The distance) 5° east of the 4 stars of his chest [ditto. The third portion of Scorpius (is called) Capricorn of Scorpius.]

5 Ṭebētu (Month X): KUR in Ṭebētu morning of the 28th. Great One produced a flare. (The distance) 8;20° east of the 4 stars of [his chest ditto. The fourth portion of Scorpius (is called) Aquarius of Scorpius.] Šabaṭu (Month XI):

6 Šabaṭu (Month XI): KUR in Šabaṭu morning of the 28th. Numušda produced a flare. (The distance) 11;40° east of the 4 stars [of his chest ditto. The fifth portion of Scorpius (is called) Pisces of Scorpius.] Addaru (Month XII):

7 Addaru (Month XII): KUR in Month XII morning of the 28th. Fish produced a flare. (The distance) 15° east of the 4 stars of his chest [ditto. The sixth portion of Scorpius (is called) Aries of Scorpius.]

8 Nisannu (Month I): KUR in Nisannu morning of the 28th. The Field produced a flare. (The distance) 18;20° east of the 4 stars of his che[st ditto. The seventh portion of Scorpius (is called) Taurus of Scorpius.]

9 Ajjaru (Month II): KUR in Ajjaru morning of the 28th. Stars produced a flare. (The distance) <2>1;40° east of the two stars from the ru[mp ditto. The eighth portion of Scorpius (is called) Gemini of Scorpius.]

10 Simānu (Month III): KUR in Simanu morning of the 28th. The True Shepherd of Anu produced a flare. (The distance) <2>5° east of the two stars of [his] rump [ditto. The ninth portion of Scorpius (is called) Cancer of Scorpius.]

11 Du'ūzu (Month IV): KUR in Du'ūzu morning of the 28th. Arrow produced a flare. (The distance) <2>8;20° east of the two stars of his [rump ditto. The tenth portion of Scorpius (is called) Leo of Scorpius.]

12 Abu (Month V): KUR in Abu morning of the 28th. Bow produced a flare. (The distance) <3>1;40° east of the single star of his tai[l ditto. The eleventh portion of Scorpius (is called) Virgo of Scorpius.]

13 Ulūlu (Month VI): KUR in Ulūlu morning of the 28th. Kidney produced a flare. (The distance) <3>5° east of the single star of his tai[l ditto. The twelfth portion of Scorpius (is called) Libra of Scorpius.]

14 Tašrītu (Month VII): KUR in Tašrītu morning of the 28th. Ninmah produced a flare. The total (distance) 40° [from 5° east of the 2 stars of the head of Leo to 5°]

15 east of the single star of his tail, Scorpius from its beginning to its end rises. The first portion [...]

16 2;30° (which is) the first portion of Scorpius rises. In twelve portions 40° [Scorpius,]

17 from its beginning to its end, rises. Total (distance) 60° culminates, and Scor[pius from its beginning]

18 to its end 45° the rising in the east becomes visible.

19 From 5° east of the single star of its tail to the Rear Harness, Sagittarius from its beginning [to its end rises and the distance n° east of the Single star of its tail]

20 culminates, and ditto the sun. The first portion of Sagittarius (is called) "the beginning of Sagittarius" of Sagittarius. [Kislīmu (Month IX): KUR in Kislīmu midday of the 29th.]

21 Scorpion produced a flare. The distance 8° east of the Frond of Eru ditto.The second porti[on of Sagittarius (is called) Capricorn]

22 [of Sagittarius. Ṭebētu (Month X): KUR in] Ṭebētu midday of the 29th. Panther ditto (= flared). (The distance) 8° east of the Frond of Eru [ditto. The third portion of Sagittarius (is called) Aquarius]
23 [of Sagittarius. Šabaṭu (Month XI): KUR in] Šabaṭu midday of the 29th. Cancer ditto. (The distance) 8; 20° east of the Frond of Eru [ditto. The fourth portion of Sagittarius (is called) Pisces]
24 [of Sagittarius. Addaru (Month XII): KUR in] Addaru midday of the 29th. Ninmah ditto. (The distance) $11;40^{\circ}$ east of the Frond of Eru [ditto. The fifth portion of Sagittarius (is called) Aries]
25 [of Sagittarius. Nisannu (Month I): KUR in] Nisannu midday of the 29th. Fox ditto. (The distance) 15° east of the Frond of Eru [ditto…]

A 3427

Philological Commentary

obv. 1 Transits of *ziqpu* stars are used here to measure time in degrees (UŠ), as in the "GU-text," see Pingree and Walker "A Babylonian Star-Catalogue," p. 315: 7, 12, and 19. The use of *ziqpu* star transits to express time at night is attested as early as the Neo-Assyrian period in letters from diviner-scholars to the king. Primarily, such times are given so as to note the time of a lunar eclipse occurrence, as in the following from a Neo-Assyrian letter, see Parpola SAA 10 No. 149 rev. 1–4: *ina* KI MUL.GÍR.TAB *a-dir* MUL *ku-ma-ru ša* MUL.UD.KA DU$_8$.A *ziq-pu* "(the moon) was eclipsed in the region of (the constellation) Scorpius. The Shoulder of the Panther culminated." The Diaries provide more examples of the use of *ziqpu* stars to express time, often of a lunar eclipse, although few passages give degrees either "before" (*ina* IGI, meaning to the west of) or "after" (*ár*, meaning to the east of) the culmination of a *ziqpu* star. The following Diaries entries contain degrees with respect to a culminating star: No. −163:20' 3 UŠ *ár* MUL *na-ad-dul ár ziq-pi*; No. −149:5' 4 UŠ *ina* IGI MUL *kin-sa ziq-pi*; No. −122 D obv.8 5 UŠ *ár* MUL DELE *ziq-pi*; and No. –95 F 4' 5 UŠ *ár* SA$_4$ *šá* GABA-*šú ziq-pi*, see Sachs-Hunger *Diaries* Vol. III.

obv. 3 *mešḫa imšuḫ: mešḫu* has been defined as a luminous phenomenon produced by stars (CAD M s.v. *mišḫu*). In a commentary to celestial omens, the *mešḫu* is explained as the bright appearance of the star (or planet), see CAD M s.v. *mišḫu* b) 2'. Stellar *mišḫu*'s are frequently associated with months. Here the month associations made with stars producing *mišḫu*'s are in accordance with the Astrolabe text, where heliacally rising stars are arranged month by month. In the case of

Text B (LBAT 1499), the Astrolabe is written on the obverse of the same tablet. The choice of *mešḫu* stars is determined by the month of a given micro-zodiac portion. In the Astrolabe section of Text B, the stars whose heliacal risings are (not always correctly) assigned to the months are indeed the *mešḫu* stars in the months stated in the micro-zodiac texts (LBAT 1499 obv. 1–12). Table 1 shows the correlation between months and their *mešḫu* stars in the micro-zodiac texts and the Astrolabe. It readily points up the error in the copy of the Astrolabe of LBAT 1499, namely, the second and third stars of each month are displaced one month ahead of the standard copies of the Astrolabe (i.e., MÚL.GÍR.TAB belongs to the middle "ring" of Mo. VIII in Astrolabe B, but the middle "ring" of Mo. IX in Text B, and so on). Nonetheless, the intended relation is clear, i.e., to match up the month of the micro-zodiac portion to a star rising in that month in a particular path of the sky according to the Astrolabe tradition.[7]

Table 1. Relation between *mešḫu* Stars of Micro-Zodiac Texts and Astrolabe[8]
(restored data is not indicated as such)

Zodiacal Sign	*ḪA.LA*	*Month of ḪA.LA*	*mešhu star*	*No. of mešhu star in Astrolabe*
Aries	VI Virgo of Aries	VI morning	Kidney	VI outer ring/ path of Ea
	VII Libra of Aries	VII morning	Ninmah	VII outer ring/ path of Ea
	VIII Scorpius of Aries	VIII morning	Wolf	VIII outer ring/ path of Ea
	IX Sagittarius of Aries	IX morning	Mars	IX outer ring/ path of Ea
	X Capricorn of Aries	X morning	Great One	X outer ring/ path of Ea
	XI Aquarius of Aries	XI morning	Numušda	XI outer ring/ path of Ea
	XII Pisces of Aries	XII morning	Fish	XII outer ring/ path of Ea
Taurus	I Taurus of Taurus	II morning	Stars	II outer ring/ path of Ea
	II Gemini of Taurus	III morning	True Shepherd of Anu	III outer ring/ Ea

[7] The astronomical sense of the *mešḫu* stars' connection to the 1/12's of zodiacal signs is difficult to see. Note that the obverse of LBAT 1499 (= Text B):13–42 consists of three ruled sections in which the Astrolabe stars are said to produce a flare (*mešḫu imšuḫ*) in the morning (*šērim*), midday (muslālu), and afternoon (kinsigu), and are assigned to the months and to the values of daylight length associated with those months. As in Text B rev., the *mešḫu* stars are assigned to one of the three times of day in accordance with the "ring" of the Astrolabe with which they are identified in that text. See the comments of Weidner, *Gestirn-Darstellungen*, Österreichische Akademie der Wissenschaften. Philosophisch-Historische Klasse. Sitzungsberichte, 254. Bd., 2. (Graz, Vienna, Köln, Böhlau in Kommission), pp. 19–20 note 60.

[8] For the standard text of the Astrolabe see Weidner, *Handbuch*, pp. 65–66, and see BPO 2, p. 4 Table II.

Table 1. (*cont.*)

Zodiacal Sign	*ḪA.LA*	*Month of ḪA.LA*	*mešḫu star*	*No. of mešḫu star in Astrolabe*
Libra	VII Aries of Libra	I morning	Field	outer ring/ path of Ea
	VIII Taurus of Libra	II morning	Stars II	outer ring/ path of Ea
	IX Gemini of Libra	III morning	True Shepherd of Anu	III outer ring/ Ea
	X Cancer of Libra	IV morning	Arrow	IV outer ring/ path of Ea
	XI Leo of Libra	V morning	Kidney	VI outer ring/ path of Ea[9]
Scorpius	I Scorpius of Scorpius	VIII morning	Wolf	VIII outer ring/ path of Ea
	II Sagittarius of Scorpius	IX morning	Mars	IX outer ring/ path of Ea
	III Capricorn of Scorpius	X morning	Great One	X outer ring/ path of Ea
	IV Aquarius of Scorpius	XI morning	Numušda	XI outer ring/ path of Ea
	V Pisces of Scorpius	XII morning	Fish	XII outer ring/ path of Ea
	VI Aries of Scorpius	I morning	Field	I outer ring/ path of Ea
	VII Taurus of Scorpius	II morning	Stars	II outer ring/ path of Ea
	VIII Gemini of Scorpius	III morning	True Shepherd of Anu	III outer ring/ Ea
	IX Cancer of Scorpius	IV morning	Arrow	IV outer ring/ path of Ea
	X Leo of Scorpius	V morning	Bow	V outer ring/ path of Ea
	XI Virgo of Scorpius	VI morning	Kidney	VI outer ring/ path of Ea
	XII Libra of Scorpius	VII morning	Ninmah	VII outer ring/ path of Ea
Sagittarius	I Sagittarius of Sagittarius	IX midday	Scorpion	VIII middle ring/ path of Anu
	II Capricorn of Sagittarius	X midday	Panther	IX middle ring/ path of Anu
	III Aquarius of Sagittarius	XI midday	Crab	X middle ring/ path of Anu
	IV Pisces of Sagittarius	XII midday	Swallow	XI middle ring
	V Aries of Sagittarius	I midday	Fox	XII middle ring
Pisces	[IX Scorpius of Pisces]	VIII afternoon	Mouselike	VII inner ring/ path of Enlil
	X Sagittarius of Pisces	IX afternoon	King	VIII inner ring/ path of Enlil
	XI Capricorn of Pisces	X afternoon	She-Goat	IX inner ring/ path of Enlil
	XII Aquarius of Pisces	XI afternoon	Raven	X inner ring/ path of Enlil

obv. 3 ZI: ZI= *nisḫu* "distance," from the verb *nasāḫu* "to move (forward)," here in terms of degrees per unit. For astronomical usage, see ACT glossary s.v. ZI.

[9] The Astrolabe requires MUL.BAN (*Qaštu*) "Bow" in the outer ring of Month V. Our text simply skipped Month V and entered MUL.BIR (*Kalītu*) "Kidney" from Month VI.

obv. 5 KUR: Two possible interpretations of KUR in the present context may be entertained. The basic meaning of KUR= *nipḫu* as the rising of heavenly bodies can be taken to refer either to the heliacal rising of a fixed star or, alternatively, the last rising of the moon before sunrise on the last day of the month. The heliacal rising of a star may be argued on the basis of the assignment of the *mešḫu* star to the month of the given micro-zodiac portion, especially if we take account of the relationship between the present texts and the Astrolabe, as indicated by Table 1.

The time designations morning (*šēru*), midday (AN.NE), and afternoon (KIN.SIG), are easily correlated with the three paths of the *mešḫu* stars in a purely schematic fashion. Weidner's suggestion[10] to take morning as south, midday as east, and afternoon as north would make some sense out of the correlation of the paths to the time designations.

The other possibility, to read KUR in reference to moonrise on the day of the last visibility of the moon, is supported by the dates given, which range from the 28th to the 30th of each month. Here, the time designations must also be otherwise explained, perhaps in terms of the three paths Ea, Anu, or Enlil, since the lunar KUR is by definition a dawn phenomenon.

Obv. 7 The writing of Aries as LU, while not commonly used, is found in e.g., horoscope texts, see BH, and in BRM 4 19, see A. Ungnad, "Besprechungskunst und Astrologie," pp. 274–82. See also Text B passim.

Obv. 17 *ina ziqpi illakma* is the only occurrence in these texts constructed with the preposition *ina*. Elsewhere the expression "to go toward the zenith," i.e., "to culminate," is constructed with *ana*. See also line obv. 20, and Text B rev. 14, 16, 18, 20, 22, 24, 26, 28, 29, 32, 33, and Text C: 3, 6, 8, 13, and rev. 3 and 6.

Obv. 19 *nattulum*: For the Harness constellation, see CAD s.v. *nattulum* mng. 2, and Schaumberger, ZA 50 218f. and ZA 51 243. The identification of the Harness as η Boötis (*zipqu* star no. XXVI in the list AO 6478) follows Hunger-Pingree, *Astral Sciences*, p. 87.

Sagittarius is written here MÚL.PA, which is the standard writing of the ACT's. Note that Text B:20 has MÚL.PA.BIL, a form which

---

[10] Weidner, *Gestirn-Darstellungen*, p. 20 note 60.

appears occasionally elsewhere, as in the early Diary –378:9’ (Sachs-Hunger, *Diaries* Vol. I p. 92).

Obv. 21 and 22 The text has 8° for the ZI of the first portion of Sagittarius and again 8° for the second portion. From the scheme in which 40°/12 = 3,20° as the constant difference between the rising times of each portion, we expect 1,40° for portion 1 and 5° for portion 2. The value for the third portion is correct, i.e., 8;20°, and thereafter the values are separated by 3,20° as required by the reconstructed scheme.

Reverse: The entire surface of the reverse is badly damaged, but there is a ruling followed by a four- line colophon containing the imprecation *pālih Ani Enlil u Ea la itabbalšu* “whoever honors Anu, Enlil, and Ea, may he not remove it (the tablet).” This particular form of the *pāliḫ* DN formula is not so common, see Hunger, *Kolophone* Nos. 97 and 98.

Text B LBAT 1499 rev. 10–34

Transcription

10 [ki]-i ina ITI.BARA$_2$ ITI AN.GE$_6$ ^{d}UTU ina UGU⸢ MÚL⸣.[ku-mar šá] MÚL.UD.KA.DU$_8$.A KUR-ḫa

11 ina UGU-ḫi MÚL.ME ár-tú šá MÚL.ALLA ŠÚ-ma 6 DANNA U$_4$–mu 4 x x [(x)] ki(?) šá-as-ma

12 ḪA.LA reš-tú ⸢2(?)⸣ DANNA še-rim UD.28!.KAM 2-tú ḪA.LA 2 DANNA [AN.NE] ⸢UD.29.KAM⸣

13 3-tú ḪA.LA 2 DANNA EN.USAN UD.30.KAM ki-i ina ITI.BARA$_2$ KI KUR šá ^{d}UTU MÚL.ku-mar šá MÚL.UD.KA.DU$_8$

14 ana ziq-pi DU-ma ^{d}UTU ki-i GIŠ.KUN MÚL.LU AN.GE$_6$ TAB-ú 6-tú ḪA.LA šá MÚL.LU MÚL.ABSIN

15 šá MÚL.LU KIN KUR ina KIN ina še-rim UD.28.KAM MÚL.BIR meš-ḫu im-šuḫ ZI 1 UŠ 40 NINDA

16 ár MÚL.ku-mar šá MÚL.UD.KA.DU$_8$ ana ziq-pi DU-ma šamáš KI.MIN 7-tú ḪA.LA šá MÚL.LU

17 MÚL.RÍN šá MÚL.LU DU$_6$ KUR ina DU$_6$ ina še-rim UD.28 MÚL.NIN.MAḪ meš-ḫu im-šuḫ ZI

18 3 UŠ 20 NINDA ár ku!-mar MÚL.UD.KA.DU$_8$ ana ziq-pi DU-ma šamáš KI.MIN 8-tú ḪA.LA

19 šá MÚL.LU MÚL.GÍR.TAB šá MÚL.LU APIN KUR ina APIN ina še-rim 28 MÚL.UR.IDIM meš-ḫu im-šuḫ ZI

20 5 UŠ ár ku-mar MÚL.UD.KA.DU$_8$ ana ziq-pi DU-ma šamáš KI.MIN 9-tú ḪA.LA šá MÚL.LU MÚL.PA.BIL

21 šá MÚL.LU GAN KUR ina GAN ina še-rim 2[8 MÚL.Ṣal]-bat-a-nu meš-ḫu im-šuḫ ZI 6 UŠ 40 NINDA

22 ár MÚL.ku-mar MÚL.UD.KA.D[U$_8$] ⸢ana ziq-pi DU⸣-ma šamáš KI.MIN 10-tú ḪA.LA šá MÚL.LU MÚL.MÁŠ šá MÚL.LU
23 AB KUR ina AB ina še-rim 28 MÚL.GU.LA meš-ḫu im-šuḫ ZI 8 UŠ 20 NINDA ár MÚL.ku-mar
24 MÚL.UD.KA.DU$_8$ ana ziq-pi DU-ma šamáš KI.MIN 11-tú ḪA.LA šá MÚL.LU MÚL.GU.LA šá MÚL.LU
25 ZÍZ KUR ina ZÍZ ina še-rim 28 MÚL.Nu-muš-da meš-ḫu im-šuḫ ZI MÚL.SA$_4$ šá GABA-šú ana ziq-pi
26 DU-ma šamáš KI.MIN 12-tú ḪA.LA šá MÚL.LU MÚL.AŠ.GÁN šá MÚL.LU ŠE KUR ina ŠE ina še-rim 28 MÚL.KU$_6$
27 meš-ḫa im-šuḫ ZI PAP 10 UŠ TA MÚL.ku-mar šá MÚL.UD.KA.DU$_8$ EN SA$_4$ šá [G]ABA-šú MÚL.LU
28 [TA GIŠ].KUN-šú EN TIL KUR 1–et ḪA.LA 1 UŠ 40 NINDA ziq-pi i-lak-ma 2 UŠ 30 NINDA 1–et ḪA.LA
29 [šá MÚL.L]U KUR 6 ḪA.LA.MEŠ 10 UŠ ziq-pi i-lak-ma
30 [6 ḪA].LA šá MÚL.LU TA MAŠ-šú [E]N TIL-šú KUR
31 [TA n UŠ SA$_4$ šá] GABA EN 4 UŠ ina IGI MÚL.kin-si MÚL.MÚL EN TIL(?) ⸢ KUR(?)⸣ 11 UŠ 40 NINDA ár SA$_4$
32 [šá GABA-šú ana ziq-p]i DU-ma šamáš KI.MIN ḪA.LA reš-tú šá MÚL.[MÚL MÚL].MÚL šá MÚL.MÚL GU$_4$ KUR
33 [ina GU$_4$ ina še-rim 28 MÚL.MÚL(?) m]eš-ḫa im-šuḫ ZI 3 UŠ ⸢20(?)⸣ [NINDA ár SA$_4$ šá GABA] ⸢ana⸣ ziq-pi DU-ma
34 [šamáš KI.MIN 2-tú ḪA.LA š]á MÚL.MÚL MÚL.MAŠ.MAŠ šá MÚ[L.MÚL SIG KUR ina SIG ina še-rim 28 MÚL.SIPA.Z]I.AN.NA
remainder broken

LBAT 1499 rev. 10–34

Translation

10–11 When in Nisannu the month of an eclipse, the sun rises before [the Shoulder of] the Panther, and sets before the Rear Stars of the Crab; 6 DANNA is the day (=12 hours, or 180°), 4 […]….
12 The first portion (is) 2(?) DANNA morning of the 28th; second portion (is) 2 DANNA [midday] of the 29th;
13 third portion (is) 2 DANNA evening of the 30th. When in Nisannu with the rising of the sun, the Shoulder of the Panther
14 culminates, and the sun…. the loins of Aries begins an eclipse. The 6th portion of Aries (is called) Virgo
15 of Aries. Ulūlu (month VI): KUR in Ulūlu morning of the 28th. Kidney produced a flare. The distance 1;40°
16 east of the Shoulder of the Panther culminates, and the sun ditto. The 7th portion of Aries (is called)

17 Libra of Aries. Tašrītu (month VII): KUR in Tašrītu morning of the 28th. Ninmah produced a flare. The distance
18 3;20° east of the Shoulder of the Panther culminates and ditto the sun. The 8th portion
19 of Aries (is called) Scorpius of Aries. Arahsamna (month VIII): KUR in Arahsamna morning of the 28th. Wolf produced a flare. The distance
20 5° east of the Shoulder of the Panther culminates and ditto the sun. The 9th portion of Aries (is called) Sagittarius
21 of Aries. Kislīmu (month IX): KUR in Kislīmu morning of [the 28]th. Mars flared. The distance 6;40°
22 east of the Shoulder of the Panther culminates and ditto the sun. The 10th portion of Aries (is called) Capricorn of Aries.
23 Ṭebētu (month X): KUR in Ṭebētu morning of the 28th. Great One produced a flare. The distance 8;20° east of the Shoulder
24 of the Panther culminates and ditto the sun. The 11th portion of Aries (is called) Aquarius of Aries.
25 Šabaṭu (month XI): KUR in Šabaṭu morning of the 28th. Numušda produced a flare. The distance (east of) the Bright star of its Chest culminates
26 and ditto the sun. The 12th portion of Aries (is called) Pisces of Aries. Addaru (month XII): KUR in Addaru morning of the 28th. Fish
27 produced a flare. The distance a total of 10° from the Shoulder of the Panther to the Bright star of its Chest; Aries
28 [from it]s loins to its end rises. The first portion (of this part of the equator) 1;40° culminates and 2;30° the first portion
29 [of Aries] rises. 6 portions (equal to) 10° culminate and
30 *[6 por]tions of Aries from its midpoint to its end (equal to 15°) rise.*
31 [From n° east of the Bright star of its] Chest to 4° west of the Knee, Taurus until its end rises(?). (The distance) 11;40° east of the Bright star
32 [of its Chest] culmin[ates] and ditto the sun. The first portion of Taur[us (is called) Tau]rus of Taurus. Ajjaru (month II): KUR in Ajjaru
33 [morning of the 28th. Stars] produced a flare. The distance 3;⌜20(?)⌝° east of the Bright star of its Chest] culminates and
34 [ditto the sun. The 2nd portion o]f Taurus (is called) Gemini of Taur[us. Simanu (Month III): KUR in Simanu morning of the 28th. True] Shepherd of Anu

LBAT 1499 rev. 10–34

Philological Commentary

rev. 10 MÚL.ME *ár-tú šá* MÚL.ALLA *(kakkabānu arkâtu sa Alluttu)*: The "rear stars of the Crab" seem to function as *ziqpu* stars here, and in Text C rev. 1–3 and 8, although these are not included in the *zipqu* star list referred to above (AO 6478, Schaumberger, "Die *Ziqpu*-Gestirne," pp. 214–229), nor do they seem to be attested elsewhere as such. As a *ziqpu* star, Cancer is attested as star no. XX in AO 6478 and is also found in the "GU-text," BM 78161:5, see Pingree and Walker, "A Babylonian Star Catalogue," p. 313. Two Normal Stars, MÚL *ár šá* ALLA *šá* SI "Rear Star of the Crab to the North" (γ Cancri) and MÚL *ár šá* ALLA *šá* ULÙ "Rear Star of the Crab to the South" (δ Cancri), however, are known, see Sachs-Hunger, *Diaries* Vol. I, p. 18. The function of Normal Stars, to indicate the relative position of a planet and a star, where the star becomes the reference point "above," "below," "in front of," or "behind" which the planet is observed to be, is not the same as the use of a *ziqpu* star as an indication of the time of the appearance of a planet, or a phenomenon such as an eclipse, by reference to its culmination. In view of this, the modern identification of MÚL.ME *ár-tú šá* MÚL.ALLA is uncertain. It is the case, however, that when the sun is in Aries in Mo.I, at sunset, Cancer with a R.A. of about 90° sits on the meridian, being 90° from Libra on the eastern horizon and Aries on the western horizon with the setting sun. Note that the reverse situation is given in Text C rev. 1–3, where the sun is in Libra in Mo.VII and the stars of Cancer cross the meridian around sunrise.

rev. 20 MÚL.PA.BIL obviously an abbreviated form of PA.BIL.SAG, which is the spelling of Sagittarius in nearly all texts outside the tradition of ACT. Interestingly, the three texts treated here do not agree on the spelling of this sign, Text A having MÚL.PA throughout, as in the late mathematical astronomical texts, and Text C:4 having the unabbreviated form MÚL.PA.BIL.SAG as in earlier texts, such as MUL.APIN (where Sagittarius is of course a constellation not a zodiacal sign, but also the texts BRM 4 19 and 20, see Ungnad, "Besprechungskunst und Astrologie," pp. 274–82).

rev. 24 The spelling of Aquarius MÚL.GU.LA is a reflection of an earlier tradition. Elsewhere in the micro-zodiac texts the abbreviated late form MÚL.GU is used.

rev. 26 The representation of Pisces as MÚL.AŠ.GÁN "The Field" is consistent with that found in BRM 4 19 (see note to rev. 20 above for reference). Other astrological and astronomical texts, however, including the horoscopes and ACT use KUN.(ME) or ZÍB.(ME), following the normal sequence of zodiacal constellation names of the early tradition of MUL.APIN, where Pisces is MUL.KUN.MEŠ.

rev. 28 *illakma*: In astronomy, DU means "to move (toward or forward)," see ACT glossary s.v. DU. In relation to the zenith or meridian *(ziqpu), alāku* means "to culminate." The expression *ana ziqpi illak* is normally written with the logogram DU, but for other syllabic spellings, see Text B rev. 29 and Text C:13.

rev. 33 The value 3 UŠ followed by what appears to be ⸢30⸣ or possibly ⸢20⸣ [NINDA] is difficult to resolve because no other values are available in the section for Taurus. Without at least one other, we cannot be certain of the constant difference between the values between *ziqpu* transits, hence of the rising time for Taurus.

Text C LBAT 1503

Transliteration

1 ⸢x x x x⸣
2 [EN.TE.N]A.BAR.ḪUM meš-ḫu im-šuḫ ZI ⸢6⸣ U[Š 40 NINDA]
3 [ár] MÚL.GAŠAN.TIN ana ziq-pi DU-ma šamáš KI.MIN 10-tú ḪA.LA šá MÚL.[AŠ.GÁN]
4 MÚL.PA.BIL.SAG šá MÚL.AŠ.GÁN GAN KUR ina GAN ina KIN.SIG U[D.30.KAM]
5 MÚL.LUGAL meš-ḫu im-šuḫ ZI 8 UŠ 20 NINDA ár MÚL.GA[ŠAN.TIN]
6 ana ziq-pi DU-ma šamáš KI.MIN 11-tú ḪA.LA šá MÚL.AŠ.GÁ[N]
7 MÚL.MÁŠ šá MÚL.AŠ.GÁN AB KUR ina AB ina KIN.SIG UD.30.KAM MÚL.Ù[Z(?)]
8 meš-ḫu im-šuḫ ZI 10 UŠ ár MÚL.GAŠAN.TIN ana ziq-pi D[U-ma]
9 šamáš KI.MIN 12-tú ḪA.LA šá MÚL.AŠ.GÁN MÚL.GU šá [MÚL.AŠ.GÁN]
10 [ZÍ]Z KUR ina ZÍZ ina KIN.SIG UD!.30.KAM MÚL.UGA.MUŠEN me[š-ḫu]
11 im-šuḫ ZI PAP 2/3 DANNA TA MÚL.AŠ.<GÁN> EN [...]
12 [á]r MÚL.GAŠAN.TIN MÚL.AŠ.GÁN TA SAG-šú EN TIL!-šú [...]
13 ⸢1⸣ UŠ 40 NINDA ziq-pi i-lak DIRI UŠ 30 NINDA x [...]
14 ⸢x x⸣ šá MÚL.AŠ.GÁN KUR-ḫa ina 12 ḪA.LA.MEŠ 2/3 DAN[NA...]

rev.

1 [ki-i ina I]TI.DU_6 UD.15 ina UGU MÚL.ME ár.ME [šá MÚL.ALLA šamáš KUR-ma(?)]

2 [ina UGU M]ÚL.ku-mar šá MÚL.UD.KA.DU_8 ŠÚ-ma [. . .]

3 [MÚL.ME ár].ME šá MÚL.ALLA ziq-pi DU šamáš K[I.MIN 7-tú ḪA.LA šá MÚL.RÍN]

4 [MÚL.L]U(?) šá MÚL.RÍN BAR KUR ina BAR ina še-rim U[D.28.KAM MÚL.AŠ.GÁN meš-ḫu]

5 [im-šu]ḫ ZI erasure(?) 5 UŠ x [. . .]

6 [ana zi]q-pi DU-m[a šamáš KI.MIN 8-tú ḪA.LA šá MÚL.RÍN]

7 [MÚL. MÚL] šá MÚL.RÍN GU_4 KUR ina [GU_4 ina še-rim UD.28.KAM MÚL. MÚL]

8 [meš-ḫu im-šuḫ] ZI 10 UŠ ár MÚL.ME ár.ME [šá MÚL.ALLA ana ziq-pi DU-ma]

9 [š]amáš KI.MIN 9-tú ḪA.LA šá MÚL.R[ÍN MÚL.MÁŠ šá MÚL.RÍN]

10 [SIG KUR ina] SIG ina še-rim UD.28.KAM MÚL.SIPA.[ZI.AN.NA meš-ḫu im-šuḫ]

11 [Z]I 13 UŠ 20 NINDA ár MÚL.ALLA [ana ziq-pi DU-ma šamáš KI.MIN]

12 [10]-tú ḪA.LA šá MÚL.RÍN MÚL.ALLA [šá MÚL.RÍN ŠU KUR ina ŠU ina]

13 [še-rim U]D.28 MÚL.KAK.SI.SÁ meš-ḫ[u im-šuḫ ZI 16 UŠ 40 NINDA]

14 [ár MÚL.II] MÚL.ME šá SAG.DU [MÚL.UR.GU.LA ana ziq-pi DU-ma šamáš KI.MIN]

15 [11-tú] ⸢ḪA.LA⸣ šá MÚL.[RÍN. . .]

16 [ ] x [. . .]

remainder broken

LBAT 1503

Translation

1 ⸢. . . .⸣

2 [Ḫabas]ī rānu flared; the distance 6[,40°]

3 [east of] Lady of Life culminates and ditto the sun.
The 10th portion of Pi[sces (is called)]

4 Sagitarrius of Pisces. Kislīmu (Month IX): KUR in Kislīmu in the afternoon of the [30th.]

5 The King produced a flare. The distance 8,20° east of Lady of Life

6 culminates and ditto the sun. The 11th portion of Pisces (is called)
7 Capricorn of Pisces. Ṭebētu (Month X): KUR in Ṭebētu in the afternoon of the 30th. The She-[Goat]
8 produced a flare. The distance 10° east of Lady of Life culminates and
9 ditto the sun. The 12th portion of Pisces (is called) Aquarius of [Pisces].
10 Šaba[ṭu (Month XI]: KUR in Šabaṭu in the afternoon of the 30th. Raven [a flare]
11 produced. The distance total 20° from Pisces to [...]
12 [ea]st of Lady of Life Pisces from its beginning to its end
13 1,40° (of the equator) culminates extra from(?) 30 DANN[A...]
14 ...of Pisces rises in 12 portions 20[$^{\circ}$...]

rev.
1 [When in Tašr]ītu (Month VII) the 15th day in front of the Rear stars of [Cancer(?) the sun rises(?)]
2 and [in front of(?) Shoulder of P]anther sets [...]
3 [the Rear stars of] Cancer(?) culminate and dit[to] the sun. [The 7th portion of Libra]
4 [(is called) Ari]es of Libra. Nisannu (Month I): KUR in Nisannu in the morning [of the 28th. The Field produced a flare.]
5 The distance 5° x [...]
6 [...cu]minates an[d ditto the sun. The eighth portion of Libra (is called)
7 [Taurus] of Libra. Ajjaru (Month II): KUR in [Ajjaru in the morning of the 28th. Stars]
8 [produced a flare]. The distance 10° east of the rear stars [of Cancer culminates and]
9 ditto [the sun]. The ninth portion of Lib[ra (is called) Gemini of Libra.]
10 [Simanu (Month III): KUR in] Simanu in the morning of the 28th. True Sh[epherd of Anu produced a flare.]
11 [The di]stance 13;20° east of Cancer [culminates and ditto the sun.]
12 [The ten]th portion of Libra (is called) Cancer [of Libra. Du'ūzu (Month IV): KUR in Du'ūzu in]
13 [the morning of the] 28th. Arrow produc[ed a flare. The distance 16; 40°]

14 [east of the 2] stars of the head [of Leo culminates and ditto the sun.]
15 [. . . . the eleventh] ⌜portion⌝ of Li[bra (is called) Leo of Libra. . . .
Remainder broken

LBAT 1503
Philological Commentary
obv. 4 MÚL.AŠ.GÁN is used here to write the zodiacal sign Pisces. The constellation MÚL.AŠ.GÁN (*Ikû*), which in Astrolabe B (KAV 218 B i 1–4) is the first to rise heliacally at the new year, is identified as α, β, γ Pegasi and α Andromedae, see Hunger and Pingree, *Astral Sciences*, p. 272. Pisces does have a number of writings in late astrological texts, among them MUL.KUN.MEŠ and ZÍB.ME, or ZÍB. See above, p. 36, Table 1, for a comparison of the various spellings of all the signs of the zodiac (or, in the case of MUL.APIN, constellations of the ecliptic) in a number of texts.

Rev. 1 On the *ziqpu* stars MÚL.ME *ár*.ME *šá* MÚL.ALLA (also rev. 2, 3, and 8), see commentary to Text B rev. 11.

rev. 5 Text has ZI "the distance" followed by an obscured sign, then a clear 5 UŠ, when we expect 6 UŠ 40 NINDA from the scheme.

Analysis
The micro-zodiac Texts A-C share a number of features. Of primary concern are the one-twelfths, or 2 1/2°, "portions" (ḪA.LA = *zittu*) of the twelve zodiacal signs (*dodekatemoria*, see Figure 1). Associated with these portions are "distances" (ZI = *nisḫu*) or intervals between transits of the so-called *ziqpu*, or culminating, stars, and measured in degrees of arc. The distances ZI give rise to the degree values for the rising times of the signs that cross the eastern horizon in equal times. Values for such distances were collected in texts such as the well-known *ziqpu* list (TCL 6 21 = AO 6478).[11] The ZI's in our texts, however, must correspond to the number of degrees equal to twelfths of a zodiacal sign or 2 1/2°. It will be seen that the individual ZI's have constant differences equal to 1/12 of the value of the total ZI for the oblique ascensions. Nonetheless, in Texts A-C, the reckoning of the *ziqpu* star distances is in accordance with the values from such a list as the *ziqpu* text AO

[11] For a recent discussion and bibliography, see Horowitz, *Mesopotamian Cosmic Geography*, pp. 182–188.

6478. Not surprisingly, the derived rising times do not conform to those of System A (or B), but are far simpler. Despite the differences in values, the principles employed in the present texts, i.e., the concept of rising times and the implicit relation of the change of daylight length to the passage of the sun through the ecliptic, remain the same. As will be shown in the following discussion, the simple structure of the rising times scheme of the micro-zodiac texts is derivative of the scheme for the variation in daylight known in the Astrolabe and MUL.APIN, as it preserves the 2:1 ratio of longest to shortest daylight. Given this, one would not expect the rising times values of the micro-zodiac texts to be consistent with those of System A, whose daylight scheme presumes a 3:2 ratio for the daylight length extrema. Although Texts A-C do not concern the length of daylight per se, a daylight scheme is implicit in the rising times preserved (and reconstructed) from these texts, and can be discussed.

The main body of each of the three texts presents data concerning the micro-zodiac portions, the *ziqpu* star intervals corresponding to their risings, dates of a phenomenon KUR, and the appearances of stars that produce a luminous flare termed *mešḫu*. The dates of KUR, here taken to represent the last visibility of the moon at the end of the month, are also given in schematic fashion. The data follows the same formulary in each text:

> The *n*th portion of sign$_x$ (is called) sign$_y$ of sign$_x$. Month *m*: KUR in Mo.*m* morning/midday/afternoon of the 28th/29th/30th day. Star *m* flared. The distance d° east of star *z* stood on the meridian, ditto the sun.

The number in the sequence of twelve 2 1/2° portions per zodiacal sign determines the name of that portion. Portion 1 is named for the sign itself, and the rest follow in order of the remaining signs of the zodiac.[12] For example, Aries' portions are named Aries of Aries, Taurus of Aries, etc. The nature of the correspondence between the number of the micro-zodiac portion and the month is determined by the particular sign whose name is given to the portion. For example, in Text B, the 6th portion of Aries is "Virgo of Aries". The month is then Month VI, corresponding to the position of Virgo as the sixth sign of the zodiac. For the sign Scorpius (see Text A), however, the

[12] The method is seen as well in the texts published in Weidner, *Gestirn-Darstellungen*. See the summary description in Hunger and Pingree, *Astral Sciences* (Leiden, Boston, E.J. Brill, 1999), p. 29.

6th portion is "Aries of Scorpius." Month I is then correlated with the 6th portion, since Aries is the first sign of the zodiac.

The months are in turn associated with the phenomenon KUR and the flare of a star (*mešḫu*). The pairing of a star said to produce a *mešḫu* and associated with a particular month as the month of its supposed heliacal rising together with a *ziqpu* star is reminiscent of the association made in MUL.APIN between twelve *ziqpu*'s crossing the meridian before sunrise in mid-month and the heliacal risings of certain constellations.[13] As can be readily seen from this section of MUL.APIN, however, no relation can be made between pairs of *ziqpu* and rising stars of MUL.APIN and the stars mentioned in Texts A-C. Remarks on the *mešḫu* stars and the phenomenon KUR have already been made in the commentary to Text A. I leave these questions as to the function of the *mešḫu* stars and meaning of KUR unresolved and turn to the central question of the rising times scheme.

The use of the *ziqpu* stars is key to understanding the scheme developed in Texts A-C. Table 2 summarizes the data on the *ziqpu* stars preserved in the micro-zodiac texts, and follows the identifications and right ascensions as given in Hunger and Pingree, *Astral Sciences*.[14]

As indicated by the Roman numerals, this table is arranged according to the order of the *ziqpu* stars in AO 6478 (see Schaumberger, "Die *Ziqpu*-Gestirne," pp. 228–9). Only the "rear stars of the Crab" (MÚL. ME *ár*.ME *šá* MÚL.ALLA, possibly γ and δ Cancri), mentioned in both Texts B and C, do not appear in Schaumberger's table. The arrangement is in progressive sequence by right ascension. The ΔR.A.'s have been given to indicate the distance (ZI) between culminations of the *ziqpu* stars used to measure the rising of a given zodiacal 30° arc of the ecliptic. These ΔR.A values, however, are useful only for the three zodiacal signs for which complete data on the *ziqpu* transits is preserved. This situation obtains for Aries, Scorpius, and Sagittarius. Here one can compare the modern ΔR.A values against the schematized values adopted in the text. For example, for *ziqpu*'s correlated with Aries ΔR.A = 41;54°, which rounds down to 40° and gives a rising time value for Aries of 40°. For Scorpius, measured from ε Leonis + μ Leonis to β Leonis, ΔR.A = 35;32°, but this value is also taken as

[13] MUL.APIN I iv 13–30, and see Hunger and Pingree, *MUL.APIN*, p. 142 Table 4.
[14] See the *ziqpu* table in Hunger and Pingree, *Astral Sciences*, p. 87.

Table 2. Ziqpu Stars in Texts A-C

No.	*Star name*	*Modern Identification*	*R.A.*	*Δ R.A.*	*Rising Zod.Sign*
VII	MÚL GAŠAN.TIN *Bēlet balāṭi* "Lady of Life"	α Lyrae	256;42°	–	Pisces
VIII	MÚL *kumar ša* UD.KA.TUḪ.A *Kumar ša Nimri* "Shoulder of the Panther"	β Cygni	265;38°		Aries
IX	MÚL SA_4 *ša* GABA-*šu* *Nibî ša irtišu* "Bright Star of his Chest"	α Cygni	287;32°	41;54°	
X	MÚL *kinsu* Lower leg (of Panther)	α Lacertae	311;36°	24;04°	Taurus
XX	MÚL.AL.LUL *Alluttu* "The Crab"	ε Cancri	89;55°		Libra
	MÚL.ME *ár*.ME *šá* MÚL.ALLA	γ Cancri(?)			
	kakkabānu arkâtu ša Alluttu	δ Cancri(?)			
XXI	MÚL 2 MÚL.MEŠ *ša* SAG.DU MÚL.UR.GU.LA				
	2 *Kakkabānu ša rēš* UR.GU.LA	ε Leonis	105;30°		
	"Two Stars of the Head of the Lion"	μ Leonis	106;50°	16;55°	
XXII	MÚL 4 *ša* GABA-*šu* 4 *ša irtišu* "The Four Stars				Scorpius
	of his Chest"	η Leonis	112;54°		
		ζ Leonis	113;46°		
		α Leonis	114;26°		
		γ Leonis	115;17°		
XXIII	MÚL 2 *ša* KUN-*šu* 2 *ša zibbatišu*	δ Leonis	130;1°		
	"2 Stars of his Rump"	θ Leonis	131;4°		
XXIV	MÚL DELE *ša* KUN-*šu* *Edu ša zibbatišu* "The Single Star of his Rump"	β Leonis	141;2°	35;32°	
XXV	MÚL e_4–ru_6(A.EDIN) *Erua* "The Frond"	γ Coma Berenices	150;49°		Sagittarius
XXVI	MÚL *na-at-tul-lum* *Nattullum* "The Harness"	η Boötis	175;47°	34;44°	

Table 3. Degrees of Arc between *ziqpu* Stars

Zodiacal Sign	*No.*	*Ziqpu Star*	*UŠ ina qaqqari*	*Total ZI*	*ZI in micro-zodiac texts*
Pisces	VI	[μ Herculis]	10		
	VII	α Lyrae	10	20	20
Aries	VIII	β Cygni	20		
	IX	α Cygni	10	30	20
Taurus	X	α Lacertae	20	20	[20]
Libra	XX	ε Cancri	20		
	XXI	ε + μ Leonis	20	40	[40]
Scorpius	XXII	α, γ, ζ,+η Leonis	10		
	XXIII	δ + θ Leonis	20		
	XXIV	β Leonis	10	40	40
Sagittarius	XXIV	β Leonis	10		
	XXV	γ Coma Berenices	10	20	40

40° and the rising time adopted for Scorpius is 40°. For Sagittarius as well, which is measured from β Leonis to η Boötis, ΔR.A = 34;44°, but is found to be 40° in the text, and assigned a rising time of 40° for the sign. It is interesting to see how close the ΔR.A's for Scorpius and Sagittarius in fact are to the System A rising time values for these signs, for Scorpius 36° and Sagittarius 32°. Our texts, as we shall see, present a far simpler scheme. The other three zodiacal signs give us only partial information. For Pisces, only the last *ziqpu* is preserved, so no estimate of the distance between such culmination stars can be supplied. The same applies to Libra. For Taurus, the beginning is preserved, but we lack the end. As shown in Table 3, however, the "degrees of arc" (UŠ *ina qaqqari*)[15] between *ziqpu* stars, as given in the star list AO 6478, do not in every instance correspond to the distances between culminations of *ziqpu* stars presumed in our texts.

This table shows that the numerical data for the intervals between *ziqpu* star transits as stated in the micro-zodiac texts do not with any certainty follow from the UŠ *ina qaqqari* of the *ziqpu* star list. From Texts A-C's numerical values, however, a scheme can be reconstructed for the rising times of the zodiac whose method resembles System A,

[15] See the discussion in Horowitz, *Mesopotamian Cosmic Geography*, pp. 183–185.

but whose numbers are clearly cruder, as seen in the above Table 3. Before considering this scheme in more detail, the method already well-known from ACT should be briefly described.

Hitherto, two rising times schemes were known for Babylonian astronomy only as derived from the two Babylonian schemes for computing the length of daylight from a solar (or a lunar) longitude in Column C of the late astronomical ephemerides. That schemes for the rising times of the zodiac underpinned this column was demonstrated by Neugebauer.[16] He showed that the length of a day for a given position of the sun in the ecliptic was indeed the sum of the rising times of the 180° of the ecliptic beginning with the sun's position: length of daylight (C) = the rising time of 1/2 of the ecliptic, viz., the half from the longitude of the sun (λ_{sun}) to $\lambda_{sun} + 180°$.[17] Necessarily, the rising times were constrained by the 3:2 ratio of longest to shortest daylight adopted in the ephemerides.

Underlying the computation of daylight in Systems A and B were rising times schemes of simple linear sequences in which the rising times values of System A have a constant difference of 4° and System B of 3°, but for one middle difference of 6°, as seen below (Table 4).

Table 4. Systems A and B Daylight Schemes

zodiacal signs	*α° System A*	*d*	*α° System B*	*d*
♈ / ♓	20		21	
♉ / ♒	24	4	24	3
♊ / ♑	28	4	27	3
♋ / ♐	32	4	33	6
♌ / ♏	36	4	36	3
♍/ / ♎	40	4	39	3

System A, which normed the zodiac at Aries 10°, derived values for daylight lengths for every 10th degree of a sign, System B for every 8th degree. Consequently, the cardinal points of the year were set at 10° and 8° of their respective signs.[18] It then becomes clear that the

[16] Neugebauer, "The Rising Times in Babylonian Astronomy," p. 100 note 4, citing his earlier "On some Astronomical Papyri and Related Problems of Ancient Geography," pp. 251–263.

[17] Neugebauer, "Jahreszeiten," pp. 517–550, see especially p. 530ff. and p. 544ff. See also HAMA, p. 368.

[18] As Neugebauer has explained, "When finally the irregular configurations [constellations] were replaced by real ecliptic coordinates in signs of equal 30° length

lengths of daylight for the 10th or 8th degrees of the zodiacal signs computed in Systems A and B respectively are in fact the sums of the rising times for the appropriate half of the ecliptic that rises on the day in question. For example, and using the values of α from System A, when the sun is in Aries 10°, the value C is a result of the sum of the rising times of signs 1–6

$$20 + 24 + 28 + 32 + 36 + 40 = 3,0\ (= 180)^{\circ} = 12 \text{ hours}$$

For the sun in Taurus 10°

$$24 + 28 + 32 + 36 + 40 + 40 = 3,20\ (= 200)^{\circ} = 13 \text{ hours } 20 \text{ min.}$$

The following Table 5 gives the daylight scheme for λ_{sun} according to System A.

Table 5. System A Daylight Scheme for λ_{sun}

solar λ	*System A*		*value for C*
♈ 10°	3;0^{H}	=	12;0 hours
♉ 10°	3;20	=	13;20
♓ 10°	3;32	=	14;8
♋ 10°	3;36	=	14;24 M
♌ 10°	3;32	=	14;8
♍ 10°	3;20	=	13;20
♎ 10°	3;0	=	12;0
♏ 10°	2;40	=	10;40
♐ 10°	2;28	=	9;52
♑ 10°	2;24	=	9;36 m
♒ 10°	2;28	=	9;52
♓ 10°	2;40	=	10;40

For all other solar positions, values of daylight were interpolated by factors derived from the differences of column C divided by 30°, which then represent the increase or decrease in daylight length per degree of solar longitude,[19] as shown in Table 6 for System A.

the sign 'Aries' obtained by some accidental compromise such a position within the constellation Aries that the vernal equinox took place when the sun was at the 10th, respectively 8th, degree of the sign." He did not find any chronological significance to the two norms, and certainly dismissed any connection with a knowledge of precession. For details, see HAMA, pp. 368–9.

[19] ACT 200 sect. 2; ACT 200b sect. 2, both for System A.

Table 6. System A Increase/Decrease in Daylight Length per Degree of λ_{sun}

zodiacal sign	*C*	*d*	*interpolation beyond 10°*
♈	3,0	+20	20°/30° = +0;0,40–10°
♉	3,20	+20	20°/30° = +0;04–10°
♊	3,32	+12	12°/30° = +0;0,24–10°
♋	3,36	+4	4°/30° = +0;0,8–10°
♌	3,32	–4	4°/30° = –0;0,8–10°
♍	3,20	–12	12°/30° = –0;0,24–10°
♎	3,0	–20	20°/30° = –0;0,40–10°
♏	2,40	–20	20°/30° = –0;0,40–10°
♐	2,28	–12	12°/30° = –0;0,24–10°
♑	2,24	–4	4°/30° = –0;0,8–10°
♒	2,28	+4	4°/30° = +0;0,8–10°
♓	2,40	+12	12°/30° = +0;0,24–10°

The method of computation for the daylight length when the sun is at some longitude in between the 10th degree of each sign requires that the daylight length for the sign of the sun (or opposite the sun when the longitudes are based on full moons) be modified (increased) by the number of degrees the sun exceeds 10° of the sign multiplied by the interpolation factor, as shown in Table 6. In this way, the rising times are implied by column C of the ACT ephemerides and indeed can be derived from them, but it should be noted that the values themselves do not appear in the ACT material.

It is only in the group of micro-zodiac texts presented here that several of the actual values of the zodiacal rising times are given to us directly, as noted by Schaumberger in his publication of three of these texts, which Schaumberger designated as *ziqpu*-texts.[20] Schaumberger identified the rising time values as those connected with System A. He pointed out that these same values also appear in the Greco-Roman treatises of Manilius (15 C.E.),[21] Vettius Valens (ca. 150 C.E.)[22] and Firmicus Maternus (ca. 350 C.E.),[23] attesting to the adoption of Babylonian astronomical parameters in Hellenistic Greek astronomy. On

[20] Schaumberger, "Anaphora," pp. 237–251.
[21] Manilius, *Astronomica* 3. 275ff., ed. Breiter, p. 74 and p. 88; ed. Housman p. 24 and p. xiii ff.
[22] I,7 and 14, ed. Kroll pp. 23 and 28.
[23] Firmicus Maternus, *Mathesis* 2.11, ed. Kroll-Skutsch I, pp. 53–55, see HAMA p. 719.

the basis of the identification between rising time values in the microzodiac texts and some of those of System A, Schaumberger proceeded on the assumption that the microzodiac texts' rising times scheme was identical to that of System A.[24] Although he did not address the question of the related scheme for length of daylight in his article, he would have to have inferred that it too was identical to that of System A. As already indicated above, a different and simpler scheme than that of System A is discernible in Texts A-C.

As mentioned above, the two of the main features of the microzodiac texts are the transits of *ziqpu* stars and the twelfth portions of zodiacal signs (*dodekatemoria*) that define the ecliptic. Because the texts reckon the time required for *dodekatemoria* to rise (i.e., rising times of twelfths of zodiacal signs) in terms of the distance (expressed in time) since meridian crossings of *ziqpu* stars, twelve "distances" called ZI (*nisḫu*) are given for each zodiacal sign. The rising time of each sign, therefore, is given, as it should be, in time degrees with reference to the equator, and the constant differences of the ZI's are therefore twelfths of rising times to correspond to the twelve "portions" or *dodekatemoria*. The sum of the twelve ZI differences should equal the rising time for the sign. The four extant microzodiac texts of this type preserve data only for the signs Aries, part of Taurus, part of Libra, Scorpius, part of Sagittarius, and part of Pisces.[25] Because of the symmetry of the rising times, according to which

$\alpha_1 = ⌜\alpha_{12}⌝$
$⌜\alpha_2⌝ = [\alpha_{11}]$
$[\alpha_3] = ⌜\alpha_{10}⌝$
$[\alpha_4] = ⌜\alpha_9⌝$
$[\alpha_5] = \alpha_8$
$[\alpha_6] = ⌜\alpha_7⌝$

the rising times values for nearly all twelve signs may be reconstructed.

---

[24] His analysis of U 196, however, entertains the possibility of correpondence with either System A or B, see Schaumberger, "Anaphora," pp. 242–243.

[25] U 196:10 may provide a value for Capricorn, but is utterly fragmentary and needs collation. The value given in U 196:10 for the zodiacal sign Capricorn (Schaumberger put two question marks by his reading MÁŠ) is 2/3 DANNA 7 UŠ "27°," which belongs to System B. If the reading is correct, the text reflects a different scheme than that of the others, and so U 196 is left out of consideration for now.

If the rising times values of System A truly underly this scheme, we should expect the following values of the difference of ZI (TABLE 7), derived by dividing the rising times of System A by 12 to obtain 12 constant increments in ZI, which together constitute a total distance crossed by the *ziqpu* stars equal to the time taken for the 30º of the sign to rise.

Table 7. Differences of ZI Derived from System A Rising Times Scheme

zodiacal signs	*rising times/12*	*d of ZI's*
♈ / ♓	20º/12	1,40º
♉ / ♒	24º/12	2º
♊ / ♑	28º/12	2,20º
♋ / ♐	32º/12	2,40º
♌ / ♏	36º/12	3º
♍ / ♎	40º/12	3,20º

In fact, only 1,40º and 3,20º appear as differences in the ZI's given in our texts, implying that the rising times scheme underlying these texts is limited to the values 20º and 40º for rising times of signs. The best preserved sections illustrate:

Table 8. Degrees of ZI for Half of the Sign Aries

HA.LA (of ♈)	degrees of ZI	d of ZI
6	1,40	
7	3,20	1,40
8	5	1,40
9	6,40	1,40
10	8,20	1,40
11	< >	
12	TOTAL 10	1,40

Only the second half of the Aries section is given,[26] so the total of 10º is the rising time for 15º of Aries. For the entire sign, the rising time will be 2 × 10º = 20º, and 20º ÷ 12 = 1,40. The value for Aries is the same as that of System A. The derivation of the rising time for Scorpius is shown in Table 9 below.

[26] See Text B (LBAT 1499) rev. 14–30, referring to the half of the sign Aries TA MAŠ-*šú* [E]N TIL-*šú* "from its middle to its end" (line 30).

Table 9. Degrees of ZI for Scorpius

HA.LA (of ♏)[27]	*degrees of ZI*	*d of ZI*
1	1,40	
2	5	3,20
3	8,20	3,20
4	11,40	3,20
5	15	3,20
6	18,20	3,20
7	<2>1,40	3,20
8	<2>5	3,20
9	<2>8,20	3,20
10	<3>1,40	3,20
11	<3>5	3,20
12	TOTAL 40	

Note that the difference of ZI from portion 11 to 12 is 5°. If, however, the ZI of the first portion is subtracted, the correct difference is obtained. The total 40°, the value of the rising time of Scorpius, is not in agreement with System A, where Scorpius has the rising time of 36°. It is the only possible value in light of the constant difference of 3,20. There is enough textual evidence preserved to establish that one-half the ecliptic consisted of zodiacal signs having rising times of 40° each and in the other half, two signs, Aries and its symmetrical Pisces, had rising times of 20°. Although the texts do not preserve values for the remaining four signs, the nature of the scheme which emerges from the data that are preserved is sufficient to argue for restoring the values 20° for these too.[28]

The scheme divides the ecliptic into equal halves. From Cancer to Capricorn the signs are assigned the rising time 40° and from Capricorn to Cancer, the signs are assigned the value 20° (see Figure 2). If we compare these rising times against those of System A, we note that two of the six System A rising times are found in the microzodiac

[27] See Text A (A 3427) obv. 1–18.

[28] The one seemingly contradictory text, the fragmentary U 196, has the value 27 for Capricorn(?). This value, however, if the reading is correct (text needs collation), corresponds to System B, and so would not be relevant to the other texts. In order for U 196 to be considered evidence that this entire text group corresponds to the System A rising times scheme (as Schaumberger assumed), the value 27 must be emended to 28. That still would not mitigate the fact that for those data which are preserved or restorable in the other three extant texts, the value 40 is repeated from Cancer to Sagittarius, a fact which cannot be reconciled with System A. A wholly different, and much cruder, rising times scheme, must be seriously considered.

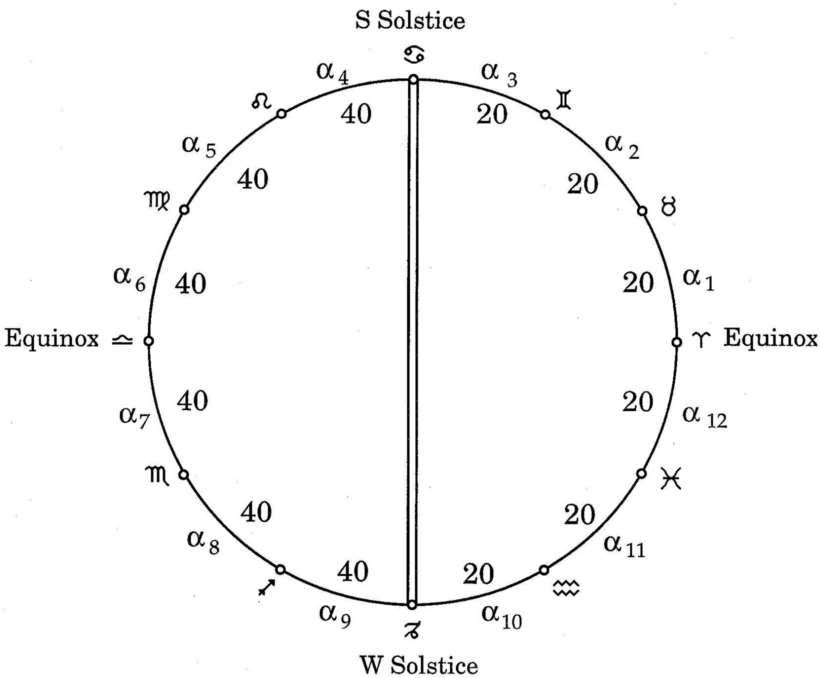


Figure 2. Rising Time Scheme according to micro-Zodiac texts

texts. Indeed these texts seem to divide the ecliptic into only two kinds of signs, those with a fast rising time (20^0) and those with a slow (40^o), as in Table 10 and Figure 2. It is interesting to see that the same symmetry is followed as in the fully developed scheme, i.e., $\alpha_1 = \alpha_{12}$, $\alpha_2 = \alpha_{11}$, $\alpha_3 = \alpha_{10}$, etc. The rule that the sum of the rising times = 360 is also obeyed by the cruder scheme: $20^o \times 6 + 40^o \times 6 = 360^o$.

If this reconstructed scheme is a precursor to System A, the resulting model of two equal "zones" of the ecliptic, one in which the signs rise "fast" and the other in which the signs rise "slow" is only reminiscent

Table 10. Rising Times of the Signs in the ḪA.LA Texts

zodiacal signs	*rising time*
♈ / ♓	20
♉ / ♒	[20]
♊ / ♑	[20]
♋ / ♐	40
♌ / ♏	40
♍ / ♎	40

of System A's model of solar progress around the zodiac. In System A, the ecliptic is also divided into two parts, but not equal halves, and the sun moves with one rate of progress in a "fast" zone and another in a "slow" zone. The sum of the lengths of each zone must be 360°. The points where the sun's progress in longitude jumps from fast to slow and back to fast are placed roughly near the solsticial points, at Gemini 25° and Scorpius 30° respectively.

In terms of daylight length, the scheme implied in the micro-zodiac text tradition divides the year into symmetrical halves at the solstices: From Cancer to Capricorn the days become progressively shorter, and from Capricorn to Cancer they become progressively longer. Stressing again the hypothetical nature of the daylight scheme that follows from the rising times reconstructed here for the microzodiac texts, the values C which would be obtained by taking the sum of the rising times of the six signs that cross the horizon from sunrise to sunset, are given in TABLE 11.

As can readily be seen, C is obtainable from the sum of the six rising times of the zodiacal signs crossing the horizon over the course of a day, from sunrise to sunset (λ_{sun} to λ_{sun} + 180°), in exactly the same manner as System A. For Aries, the length of daylight is found by adding the rising times from Aries to Virgo: 20 + 20 + 20 + 40 + 40 + 40 = 3,0 = 12 hours. For Taurus, the sum of the rising times of Taurus to Libra: 20 + 20 + 40 + 40 + 40 + 40 = 3,20 = 13 hours 20 minutes. Although the method of deriving the values C from the sums of rising times is identical with that of System A, the values of the daylight scheme are identical to those of earlier Babylonian astronomical

Table 11. Implied Daylight Length from ḪA.LA Text Scheme

zodiacal sign	α	*C (daylight length)*		
♈	20	3	=	12 h Vernal Equinox
♉	20	3,20	=	13 h 20'
♊	20	3,40	=	14 h 40'
♋	40	4	=	16 h Summer Solstice
♌	40	3,40	=	14 h 40'
♍	40	3,20	=	13 h 20'
♎	40	3	=	12 Autumnal Equinox
♏	40	2,40	=	10 h 40'
♐	40	2,20	=	9 h 20'
♑	20	2	=	8 h Winter Solstice
♒	20	2,20	=	9 h 20'
♓	20	2,40	=	10 h 40'

Table 12. Daylight Scheme in MUL.APIN and Cardinal Points of the Year

Month	*C (in mana)*	*C in UŠ*[29]	*= Hours*	*Cardinal Points*
I	3;0	3	= 12hr	Vernal Equinox
II	3;20	3,20	= 13h 20'	
III	3;40	3,40	= 14hr 40'	
IV	4;0	4	= 16hr	Summer Solstice
V	3;40	3,40	= 14hr 40'	
VI	3;20	3,20	= 13hr 20'	
VII	3;0	3	= 12hr	Autumnal Equinox
VIII	2;40	2,40	= 10hr 40'	
IX	2;20	2,20	= 9hr 20'	
X	2;0	2	= 8hr	Winter Solstice
XI	2;20	2,20	= 9hr 20'	
XII	2;40	2,40	= 10hr 40'	

texts, such as the Astrolabe, *Enūma Anu Enlil* XIV, and MUL.APIN. Whereas, however, In the Astrolabe tradition, the cardinal points of the year are placed in months XII (VE), III (SS), VI (AE), and IX (WS), MUL.APIN II i 9–21 divides the year around months I (VE), IV (SS), VII (AE), and X (WS), as shown in Table 12. It is clear that Texts A-C's assignment of daylight lengths to the month in which the sun is in a given zodiacal sign accords with MUL.APIN rather than the Astrolabe/*Enūma Anu Enlil* scheme, and remains consistent with System A as well (and see the assignment of the cardinal points above in Table 5).

While many aspects, both philological and astronomical, of the micro-zodiac Texts A-C must here be left unresolved, these sources may be viewed as evidence for the development of the characteristically Babylonian method of solving the problem of determining oblique ascensions of arcs of the ecliptic, a problem which would continue to be of the highest importance in later ancient spherical astronomy. Of course, we may be dealing with an archaized rising times scheme as opposed to evidence of a precursor to the methods of the late tabular texts. Regardless of the date of its invention, the hybrid daylight scheme that follows from the rising times values in Texts A-C, i.e., a cross between that of Column C of the System A ephemerides on one hand, and the early astronomical tradition of the Astrolabes, *Enūma Anu Enlil*, and MUL.APIN on the other, certainly adds a new dimension to our picture of late Babylonian non-tabular astronomical texts.

[29] The relation between these measures is 1 *mana* = 1,0 UŠ.

CHAPTER FIFTEEN

OLD BABYLONIAN CELESTIAL DIVINATION

Because celestial divination was part of a wider effort to interpret signs in the physical world as divine warnings of things to come, we see a common rationale for all forms of Mesopotamian divination, linking the various omen series to one another and placing celestial divination within a broader textual and cultural context. In similar fashion to other divinatory series such as *Šumma izbu*, the Dreambook, or the repertoire of the haruspex, *Bārûtu*, the earliest collections of celestial omens emerge in the Old Babylonian period, and reflect a purely Akkadian genre. That no Sumerian proto-types are known has been observed before, although, as already noted by A. Falkenstein, the practice of divination in some form as early as the Early Dynastic period is indicated by a number of professional titles in the Early Dynastic lexical list Lu, such as ugula.azu, máš.šu.gíd.gíd and ugula máš.šu.gíd.gíd.[1] We must admit, though, that we do not know what this amounts to. Urnanshe consults the ugula.azu in connection with building a temple.[2] Otherwise, Sumerian terms for cultic functionaries associated with divination and dream incubation are known in Ur III economic texts.[3] Late third millennium Sumerian literature also attests to the association of divination and cult. In the Hymn to Enlil is an enumeration of clergy, beginning with é-a en-bi-im é-da mú-a "the en priest of the house was a diviner."[4] Perhaps the best, or only

---

[1] A. Falkenstein, "'Wahrsagung' in der sumerische Überlieferung," in *La divination en Mésopotamie ancienne*, CRRA 14, (Paris: Presses Universitaires de France, 1966), pp. 45–68. Early Dynastic Lu 130. See also J. Renger, "Untersuchungen zum Priestertum der altbabylonischen Zeit," ZA 59 (1969), p. 203, note 940.

[2] Falkenstein, "Wahrsagung," p. 47, also J.J. Finkelstein, "Mesopotamian Historiography," PAPS 107 (1963), p. 464, note 12.

[3] As cited in CAD sub *bâru* discussion section, p. 125, máš.šu.gíd.gíd.da in Ur III texts may be found in A.L. Oppenheim, Eames Coll., p. 37f. Cf. maš.šu.gíd.gíd ITT 2/2 3108 rev. 2 and máš.šu.gi_4.gi_4 Nikolski 2 83:6. Later, of course, in Old Babylonian, these professions are better attested, as outlined in detail by Renger, "Untersuchungen," and even occur in omen protases: "If he sees a diviner(*bārû*)/an exorcist (*āšipu*)/a physician(*asû*)."

[4] Joan Goodnick Westenholz, "The Clergy of Nippur," in *Nippur at the Centennial*, Maria de Jong Ellis, ed., Occasional Publications of the Samuel Noah Kramer Fund 14 (Philadelphia: Babylonian Section, University Museum 1992), p. 299.

intelligible, example is Cylinder A of Gudea of Lagash, which suggests some aquaintance with dream omens, extispicy, and even celestial signs, and places divination in the context of a temple building ritual.[5]

The poetic inscription describing Gudea's building of Ningirsu's temple Eninnu refers to the goddess Nisaba consulting a tablet, dub mul-an "the tablet 'stars of heaven,'" which rests on her knee.[6] Also in the Sumerian composition "The Blessing of Nisaba," the goddess consults a tablet, there described as made of lapis-lazuli.[7] Whether the blue tablet and the tablet of heavenly stars "mul-an" refer to the same object is, however, not clear, but in both contexts, Nisaba's tablet appears to be a symbol of learning and wisdom.[8] Thorkild Jacobsen translated the latter as "a tablet (treating) of the stars above,"[9] W. Horowitz suggested it is a "replica or chart" of the sky, conceived of as a big blue cosmic tablet, taking the lapis lazuli tablet as referring to the same. Å. Sjöberg suggested a translation of this mul as "script," thus "the tablet of heavenly writing,"[10] an insightful interpretation when we think that Mesopotamian literati of the middle of the first millennium expressed the notion of the patterns of stars covering the sky as a celestial script. The poetic metaphor of the "heavenly writing" (*šiṭir šamê* or *šiṭirti šamāmī*) appears on occasion in later Neo-Babylonian royal inscriptions to refer to temples made beautiful "like the stars" (*kima*

---

[5] Gudea *Cyl.*A xii 16–17; xiii 16–17; xx 5 refers to the performance of extispicy; dreams (máš-gi$_6$ "night vision") are found in i 17–18; i 27 and note the use of the word giskim "sign," viii 19; ix 9, and xii 11, see D.O. Edzard, *Gudea and His Dynasty* (Toronto, Buffalo, London: University of Toronto Press, *The Royal Inscriptions of Mesopotamia*: *Early Periods*, volume 3/1, 1997). See also U. Koch-Westenholz, *Mesopotamian Astrology* (Copenhagen: The Carsten Niebuhr Institute of Near Eastern Studies, Museum Tusculanum Press, 1995), pp. 32–33.

[6] Gudea *Cyl.*A iv 26 and v 23, see Edzard, *Gudea*, p. 72.

[7] For The Blessing of Nisaba, see W. Hallo, "The Cultic Setting of Sumerian Poetry," in André Finet ed., *Actes de la XVIIe Rencontre assyriologique internationale* (1970), p. 125:29–31, and see also Å. Sjöberg and E. Bergmann, *The Collection of the Sumerian Temple Hymns*, Texts from Cuneiform Sources 3 (Locust Valley, New York: J.J. Augustin Publisher, 1969), p. 49:538–39, also cited in W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, Indiana: Eisenbrauns, 1998), pp. 166–7.

[8] See the passage TCL 16 88 v 20–24, cited in Å. Sjöberg and E. Bergmann, *Sumerian Temple Hymns*, p. 148, note to line 538.

[9] Thorkild Jacobsen, *The Harps That Once: Sumerian Poetry in Translation* (New Haven and London: Yale University Press, 1987), p. 393.

[10] Å. Sjöberg and E. Bergmann, *Sumerian Temple Hymns*, p. 138b, citing MSL II p. 132 VI 57 mul = *šiṭirtum*. Nisaba holds the "holy tablet of the heavenly star/writing (dub-mul-an-kù)" as well in the composition "Nisaba and Enki" lines 29–33, see W.W. Hallo, "The Cultic Setting of Sumerian Poetry," in André Finet ed., *Actes de la XVIIe Rencontre* 17 (1970), pp. 125, 129, and 131.

šiṭir šamê, literally, "like the heavenly writing").[11] 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. A seventh century scholarly text from Assur explains the starry sky as the "lower heavens" (*šamû šaplûti*), made of jasper, and on whose surface the god Marduk drew "the constellations of the gods" (*lumāši ša ilāni*).[12] 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."[13] They further remark on the relationship between the arrangement of stars in certain constellations and that of the wedges in cuneiform signs.[14] 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.[15]

In the first discussion of the history of the celestial omen series *Enūma Anu Enlil*, E. Weidner knew of only one such tablet from the Old Babylonian period.[16] This text was first published by Šileicko in 1927, then

[11] In the following inscriptions of Nebuchadnezzar: VAB 4 187 i 39, also 74 ii 2, YOS 1 44 i 21; cf. BBSt. No. 5 ii 28. Also in the form *šiṭir burūmê*, literally "writing of the firmament," for which, see CAD s.v. *burūmû* usage b, predominantly in Neo Assyrian royal inscriptions, but also in a hymn to Aššur, see A. Livingstone, *Court Poetry and Literary Miscellanea*, State Archives of Assyria 3 (Helsinki: University of Helsinki,1989), p. 4 Text No. 1:21. See also W. Horowitz, *Mesopotamian Cosmic Geography*, p. 15, note 25, and p. 226.

[12] KAR 307 33, see 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.

[13] 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.

[14] Roaf and Zgoll, "Assyrian Astroglyphs," ZA 91 (2001), p. 289.

[15] The notion of the god (often Šamaš) "writing" the signs on the exta of sheep is well-known, see e.g., *ina libbi immeri tašaṭṭar šērē 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.

[16] E.F. Weidner, "Die astrologische Serie Enuma Anu Enlil," in AfO 14 (1941–44), pp. 172–195 and 308–318.

by Bauer in 1936, and most recently by Horowitz in 2000.[17] The fact that this text combines disparate subjects makes it difficult to see it as any kind of forerunner to a specific tablet of *Enūma Anu Enlil*. Nine omens concerning the appearance of the sky, some lunar phenomena, and a couple of atmospheric phenomena are assembled in a rough sort of order, at least the lunar omens follow in sequence by day of the month (i.e. the day of disappearance, the 6th, 7th, and 25th), but these are interspersed with omens for *pani šamê* "the face of heaven." The first two omens are for the sky's appearance. A "dull" (*ešû*)[18] sky signals *šattum lemnat* "a bad year," while a sky shining like the rising moon signals *šattum damqat* "a good year." Another omen for the sky (line 13) compares its appearance to water, reminiscent of the later scholarly etymology of *šamê* "sky" as *ša mê* "of water."[19] These lunar omens also differ from *Enūma Anu Enlil* and even the other Old Babylonian celestial omens in the manner of writing the moon as *ilum* "the god" or even ^{d}ŠEŠ.KI =Nanna, the Sumerian name for the moon god. In the later texts, *ilum* still occurs, only rarely, as in the phrase *ilu itbal* "the moon set (literally, "the god disappeared")." Otherwise, in the Old Babylonian lunar eclipse texts, the moon is written ^{d}EN.ZU, and of course *Enūma Anu Enlil* uses ^{d}30 fairly consistently.

Direct Old Babylonian forerunners to the series *Enūma Anu Enlil* were, therefore, at the time of Weidner's writing, unknown for the period before the first millennium, although indications that an Old Babylonian origin might still be found were apparent in celestial omen texts from a variety of areas on the peripheries of Mesopotamia, i.e., Anatolia (Hattuša), the Levant (Emar, Qatna, Alalakh, and Ugarit), and Iran (Susa), dating to the second millennium. In addition, uncontracted writings and vestiges of the Old Babylonian syllabary (such as the signs *qá*, *te*$_4$, and *pí*) found in the Neo-Assyrian *Enūma Anu Enlil* texts were generally regarded as orthographic evidence of a likely Old Babylonian origin for the series. Given that other forms of divination have Old Babylonian exemplars, especially extispicy (*barûtu*), but also divination from physiognomy (*alamdimmû*), and malformed births

[17] W. Horowitz, "Astral Tablets in the Hermitage, Saint Petersburg," ZA 90 (2000), pp. 203–206.

[18] Šileicko and Bauer read *iš-šu-*[*ú*], while Horowitz reads *uš-šu-*[*ú*], taking the verb as the D-stem of *ešû* in the meaning "confused." The sign in the copy (Šileicko) looks like a hybrid of iš and uš.

[19] Inamgišhurankia K.170+ rev. 6, see A. Livingstone, *Mystical and Mythological Explanatory Works* (Oxford: Clarendon Press, 1986), p. 32.

(*izbu*),[20] the absence of similar Old Babylonian sources for *Enūma Anu Enlil* was surprising.

Since the time of Weidner's researches, Douglas Kennedy identified four Old Babylonian celestial omen tablets in the British Museum. Kennedy's tablets contained lunar eclipse omens which prove to be forerunners to the lunar eclipse omen section of the "canonical," or main text of *Enūma Anu Enlil*. Other Old Babylonian celestial omen texts containing solar and weather omens may also be included among the earliest attested celestial omen texts, namely the just mentioned Šileiko tablet, a British Museum tablet kindly brought to my attention by C.B.F. Walker, and a solar eclipse tablet published by M. Dietrich.[21] Admittedly the disparity in the number of sources, barely more than a handful from the Old Babylonian period as against the voluminous mass of later sources, makes a "history of Babylonian celestial divination" difficult to formulate. Not only that, but bridging the gap between the Old Babylonian and Neo-Assyrian (and Neo-Babylonian) *Enūma Anu Enlil* relies on fewer than ten exemplars of Middle Assyrian or Middle Babylonian date. Nevertheless, and particularly with respect to Kennedy's tablets, the relationship of the Old Babylonian forerunners to the later standardized series adds considerably to our knowledge of the development of celestial divination as of the Mesopotamian intellectual tradition itself.

The most extensive and best preserved of the Old Babylonian celestial omens (BM 22696 and BM 86381)[22] deal with lunar eclipses. In relation to versions of *Enūma Anu Enlil* from Middle Assyrian and Middle Babylonian sources, with parallels in Hittite sources and Akkadian texts from Boghazköy, as well as other "peripheral" texts such as those of Emar from the 13th century, the Old Babylonian texts serve to outline a literary development from a stage before standardization to the more or less standard series *Enūma Anu Enlil* that ultimately provided the reference work for the scholar who specialized in celestial divination, i.e. the *ṭupšar Enūma Anu Enlil* in the employ of the Neo-Assyrian court. Cautionary remarks as to the conceptualization

---

[20] YOS 10 12 and 56.

[21] M. Dietrich, "Altbabylonische Omina zur Sonnenfinsterniss," WZKM 86 (1996), pp. 99–106, apud Hermann Hunger and David Pingree, *Astral Sciences in Mesopotamia* (Leiden and Boston: Brill, 1999), p. 8 and note 9.

[22] I thank the Trustees of the British Museum for permission to cite these unpublished tablets.

of such an official or canonical *Enūma Anu Enlil* text, are probably no longer necessary, as it is well-known that *Enūma Anu Enlil* not only circulated in various recensions, but included other omens—termed *ahû* "extraneous," or alternative omens—within a generally accepted repertoire.[23] The sense in which we characterize the series as "standard" has to do with the fact that catalogues arranged the numbered tablets in a certain order, and that commentaries refer to these tablets by their numbers, even though there are discrepancies in the assignment of such tablet numbers.

Because the fundamental thematic elements found in the protases of all four Old Babylonian eclipse omens continue throughout later redactions, they may be viewed as forerunners to the lunar eclipse section of *Enūma Anu Enlil*, especially Tablets 17–18. Although variants among the Old Babylonian exemplars are numerous and one of the texts is an excerpt tablet, all four texts draw upon a single set of omens. The Old Babylonian omens appear to provide the foundation for the expansion of this collection of omens in the Middle Assyrian, Middle Babylonian, and Neo-Assyrian works. This contrasts with the Old Babylonian *izbu* material, e.g., YOS 10 12 and 56, which do not parallel the Neo-Assyrian *izbu* compendium so closely. Aside from obvious structural differences due to the smaller number of omens in Old Babylonian sources, other differences from the Neo-Assyrian recension are found in formulary and orthography.

The orthography of the Old Babylonian eclipse omens can be characterized as typically Old Babylonian in the use of syllabic spellings, plene writings, sandhi writings, and the preservation of mimation. The particular orthographic characteristics of these texts cannot, however, be identified with respect to a more specific form of Old Babylonian, such as the Northern or Southern "dialects" of the Old Babylonian language described by A. Goetze in Sachs-Neugebauer MCT. To expect the orthography of this corpus to conform to such characteristics as defined by Goetze on the basis of Old Babylonian letters, economic or legal documents, is perhaps unwarranted, if indeed the specialized "literary-scholarly" tradition which produced these texts does not exhibit the same set of characteristics. The celestial omens exhibit both

[23] See William W. Hallo, "The Concept of Canonicity in Cuneiform and Biblical Literature: A Comparative Appraisal," in K. Lawson Younger, Jr., William W. Hallo, and Bernard F. Batto eds., *The Biblical Canon in Comparative Perspective: Scripture in Context IV* (Lewiston, Queenston, and Lampeter: The Edwin Mellen Press, 1991), pp. 1–19.

so-called Northern and Southern writing conventions, e.g. DI for /ṭi/ as in *bu-ta-al-lu-*(DI)*ṭí-im* (A:39), which according to Goetze is a sign of Southern Old Babylonian dialect whereas TU for /ṭu/ (instead of DU) as in *ub-bu-*(TU)*ṭú* (A:18) is typical of the Northern dialect.[24] We also find for syllables beginning with /s/, the signs ZI and ZU for /si/ (*i-sa-ab-as-*(ZI)*sí* A r.41) and for /su/ *su* (*ḫa-as-*(ZU)*sú* A r. 33), also supposedly indicative of Southern writing conventions.

Despite a preponderance of syllabic spellings, in comparison with other Old Babylonian omen texts, this corpus makes use of relatively many logograms. In contrast to the much larger volume of texts in the series *izbu*, in which only about twenty logograms are used, all of which are substantives, the eclipse omens have three times that number, of which, however, only seven are verbs. The logograms appearing in the Old Babylonian celestial omens are for the most part the same as those used in the canonical series of the later period, with only a few exceptions. The most obvious exception is in the writing of the word "eclipse" *attalû* (*antalû*). In no case is this spelled syllabically, as elsewhere in Old Babylonian,[25] but only with the logogram AN.TA. LÙ. This is also the practice known in texts from Boghazköy and Elam (although there is a syllabic spelling at Boghazköy).[26]

Both the derivation and the etymology of the logogram AN.TA. LÙ are obscure. One may of course read it as a pseudo-logographic phonetic rendering of the Akkadian word *antalû*, or as a learned pseudo-etymology, in which AN.TA (*eliš*) "above" is combined with LÙ (*dalāḫu*) "to disturb" to mean "disturbance above," or the like. The latter derivation is supported by a late commentary to *Enūma Anu Enlil* Tablet 1:"AN.GE$_6$ is darkness and AN.GE$_6$ is disturbance, ... variant, disorder, and troubles."[27] The association of AN.GE$_6$ with disturbance is seen again in an astrological report: "an eclipse will occur; AN.GE$_6$ means troubles."[28] Goetze found etymological explanations of *antalû* in terms of Sumerian also unlikely; he felt that *antalû*, and its Old

[24] MCT p. 146.

[25] G. Dossin, CRRA 2 47:5f., and see CAD sub *attalû* (d).

[26] KUB 37 160:5', 7', and 10' see CAD *attalû* (d) 2'.

[27] Late Babylonian astrological commentary VAT 7827, AfO 14 pl.4 I 16f.: AN.GE$_6$ KAxMI AN.GE$_6$ *du-lu-uḫ-ḫu-ú* // AN.TA.LÙ.LÙ [x.N]E LÙ.LÙ // *e-ša-a-tu$_4$* // *a-ša-a-tum dal-ḫa-a-tu$_4$*.

[28] Hermann Hunger, *Astrological Reports to Assyrian Kings*, SAA 8 (Helsinki: University of Helsinki Press, 1992), p. 55:4–5: AN.GE$_6$ *iššakkan* AN.GE$_6$ *duluḫḫû*.

Babylonian variant *namtallûm* (*nantallûm*), attested in Old Babylonian extispicy and hemerologies was possibly of foreign origin.[29] *Antalû* was later borrowed into Aramaic as *ʿātaljā*, and into Mandaic as *talia*. The Aramaic and Mandiac terms refer to a mythical dragon that caused eclipses by devouring or wrapping itself around the moon, and also become the names for the constellation Draco. Perhaps in the remote background are the seven evil gods or demons of the bilingual udug. hul/ *utukku lemnūti*, who "kept passing (Akkadian, "kept encircling," from Gtn *lamû*) furiously in front of the divine crescent, Sin."[30]

The two best preserved of the Old Babylonian eclipse omens, which will be referred to here as Texts A and B,[31] use the form AN.TA.LÙ, and most likely so does Text D, although its line beginnings, where this word occurs, are not preserved. Text C uses an abbreviated form AN.TA consistently. The form AN.TA.LÙ is also preserved in Standard Babylonian texts which retain Old Babylonian orthography, e.g. *Enūma Anu Enlil* Tablet 22.[32] The logogram AN.GE_6 seems to appear for the first time only after the Old Babylonian period. From a paleographic standpoint, the Old Babylonian celestial omens (including BM 97210 with solar and weather omens) show a standard Old Babylonian script, conforming to the so-called younger cursive, as defined by Goetze in YOS 10. Goetze identified this later Old Babylonian script as that employed in documents of the "Hammurabi chancellory."

The relationship between the Old Babylonian lunar eclipse omens and *Enūma Anu Enlil* Tablets 17–18 can best be shown using Text A, which serves as a convenient reference. Note, however, that all four Old Babylonian tablets contain the same material. Tablets 15 and 16 of the lunar eclipse omen section also relate in part to the Old Babylonian material. These parallels will be enumerated first.

Enūma Anu Enlil Tablet 15[33] parallels the Old Babylonian texts only in its focus on the passing of the eclipse shadow over the moon.

---

[29] CAD sub *attalû* (d), YOS 10 42 iv 38. It is also unlikely that *namtallûm* has anything to do with Sumerian nam.talla (Goetze JCS 1, p. 251f.) Various Sumerian equivalents, non etymologically related to the Akkadian word, are attested for *antalû*, viz., BAR.giš.na, UD.mud.nun.ki, as well as an.GE_6.

[30] dub.sag.ta ud.sar den.zu.na šúr.bi ba.an.dib.bi.eš: *ina maḫar ᵈNannari ᵈSin ezziš iltanammû* CT 16 20:73f; ibid. 21:148f. For a translation of portions of this myth, see A.D. Kilmer, "A Note on the Babylonian Mythological Explanation of the Lunar Eclipse," JAOS 98 (1978), 372–374.

[31] Text sigla are carried over from ABCD, p. 19.

[32] See ABCD, pp. 251–272.

[33] References to this text refer to ABCD, pp. 67–81.

The location of the eclipse shadow on the "right side" is found in the Old Babylonian text, and is preserved in an excerpt of EAE 15: DIŠ AN.GE_6 ZAG-*šú* BAL-*at* (EAE 15 text a:6–13//A:4f.). The various directions of the shadow as it moves across the lunar disk form the content of the best-preserved part of EAE 15, i.e., col.iii. As such, it seems to be an expansion of Text A:8–11. EAE 15 contains some apodoses also seen in Text A, e.g., *abūb mithariš išakkan* "devastating flood waters will occur,"(A:4–5, cf. EAE 15 Sources F:1', 6', 9' and G:1', 5'), and *miqitti* (Old Babylonian RI.RI.GA, Neo-Assyrian ŠUB-*ti*) *Akkadî* (*Šubarî*, *Amurrî*, *Elamtî*) "downfall of Akkad (Subartu, Amurru, Elam)" (A:8–11, cf. EAE 15 col. iii passim).

EAE 16 organizes its omens by the calendar year of 13 months. The first four omen protases of the EAE 16 schema parallel Text A:8–11 "If an eclipse occurs on the 14th day of MN, and it begins and clears in the south (north, east, west)." The next protasis in the schema is also found in Text A, although not in the same sequence: "If an eclipse occurs on the 14th of MN and a meteor falls." The general arrangement of eclipse omens in the Old Babylonian texts by day 14, 15, 16, 19, and 20 of each of the 13 months is also preserved in EAE 16. When it comes to the apodoses, however, the parallelism falls apart. Where apodoses are preserved in EAE 16, (months II, III, IV, V, VII, IX, X, XI, XII, XII*) there are no parallels to Text A (with a single exception, Text A rev. 54, the omen for Month XII* day 14 has the apodosis *nīšu šerrišina ana kaspi ipaššarā* "people will sell their children," found in EAE 16 ∮ XII* I rev. 4' UN.MEŠ TUR.MEŠ-*ši-n*[*a ana* KÙ.BABBAR BÚR.MEŠ].

Close parallels between EAE 17 and the Old Babylonian forerunners have been cited before.[34] Here it will have to suffice to give a few examples, and to make the point that the parallelism between EAE 17 (and 18) with the Old Babylonian material is complete. The following are omens from EAE 17 IV.7–9 and Text A:42–45.

EAE 17	IV.7 (F 11') DIŠ *ina* ITI.ŠU UD.16.KAM AN.GE_6 GAR SU.KÚ IN.NU GÁL-*ma* [ŠUB-*tim* GU_4.ḪI.A GÁL]
A:42–3	AN.TA.LÙ ITI.ŠU.NUMUN.A UD.16.KAM *ḫu-ša-ḫi* IN.NU *iš-ša-ak-ka-an* RI.RI.GA GUD.NITÁ.ḪI.A *ib-ba-aš-ši tar-ba-ṣu i-l*[*a*]*-wu*

[34] ABCD, pp. 114–115.

"An eclipse on the 16th of Du'ūzu: There will be want of straw; downfall of cattle will occur; the cattle pen will be surrounded (besieged?)."

EAE 17 IV.8 (F 12') DIŠ *ina* ITI.ŠU UD.20.KAM AN.GE$_6$ GAR ŠUB-*tim* NIM.MA.KI *u Guti-i*

A:44 AN.TA.LÙ ITI.ŠU.NUMUN.A UD.20.KAM GAR RI.RI.GA NIM.MA.KI *i-na* KÁ KUR *i-ḫa-*[*li-iq*]

"An eclipse on the 20th of Du'ūzu: Downfall of Elam; it wil perish at the gate of the land."

EAE 17 IV.9 (F 13') DIŠ *ina* ITI.ŠU UD.21.KAM AN.GE$_6$ GAR ^{d}IŠKUR A.AB.BA RA A.MEŠ *ina* AN-[*e* A.KAL *ina* BE TAR.MEŠ]

A:45 AN.TA.LÙ ITI.ŠU.NUMUN.A UD.21.KAM GAR ^{d}IŠKUR *ḫi-ṣi-ib ia-ab-ba u-ḫal-*[*liq*]

"An eclipse on the 21st of Du'ūzu: Adad will destroy the produce of the sea."

This relationship between EAE 17–18 and the Old Babylonian tradition extends throughout. Far less striking, but noteworthy is the incorporation into EAE 19 of omens for the time of the eclipse in watches seen in Text A. EAE 21 is for the most part not parallel. A few omens of Text A, however, seem to have been taken into Tablet 21, but these are omens that also overlap with EAE 17–18. EAE 22 Part I exhibits some connection to the Old Babylonian texts, although not to the extent shown for EAE 17–18. Elamite writings and parallels with other peripheral exemplars of eclipse omens have pointed toward a Susite or at least extra-Mesopotamian intermediary for this tablet.[35] Comparison between EAE 22 and the Old Babylonian texts confirms the ultimate origins of Tablet 22 Part I in Mesopotamia proper, not in Elam or the Hittite Empire. However, as W. Farber argued, the orthography of this tablet quite likely preserves the form of the Elamite source from which the Neo-Assyrian EAE 22 was taken.[36] The omens

[35] ABCD, pp. 31, 251–2; W. Farber, "Zur Orthographie von EAE 22: Neue Lesungen and Versuch einer Deutung," in Hannes D. Galter, ed., *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Grazer Morgenländische Studien, 3 (Graz: GrazKult, 1993), pp. 247–257; Koch-Westenholz, *Mesopotamian Astrology*, pp. 49–51.

[36] Farber, "Zur Orthographie von EAE 22."

of EAE 22 Part II, for an eclipse occuring each month "from the 1st to the 30th day," and for thunder, earthquake and mudslide, seem to have no Mesopotamian Old Babylonian foundation.

The only tablet not so far mentioned is EAE Tablet 20. This tablet is exceptional in its complexity and detail, as the following example shows:

> If an eclipse occurs on the 14th day of Ṭebētu, and the god (= the moon), in his eclipse, becomes dark on the east upper part of the disk and clears on the west lower part; the west wind (rises and the eclipse) begins in the last watch and does not end (with the watch); his cusps are the same (size), neither one nor the other is wider or narrower. Observe his eclipse, i.e., of the moon in whose eclipse the cusps were the same, neither one being wider or narrower, and bear in mind the west wind. The prediction (literally: "verdict") applies to Subartu. Subartu and Gutium.... brother will smite brother; the people will suffer defeat(?); there will be many widows; the king of Subartu will make peace with the lands.... It (the eclipse) began in the middle watch and did not end (it). Thus is its omen and its consequence (literally: "verdict").[37]

In short, Tablet 20 is the *only* eclipse tablet that has no connection to the Old Babylonian material. Because of the comparatively many details of eclipses given in the protases of Tablet 20, the idea that these reflect a firmer empirical basis than can be established for the other eclipse tablets with their generic and schematic protases, and therefore might constitute more secure evidence for chronology could have gained ground had we been able to establish a solid textual connection to the Old Babylonian period.[38] Unfortunately we still do not have a textual basis in Old Babylonian for EAE 20.

The obvious historical question, "How far back can we push the beginning of the celestial omen tradition?" I suppose, has two answers. Conservatively, taking the question in a literary- historical sense, there are no celestial omens attested before the Old Babylonian period. Thus the beginnings of this tradition cannot be pushed beyond the Old Babylonian period, and, given the late Old Babylonian script noted above, it is safer to set a date towards the latter part of the

---

[37] ABCD, p. 209.

[38] For a discussion of the chronological potential of the eclipses described in EAE 20's omens, see Peter J. Huber, "Dating by Lunar Eclipse Omina, with Speculations on the Birth of Omen Astrology," in *From Ancient Omens to Statistical Mechanics: Essays on the Exact Sciences Presented to Asger Aaboe* (ed. J.L. Berggren and B.R. Goldstein; Copenhagen: University Library, 1987), pp. 3–13.

17th century B.C. From a liberal standpoint, taking the question in a broader cultural sense, it appears that the idea of signs in the heavens was already current at Lagash in the late third millennium, taking the evidence from Gudea as the clearest case. Besides Nisaba's "tablet," the meaning of other key passages in Gudea's cylinder with respect to divination depend on our understanding the use of Sumerian eš.bar kin, eš.bar.kin du$_{11}$ "to pronounce an oracular decision" and giskim "sign" in such literary contexts. Additional examples are found in the Keš Temple Hymn, where the temple is "given an oracle by mother Nintu" (ama ^{d}nin-tu-ra eš-bar-kin du$_{11}$-ga).[39] The idea that omens conveyed divine decisions (eš.bar/*purussû*) persists in later texts, where the word *purussû* comes to refer specifically to the omen apodosis.[40] Finally, in Ningirsu's promise to Gudea in the dream, the god says:[41] "Gudea, for building my house let me give you its giskim. Let me tell you the pure stars above (mul-an-kù-ba) (the heralds) of my appointed tasks."[42] But for pursuing the origins of scholarly celestial divination, i.e. omen texts, back before Late Old Babylonian times, such texts do little but attest to the use of giskim in the same context, or nearly, as the mention of stars. Even were we to assume that such as thing as celestial divination existed in the third millennium, we have no texts with which to give it any form, content, or extent.

Because the age of the beginnings of astronomical observation and the systematization of astronomical phenomena is directly correlated with the existence of celestial omens, our tracing the formation of scholarly celestial divination is of no small significance. Already well-known are the early strands of Babylonian astronomy embedded in EAE Tablets 14 (on lunar visibility), 59–60 (on the planet Jupiter) and

---

[39] Gene B. Gragg, The Keš Temple Hymn, in *The Collection of the Sumerian Temple Hymns*, Texts from Cuneiform Sources 3 (Locust Valley, N.Y.: J.J. Augustin Publisher, 1969), pp. 169:39 and 171:61, and for commentary, see pp. 128 and 181–2.

[40] As for example in the reports of the diviners to the Neo-Assyrian kings, in which *Enūma Anu Enlil* is quoted: ITI.SIG$_4$ KUR.MAR.TU.KI *ù pu-ru-us-su-ú a-na* ŠEŠ.UNUG.KI *na-din* "Simanu means the Westland and a decision (*purussû*) is given for Ur." Hunger, *Astrological Reports* (SAA 8), p. 316:6. Cf. the usage in the Seleucid astronomical/astrological text TCL 6 11 r. 37 BE-*ma* EŠ.BAR 3,20 *ana* IGI-*ka ša* ^{d}UDU.IDIM.MEŠ *ina lu-maš* KIN.KIN-*ma* "In order for you to see an ominous decision about the king, you seek (the position) of the planets within the (zodiacal) constellations, and," see Lis Brack-Bernsen and Hermann Hunger, "TU 11: A Collection of Rules for the Prediction of Lunar Phases and of Month Lengths," SCIAMVS 3 (2002), pp. 12 and 17.

[41] Cyl A viii 19, ix 7–xii 9.

[42] Cyl A ix 9–10, Jacobsen's transl. In *The Harps That Once*, p. 399.

63 (on the synodic phenomena of Venus), but none of these tablets are extant in Old Babylonian form. It is easily shown that the principles of organization of the protases of the Old Babylonian lunar eclipse omens reflect systematic study of this lunar phenomenon. Continuity, therefore, between the celestial omen tradition reaching back to the early second millennium (1800 B.C.E. serves as a convenient date) and the earliest astronomical tradition is fully justified even if viewed conservatively as tied solely to the lunar eclipse tablets. In addition to the astronomy of the omen texts, an early astronomical tradition preserved in non-divinatory texts of the end of the second and early in the first millennium, namely, MUL.APIN and the Astrolabe texts, attests to a foundation of astronomical observation and the early construction of schemes (mostly not yet quantitative) for a variety of phenomena related to problems of time-keeping (seasonal appearances of fixed-stars) and calendaric reckoning (the length of daylight and intercalations). The history of Babylonian celestial divination is therefore inseparable from the history of Babylonian astronomy, and the shadowy beginnings of one must in fact be those of the other as well.

CHAPTER SIXTEEN

THE HEAVENS AND THE GODS IN ANCIENT MESOPOTAMIA: THE VIEW FROM A POLYTHEISTIC COSMOLOGY

Introduction

As A.A. Long pointed out in the context of the use of Hellenistic philosophy by early Christian writers, "the English language of religious experience is indelibly colored by expressions we have inherited from ancient Greece and Rome. Theology, piety, mysticism, union, divinity, spirituality—all these, and many more, are terms originating from classical antiquity and suggesting thereby direct connections between ancient and modern patterns of thought."[1] The embeddedness of Greco-Roman conceptions within our language and our thinking makes coming to terms with religious ideas expressed in a wholly different language and stemming from a wholly different world view a difficult undertaking. With respect to Sumerian and Akkadian theological and cosmological sources, the categories of divine, celestial, material, immaterial, transcendent or immanent, all seem to need definition or redefinition, deconstruction and reconstruction by means of a close reading of their particularity in a variety of contexts of use. The present discussion concerning the heavens and the gods in ancient Mesopotamia, therefore, attempts to navigate through some cosmological and theological layers of meaning about the divine and the celestial expressed in Akkadian and Sumerian texts, but filtered through the Western conceptual heritage within which we speak.

The problematic of this essay is whether the ancient Mesopotamian view of the relation between the divine and heaven ever offered the possibility of a divine unity, a "monotheism," conceived in the form of a divine cosmos. Its conclusions on this question are negative. That the question is not addressed as such in cuneiform texts seems to confirm

[1] A.A. Long, "Epicureans and Stoics," in A.H. Armstrong, ed, *Classical Mediterranean Spirituality* (New York: The Crossroad Publishing Company, 1986), p. 135.

that the idea of a singular universal divine "oneness" was not an issue in ancient Mesopotamian theologies. One can, however, on the basis of a selection of passages from Sumerian, Assyrian and Babylonian texts, approach the question of the relation between the divine and the celestial, the gods and the stars. This relation was expressed in a variety of forms and embedded in a number of practices, such as prayers to stars and celestial divination, which may have influenced some Hellenistic religions and philosophy (such as the Stoics), who did entertain the idea of divinity of the cosmos as a whole, as, for example, when Diogenes Laertius says of Zeno "that the whole world and heaven are the substance of god," and adds that the Stoics Chrysippus and Posidonius hold similar views.[2] A cosmic theology can still be found in the late Greco-Roman period, among 2nd century C.E. writers such as the anti-Christian Celsus and the Neo-Pythagorean Numenius of Apamea.[3]

A connection between the heavens and the divine has been continuous in the history of the Mesopotamian gods. Inana, for example, seems to have had an astral aspect going back to Uruk IV cult offerings to the morning star, Inana-húd(UD) "Inana of the morning" and the evening star, Inana-sig "Inana of the evening."[4] The divine name itself is furthermore etymologically suggestive of an astral deity "Lady of Heaven," as is her temple é-an-na "House of Heaven." Despite the close association of the divine with heaven, the relationship seems to be one between certain deities and the heavenly region rather than a notion of a cosmic divine unity.

Instead of a notion of heaven itself as divine the evidence attests rather to the association or even identification of heavenly bodies with gods. Polytheism itself forestalled a unified view of "cosmos," in favor of cosmic regions that were divinized and drafted into mythological stories. An Early Dynastic mythological text, for example, personifies heaven as "a youthful man,"[5] a primordial divine "being," in existence

---

[2] See A.A. Long and D.N. Sedley, *The Hellenistic Philosophers*, 2 vols. (Cambridge: Cambridge University Press, 1987), vol. 1, pp. 266–7.

[3] See Jean Pépin, "Cosmic Piety," in A.H. Armstrong, ed., *Classical Mediterranean Spirituality: Egyptian, Greek, Roman* (London: SCM Press, Ltd. and New York: The Crossroad Publishing Co., 1986), pp. 416–418.

[4] K. Szarzyńska, "Offerings for the Goddess Inana in Archaic Uruk," RA 87 (1993), pp. 7–27. See also Beaulieu, *Pantheon*, pp. 103–4, and R.K. Englund, "Administrative Timekeeping in Ancient Mesopotamia, JESHO 31 (1988), p. 167 note 39.

[5] Å. Sjöberg, "In the Beginning," in T. Abusch ed., *Riches Hidden in Secret Places:*

before any other gods but already paired with "earth" (or, perhaps, "underworld"). The personification of heaven and earth/underworld occurs in other Sumerian compositions, such as *Lugale*, which identifies the parentage of the demon Azag as divine sky and earth/underworld themselves, i.e., An and Ki. The sky-god has his own ancestry, given in the Babylonian creation epic *Enūma eliš*. The divine pair AN.ŠÁR "totality of heaven" and KI.ŠÁR "totality of earth/underworld," are the third pair produced in the divine genealogy, and the "parents" of the divine sky-god Anu. It is perhaps worthy of mention that the meaning of ŠÁR as "totality" (= Akkadian *kiššatu* "all") comes not from the idea of "oneness," but of "many" (= Akkadian *mâdu* "to be numerous") and therefore connotes a unity comprised of plurality, i.e., "all things," or "everything."

In the absence of other evidence for universality and cosmic "oneness" in ancient Mesopotamia, one hesitates in this context to expatiate on "the one and the many," which is deeply rooted in western philosophy and religion. That those roots reach into Assyrian theology is S. Parpola's contention,[6] and claims that the writing of the name of the chief Assyrian deity Aššur as AN.ŠÁR indicates not only his universality but also his transcendence.[7] Concerning Aššur's transcendence, G. Beckman countered that the meaning of the name AN.ŠÁR can simply be taken as referring to one part of the cosmic topography "the totality of heaven," as KI.ŠÁR is the other part. Beckman said, "the use of AN.ŠÁR to designate Aššur is at least in part a scribal whimsy based on approxmiate homophony: "AN-ŠÁR" might be understood as "AN-ŠUR$_x$" with dissimulation of the cluster /šš/ in the divine name."[8] Despite passages that do support a notion of divine transcendence (see below), a reading of "oneness" as transcendental here would involve not only the conversion of a concept that is

Ancient Near Eastern Studies in Memory of Thorkild Jacobsen (Eisenbrauns: Winona Lake, IN 2002), p. 231, AO 4153 ii 1.

[6] S. Parpola, "Monotheism in Ancient Assyria," in Barbara N. Porter, *One God or Many? Concepts of Divinity in the Ancient World*, Transactions of the Casco Bay Assyriological Institute, vol. 1 (Chebeague Island, ME: Casco Bay Assyriological Institute, 2000), pp. 165–209.

[7] S. Parpola, "The Assyrian Tree of Life: Tracing the Origin of Jewish Monotheism and Greek Philosophy," JNES 52 (1993), Excursus 3 The Name of Aššur, pp. 205–08. See also his "Monotheism in Ancient Assyria," in Barbara N. Porter, *One God or Many?*, pp. 169–170.

[8] G. Beckman review of Barbara N. Porter, *One God or Many?*, in JAOS 121 (2001), p. 684 note 4.

numerical or having to do with quantity (ŠÁR = 3600) to one of ontology (= all existence/being?), but would also have to rely rather heavily on a Christian theological discourse, as one finds highly developed in Aquinas, for example.[9]

What seems interesting is the writing of the divine name Aššur with the logogram for a divinity whose identity is cosmic and heavenly, but who belongs to a cosmic pair that refers back to a cosmic disunity, above and below. But Aššur/AN.ŠÁR seems to have a different meaning from Anu, the divine sky. Indeed, Aššur was said to be one who dwells in the clear starry heavens (*āšib burumê ellūti*),[10] not that he *was* the starry heavens. Sennacherib's temple of Aššur in the city of Aššur, by virtue of the setting of the throne and the Dais of Destinies, oriented to the Path of Enlil and the Wagon Star, as two of the temple's gates are named, was intended to connect the earthly residence of the chief Assyrian god with his heavenly home. In a detailed analysis of the architecture of the temple, M. Huxley showed the astro-theological symbolism implied in the northerly orientation of the courtyard and location of the throne room, evoked in the placing and naming of gates, and concluded that "the Assur temple's courtyard...was made to reflect an abbreviated 'map' of the visible heaven...to mirror the heavens as the scene of divine activity, to locate correctly the throne of Assur, which lay behind the Gate of Kingship in the northern sky, and to stress Assur's sovereign power in the annual assembly of gods."[11] On the question specifically of the heavenly universe itself as divine, not merely populated with celestial bodies identified with divinities, but heaven as a universal, total and therefore singular divine entity, cuneiform sources are not forthcoming. If, however, we take seriously the objections of the Epicureans, at least according to Cicero, or indeed of the apostle Paul, the idea of a divine cosmos and of the fixed stars and planets as divinities was a viable current of thought in the world of the late first century B.C.E. and into the first century C.E. It was a notion that Philo attributed to the "Chaldeans" in his *Migration of Abraham*: "These men [the Chaldaeans] imagined that this visible universe was

[9] See, for example, J.F. Wippel, "Thomas Acquinas on the Distinction and the Derivation of the Many from the One: A Dialectic between Being and Nonbeing," *The Review of Metaphysics* 38 (1985), pp. 563–590.

[10] SAA 12 86:10.

[11] Margaret Huxley, "The Gates and Guardians in Sennacherib's Addition to the Temple of Assur," *Iraq* 62 (2000), p. 134. I thank Beate Pongratz-Leisten for this reference.

the only thing in existence, either being itself God or containing God in itself as the soul of the world."[12]

It is legitimate to question Philo's attribution of "Chaldean" notions to the traditions of ancient Mesopotamia. His designation "Chaldean" no doubt points to the astrological thought of his time, as opposed to being a demonym for Babylonian natives.[13] We do not know what criteria Philo might have had for distinguishing between authentic Babylonian ideas and those descended from Babylonia but transformed in the mix of Hellenistic astrology. Allowing for the ambiguity in the designation "Chaldean" in this instance, the idea of the divine heaven that Philo refers to can be either a survival or an outgrowth of something Babylonian or, that it stemmed from a later, possibly Greek, idea. The possibility of a Greek origin seems to be at least more likely than a Babylonian one, as the idea of heaven itself as an all-encompassing divine entity is not attested in cuneiform texts. This leaves the theological and cosmological affiliation for the reference in Philo open for identification. One might look to certain Stoic ideas about the superiority and therefore divinity of the world.[14]

Naming a sky-god, AN in Sumerian, Anu in Akkadian, does not support such a far-reaching theological doctrine as expressed by Philo, but only that, like other parts of the visible world, the sky too was in some contexts deified, that is, made divine and personified as a god. Heaven, as the god AN or *Anu* in cosmogonic mythology, is, however,

[12] Philo, *Migration of Abraham*, 32.179.

[13] The Greek term *Chaldaioi* could be either the gentilic (demonym) for the Babylonians of southern Mesopotamia or, because the Babylonians were so often associated with astrological and astronomical knowledge, the term came to apply more generally to astrologers and astronomers. Chaldeans were priests of Bēl (Marduk) to Herodotus (*Histories* 1.181–184), which fits well with the identification of Chaldeans as astrologers and astronomers. Hellenistic authors (such as Pliny and Columella) use the term to refer to Babylonian scholar-scribes specializing in astral sciences, but after about the 2nd century A.D. the connotation is generally speaking that of "astrologer." Also allegedly from the 2nd century (possibly 3rd century, not before Porphyry), the "Chaldean Oracles," a collection of Hellenistic religio-philosophical verses (in hexameter), held great importance for Neo-platonists, and was largely sympathetic with gnosticism and the Hermetica. See Yochanan Lewy, *Chaldean Oracles and Theurgy: Mysticism, Magic and Platonism in the Later Roman Empire* of Hans Lewy, rev. ed by Michel Tardieu (Paris: Études augustiniennes, 1978), R. Majercik, *The Chaldean Oracles*, Studies in Greek and Roman Religion V (Leiden: Brill, 1989), Edouard Des Places, *Oracles chaldaïques*, 4th ed. (Paris: Belles Lettres, 2003), and R.T. Wallis, *Neo-Platonism* (London: Duckworth, 1972), pp. 105–110.

[14] Cicero, *De Natura Deorum* 2.13. 21 and ch. 14 (referring to Chrysippus' argument for the perfection and divinity of the world).

rarely treated on its own, but instead as the other half of earth/underworld. Heaven is never taken in the meaning "all" as we sometimes find for Greek *ouranos*, even in the following rare Assyrian medical ritual text that says: "There was Anu—Anu. Anu was the whole of the above, Anu was the whole of the below."[15] Though Anu may be the whole of the upper and lower regions, the passage still asserts the whole of the cosmos as divine Anu in terms of the duality heaven-underworld.

It is the case that in Mesopotamia the first cuneiform sign used to designate the word "god" appears in the image of a star.[16] The pictogram of a (usually) 8-pointed star denotes in the cuneiform script the words dingir/*ilu* "god," an/*šamû* "sky," as well as the sky god An/*Anu*. It is also already attested as the divine determinative in archaic Sumerian script in the early third millennium (Uruk IVa). The pictographic writing for the word "star" (mul) in turn was made up of three an-signs in a visual analog to a constellation.[17] The mul-sign, also attested in archaic script, not only depicts a cluster of stars, but also very plausibly conveys the idea that the stars were from the beginning conceived of as divine. Interestingly, the only other cuneiform sign made up of stars is read "nab" or "nap," which does not seem to be of Sumerian origin.[18] As a lexeme, "nab" is found only in a lexical list of foreign words for god, "nab" being the Elamite word for god and attested in Old Elamite.[19] Presumably, then, the phonetic nab/nap, which is not phonemic in Sumerian and therefore not original to Sumerian, came into the cuneiform script via Elamite.[20] But none of this tells us much and it is manifestly not the case that all gods were stars. Neither were all stars gods.

The use of these writings, "god" and "star," can also function as classifiers written in front of the name of a divinity or a celestial body, and so clearly constitute two different classes of things. We can then

---

[15] AMT 30:3,14 + ibid.18:11,6.

[16] See R. Labat, *Manuel d'Épigraphie akkadienne* (Paris: Imprimerie Nationale de France, 1948), p. 48.

[17] Ibid. p. 96.

[18] Ibid., p. 94. I thank Irving Finkel for pointing out this fact to me.

[19] CT 25 18 r.ii.

[20] Note also the phonetic reading nab for the mul-sign, possibly the result of the reading *nabāṭu* "to shine brightly" for the logogram MUL. I thank both Irving Finkel and Matthew Waters for their comments on "nab/p" and the Elamite sources (personal communications).

assume that the ancients thought there was a difference, but we still are very far from a definition of "god" in the Mesopotamian context. In the present discussion, I simply assume that personal divine names, such as ^{d}Nanna or ^{d}Sin the moon-god, or ^{d}Inana or ^{d}Ištar the Venus-god(dess), written with the divine determinative, can be referred to as gods, regardless of what that means in a theological sense. I also assume that the definition or description of such divine names requires the use of symbol, emblem, or transferred language to convey meaning. As with other words whose essence is difficult to define, perhaps the word god could only be defined ostensively, such as by looking at a celestial body accompanied by a pointing upward. But pointing and naming are not defining, at least not in the sense we would like for the Sumerian word DINGIR or the Akkadian word *ilu* that we translate as "god."

There are two broad classifications, or modes, of references to the divinity of the heavenly bodies in cuneiform sources. These different references represent perhaps mere manners of speaking, hence merely a different modality of meaning without implying any difference in conceptualization of the gods or the stars to which they refer. The first class, or mode, derives primarily from texts we classify as religious, such genres as hymns and prayers. Here the gods are referred to, or spoken of *as* celestial bodies., e.g. Inana is referred to *as* the planet Venus or Nanna *as* the moon. The celestial bodies in this mode of reference become visible embodiments of the divine, and so point to the perception or conception of god as heavenly body.

The second class of references is the converse, or transposition of the same terms. Here the celestial bodies are referred to as gods, i.e., as worldly objects that manifest divine agency and give perceptible form to certain deities. The key element in such passages is personification, in this case meaning that a celestial body is personified and so referred to as a god in an anthropomorphic way. The anthropomorphism of the stars is not an attribution to them of human form but rather of human-like agency, i.e., that they act in ways that sentient beings who hear, write, cry, answer prayers, and create things do. These are in fact all activities attributed to gods, and so by extension are attributable to heavenly bodies. Omen texts provide a major source for such references to personified celestial bodies, but traces of such personifications also appear in other astronomical texts. This mode of expression that points to the perception or conception of a heavenly body as an image of a god, therefore, occurs in a variety of genres.

These interrelated modes of reference may seem at first blush to be some kind of true logical conversion of the sort "some gods are stars" and "some stars are gods." But it is not the conversion or transposition that is of interest, but rather the nature of the relationship between divine and celestial. These modes of reference imply different things, the first (gods as stars) reflects something on the order of divine embodiment, say the moon-god as inherent or made manifest in the moon, and the second (stars as gods) seems to express the physical representation of the divine in an object of perception, i.e., the moon as the moon-god. The difference between the two modes of reference may be merely a function of mode of discourse, either god-talk or star-talk. The notions of divine embodiment on one hand and physical representation on the other may also seem somewhat irreconcilable, or even incoherent. Reserving judgment on these questions we first examine the notion of embodiment as expressed in references to the gods as celestial bodies.

Gods As Celestial Bodies: Embodiment

The association of gods with celestial bodies as a general idea may be a consequence of, as J.J. van Dijk noted, the dualism of the Sumerian world-view, i.e., the separation between above and below. Sometimes the same deity had an astral and a chthonic manifestation, e.g., ^{d}ama-ušumgal "(divine) sovereign mother" and ^{d}ama-ušumgal-an-na "(divine) sovereign mother of heaven," or ^{d}geštin "(divine) vine" and ^{d}geštin-an-na "(divine) vine of heaven."[21] Perhaps this dualistic practice underlies historically and conceptually the astral locus of the divine, giving rise as well to the idea of celestial bodies being physical counterparts of deities. The idea seems implicit in the practice of naming (mainly astral) gods So-and-So "of heaven" (*ša šamê*), attested from the Old to the Neo-Babylonian periods, as in the deities Šamaš-of-Heaven, Adad-of-Heaven, Sin-of-Heaven, and even Anu-of-Heaven, which means literally "heaven-god of heaven," again suggesting a categorical difference between sky and sky-god.[22]

---

[21] J.J. van Dijk, "Gott," RlA 3 (1969), p. 536.

[22] See P.-A. Beaulieu, *The Pantheon of Uruk During the Neo-Babylonian Period*, Cuneiform Monographs 23 (Leiden: Brill and Styx, 2003), p. 346.

An aspect of the conception of the divine that is significant for understanding the relation between deity and star is the idea of awesome divine radiance, expressed in both Sumerian and Akkadian religious discourse with the term me.lám/*melammu*. In Sumerian liturgy, for example, the radiance of the goddess Inana is a principal element in her description as the planet Venus. In the composition "Lugalbanda in the Mountain Cave," the moon-god Suen is referred to as "the astral holy bull-calf" who "shines in the heavens like the morning star," and "spreads bright light in the night."[23] Radiant light continues as a basic characteristic of the divine in later Babylonian mythology, e.g., in *Enūma Eliš* VI 156, Marduk's 9th name is *Namru* ("Bright One") whose epithet is "the shining god who illumines our ways." The synonymy of astral luminosity and divine radiance can be seen perhaps most obviously in the case of the sun-god Šamaš. So too his wife Aja was the personification of the morning light, or goddess of the dawn, as reflected by her Sumerian name ^{d}ŠÈ.NIR.DA = $^{d.šè}$šer$_{7}$-da which goes into Akkadian as *šērtu* "dawn." The name of the temple of the sun-god Utu/Šamaš, é-babbar "Shining (white, light) House," further reflects the idea of that god's great brilliance. And even though such descriptions as "huge" (mah), "bright" (kù) and "awesome" (ní) are common in Sumerian temple names, in this case certainly, the temple seems to be named for the principal feature of its patron god.

The brilliance and luminosity of a celestial body was seen as emblematic of its divine quality, and as a physical phenomenon such luminosity made the divine manifest in the world. It is difficult to know which way to make this association work to answer the question whether it was the primacy of divine radiance that originally attracted to it astral associations for individual deities or, indeed, whether the physical brightness of the sun, moon, and planets (Venus and Jupiter in particular) was primary and gave rise to the notion of luminous divine splendor.

Any discussion of the gods as celestial bodies must give due prominence to Nanna/Suen/Sin, the moon-god. Two principal aspects of the moon-god emerge already in the hymns to Nanna ascribed to Enheduana: one as the patron of the cattle herds and of dairy products, the other as the luminary "who comes out from the bright sky" to "brighten the land," and is called "ruler, fit for the clear sky." Another

---

23 ETCLS t.1.8.2.1:202–204.

descriptive name, ^{d}giš-nu$_{11}$-gal "alabaster," suggests the lustrous white appearance of the lunar disk. The horns of the moon-god, found especially in descriptions of the appearance of the lunar crescent, refer at once to the celestial as well as the pastoral aspect of the god. Hence the references to Nanna/Suen as a horned calf or bull can be understood as referring to both as well. The conceptualization of the moon-god as a bull is exemplified in the incantation known as "The Cow of Sin," where the god as a wild bull loves and impregnates the cow Geme-Sin and facilitates her giving birth. The association of the moon-god with cattle appears as well in the earliest iconography of the moon-god, such as on a Late Uruk period seal from Choga-Mish showing a god seated on a horned bull-throne and a small figure beside him holding up the crescent standard, all arranged inside another well-known emblem of the moon-god, the barge.

The moon-god's astral character dominates his portrayals in Akkadian hymns and prayers. Because the moon as a sign made known the "decisions" of the god Sin, the god as the moon was called upon in prayer and incantation to help make a haruspicy—liver inspection—propitious, invoking the moon-god: "Oh Sin, shining, radiant god, luminary of heaven, eldest son of Enlil . . . at the sight of Sin the stars are jubilant, the night rejoices."

Celestial Bodies As Gods: Representation

In the second mode of reference, celestial bodies can be said to be gods. All celestial bodies, stars, constellations, and planets were designated as mul "star." The planets were further distinguished by the term *bibbu*, a sheep of some kind, continually wandering off the path, and were said in the astronomical compendium MUL.APIN, to "keep changing their positions." The text also instructs that "on the day they become visible, you present offerings to them." In celestial omen texts, the heavenly bodies are visible indicators of divine will. But how? One can argue that the gods produce the phenomena, at a remove from themselves–we note the use of the transitive verb *šakānu* in the meaning "to bring about" or "cause," as in the incantation "against the evil of the eclipse of the moon which Sin the moon-god made" [*ina lumun attalî Sin ša ina MN . . . iškunu*], or indeed, in the grammar of any eclipse omen "If (Sin) makes an eclipse on such-and-such a day."

An expression found in the opening lines of *Enūma Eliš* Tablet V also serves to separate the stars from the gods, calling the stars the "likenesses" of gods. The word *tamšīlu* "image" or "counterpart" in this passage conveys the idea that the stars are not themselves gods, but represent physical counterparts to the gods. The invocation of the constellation Ursa Major in the prayer for an ominous dream may also illustrate this idea in a manner reminiscent of the identification of the body parts of one god with other gods viewed as lesser powers. The prayer describes features of the constellation as representations of a number of deities

> O Wagon Star, heavenly wagon!
> Whose yoke is Ninurta, whose pole is Marduk,
> whose side-pieces are the two heavenly daughters of Anu

The astrological compilation known as the "Great Star List" contains many identifications of celestial bodies (mul's) and gods (dingir's). Among the more comprehensible entries are found the equations "Venus is (the goddess) Ištar, queen of all lands" ($^{\text{mul}}$dil.bat (=) $^{\text{d}}$*ištar bēlet mātāti*) and "The constellation Scorpius is (the god) Išhara" ($^{\text{mul}}$gír.tab (=) $^{\text{d}}$*išhara*). In this list a deity may be correlated with many more than one star, planet, or constellation, again, I would say, underscoring the distinction between the categories "god" and "star." Another well-attested identification is that of the Pleiades as the "Seven gods" ($^{\text{d}}$7.BI= *Sibitti*). And in a commentary text a series of celestial bodies are identified with the god Aššur: "Jupiter is the star of Sin and Sin is Aššur; the MÚL.MÚL-star [that is the Pleiades] is Aššur; the Yoke-star is Aššur ... the *ikû*—constellation is the seat of Aššur."[24]

Many celestial phenomena in the omen texts are described by means of personifications: the sky shouts, planets confront each other, wear crowns and clothing, carry radiance, have anthropomorphic physical attributes, e.g., a head, eyes, a beard. There are of course numerous "merely" empirical descriptions, such as "on the first day the light is red and the day is gloomy," or "Venus at her appearance goes progressively higher." These do not clue us into the conception of the stars as images of deities, but a strong correlation between the stars and the gods emerges in the way the omen texts denote each planetary

[24] G. van Driel, *The Cult of Aššur* (Assen: Van Gorcum, 1969), p. 97 BM 121206 lines 53–60.

body. I will give just two examples: In lunar omens, the word "moon" *sînu* (*suênu*), derived from the Sumerian divine name, is not used. The word *suênu* could be used to refer to crescent-shaped objects, but when referring to the moon itself, the name of the celestial object was synonymous with the Akkadian divine name of the moon-god, Sin. Divination texts favor the symbolic writing 30, referring to the schematic or ideal length of the lunar cycle, but this was frequently written with the divine determinative, and denoted the moon as the embodiment of the moon-god. Yet in celestial divination the moon is not of interest for its behavior as a god per se, but for its appearances on various days of the month, whether it appears "early" or "late," or for other appearances, say of the full moon or of eclipses, all of which can be described in the "empirical" language just mentioned.

The second example is Venus, for whom a plurality of divine names are used to designate the planet, i.e., Dilbat, Ninsianna, and Ištar (written ^{d}EŠ$_{4}$.DAR or ^{d}15) as well as Ištar of the Stars (^{d}15 MUL.MEŠ). In the Ur III period, the planet Venus was called Ninsi'ana ("Lady Light of Heaven"). In addition, she was associated with Šamaš at sunrise and Ninurta at sunset. Her dual gender shows up in omens as well, e.g., "If Venus rises in the East, she is female, favorable; if she is seen in the West she is male, unfavorable."[25] Omens in EAE 59–60 for the male Venus planet, the evening star, include his having a beard, an image also represented in some cylinder seals. Other traces of anthropomorphic language occur in the Venus omens, when the planet wears a crown, or "has a head" or "a rear," all of which have astronomical explanations, but would make no sense without the underlying identification between celestial body and deity.

Although aimed at physical descriptions of phenomena, the omen texts and related material contribute to the evidence for the idea that celestial bodies were regarded as divine. From this point of view they are entirely consistent with the perspective of religious texts that attest to the astral aspects of some deities. Thus Marduk could be spoken of as $^{\mathrm{MUL}}$*Nēbiru* "the Ford", in which form he could be "the bearer of signs to the inhabited world" or "show a sign at his rising." These lines do not support the idea that the gods are removed from the phenomena

[25] Reiner-Pingree BPO 3, pp. 82–3 K.800:7–9, pp. 213 and 223 K.3601+ rev. 31–32, pp. 237 and 241, ND 4362:27; cf pp. 248–9 line 57 said of Mercury and see Pingree's notes on p. 20.

and that the phenomena simply move to demonstrate the god's will, as though the cosmos were a physical realm controlled by but separate from the divine. Indeed, in some contexts the heavenly bodies seem to be more than mere mediators. They are not only personified, but are also referred to and sometimes addressed as gods.

Another relevant expression is the Akkadian phrase "gods of the night" (*ilāni mušīti*), attested in a number of prayers from Old to Standard Babylonian as well as in epistolary Neo-Assyrian. In the prayers to the "gods of the night" the stars and planets are conjured and offered sacrifice so that "I may obtain what I want!" The stars and constellations are addressed as agents with the capacity to produce signs from which the future can be divined. Two Old Babylonian copies of this "nocturnal prayer" say that the "gods and goddesses of the country," here Šamaš, Sin, Adad and Ištar, have "gone home to heaven to sleep" (lines 5–7), in which case they give no verdicts, i.e., do not send signs, whereas the visible constellations invoked at the poem's conclusion, the Fire-star, Irra, Bow-star, Yoke-star, Orion, Dragon-star, Wagon, Goat-star, Bison-star and Serpent-star, are asked to "put a propitious sign in the lamb I am blessing now." To ensure that the extispicy of the next morning will go well, the speaker in the prayer addresses the constellations as gods who have power to be, using E. Reiner's expression, "harnessed." The opening invocation of the ritual text against sorcery, *Maqlû* "Burning," not only calls upon the "gods of the night," but also the personified watches and night itself, "night, veiled bride." The gods of the night are also invoked in the *mīs pî* ritual for the purpose of sanctifying the divine statue. In the Babylonian version of the ritual, 24 altars are set up to the gods of the night, enumerated as the seven planets, six named stars of the path of Enlil, four of the path of Anu, four of the path of Ea, and three for stars of Anu, Enlil and Ea left unnamed, presumably meaning all the rest of them. The invocation of stars as gods is of course what we call astral magic, and is by virtue of the mode of reference to the celestial bodies as gods direct evidence for the notion of divine embodiment.

The planets are referred to as gods in the astronomical compilation MUL.APIN, as already noted. This text is interested in the positions of the planetary gods, so defines them as "the six gods who have tars of the sky (which the moon touches) and keep changing their positions (relative to the stars)." Another passage in MUL.APIN defines the planets as gods to whom one makes offerings. The collective designation of the stars as "divine judges" in the prayer to the gods of night evokes the same principle, making explicit the personification of the stars as gods who by their appearances displayed each night against the sky make their decisions evident to the trained eye. In a prayer to Ninurta as Sirius, the supplicant, the son of the haruspice, awaiting the appearance of the celestial manifestation of the god, i.e., Sirius at night, calls upon Ninurta to give judgment: "I have my hands raised, take your station in the middle of the sky and hear what I say." The prayer closes with the rubric "prayer to Sirius when it stands at sunrise," demonstrating that the prayer addresses the god as star and the star as god at the same time.

Even in the reports from scholars to the Sargonids, when blessings to the king are offered and the names of celestial bodies are given, they are referred to explicitly as gods: "Aššur, Sin, Šamaš, Adad, Nusku, Jupiter (called Sagmegar), Venus (called Dilbat), Marduk, [Zarpanitu], Nabu, Tašmetum, Saturn (called dUDU.IDIM.GUD.UD) Lady [of Nineveh], ... the great gods of heaven and earth, the gods dwelling in Assyria, [the gods] dwelling in Akkad, and all the gods of the world. . . ." *Šuilla*, or "hand lifting" prayers, recited before Sin, Pleiades, Sirius, Mars, Vega and other stars are reported to the king with the assurance that "hand-lifting" prayers are recited only on propitious days. Despite these measures, the exorcist Marduk-šakin-šumi suggests that additional "hand-lifting" prayers be performed "before the moon-god," and expresses concern about "this observation of the moon," again showing the moon-god and the moon to be one and the same. Such actions presuppose an anthropomorphic conception of the stars as divine agents ready to hear the prayer and act favorably on behalf of human beings, however the invocations to personified celestial bodies suggest that in these instances the god and the celestial body are united in one divine nature.

In a report concerning the day of opposition, the scholar Issar-šumu-ereš quotes the king's question to him: "How did you observe that the gods saw each other?", and the answer is "before daybreak, when he whom the king, my lord, knows revealed himself." The language used here is clearly anthropomorphic, as it personifies the moon in the expression "he revealed himself"; yet the next statement, "we saw where the moon was standing—it was an observation," shows that the omen phenomenon was not a strictly metaphysical experience, i.e., one involving contemplation of the deity, but, perhaps above all, an empirical one.

The evidence from references to stars as gods presents a somewhat more complex picture of the divine-celestial relationship as compared against references to gods as stars. Notions of divine embodiment, of divine representation, as well as the idea of heavenly bodies as being at a remove from the gods who from their place on high produced the phenomena so that human beings could observe them and foretell the future; all these ideas seem to be supported by textual evidence. Perhaps the differences are a superficial function of the mode of expression adopted, i.e., star-talk versus god-talk, and belie an underlying consistency of conception. Or perhaps these are distinct strains of thought on the subject that require disentanglement from the texts.

The Divine Cosmos

If we look to cosmology for a way to make consistent sense of these modes of discourse, and for more direct evidence of the conception of the divine heaven, we do not find a picture that reconciles within it the modalities of god-talk and star-talk. The drawing of the stars on the sky by the god Marduk is specified in a scholastic commentary, which states that "the lower heaven of jasper is of the stars," and that Marduk "drew the constellations of the gods on it." The cosmographical image here is of heavenly levels that house various gods, the lowest heaven being visible to human beings and displaying the "constellations of the gods" drawn on (*ina muḫḫi*) its surface of jasper stone. The heavens are described as being populated by gods and stars. The highest heaven belonged to Anu and was populated with 300 Igigi. Middle Heaven also belonged to Igigi gods, and Marduk had his throne dais there. According to this description, the gods inhabit a different realm from the stars, higher and not visible. The image of the lower heavens as a beautifully decorated stony surface contrasts in this depiction with what must be a divine realm of agency and will beyond the sensory reach of mankind, but nonetheless part of the world as a whole.

The beginning of *Enūma Eliš* Tablet V deals with the order and regularity of the appearance of heavenly bodies, describing features of the heavens as the work of Marduk. Marduk arranged the stars into constellations, the "images"of the gods themselves. By means of the fixed stars he organized the year into twelve months, marked by the (heliacal) risings of three stars in each month in their specified "paths."

These paths, named for Anu, Enlil, and Ea, were in fact used in early Babylonian astronomical texts such as MUL.APIN, the Astrolabes, and their derivatives as a reference system for positions of stars and constellations. Marduk was the creator of the heavenly domain and all that was visible in it. But the notion of the world as separate from the divine, as creation is separate from creator, is belied by other references, for example, to Marduk himself shining in the cosmos as the planet Jupiter.[26]

The plurality of ways of speaking about the divine that confronts us in cuneiform sources adds to the complexity and difficulty of understanding the relation between gods and physical entities, such as the stars or the cosmos itself. From the point of view of the Mesopotamian polytheistic cosmos, the idea of the world presupposed a notion of the divine, but seemed to permit such contradictions as divinities removed from the physical world in a kind of transcendent relation to the visible or material plane and/or as active forces within visible physical phenomena in a relation more akin to immanence. The ambiguity inherent in the Mesopotamian sources persists into later periods. Both of these relationships are evident in the account of Chaldean astrology by Diodorus Siculus, who in the first century B.C.E. wrote about the "Chaldeans" in his universal history (Bk.2.30–31).

Diodorus did not report wholly accurately on "Barbarian" history and culture, but each of the two possible relations between god and star are reported in this work. He says that the Chaldeans considered the planets instrumental in predicting the future. He says the planets, whom he refers to as "Interpreters" (ἑρμηνεῖς), "by virtue of following each its own course, point out future events, thus interpreting to mankind the design of the gods. For sometimes by their risings, sometimes by their settings, and again by their colour, the Chaldeans say, they give signs of coming events to such as are willing to observe them closely."[27] By this account, the gods are separate from heavenly bodies, which appear by divine design as signs of future events. In his description of the thirty stars (or "decans," an Egyptian doctrine erroneously attributed to the Babylonian astrological system), however, he claims these stars were designated "as 'counselling gods'," and that "twelve of these gods, they say, hold chief authority, and to each of these the

---

[26] See my "Marduk in Heaven," WZKM 97 (2007), pp. 433–442.

[27] *Bibl.Hist.* 2.30.4.

Chaldeans assign a month and one of the signs of the zodiac, as they are called."[28] Though the attribution of "decans" to the Babylonians is not legitimate, the notion of the stars as gods is. Diodorus' report evokes correctly the Babylonian idea that celestial phenomena made manifest the attributes and the agency of certain deities. Because the particular character of divine will and the attributes of particular gods were understood in human terms, i.e., the gods' capacities for action in various arenas such as in warfare, justice, or sovereignty, the dominant conceptualization of the gods in cuneiform evidence was fundamentally anthropomorphic, in the sense of their having agency and personhood.[29] In the context of their being identified with gods, I think the same can be said for the stars in so far as they are referred to as anthropomorphic deities.

The Assyro-Babylonian sciences of celestial divination and astral magic are furthermore predicated on an anthropomorphic notion of deity. Each requires that the heavenly bodies, as gods or as the images of gods, communicate with human beings, hear their prayers and answer them. Hymns occasionally refer to the gods "knowing," e.g., Šamaš "knowing both the righteous and the evil," or indeed other gods *not* knowing "the designs" of the moon-god.[30] Granting this, we have a case for an Assyro-Babylonian notion of the gods' and by extension the heavenly bodies' awareness of human beings. Celestial signs appeared for mankind to know the future. The gods, either through the stars, or as stars, made future events known, literally gave their "judgments," to human beings in the form of their ominous appearances. This relation between the stars and the gods makes sense of the personification of heavenly bodies in omen texts.

As seen from an Aristotelian viewpoint, however, the attribution of intelligence to the stars was possible without personification. According to the argument given by Cicero and ascribed to Aristotle, "the stars occupy the region of aether, and as this has a very rarefied

[28] *Bibl. Hist.* 2.30.6–7.

[29] Even with reference to the Assyrian supreme god, Aššur, whose transcendence Parpola has discussed in a number of articles, it seems worth noting that the epithets given this deity are highly anthropomorphic, e.g., "the creator" (*bānû*), "the one who pours out" (*šāpiku*), "the one who builds" (*pātiqu*), "the one who resides" (*āšibu*), "the one who decrees" (*mušimmu*), as in SAA 12 86:7–11, cited by Parpola in "Monotheism in Ancient Assyria," p. 170 note 12.

[30] Cf. Ps. 82:5 "they (the gods) have neither knowledge nor understanding, they walk around in darkness."

substance and is always in lively motion, it follows that the animal born in this region has the keenest senses and the swiftest power of movement; hence since the stars come into existence in the aether, it is reasonable to suppose that they possess sensation and intelligence. And from this it follows that the stars are to be reckoned as gods."[31] Here cosmology is determinative of the way the divine nature of the stars is defined. That is, the assertion that the stars are divine is predicated on the ideas both of the existence of heavenly aether and of a cosmic domain and everything in it consisting of that substance. A variation on this argument, that the world is divine and sentient, is given in the form of a syllogism attributed to Zeno: "Zeno also argued thus: 'Nothing devoid of sensation can have a part of itself that is sentient; but the world has parts that are sentient; therefore the world is not devoid of sensation.'"[32] He extends the syllogism to argue for the animate and rational nature of the world.[33] In the conceptual realm of Mesopotamian cosmology and astro-theology, however, these ideas appear foreign.

It may be tempting to appeal to notions of transcendence and immanence when trying to characterize the Babylonian theology that gives rise to images of the divine and its relation to the universe.[34] I think, however, it is ultimately not very helpful. Though the word "transcendence" can certainly have a non-theological usage, said of something that is above and beyond in excellence, even other-worldly, its usual connotations are religious, specifically Christian, and refer to the excellence and other-worldliness of God, and the notion of God as being above and outside the universe, His creation. Immanence, on the other hand, also can pertain to things in general, etymologically "being within" or not exceeding a given domain. But in a religious context, again mostly Christian, immanence connotes the existence or presence of God inside creation, within the world. It would be misleading to import such theological notions to ancient Mesopotamia or somehow to shape the ideas contained in cuneiform texts into this mold.

---

[31] Cicero, *De Natura Deorum* 2.15. 42, according to Rackham, possibly referring to the lost *De Philosophia*.
[32] Ibid. 2.8.22.
[33] Ibid.
[34] As Parpola, see "Monotheism in Ancient Assyria," especially pp. 167–70.

Explicit expressions of the surpassing nature of certain gods are indeed attested to in religious cuneiform texts. Such passages are concerned to describe the god as surpassing in size or greatness anything known in the world, yet these descriptions are without exception drawn in terms of the world. Thus Ningirsu appears to Gudea in a dream as a figure "like heaven and earth in extent," and in Lugale, Ninurta "arose, touching the sky, with one step (?) he covered a league." One such elaborately developed description of the enormity of a god is found in the hymn to Ninurta in which Ninurta's face is the Sun, his eyes are Enlil and Ninlil, his mouth is Ištar of the stars and Anu and Antu are his lips, and other parts of his head, neck, chest and shoulders are other astral figures. In this way, the heavens become a mere portion of the "body" of the god Ninurta. The scale of the world as something dwarfed by the imagined greatness of Ninurta is also shown in the hymn to Gula in the description of the god wearing the heavens on his head, like a tiara and wearing the netherworld on his feet like sandals. Marduk's exceeding greatness is equally well expressed in a prayer recited to that god during the Babylonian New Year's festival, in which the priest states "the expanse of heaven is (but) your insides." And Nanna/Sin is said to fill "the wide sea" and "the distant heavens" with his divinity. Accordingly, a natural phenomenon, such as storms, the sky, the sun or the moon, might become the embodiment of a divine power or the manifestation of a deity envisioned in anthropomorphic terms, but such a conceptualization of divine power cannot be contained within the limit of a single natural phenomenon. These expressions of the cosmic proportions of divinity are paralleled in later antiquity, e.g., from Porphyry's *Cult of Images* in which, according to Pépin, an Orphic Hymn is quoted, "the main idea of which is to identify the details of Zeus's person with the reality of the universe. The head and face of the god are the sky surrounded by the stars as hair. His eyes are the sun and the moon and his intellect is the aether, etc.—in short, everything here below is contained in the great body of Zeus,"[35] and "Zeus is then the whole cosmos."[36]

With respect to the Mesopotamian deities and their heavenly abode, both notions, being within and also outside of the visible universe, were expressible. Thus, Sin, as divine agent removed from the visible

[35] See J. Pépin, "Cosmic Piety," p. 421.
[36] Ibid., and note 25.

lunar disk, could be said to "show" the eclipse just as the eclipse could be described in terms of its being the despondent moon-god himself in mourning. Of course it may be that these are "mere" manners of speaking and not in fact reflections of a theological tension between ideas akin to immanence and transcendence. I would still argue that such differences in modalities must at least be grappled with even if we are reluctant to read them in the light of theological concepts borrowed from Christianity, Platonism or Hellenistic religion, and therefore carrying overtones of a relation between God and His creation that is absent from the ancient Near East.

In Christian contexts the relation between cosmology and theology often calls to mind arguments designed to deal with the question of the very existence of God, the cosmos itself being regarded as proof of the existence of the divine creator. But the Christian tradition explicitly condemned the notion of the divine cosmos. In his letter to the Galatians, Paul denounced the cult of the astral. He said, "Formerly, when you did not know God, you were in bondage to beings that by nature are not gods; but now that you have come to know God, or rather to be known by God, how can you turn back again to the weak and beggarly elemental spirits, whose slaves you want to be once more?" (Galatians 4:8–11) And this same condemnation was grounded in the Hebrew Bible (Deut 4:19), in a speech of Moses to the Israelites: "Beware lest you lift up your eyes to heaven, and when you see the sun and the moon and the stars, all the host of heaven, you be drawn away and worship them and serve them, things which the Lord your God has allotted to all the peoples under the whole heaven." The Judeo-Christian cosmos is a divine creation, but is no longer to be venerated as itself divine. In a statement that effectively disavowed the personification and intelligence of heaven, and of heavenly bodies, Paul implied in the passage just quoted that the cosmos does not or cannot know us; we are known only by God. In its opposition to all forms of association of cosmos and divinity, the various threads of theology and cosmology from the ancient Near Eastern and Hellenistic Greek traditions seem drawn together in relative sympathy.

In another vein, Philo's objection, that God "can contain, but cannot be contained," (*Migr. of Abr.* 32.182) is stated in conscious opposition to what he says of "Chaldean opinion," i.e., that "this visible universe was the only thing in existence, either being itself God or containing God..." (32.179) Philo enjoins humanity to "come down therefore from heaven" (185) because knowledge of the divine is not to be sought in "every detail respecting the movements of the sun, and of the circuits of the moon, and of the glorious rhythmical dances of the other constellations," but in our own mind (that is "nous"). (186) Philo's cosmos, as that of his Platonic underpinning, however, is spherical, and his notion of the All as that which "can contain but cannot be contained," whether God or deified Cosmos, does not sit well within Mesopotamian culture, where neither earth nor sky were spherical and therefore did not carry the connotations of finitude and containment that are possible in a spherical universe. If such ideas of a divine cosmos are not Mesopotamian but Hellenistic in origin, they bear the traces of earlier expressions of divinity in heaven. These assuredly Mesopotamian associations of gods and stars infused Babylonian celestial divination as well as, eventually, Hellenistic ("Chaldean") astrology. Although Philo was a contemporary of the late Babylonian scribes of *Enūma Anu Enlil* who continued to copy cuneiform astronomical texts throughout the period of his lifetime, different images of the world and of god were at stake, as they also were for Aristotelians or Stoics.

From the emergence of a theology concerning the heavenly bodies, reflected in Sumerian mythological works and Akkadian divinatory scholarship, to the expressions of religious and cosmological philosophy in the first century C.E., the relation between gods (or God) and the heavens was seen in a multiplicity of ways. The terms of the discussion, whether the stars were divine and sentient (anthropomorphic) or merely physical elements of creation, or indeed whether the cosmos as a whole was divine or merely a physical creation of a god occupying some metaphysical space beyond the world, may have had a degree of commonality, but, as Long suggested in the passage quoted above, the meanings attached to these terms are subject to cultural differences. The use of the term "cosmos" within the framework of Mesopotamian culture is already problematic.[37] The beginnings of such questions about the divine and the physical world are embodied already in cuneiform texts concerning the gods and the stars, but a divinization of the cosmos as a single entity is not reflected in Mesopotamia. As Babylonian traditions with their modes of reference to the gods and the stars and their relation to one another came to the attention of

[37] See my "Mesopotamian Cosmology," in Daniel Snell, ed., *Blackwell's Companion to the Ancient Near East* (Oxford: Blackwell Publishing, 2005), pp. 316–329.

Hellenistic intellectuals, and it is certain that they did as evidenced most clearly in the transmission of the astral sciences of astronomy and astrology from Mesopotamia to the Hellenistic Greek world, elements of theological and cosmological speculation on the divinity of (or in) the heavens both responded to and diverged from what was understood to have been "Mesopotamian" opinion on the matter, and the notion of the divinized cosmos emerged outside the boundaries of Mesopotamian culture.

CHAPTER SEVENTEEN

A SHORT HISTORY OF THE WATERS ABOVE THE FIRMAMENT

Within the biblical account of creation is embedded an element of cosmology, the origins of which are to be found in ancient Near Eastern mythology but the lasting impact of which was felt through the Middle Ages and into the early Renaissance. I refer here to the "waters above the firmament":

> And God said, "Let there be a firmament in the midst of the waters, and let it separate the waters from the waters." And God made the firmament and separated the waters which were under the firmament from the waters which were above the firmament. And it was so. And God called the firmament Heaven.[1]

For centuries, the meaning of these "waters" raised questions for all interpreters of the second day of creation, from the early Christian fathers such as Origen (185–254 C.E.) and Augustine (354–430 C.E.) to scholastics of the Middle Ages such as Aquinas. Whether the supracelestial waters represented physical matter in a literal reading of Genesis 1 or whether they symbolized some immaterial cosmic realm understood within a Platonic or Aristotelian cosmological context set the terms for exegesis and debate. Yet throughout the period from late antiquity to the Middle Ages, none of the natural philosophers or theologians who engaged with the cosmological implications of the biblical six days of creation had the luxury of recognizing the ancient Near Eastern background of the "waters above the firmament." Yet this ancient Near Eastern mythological motif entered the stream of Western cosmological thought and remained, albeit reinterpreted,

---

[1] Gen.1.6–8 Annotated Bible, Revised Standard Version. Cf. the translation of the JPS, *Tanakh, The Holy Scriptures* (JPS, 1985): God said, "Let there be an expanse in the midst of the water, that it may separate water from water." God made the expanse, and it separated the water which was below the expanse from the water which was above the expanse. And it was so. God called the expanse Sky. Another reference to the waters above is also found in Ps.148.3–4: Praise him, sun and moon, praise him, all you shining stars! Praise him, you highest heavens, and you waters above the heavens!

as part of the picture of the world until the final dismantling of the ancient-mediaeval world-view. This paper assumes an extra-biblical Near Eastern background for this element of the biblical account of creation, without going into the details of the reflections of specific myths or texts, and thus the specific debt of "P," the "Priestly" author of the Book of Genesis, and follows the history of the cosmic waters "above the firmament" to later formulations in the cosmologies of mediaeval European natural philosophy.

Both sides of this history, from the cosmic waters of the ancient Near East to those of Mediaeval Europe, are well-known within their respective historiographies. The idea that there is a relationship between the Book of Genesis and Near Eastern mythology goes back to H. Gunkel's *Schöpfung und Chaos in Urzeit und Endzeit: Eine religionsgeschichtliche Untersuchung über Genesis I* of 1895. Of course the biblical contribution to the formation of a European cosmology was repeatedly analyzed and explicated in the Hexaemeral treatises of the Middle Ages. But the link between these two historical extrema, the Near Eastern and the Mediaeval, with respect to the supracelestial waters, has not so far been a focus of discussion. In this short paper, I will not detail the extensive literature of either aspect of the history of the supracelestial waters, i.e., the relation between the Bible and Near Eastern mythology or the later developments in conceptions of the cosmic waters in the early Christian and Mediaeval periods. My purpose is merely to draw attention to the supracelestial waters as a literary motif and a cosmological conception that joins ancient Near Eastern creation mythology and cosmology to later Christian and European cosmogonic and cosmological ideas.

Two essential elements in Mesopotamian cosmogonic mythology are that the world came to be first from an original watery state and second as a result of the separation of heaven and earth. The original watery state of the world before anything else was created was personified as the goddess Nammu, whose epithet Amatuanki "mother who gave birth to heaven and earth" evokes her cosmic status.[2] The cosmic regions above and below that emanated from her became the two principal elements of all further cosmic evolution. An Early Dynastic Sumerian myth introduces heaven and earth before any other gods

[2] See K. Tallqvist, *Akkadische Götterepitheta* (Hildesheim and New York: Georg Olms, 1974), p. 262.

had come into being and before sunlight or moonlight existed.[3] There heaven "An" and Earth "Ki" are personified as divine parents[4] who would produce successive generations of gods. A chief attribute of the divine sky was its generative powers, often expressed metaphorically in terms of the sky's rains as semen engendering the vegetation on earth.[5] Another principal formulation of cosmogony was the separation of heaven from earth. That the separation was brought about variously by Enlil or by being "carried off" by An himself is not important. The idea is that the gods An and Enlil, who were associated with the regions heaven and earth, by taking these cosmic regions as their domiciles, established boundaries between these places that simultaneously made them exist where they had been undifferentiated before. The prologues to several Sumerian literary works, "Gilgamesh and the Huluppu Tree," the "Creation of the Pickax," and "Enki and Ninmah," attest to this idea.

The primacy of water, then, was known in Mesopotamia, and took a variety of literary forms. The latest formulation can be seen in the third century B.C. *Babyloniaca* of Berossus where in the beginning everything was "darkness and water," and the ruler over all creatures was the female Thalath or Greek Thalassa, "sea."[6] Interestingly, the alternative rendering of this passage, given by Polyhistor, refers not to the division of the waters of the sea, but rather to the separation of earth and sky.[7]

In addition to the various theogonies and myths of separation, stories of conflict between cosmic divine forces, such as between a storm-god and the enemy sea waters,[8] are found across the ancient Near Eastern geography, from Ugarit (Baal and Yam) to the Tigris-Euphrates River Valley (Marduk and Tiamat), and including ancient Israel (Yahweh

[3] Å.W. Sjöberg, "In the Beginning,"in T. Abusch ed., *Riches Hidden in Secret Places: Ancient Near Eastern Studies in Memory of Thorkild Jacobsen* (Winona Lake, IN: Eisenbrauns, 2002), pp. 229–239.

[4] Sjöberg, "In the Beginning," p. 231, AO 4153 ii 1.

[5] L. Cagni, *L'Epopea di Erra*, Studi Semitici 34 (Rome: Istituto di Studi del Vicino Oriente, 1969), p. 61, line 28 and CAD vol. 14:252–253 s.v. *reḫû* lexical section and mng.2.

[6] S.M. Burstein, *The Babyloniaca of Berossus* (Malibu: Undena, 1978), p. 14, Book I.2.1–2.

[7] Ibid., p. 15 in I.2.3b. See note 16.

[8] Alberto R.W. Green, *The Storm-God in the Ancient Near East*, p. 176 for further bibliography on the Ugaritic origins of *Enūma Eliš*.

and Rahab, Leviathan). Leviathan occurs in Ugaritic[9] where it seems to be a sea-serpent or dragon. C. Uehlinger calls Rahab a "late exilic adaptation of Leviathan, possibly supplemented from Babylonian Marduk theology."[10] Both were fantastic monsters associated with the sea, but the sea itself was also personified in Ugaritic as the proper name Yam, and Baal's kingship is tied to his battle with this deity.

Biblical reflections of the theme of cosmic conflict are particularly clear with reference to Rahab, as illustrated by the following from Job 26:12–13:

> By his power he quelled the Sea,
> By his cunning he smote Rahab.
> By his wind he bagged the Sea,
> His hand pierced the fleeting Serpent.[11]

Whether the cosmic battle described here relates to creation, making Yahweh the equivalent of Baal, has been a matter for some debate.[12] Isaiah 51:9–10 does not seem to relate the cosmic battle to the act of creation:

> Awake, awake, put on strength, O arm of the Lord; awake, as in days of old, the generations of long ago. Was it not Thou that didst cut Rahab in pieces, that didst pierce the dragon? Was it not thou that didst dry up the sea, the waters of the great deep; that didst make the depths of the sea a way for the redeemed to pass over?

Psalm 74:12–17, however, makes clear reference to cosmogony in connection with subduing the personified Sea and its monsters:

> Yet, O God, my king from of old,
> Maker of deliverance throughout the world,
> You are the one who smashed *Sea* with your Might,

---

[9] As *ltn* in KTU 1/5, I: 1 and 28. See Manfried Dietrich, Oswald Loretz and Joaquín Sanmartín, *The Cuneiform Alphabetic Texts: from Ugarit, Ras Ibn Hani and other places*, 2nd enl.ed., Abhandlungen zur Literatur Alt-Syrien-Palästinas und Mesopotamiens, vol. 8 (Münster: Ugarit, 1995), p. 22.

[10] C. Uehlinger, "Leviathan," in van der Toorn, Becking and van der Horst eds., *Dictionary of Deities and Demons in the Bible* (Grand Rapids, MI: William B. Eerdmans, 1999), p. 512.

[11] Cf. Job 9:8.

[12] See Carola Kloos, *Yhwh's Combat with the Sea: A Canaanite Tradition in the Religion of Ancient Israel* (G.A. van Oorschot: Amsterdam/E.J. Brill: Leiden, 1986), pp. 85–6; also Mary K. Wakeman, *God's Battle with the Monster* (Leiden: Brill, 1973), and John Day, *God's Conflict with the Dragon and the Sea: Echoes of a Canaanite Myth in the Old Testament* (Cambridge, London, New York: Cambridge University Press, 1985).

> Cracked the heads of the *Tannin* in the waters;
> You are the one who crushed the heads of *Leviathan*,
> Left him as food…
> You are the one who broke open springs and streams,
> You are the one who dried up the Mighty Rivers.
> To You belongs the day, Yours too the night,
> You are the one who established the Light of the Sun.
> You are the one who fixed all the boundaries of the world,
> Summer and winter—it was You who fashioned them.

Unlike in Ugaritic mythology, however, the sea became a mere representation of an obsolete god in the biblical reworking, demoted to the rank of a demon rebelling against the Almighty. These biblical passages echo yet a third, but later, Mesopotamian cosmogonic theme developed in the composition *Enūma Eliš*.[13] This work presents the most articulate Mesopotamian version of the theomachy between storm/creator (Marduk) and the waters (Tiamat, i.e., Akkadian *tâmtum* "sea"). Marduk as the personification of the storm is clear in the choice of arms marshaled against the enemy. In addition to the bow, arrow, and mace, Marduk (EnEl IV 39–43) used thunderbolts and, with Tiamat enclosed in his net, "he deployed the four winds that none of her might escape (EnEl IV 42)."

In *Enūma Eliš*, the creation of the sky from the body of "the sea" is distinct from the cosmogony found in Sumerian mythology in which An "heaven" came into existence as a result of its separation from earth. The triumph of Marduk against his cosmic foe is the prerequisite to his establishment of cosmic order, manifested in the fixing of boundaries. In this account, the primeval divine parents, Apsû and Tiāmat, were themselves waters, Tiamat the ocean and Apsû presumably the fresh waters. The name Tiamat is derivative of the Akkadian word for "sea" *tâmtu*[14] and Apsû is a Sumerian loanword into Akkadian for "deep water" or "cosmic subterranean water" *apsû*. At the very moment of the beginning of the world, these two "mingled their

[13] Just how much later is a matter of debate, and suggestions range from the early part of the second half of the second millennium (with Jacobsen) to the late second millennium period of Nebuchadnezzar I (with Lambert) to the early first millennium (with Abusch). See the discussion in Abusch, "Marduk," in van der Toorn, Becking and van der Horst eds., *Dictionary of Deities and Demons*, p. 547.

[14] W.G. Lambert, "The Cosmology of Sumer and Babylon," in Carmen Blacker and Michael Lowe, eds., *Ancient Cosmologies* (London: Allen and Unwin, 1975), p. 55 where he cites Jacobsen, the same reference on p. 70 for equation of *Tiāmat* and Tehôm "the deep."

waters" (*mêšunu ištīniš iḫeqqūma* EnEl I 5) The parental cosmic waters, salty and fresh, function in place of the goddess Nammu in this late composition. The poet develops a cosmological image that resolves the old Sumerian element of the celestial "waters" that produced rain, dew, etc., with the waters of the vanquished sea-monster, whose body (literally of water) was used to form heaven:

> The Lord calmed down, he began inspecting her carcass, that he might divide(?) the monstrous lump and fashion artful things. He split her in two, like a fish for drying. Half of her he set up and made as a cover, heaven (*šamāmū*). He stretched out the hide and assigned watchmen, and ordered them not to let her waters escape. He crossed the heaven (*šamê*), surveyed the sky (*ašratu*).[15]

The sea, slain by the god Marduk, was split into two parts to form "the world."[16] One part was made as a roof, expressed with the verb *ṣullulu* "to roof (a building)" or "to put on as a top."[17] As constructed by Marduk, the heavens would contain the waters of Tiamat, which were guarded and held in by a tightly stretched skin (EnEl IV 139 *išdud maška* "he pulled taut the skin") In the learned commentary I.NAM. GIŠ.HUR.AN.KI,[18] the Akkadian word "sky" is explained as *ša mê* "of water," and the same idea is reflected in the spelling of the word "rain" as "water of heaven" (šèg written A.AN "water of heaven"). Obviously a rational account for water above in the heavens was desirable, as experience tells us that water falls from the sky in the form of rain. The idea of a cosmic feature to function as a barrier between the heavenly waters above and earth below may also be identified in literary texts where the celestial realm of the planetary deities is sometimes denoted by the term *šupuk šamê*, literally "base of heaven." This expression has been translated as "firmament," as in,"they installed Sin, Šamaš, and

---

[15] *Enūma* Eliš IV. 135–141, modified from Foster, *Before the Muses* 3rd ed. (Bethesda, MD:CDL Press, 2005) in accordance with CAD s.v. *ašratu* Foster's notes indicate for discussion of this line, William H. Moran, "Puppies in Proverbs—From Samsi-Adad I to Archilochus?" *Eretz Israel* 14 1978, p. 35; on *ašrātu*, W.G. Lambert, "Fire Incantations," AfO 23 (1975), p. 43.

[16] This motif is also found in Berossus' *Babyloniaca*: "Bel rose up and split the woman [Thalassa, the sea] in two. One half of her he made earth and the other sky" (I.2.3a). See S.M. Burstein, *The Babyloniaca of Berossus* (Malibu: Undena, 1978), p. 15.

[17] CAD s.v. *sullulu* A mng.1 b, where the line EnEl IV 138 is translated "he set up half of her (Tiamat) and roofed the sky (with it).

[18] A. Livingstone, *Mystical and Mythological Explanatory Works of Assyrian and Babylonian Scholars* (Oxford: Clarendon Press, 1986), p. 32, line 6.

Ištar (that is, moon, sun and Venus) to keep the firmament in order."[19] Whether the *šupuk šamê* is related in imagery to the stretched skin of Tiamat, however, is unknown.

If the motif of the primordial cosmic waters is traceable to Sumerian mythology, whence came the theme of the battle between storm god and salt sea? In the battle scene of *Enūma Eliš* Tablet IV, the poet imagines Marduk as the storm, with his weapons the winds:

> They (Marduk and Tiamat) locked in single combat, joining for the fray.
> The lord spread out his net, encircled her,
> The ill wind he had held behind him he released in her face.
> Tiamat thrust in the ill wind so she could not close her lips.
> The raging winds bloated her belly,
> Her insides were stopped up, she gaped her mouth wide.
> He shot off the arrow, it broke open her belly,
> It cut to her innards, it pierced the heart.
> He subdued her and snuffed out her life,
> He flung down her carcass, he took his stand upon it.
>
> ....
>
> The Lord trampled upon the frame of Tiamat,
> With his merciless mace he crushed her skull.
> He cut open the vessels[20] of her blood,
>
> ....

Jacobsen made the observation that, "if we must thus conclude that the battle between Marduk and Tiamat described in *Enūma Eliš* is a battle of the elements, of forces in nature, a battle between the thunderstorm and the sea, it will naturally occur to one that such a battle is well known from elsewhere in the Ancient Near East."[21] He pointed to the Ugaritic myth of Baal and Yam, the sea, in which the sea demands of El that Baal, the storm, become his slave. The resistance of Baal to enslavement culminates in the battle that subdues Prince Yam. Jacobsen speculated that the Ugaritic form of the story might be original, given its coastal location on the Mediterranean Sea, and that its entry into Mesopotamia came "with the Amorites."[22]

---

[19] W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, Indiana: Eisenbrauns, 1998), p. 239.

[20] I thank Heinrich von Staden for suggesting the translation "vessels" rather than "arteries" for the reason that the distinction between arteries and veins was not yet made in Near Eastern antiquity.

[21] T. Jacobsen, "The Battle between Marduk and Tiamat," JAOS 88 (1968), pp. 106–7.

[22] Jacobsen, "The Battle between Marduk and Tiamat," p. 108.

Near Eastern myths of conflict between a creator god and cosmic personified waters, especially the motif of subduing a watery chaos prior to creation, as already noted, have been traced in the biblical text. U. Cassuto argued that such traces indicate the existence of a lost Hebrew epic poem on the theme, still echoed later in Talmudic, Midrashic, and Cabalistic literatures.[23] Yahweh's cosmic enemies *yām*, Leviathan, and *tannīn*, as in Psalm 74 quoted above, parallel the cosmic enemies of the Ugaritic mythology of El and Baal. They are, however, demoted in the biblical theology to less than divine status and even occasionally presented as mere physical elements of Yahweh's creation.[24] The weaponry used by Yahweh to fight his foes, sword, spear, rod, bow, arrows that are flashes of lightning recall the armaments of Marduk.[25] Cassuto further relates the act of Yahweh's "cleaving" of the rivers and other waters to Marduk's cleaving of Tiamat's carcass.[26] Another important theme carried over into the biblical text is the setting of a boundary for the sea. Allusions to this are collected by Cassuto from Job, Psalms, the Ethiopic version of the Bk of Enoch, the Prayer of Manasseh and the Revelation to John, which, he points out, "speak of the thrusting back of the sea with a *bridle*, and of the *shutting up* and *sealing* of the sea or of the dragon,"[27] reminiscent of Marduk's assigning watchmen ordered not to let Tiamat's waters escape (EnEl IV 139–140).

Not only are the cosmic waters, the personified body of a female deity that ended up in heaven, traceable as a literary motif in various Near Eastern myths, they also gave rise to a certain imagery that had a persistent influence in the later imagining of cosmological "space." The image conveyed in *Enūma Eliš* Tablet IV (cited above) when Marduk makes the sky as a roof out of the skin of Tiamat, is that of something stretched out and taut, covering the world and holding in her waters. Another tradition presents an image of three

---

[23] See U. Cassuto, "The Israelite Epic," pp. 80–102 and Mark S. Smith, *The Origins of Biblical Monotheism: Israel's Polytheistic Background and the Ugaritic Texts* (Oxford: Oxford University Press, 2001), pp. 36–40.

[24] Mark S. Smith, *The Origins of Biblical Monotheism*, pp. 33–35.

[25] Isa 27.1; Habakkuk 3.9 and 11 and Psalms 77.18, cited Cassuto, "The Israelite Epic," p. 91.

[26] Proverbs iii 20 in a reference to the work of creation: "by His knowledge the deeps were cleft open." Also Habakkuk 3.9 "Thou didst cleave the earth with rivers" and Psalms 74.15 Thou didst cleave open springs and brooks." See Cassuto, "The Israelite Epic," p. 94 .

[27] Cassuto, "The Israelite Epic," p. 96.

superimposed heavenly realms, the highest heaven belonging to the sky god Anu, Middle Heaven belonging to Igigi gods, and containing the seat of Marduk (Bēl), and the lower, or visible, heaven where stars and constellations were drawn upon its surface. This cosmological picture introduced speculation about the material constituents of the heavens. Each was made of different stones, varying in color: The heaven of Anu was of reddish *luludānītu* stone speckled with white and black, the middle heaven was of blue *saggilmud* like lapis-lazuli, and the lower heaven was translucent jasper, either blue or grey, upon which were inscribed the stars: "He (Bēl) drew the constellations of the gods on (the lower heavens)."[28]

In the biblical text a similar situation applies with respect to the term "firmament," which is differentiated from "sky." The author of Genesis calls the firmament *rāqîʿa* "a plate" or "vault,"from the root *rqʿ* meaning "to tread or stamp with the feet, to spread out, to beat or hammer out (metals) or apply a plating," as in "the birds of the skies will fly 'across the surface of the plate of the skies,' (Gen. 1:20) or "Yhwh sets the luminaries *into the plating of the sky*" (Gen. 1:17). [p. 75].[29] This would seem to be the source for the common expression "vault of heaven." The rendering of the Hebrew *rāqîʿa* in the Septuagint became *stereoma* "a firm or solid structure" from *steresein* "to make firm or sold." In the Vulgate, the equivalent *firmamentum* suggested something "which strengthens or supports." B. Halpern explains the use of *rāqîʿa* as not identical with heaven but as giving it definition, as in "the firmament ("plate") of heaven."[30] He sees the *rāqîʿa* or plate as parallel to the Mesopotamian image of the tightly stretched fabric of the surface of the sky and the plate as being wholly "in the midst of

[28] KAR 307:33, see A. Livingstone, *Court Poetry and Literary Miscellanea*, SAA 3 (Helsinki: University of Helsinki Press, 1989), p. 100. Also W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, IN: Eisenbrauns, 1998), pp. 9–15 and U. Koch-Westenholz, *Mesopotamian Astrology: An Introduction to Babylonian and Assyrian Celestial Divination* (Copenhagen: Carsten Niebuhr Institute of Near Eastern Studies, Museum Tusculanum Press,1995), p. 203, line 280.

[29] For a discussion of *raqiʿa*, see Cornelius Houtman, *Der Himmel im Alten Testament: Israels Weltbild und Weltanschauung*, *Oudtestamentische Studien*, deel XXX (Leiden, New York and Köln: E.J. Brill, 1993), sub section 6.3.2 "Der Himmel: eine feste, unerschütterliche und weit augsestreckte Fläche," and Luis Stadelmann, *The Hebrew Conception of the World: A Philological and Literary Study, Analecta Biblica* 39 (Rome: Pontifical Biblical Institute, 1970), pp. 55–57.

[30] Baruch Halpern, "The Assyrian Astronomy of Genesis I and the Birth of Milesian Philosophy," *Eretz Israel* 27 (2003), p. 80 note 11. I thank Ronald Hendel for this reference.

the waters," i.e., "contained entirely within the *tōhû*, where it separates water above from water below."[31] The image of the heavens "stretched out" by God occurs elsewhere in the Bible, such as in Is. 44:24

> It is I, the Lord, who made everything,
> Who alone stretched out the heavens
> And unaided spread out the earth.[32]

C. Westermann emphasizes the received nature of the image of the sky "as a solid partition or vault that separates the earth from the waters above," viewing that image not as a reflection of a contemporary cosmology, but rather the vestige of an old one.[33] However, as L. Stadelmann points out, "the imagery here is akin to Marduk's creative act in the *Enūma eliš*, but with a notable difference with regard to how the canopy of the sky was fashioned and the material employed for that purpose."[34] This inheritance became the source of interpretational variety and a differentiation in the image of heaven itself (or the heavens themselves), beginning with the church fathers who commented on the creation account of Genesis and continuing with the cosmology of medieval natural philosophers.

Biblical exegesis on the supracelestial waters had already become a matter for cosmological speculation by the 3rd century C.E. The discussion concerned the physical location of the waters as well as their material or metaphysical nature. The text of the second day of creation (Gen. 1.6–8) raised the problem of the difference between "heaven" and the "firmament." Heaven (*caelum*) had been created on the first day, so what was the meaning of the firmament? This question, among many others, occupied the mediaeval natural philosophers who sought to reconcile the account of creation from the Bible with classical, largely Platonic but also, later, Aristotelian, physics.

The ambiguity in the translation of terms for the "heavens" in Genesis 1, stemming from the use of the Hebrew *šm'm* (= Gk. *ouranos* = Lat. *caelum*) for the heaven created on the first day and *raqiʿa* (= Gk. *stereoma* = Lat. *firmamentum*) for heaven created on the second day, gave rise to diverse cosmological images. Knowing where to place the

---

[31] Halpern, "The Assyrian Astronomy," p. 75.
[32] Cf. Is. 51:13 and Zech. 12:1.
[33] C. Westermann, *Genesis 1–11: A Commentary*, translated by John J. Scullion S.J. (Minneapolis: Augsburg Publishing House, 1984), p. 116.
[34] Luis Stadelmann, *The Hebrew Conception of the World*, p. 16.

"waters of the firmament" was obviously dependent upon a correct understanding of the placement of the two "heavens" in the overall architecture of the cosmos. Already in the 3rd century, Origen identified the supracelestial region of waters above heaven as the fourth part of the world, which was the invisible supreme region of creation.[35] He located it in the ninth heavenly sphere (*nona sphaera*), calling it "celestial earth" (*terra caeli*) and identified it with the earth created on the first day. The earth of Genesis 1:10, the "dry land" created on the third day was a second earth. Above the ninth sphere he located the heaven created on the first day, and left the fixed star sphere to correspond to the firmament created on the second day.[36] Origen's Neo-Platonic dichotomy between two heavens and two earths, one being a spiritual "higher" entity of which the other is the "mere" physical counterpart, would persist among later discussants of the two "heavens," *caelum* and *firmamentum*. Despite the variations on the identification of heaven of the first day (*caelum*) and heaven of the second day (*firmamentum*) that emerged later, the relation of "higher" to "lower" was carried on so that the heaven of the first day was widely viewed as spiritual and immaterial, the heaven of the second day as corporeal and sidereal.[37]

Augustine asks whether the supracelestial waters are the same or different from the waters visible below the firmament, and struggles with the two terms for heaven, appealing to a Platonic division between the baser matter below heaven and celestial higher spirit:[38]

> Were the waters above the firmament like these visible ones below the firmament? Scripture seems to refer to the water over which the Spirit was borne, and we took that water to be the matter of this world. Should we then believe that in this passage this matter is separated by the interposition of the firmament so that the lower matter is that of bodies and

[35] A. Scott, *Origen and the Life of the Stars: A History of an Idea* (Oxford: Clarendon Press, 1991), p. 120 and note 45.

[36] Ibid., p. 120 and note 46.

[37] See E. Grant, *Planets, Stars, & Orbs: The Medieval Cosmos 1200–1687* (Cambridge and New York: Cambridge University Press, 1994), pp. 97–103.

[38] Kaiser points out that in *Confessions* 13.7.8;15.18;32.47 and *City of God* 11.34, Augustine transmitted a tradition from early Christian texts such as the *Ascension of Isaiah* (7.9–13) and Pseudo-Clementine's *Recognitions* (9.3) which understood the firmament as a demarcation between the physical perceptible world and the imperceptible realm of angels, see Christopher B. Kaiser, *Creational Theology and the History of Physical Science: The Creationist Tradition from Basil to Bohr* (Leiden, New York, Köln: Brill, 1997), p. 58 note 189.

> the higher matter that of souls? For Scripture here calls the firmament what it later calls heaven.[39]

This approach gave rise to an allegorical interpretation of the "waters," not as physically embodied, but as metaphysically elevated to a superior state of being, which can be seen, for example, in the ninth century speculation of John Scotus Eriugena's *On the Division of Nature*, where he understood the waters as an "intellectual world of primordial causes."[40]

The bishop Ambrose (340–397), puzzled by how waters could be held up if the cosmos is a sphere, reasoned that externally round buildings could have square interiors with level places within them that collect water, but admitted that heaven was not structured that way. He appealed to the omnipotence of God, who could just as well divide the waters of the cosmos as he divided the waters of the Red Sea at the Exodus. He also offered that if the earth could stay unsupported in the middle of the cosmos, so could the waters stay unsupported above the firmament.[41] Similarly, Augustine concluded that "only God knows how and why they [the waters] are there, but we cannot deny the authority of Holy Scripture which is greater than our understanding."[42] What sense the waters of the firmament made was also simply deferred to the authority of Scripture in later *hexaemera*, e.g. of Bede (673–735) and Abelard (1079–1142?),[43] but Bede further considered whether the waters remained in place because they were frozen solid.[44] This solution was later rejected in the 12th century by William of Conches in his *Dragmaticon*,[45] but was again reversed by Bernard of

---

39 Augustine, *De Genesi ad litteram*, 8:29, see Roland J. Teske translation, *On Genesis: Two Books on Genesis against the Manichees; and, On the Literal Interpretation of Genesis, An Unfinished Book*, Fathers of the Church, vol. 84, (Washington, D.C., Catholic University of America Press, 1991), p. 165.

40 Kaiser, *Creational Theology*, p. 58 note 189. See Eriugena *On the Division of Nature* III., pl cxxii, 693 C, 695 C-696A; 697A .

41 Hexaemeron 2.3, 9–11; pl. XIV, 160 B-161D; see discussion in Helen Rodnite Lemay, "Science and Theology at Chartres: The Case of the Supracelestial Waters," *British Journal for the History of Science* 10 (1977), p. 227 and John Kirtland Wright, *Geographical Lore of the Time of the Crusades* (New York: American Geographical Society, Research Series no. 15,1925), p. 183.

42 *De Genesi ad litteram* 2.5; pl XXXIV, 267A, in Lemay, "Science and Theology at Chartres," p. 227.

43 Lemay, "Science and Theology at Chartres," p. 227.

44 Bede, *Hexaemeron*, Liber Priumus, Pl xci, 19A.

45 Lemay, "Science and Theology at Chartres," p. 232.

Silvestris, whose literal interpretation of Genesis 1.6 is given in a commentary on Martianus Capella:

> The waters are there because the Bible and the Fathers say they are there, and their existence is by no means impossible. The air can hold up birds, so it can certainly hold up tiny droplets of water; indeed, if these waters are frozen the crystalline solidity of the sphere they form holds itself up.[46]

The Platonic character of much early speculation on the cosmology of Genesis figures in the works of Basil of Caesarea (d.379), Gregory of Nyssa (331–396), and other "Cappadocians."[47] Gregory imagined mountains reaching up to heaven to contain the waters.[48] In his *Homilies on the Hexaemeron*, Saint Basil depicted a dome-shaped roofed structure with a flat underside to hold in the waters.[49] The importance of this commentary went beyond matters of the cosmic waters to a confrontation with the problem of the eternity of matter. Basil's natural philosophy subjected the behavior of the classical four elements to God's laws established at creation. Heaven and earth alike were subject to this single code of law, and heaven was as mutable and corruptible as earth. The six days of creation was the time when God established this code of natural law, after which time nature followed the laws without "interference."

Basil, in one of the very first commentaries to the biblical six days of creation,[50] offered that the waters remained on a convex surface of the firmament and that the outermost surface of the firmament was not spherical. Also in response to the problem of the water being removed from its place in the proper arrangement of matter was Basil's idea

[46] Bernard Silvestris, Commentary on Martianus Capella, ed. Edouard Jeauneau, in *Studi medievali* 3[a] serie, V (1964), 860–62, see Lemay, "Science and Theology at Chartres," p. 234.; Brian Stock, *Myth and Science in the Twelfth Century: A Study of Bernard Silvester* (Princeton, N.J.: Princeton University Press, 1972).

[47] J. Pelikan, *Christianity and Classical Culture: The Metamorphosis of Natural Theology in the Christian Encounter with Hellenism* (New Haven and London: Yale University Press, 1993), p. 96 and passim.

[48] P. Duhem, *Système du Monde*, vol. 2 (Paris: A. Hermann, 1914), p. 489.

[49] David C. Lindberg, "Science and the Early Church," in David C. Lindberg and Ronald L. Numbers, *God and Nature: Historical Essays on the Encounter between Christianity and Science* (Berkeley, Los Angeles and London: University of California Press, 1986), pp. 19–48.

[50] On the origins of the hexaemeral tradition, see Frank Egleston Robbins, *The Hexaemeral Literature* (Chicago: University of Chicago Press, 1912), especially chapter 3 "Early Christian Hexaemera Before Basil."

that the "water" of heaven existed in a hardened crystalline state, possibly based on Ez.1:26:

> And above the firmament over their heads there was the likeness of a throne, in appearance like sapphire (Hebrew: lapis lazuli).

As these sources indicate, the understanding and imagery of the heavenly waters in Christian and mediaeval sources had departed entirely from that of its ancient predecessors. The mediaeval concerns were principally with the nature of matter. If crystalline, for example, the waters would be solid and heavy and, according to Platonic thinking about matter, should not exist above the earth's surface. Such was the opinion of William of Conches in the 12th century, who adhered to the laws of physics in his attempt to reason with the Biblical cosmos.

William addressed the problem of the supracelestial waters from a Platonic viewpoint when he refuted the idea that the heaven consisted of frozen waters of a crystalline color. He pointed out that cold was a property that could only exist in the world below the heavens, which consisted of fire. Either the frozen waters would put out the celestial fire, or their weight would cause them to fall downward to earth. He offered a physiological explanation for our observation of the crystalline watery appearance of the sky due to a defect in our visual perception and the watery nature of the human eye.[51] William approached the question of the waters above the firmament as a matter of natural science and the physical laws of Plato, not theology, and H.R. Lemay notes that, "William's refusal to accept Biblical statements that run contrary to physical laws is evident not only in his treatment of the supracelestial waters."[52] In *Philosophia mundi*, as Lemay explains, William "clearly states that their [the waters] existence is attested to by Holy Scripture, but declares that this is contrary to reason, so the Scriptural text must be understood allegorically."

Opinion on the nature of the waters above the firmament also diverged with different understandings of the nature and location of the firmament itself. If Genesis 1.6–8 supported ideas about the firmament as the region of the fixed stars or of clouds and the moist atmosphere,[53] then Genesis 1.14–19, which clearly states that the celestial bodies (sun and moon) were placed in the firmament, sustained the idea that the

[51] Lemay, "Science and Theology at Chartres," p. 229.
[52] Ibid., p. 230.
[53] Grant, *Planets, Stars, & Orbs*, p. 96 note 45.

firmament was the eighth sphere of the fixed stars, and sometimes even included the planetary spheres. As the region of the fixed stars and even the planets as well, further speculation as to the material constitution of the firmament itself gave rise to theories of its being air, or all four elements, or indeed, as Aristotle's heaven was comprised, of the fifth element. A further consideration was whether the matter that made the firmament was "firm," that is hard, or indeed soft and fluid. Grant has shown that earlier mediaeval cosmologists held the heavens to be fluid and that this idea was only challenged after the 13th century when the Aristotelian-Ptolemaic cosmos was introduced.[54] Before this time natural philosophers who thought of the supracelestial waters as crystalline had an image of something luminous and transparent, i.e., like crystal, but not as "hard."[55] The impetus to understand the heavenly spheres as "hard," was encouraged by the Ptolemaic planetary models internested in the cosmos with their epicycles, eccentrics, and deferents. One of the earliest proponents of this image was Richard of Middleton, who, according to Grant, may have derived the idea from Grosseteste, who had made reference to Job 37.18: Can you, like him, spread out the skies, hard as a molten mirror?[56] Thereafter in the 14th century, represented by such authors as Nicole Oresme, and Pierre d'Ailly in the early 15th century, cosmologists moved toward viewing the heavens as composed of solid hard orbs, and this trend continued and culminated in the 16th century.

Only the briefest outline of the later history of the waters above the firmament in Western cosmology has been presented within the limited scope of this paper. No awareness of the ancient Near Eastern foundation for the heavenly waters is to found in either early Christian *hexaemera* or mediaeval cosmological texts, and for obvious reasons. It was simply that, although the Bible continued to circulate in Hebrew, Greek, Aramaic, and eventually Latin following the Roman destruction of Jerusalem in 70 C.E., cuneiform texts after the first century of our era ceased to be written or read, and with them the literary traditions they contained. The particular conception of the watery origins of heaven and the world order found, for example in *Enūma*

[54] Ibid., p. 338.
[55] Ibid., pp. 332–4.
[56] Annotated Bible, Rev. Standard Version, or, "Can you help him stretch out the heavens, firm as a mirror of cast metal?" translation of the JPS, *Tanakh, The Holy Scriptures* (Philadelphia: Jewish Publication Society, 1985).

Eliš, survived antiquity only insofar as its elements were embedded within the biblical text. And from the Bible this ancient Near Eastern conception passed unacknowledged into yet other forms in Western cosmology.

The form in which speculation on the origins of the heavens captured the imagination of all succeeding generations within Western culture was the version formulated by the so-called "Priestly" author of Genesis. There, the heavens are not in themselves divine and the heavenly waters "above the firmament" cease to explain or stand in any relation to the rains and mists of the atmosphere. Yet the heavenly waters "above the firmament" are rooted in an extra-biblical mythology of the Near East, which testifies to the origins of the waters above the heavens in the mythological *topos* of a conquered deity whose nature was watery. It is therefore not the mythic battle itself but its result, namely, the formation of heaven literally from a body of water, that forms the lasting contribution of the Mesopotamian cosmogony, particularly that transmitted from *Enūma Eliš* to the Bible, on subsequent cosmological speculation. Discussion of the waters above the firmament remained a legitimate aspect of cosmology until the very cosmological system to which it belonged, i.e., the finite geocentric spherical universe, was rendered untenable by the introduction of heliocentrism and its ultimate effect to dissolve the finite celestial sphere. The legacy of the ancient Near East in Western European cosmology, therefore, endured as a feature of the ancient-mediaeval world-view. Only with the dissolution of the celestial spheres themselves did the waters above the firmament and their impact on conceptions of the spheres as crystalline become obsolete.

CHAPTER EIGHTEEN

PERIODICITIES AND PERIOD RELATIONS IN BABYLONIAN CELESTIAL SCIENCES

The flowering of astronomical science in Achaemenid Babylonia came from deep roots in both celestial observation and divination practiced since the second millennium B.C.E. Babylonian astral sciences continued to develop in Hellenistic Babylonia from which time Greek, Greco-Roman, and Indian cultures became aware and borrowed ideas and methods from Babylonian astronomy and astrology. Ultimately some of Babylonian astrology's systems and astronomy's mathematical content entered the stream of Western science, continuing until the European Renaissance. What gave the Babylonian astronomical tradition its power and longevity was the fact that it was grounded in an understanding of periodicities. Periodicities and the combination of these into period relations are basic to all astronomical thought and practice, but in ancient Mesopotamia they are both its point of departure and enduring central feature.

It is by now canonical that the foundation of Babylonian mathematical astronomy is built upon the recognition of period relations.[1] These take two forms, each one expressed in some unit or units of time, such as the year, month, day and degree. One type of period relation identified a whole number of cycles made by one heavenly body (such as the sun) with a whole number of cycles made by another (such as the moon). An example of such a period relation is the calendrical cycle 19 (sidereal) years = 235 lunar (synodic) months. The other type correlated integral numbers of phenomena with integral numbers of some time unit, say years or months, such as the well-known Saros cycle where 38 eclipse possibilities = 223 synodic months. The period relations implicit in Babylonian astronomical texts provide the means for solving various problems of lunar or planetary behavior, and they

[1] The first important paper on the subject, which also attempted to describe period relations and methods of predicting planetary and lunar positions from within a Babylonian perspective, was A. Aaboe, "On Periods Relations in Babylonian Astronomy," *Centaurus* 10 (1964), pp. 213–231.

all have in common a desire to know when a phenomenon will occur again. The phenomenon can be a return to a certain position of the sun or moon or planet with respect to the fixed stars, or the return of a planet with respect to the sun, such as the first or last appearance of Jupiter. All such returns can be counted in terms either of the position in the heavens where the phenomenon occurs or by the date when it occurs. Positions and dates are the fundamental elements in the expression of periods and their relations. In principle, all regularly recurring celestial phenomena can be rendered predictable by means of such period relations.

Of course the behavior of the moon with respect to the sun is the all important determiner of Babylonian calendrical systems, but the calendar does not provide the focal point for all Babylonian astronomical inquiry, as the periodic return of the planets to initial positions of a variety of appearances is of interest as well. It is the unification of a method of approach to both lunar and planetary phenomena, one based on the establishment of relations between relevant periods, that brings both lunar and planetary theory into a coherent system within Babylonian astronomy. Also significant is the harmony struck between the aims of this system and the essential concerns of celestial divination, i.e., with the visible phenomena, though not all ominous phenomena were amenable to astronomical prediction. The common interest in visible phenomena, however, reflects a congruence or compatibility between the various parts of the Babylonian celestial sciences—that is among celestial omina, horoscopes, observational and computational texts—and this is evident from the perspective of the attention to periodicities and period relations.

As B.R. Goldstein has pointed out, the quantities expressed in period relations do not derive either from geometry or precise measurement, but from counting.[2] To determine when a phenomenon will recur, returning either to a certain date or a certain position in the sky, it is obviously more desirable to count with whole numbers than fractions. For practical purposes, the development of Babylonian period relations is the result of a desire to establish integral periods to bring an exact return of particular phenomena to dates, i.e., days of the month,

[2] See B.R. Goldstein, "On The Babylonian Discovery of the Periods of Lunar Motion," *Journal for the History of Astronomy*, 33 (2002), 1–13, especially p. 9. See also A. Aaboe, "Observation and theory in Babylonian Astronomy," *Centaurus* 24 (1980), p. 30, and A. Aaboe, *Episodes from the early history of astronomy* (Berlin and New York: Springer, 2001), p. 66.

and positions in the sky, i.e. degrees of the zodiac. In the case of dates, of course it is desirable to avoid fractions of a day, and similarly, to avoid fractions of degrees. Although the periods and their relations deal in integer quantities, the calculations in the ephemeris tables do compute fractions of what are for all intents and purposes days—they are 1/30ths of a lunar month (*tithis*)—but this is necessary to maintain number theoretical control of the underlying period relations.

John Britton has discussed the central importance of annually recurring phenomena in Babylonian astronomy.[3] Such phenomena are the subject of Babylonian astronomical work from the earliest written evidence for the recognition of the periodic nature of celestial phenomena in the second millennium B.C.E. to the latest development of methods to predict them in the 6th to 4th centuries B.C.E. Beginning with a schematic treatment of the dates of the cardinal points of the year, that is, the equinoxes and solstices, and the corresponding variation in the length of daylight over the course of the year, the progressive development of Babylonian astronomy had to do with achieving over the course of some 600 years an understanding of the relationships between years, months, and days and the determination of increasingly better values for the lengths of the (solar) year and the (lunar) month.[4] Good values for these units of time were key to the success of computational models to predict periodic phenomena, be they annual, such as equinoxes and solstices, or occurring at greater intervals, such as first appearances of the planet Jupiter, or indeed smaller intervals, such as the first visibility of the moon each month.

One fundamental unit of time was the ideal year of 360 units. This implies twelve ideal months, each divided into 30 units, treated as days in a schematic calendar. The month, even when idealized in the schematic calendar, is tied to the synodic cycle of the moon. That is, day 1 is defined by the first visibility of the moon following conjunction, when it sets for the first time after sunset and one sees the thin crescent moon in the West in the evening for a short time. The middle of the month is defined with the opposition of sun and moon, when

[3] J.P. Britton, "Treatments of Annual Phenomena in Cuneiform Sources", in J.M. Steele and A. Imhausen eds., *Under One Sky: Astronomy and Mathematics in the Ancient Near East*, AOAT 297 (Münster: Ugarit-Verlag, 2002), pp. 21–78, and *idem*, "Calendars, Intercalations and Year-Lengths in Mesopotamian Astronomy," in J.M. Steele, ed., *Calendars and Years: Astronomy and Time in the Ancient Near East* (Oxford: Oxbow Books, 2007), pp. 115–136.

[4] Ibid.

the moon rises at sunset and sets at sunrise. The earliest astronomical compendium, composed around 1100 B.C.E. probably in Nineveh and entitled MUL.APIN or "Plow Star,"[5] utilizes the schematic year with its twelve 30-day ideal months and 360 ideal days. This calendar continued in use throughout the cuneiform writing tradition within celestial divination texts.

Already in MUL.APIN the sun is described as rising along the eastern horizon in a different place each season. On the day of the vernal equinox its point of rising was in the middle of "the cattle pen" (*tarbaṣu* "cattle pen" meaning horizon) due east. From there it moved progressively northward with the increase in daylight length and the coming summer solstice, then south during the winter, returning to its initial spot twelve months later. MUL.APIN describes the cardinal points of the year by saying that when the Arrow (Sirius) becomes visible on the 15th of the fourth month (Du'uzu), and the day is 4 minas and the night 2 minas, the sun, "which rose toward the north with the head of the Lion turns and keeps moving down towards the south at a rate of 40 ninda per day. The days become shorter, the nights longer."[6] This statement reflects a ratio of longest to shortest day of 2:1, a placement of the summer solstice at the mid-point of month on the 15th day, and an awareness that the rate of solar progress is less than 1 degree per day. Here the 40 ninda value (= about 2/3 degree) is a result of the daylight scheme which is utterly schematic.

A correspondence was made between the sun's positions on the horizon at its monthly risings and a group of stars seen to rise or set near sunrise or sunset. It would be a very short step from noting the variation of the position of the sun along the eastern horizon at the cardinal points to the variation of its position month by month in accordance with the risings of constellations. This is the empirical basis for a hypothesis put forward by Lis Brack-Bernsen and Hermann Hunger that the zodiac was first "perceived as arcs along the horizon over which the constellations rise."[7] The identification of times of year

---

[5] Known from its incipit: *šumma* $^{\mathrm{MUL}}$ $^{\mathrm{GIŠ}}$APIN $^{\mathrm{d}}$EN.LÍL *ālik pani kakkabāni šūt* $^{\mathrm{d}}$EN.LÍL "The (constellation) Plow, Enlil, who goes at the front of the stars of Enlil." See Hunger-Pingree, MUL.APIN, p. 18.

[6] MUL.APIN II i 9–18.

[7] Lis Brack-Bernsen and Hermann Hunger, "The Babylonian Zodiac: Speculations on its invention and significance," *Centarurus* 41 (2007), pp. 280–281. For this they adduce the LBAT 1495 and 1495, which concerns the construction of a shadow clock of some kind.

with positions of the sun in the region of twelve constellations, that is, one constellation rising per month, meant that the sun's position was automatically known by the date. A later substitution of 30 degrees for 30 days in the schematic year seems a natural enough effect of the recognition of the correspondence between position and date.

This idea of identifying times with positions is diagnostic of the Babylonian approach and underlies most of the methods devised to predict the phenomena. It is still the essential feature of the fully mature theories of the moon and planets represented in the ephemerides of the Seleucid period. Why the continuity in methodological style is evident throughout the cuneiform astronomical tradition is a question that might be addressed by reference to its divinatory and astrological motivation which provided the context within which astronomical work was done.

MUL.APIN reflects the state of Babylonian astronomical knowledge and practice around the turn of the first millennium B.C.E. It provides a systematic astronomical counterpoint to the extensive set of celestial omens of *Enūma Anu Enlil*, which also stem from the Old Babylonian period in the 2nd quarter of the second millennium. The celestial omen series, continues, however, to have an intimate connection with Babylonian astronomy, being both its wellspring as well as continuous partner until both traditions ceased to exist in their native language and script. Celestial omens do not, however, limit themselves to periodic phenomena, though the concern to identify the occurrences of phenomena with dates is certainly prominent, as exemplified in the Venus Tablet of Ammiṣaduqa that provides dates of appearances and disappearances of Venus. Lunar and solar eclipses, constituting fully 1/5 of all celestial omens, are regularly given together with their dates of occurrence, though many of these omens are not valid from an astronomical point of view. Still, the attention to the periodic nature of visible phenomena is marked in the omens.

Because of the concern for the recurrence of phenomena, periodic or not, celestial omens display great interest in the position of the moon and planets with respect to the sun. Judging by the omens themselves, the most important, that is to say ominous, synodic moments of the moon's cycle were conjunction and opposition. As a result the diviners watched for the day of the moon's first visible crescent shortly after sunset, and then most attentively the day of full moon, considered ideally to fall on the 14th day. These moments of syzygy, of course, are also the focus of the later lunar ephemerides. The 22 tablet lunar section of EAE is itself divided into two parts focused on syzygies in the lunar synodic cycle: Part I (Tablets 1–14) deals with the appearance of the moon in its first crescent, termed "the visibilities of the moon" and Part II (Tablets 15–22) concerns the middle of the month when eclipses occur, and pay close attention to when "one god is seen with the other." This expression is still used in early, i.e., seventh and sixth century, astronomical diary texts to mean "opposition," but by the fourth century, the statement that the moon and sun were in opposition was fully replaced by references to intervals in time degrees between the risings and setting of the sun and moon around opposition and designated in the texts as the quantities ŠÚ and NA, ME and GE_6.[8] The sun and moon may have been referred to as "gods" in the omens and early diaries, but the observation of the luminaries on the day of opposition was a matter of astronomical interest in the same way as were the later observations of ŠÚ and NA, ME and GE_6.

The dates of opposition were a significant feature of the omen texts as well. These focused on whether or not the syzygy was timely, early, or late. The 14th and 15th days were considered normal for opposition, hence of good portent, as in the following Neo-Assyrian astrological report sent by a court diviner to the Neo-Assyrian king:

> "On the 14th day the moon and sun will be seen with each other. If the moon and sun are in opposi[tion]: the king of the land wil[l widen] his understanding; the foundation of the king's throne will becom[e stable].—On the 14th day one god will be seen with the other." (Report of Nabû-Iqīša, translation of H. Hunger, SAA 8 294)[9]

Conversely, if opposition did not occur at the normal time the diviner said:

> "If on the 13th day [the m]oon and sun are seen together: unre[liab]le speech; the ways of the land will not be straight; the foot of the enemy (will be in the land); the enemy will plunder in the land. If the moon in month Ab is not seen with the sun on the 14th or on the 15th day:

[8] For an interesting and condensed discussion of Lis Brack-Bernsen's work on the lunar four and the period of lunar velocity in terms of these quantities as well as their relation to the Saros, see Lis Brack-Bernsen and M. Brack, "Analyzing Shell Structure from Babylonian and Modern Times," *International Journal of Modern Physics E* 13 (2004), pp. 247–260.

[9] See Hermann Hunger, *Astrological Reports to Assyrian Kings*, SAA 8 (Helsinki: Helsinki University Press, 1992).

> there will be deaths; a god will devour (meaning 'pestilence')." (Report of Zakir, translation of H.Hunger, SAA 8 306)

Omens for the appearance of the lunar crescent around conjunction always include the possibility that the moon's first or last appearance of the month was "not according to its count," meaning "at the wrong time."[10] The letters and reports from the scribes to the Assyrian monarchs reflect considerable anxiety about the timeliness of celestial appearances. This evidence of the conception of periods and periodicities in the omen and divinatory literature stands in direct relation to the development of quantitative means to deal with such periodicities evident in other kinds of astronomical texts.

It is the quantitative expression of the conception of periodicity that seems particularly diagnostic of the Babylonian approach and was that which made Babylonian astronomical knowledge useful and adaptable by the Greeks. Gaining quantitative control over lunar and planetary periods may indeed have been motivated by the concerns of the diviners and from this point of view periodicity in divination, despite the crudity and inexactness of its expression, may not have been conceptually so different from that in astronomy. What is interesting to note, especially with respect to the difference between the Babylonian tradition and the Greek, at least in the Greek cinematic tradition, is that there is no geometry in period relations—they are based on simple counting.

Surely one of the more celebrious of all Babylonian period relations is the Saros, the cycle that brings the return of eclipses of similar nature. This is because it brings a return to the moon's synodic phase, i.e., to opposition, a return to its position with respect to a node (which in modern terms is the intersection of the moon's path with the ecliptic), and a return to its position with respect to its distance from earth, an important factor in solar eclipse magnitudes. This cycle is a perfect illustration of a good period relation as it establishes the equivalence between whole numbers of three interconnected lunar periods, the synodic month, the draconitic month, and the anomalistic month. These lunar periods will repeat nearly exactly in the relation 223 syn mos = 242 draconitic months = 239 anomalistic mos and are very nearly equal to 6585 days or roughly 18 years, 11 days + 8

[10] E.g., Ch. Virolleaud, *L'Astrologie Chaldéenne* (Paris: Paul Geuthner, 1911) Suppl. 2 II, pp. 5–4 lines 9 and 25–31.

hours. The so-called "Saros Cycle Texts" dating to the Achaemenid period tabulate the months of eclipse possibilities arranged in cycles of 223 months. Three of the four Saros texts concern lunar eclipses and one solar, which is treated in exactly the same way as the lunar eclipse tables.[11]

Each Saros cycle has 38 eclipse possibilities. An eclipse possibility is treated as a phenomenon, regardless of its visibility, and is defined in modern terms as "the syzygy [i.e., conjunction or opposition of sun and moon that occurs] in the vicinity of a node [where the moon's path intersects that of the sun's path, and] in which the earth's shadow—for a lunar eclipse—or sun (for a solar eclipse) is closest to that node."[12] In other words an eclipse possibility will occur at any conjunction or opposition at which the sun is near a node.[13] The Babylonian approach to the prediction of eclipses is to establish a period for eclipse cycles which is the ratio of the number of months to the number of eclipse possibilities. This period was determined on the basis of counting only the number of months and eclipse possibilities that separate two eclipses with the same distance to a node. Of course this statement belies great complexity in the understanding of the many factors that determine when in fact an eclipse will actually be visible. Establishing the period relation, however, avoids the entire question of lunar motion per se by focusing on the factors that define the basic lunar periods, i.e., the synodic, draconitic, and anomalistic months, and avoids the problematic issue of visibility factors by treating the *possibility* of an eclipse as an occurrence. The construction of the Saros is surely not an unexpected consequence of the centuries of focus on conjunctions and oppositions of the sun and moon within the context of celestial divination, not to mention the extensive collection of hypothetical eclipse "possibilities" in the form of omens.

The style of this work is the same for the phenomena of the planets. Rough empirical estimates of periods of visibility and invisibility of some of the planets were already known by the end of the second millennium, and these early estimates no doubt provided a beginning

[11] A. Aaboe, et al., *Saros Cycle Dates and Related Babylonian Astronomical Texts* (TAPS 81/6, Phila., 1991).

[12] J.P. Britton, "An Early Function for Eclipse Magnitudes in Babylonian Astronomy," *Centaurus* 32 (1989), pp. 1–52.

[13] See also the definition given in A. Aaboe, et al., *Saros Cycle Dates*, p. 16, cited in B.R. Goldstein, "On the Babylonian Discovery of the Periods of Lunar Motion," JHA 33 (2002), p. 2.

for the eventual development of excellent periods and period relations for the planets that underlie the later ephemerides. The function of the periods stated, for example, in the early MUL.APIN text, in addition to establishing guidelines for knowing when a planet would be seen in a particular appearance again no doubt also served purposes of divination, whose interest was not only where in the sky and when a phenomenon would recur, but also whether a certain appearance was propitious or not. MUL.APIN already gives the duration of intervals of visibility between first and last visibilities for all five naked eye planets, but without an indication of how such intervals were to be used. Mars, for example is given an interval of 2 years for the period of visibility and 2 months for the period of invisibility. Saturn is given a period of 1 year + 20 days, which compares favorably with the 1 year 18 day interval of the later table texts. The Venus Tablet of Ammiṣaduqa, EAE 63, constructs a scheme for intervals of visibility and invisibility of Venus. Clearly synodic periods of the planets as well as the moon were integral to both divination and astronomy, though for different reasons.

Together with the determination of the correspondence between positions and dates of phenomena was progress in control of the calendar and thereby the units in which period relations could be expressed. This depended upon construction of practical and successful intercalation rules to square the lunar cycles or months with the solar cycles or years. MUL.APIN's schematic year of 360 days obviously could not sustain a workable calendar as it would be off by an entire month in a mere 3 years. An extra month added every 3 years was not quite enough and every 2 was a little too much. Variations on the schematic calendar led eventually in the last quarter of the 6th century to the standardized 19-year cycle referred to at the outset. The 19 years refer to complete returns in position with respect to the stars for the sun, i.e., to a position in the zodiac which was sidereally fixed. Hence we refer to 19 sidereal years. In the 2nd year of Xerxes (484 B.C.E.), this period relation 19 years = 235 months was fixed with 7 intercalations occurring regularly in cycles of 19 years and then remained in use for the next five hundred years until the disappearance of cuneiform astronomical texts altogether.[14] The year referred to in the 19-year cycle is the sidereal year, which is the time for the Sun to return to the same position with respect to the stars. The month is the synodic

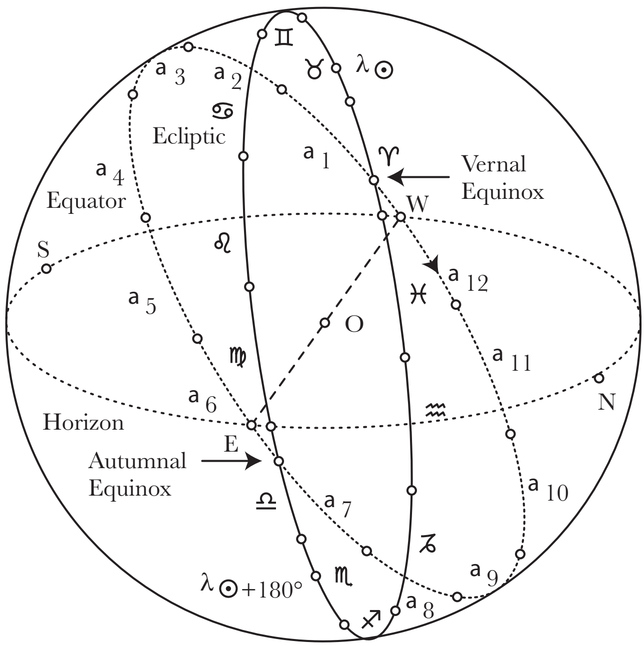
[14] J.P. Britton, in Steele, *Calendars and Years*, p. 122.

month, reckoned from first visibility of the moon. With units of time firmly established for expressing the dates there was the need for arithmetical standardization of the expression of celestial positions as well.

It was at about the same time, early in the fifth century, that a standard numerical reference for the positions of the sun in the heavens were adopted for the calculation of what we call longitudes. The earliest zodiacal longitudes that can be dated appear in one of the Saros Cycle Texts, the text that lists the 38 solar eclipse possibilities from 475 B.C.E. to 457 B.C.E. in the reigns of Xerxes II and Artaxerxes I. As discussed earlier the 360 ideal calendar days could have been transformed into ecliptical degrees by associating intervals of solar risings along the horizon with the 12 ideal months. The sun would stay in each of the twelve arcs for 30 days, giving rise to a numerically identified solar path divided into twelve portions of 30 units each, called UŠ. This, as posited by Brack-Bernsen and Hunger, is a plausible derivation of the twelve zodiacal signs and the 360 degrees of the ecliptic. Indeed it is common practice in late astrological texts to substitute months for zodiacal signs, or simply to use numerals to indicate either one, making reference to months or signs quite ambiguous. And if the signs of the zodiac and their corresponding degrees were conceived of with respect to the various positions of the sun on the horizon throughout the year, we do not have a great circle on the celestial sphere around which the sun, moon, and planets progress from west to east against the fixed star background.[15]

The particular conceptual nature of the zodiac and its relation to the year throws certain aspects of Babylonian astronomy into a sharper light. For example, it is interesting to note the development of the treatment of the variation in length of daylight from a function of the ideal calendar month to the idea that length of daylight is directly tied to the sun's position in the ecliptic. Early texts such as MUL.APIN

[15] Noel Swerdlow, *The Babylonian Theory of the Planets*, p. 34 and John Steele, "Celestial Measurement in Babylonian Astronomy," *Annals of Science* 64 (2007), pp. 293–325, have both rightly pointed out the fallacy in regarding the Babylonian zodiac as equivalent to Ptolemy's or modern astronomy's ecliptical coordinate of "longitude." The celestial bodies travelled on "paths" (*ḫarrānu*) in the direction against that of the daily rising and setting of the stars. These paths were fairly parallel to one another, but had different widths, or "latitude," as a body could be said to be "high" or "low" or in the "middle." There is insufficient evidence to show that these paths all shared the same center, which would be the equivalent of our ecliptic, which is the line along which the sun appears to an observer to move through the stars in one year.



Rising thimes a are measure along equator from vernal equinox.
♈ 0° is setting; ♎ 0° is rising. $\lambda_{\odot}$ = ♉ 10°; $\lambda_{\odot}$ +180° = ♏ 10°.
Length of daylight is $\sum a_{(2-7)}$

Figure 1. Risings times of the zodiac

and EAE find the length of the day as a direct corollary to the month of the year, while the late ephemerides compute the length of daylight based on a position of the sun in the zodiac on a given date and the sum of what came to be well- known in Greek astronomy as the rising times of the zodiac.

Otto Neugebauer first showed that evidence for the rising times of the zodiac (see Figure 1) are embedded in the Babylonian ephemerides in the column that calculates the length of daylight (so-called Column C).[16]

[16] O. Neugebauer, "Jahreszeiten und Tageslangen," *Osiris* 2 (1936), pp. 517–550, especially p. 530ff. And 544ff. See also Neugebauer's "The Rising Times in Babylonian Astronomy," p. 100 note 4 citing his earlier "On some Astronomical Papyri and Related Problems of Ancient Geography," TAPS N.S. 32 (1942), pp. 251–263.

A rising time (marked α_1, α_2, etc. on the diagram) is the time required for one zodiacal sign to cross the eastern horizon. Since, from a geometrical point of view, both horizon and ecliptic are great circles on the celestial sphere, as shown in the diagram, at any given moment, one-half of the ecliptic (6 zodiacal signs) is above the horizon and the other half is below. During the interval of sunrise to sunset, 180° of the ecliptic will have crossed the horizon. The assumption is, if the rising time of each individual zodiacal sign is known, the length of daylight for any day of the year is also known. The diagram shows α_1-α_6 rising, so the length of day is the sum of the rising times of α_1-α_6. But without the conception of the celestial sphere and great circles such as the ecliptic and equator, how did the Babylonians conceptualize the rising times?

The computation of daylight length in the lunar ephemerides derives the length of daylight from the sum of the rising times for the appropriate half of the zodiac that rises on the day in question, beginning with the position of the sun (that is, values in column C [daylight length for a given solar position] = $\alpha_1+\alpha_2+\alpha_3+\ldots+\alpha_6$).[17] But given the hypothesis that the heavenly bodies did not, in the Babylonian conception, travel continuously in arcs of the ecliptic viewed as a great circle around the heavenly sphere, we can hardly take the rising times scheme to imply a conception of the continuously moving great circle of the ecliptic. Cognizance of the connection between the position of the sun in the ecliptic and the length of daylight is certainly expressed in the Babylonian scheme. The solar positions given in the table texts, however, do not represent locations on a continuous arc of solar motion, but are intermittent locations derived from the lunar longitudes of the preceding column, Column B, which are positions of the moon at conjunction or opposition. These then are intermittent lunar phenomena, and ignore the motion of the moon in between. The sun's derived positions, what we call longitudes, refer not to progress along a continuous arc—but only discrete positions which are either the same as the moon at conjunction, or 180° apart at full moon.

In the absence of spherical geometry, the question of rising times becomes most interesting. The rising times were the key to the solution of what is known as oblique ascensions, which has been said to be one of the two central problems of ancient spherical astronomy (the other

[17] Ibid., and see also HAMA, pp. 368–371.

being the problem of the so-called zodiacal anomaly, or the fact that the sun does not move at a constant rate around its circular path). Euclid's *Phaenomena*, ca. 300 B.C.E., is the earliest extant Greek treatise to take up the question of the rising times and the corresponding values for length of daylight. Theodosius of Bithynia's late 2nd century B.C.E. *On Days and Nights* and Menelaus' *Sphaerica* ca. 100 B.C.E. both focus on the rising times, and of course, Ptolemy's *Almagest* Bk II.9 provides the definitive trigonometrical solution to the oblique ascensions. It is also clear that Hellenistic Greek writers knew of the Babylonian arithmetic techniques for calculating rising times, for example, Hypsicles' *Anaphoricus* of ca. 150 B.C.E. It is J.L. Berggren and R.S.D. Thomas' view, in fact, that Euclid knew of these methods and that, as they put it, "one of his goals in writing the *Phaenomena* was to demonstrate geometrically the assumption behind this arithmetic method."[18]

The problem of oblique ascensions is dependent upon the conception of the celestial sphere and the great circles of the celestial equator and the ecliptic. These are the great circles represented in the diagram. But the diagram is static. In fact, because the ecliptic changes its angle of inclination to the horizon throughout the year, as the sun is changing its place along the horizon at its rising, equal arcs of the ecliptic do not rise in equal times. Only equal arcs of the celestial equator rise in equal times and this is because the position of the celestial equator with respect to the horizon is fixed for a given locale. On this basis such a concept as oblique ascensions or rising times makes little sense in an astronomical system that does not operate within a geocentric spherical framework.

What then are the rising times values that Neugebauer discovered in the mathematical structure of the daylight schemes of late Babylonian astronomy? They are linear arithmetic extrapolations from more elementary daylight schemes and from earlier texts that in fact describe the risings of segments of zodiacal signs in terms of the crossings of the meridian by a certain group of fixed stars long used for telling time at night. The idea is that just as noon is indicated by the sun's passing the local meridian at midday, so at night different times are indicated by the meridian crossings of particular fixed stars. The early

[18] J.L. Berggren and R.S.D. Thomas, *Euclid's Phaenomena: A Translation and Study of a Hellenistic Treatise in Spherical Astronomy* (New York and London: Garland Publishing, 1996), p. 2.

rising times scheme is symmetrical because it is based on the Babylonian ideal year, the 12 months of 30^d, which was made equivalent to the 12 signs of 30^o in a correspondence of time and position, the two chief elements in the creation of one of the types of Babylonian period relations. The meridian crossings of the stars were observable for any date in the year, so the correspondence obtained between these observational quantities, that is the intervals in time degrees for certain stars to cross the meridian, and intervals of degrees of zodiacal signs would have been a theoretical step, but only insofar as dates in the ideal calendar were already interchangeable with zodiacal "positions." Dates (months) and positions (zodiacal signs) were seen in lockstep with one another, permitting events that occur at various intervals to be related to events that occur in various parts of the sky.

The point of the excursus into the rising times was to underscore the nature of the Babylonian astronomical methodology that addressed the recurrence of celestial phenomena with respect to time and position and did so in a thoroughly arithmetic way. The very conception of position in the zodiac was tied to corresponding dates. The 30 degrees per zodiacal sign provided an arithmetic standard of reference not tied to a geometrical cosmological framework as they were in Greek astronomy, where positions meant longitudes on a continuously moving ecliptic envisioned as a great circle bisecting the celestial sphere. In other words, each system, the Babylonian and the Greek, had a zodiac, i.e., 12 30^o segments of the sun's path against the background of the fixed stars. But what the zodiac referred to in terms of the physical world was different in each system.

One can argue that the Babylonian zodiac was indeed a circle, and of course 360^o comes to be by definition a circle. But the words that we translate as "zodiacal sign" in Akkadian and Greek, i.e., *lu-maš* and *zoidion*, express two different "things," with two entirely different relationships to the cosmos. The difference in conception of celestial positions is important not only for our understanding of Babylonian astronomy on its own terms, but it reminds us that in the history of science there are such examples of changes in ontological assumptions which raise questions about the nature of empiricism and more generally of scientific inquiry and its relation to the "world."

The difference in definition of the celestial positions from Babylonian to Greek also had an impact on the function and further development of period relations. As Goldstein and Bowen have discussed, any period relation implies a mean period,[19] for example, the relation 19 sidereal years = 235 lunar synodic months implies a mean period for the year of 12+ a fraction months, expressed sexagesimally, this value is 12;22,6,18m. The period relations that equate phenomena with time units also imply mean periods, found by dividing the number of days or whatever the time unit is by the number of phenomena to find a mean period of so-many phenomena per time unit.

This arithmetical determination of mean periods is certainly possible in Babylonian astronomy and such mean periods are embedded in the structure of various columns of the ephemeris tables. For example the period relation 19 sidereal years = 235 synodic months implies 19 complete returns to a given position for the sun but it also implies 254 (i.e. 235 + 19) complete returns to a given position for the moon. In terms of returns of the moon to a given position of longitude, an interval known as the sidereal month, the question arises "how many degrees of longitudinal progress does the moon make per day in a sidereal month?" Goldstein showed how the number of days in a sidereal month can be found from the relation 235 synodic months = 254 sidereal months, by finding the length in days of 235 synodic months (multiply the number of months by the value for the number of days in a synodic month) and dividing this number by 254: 6939;41 ÷ 254 = 27;19,17,43 $^{\text{d/sidereal month}}$.[20] If one complete revolution of the zodiac, or 360°, is divided by this value, the result is 13;10,35$^{\text{o/d}}$ which is a standard Babylonian value for the daily mean progress in longitude of the moon.[21]

The mean period of the moon in longitude (13;10,35$^{\text{o/d}}$) is implied by the period relation 235 synodic months = 254 sidereal months. But, as made clear in Bowen and Goldstein's argument, an implied mean *period* is not the same as the concept of mean *motion*.[22] The concept of mean motion, according to Bowen and Goldstein, appears for the first time in Greek astronomy, beginning perhaps with Geminus' *Introductio*

[19] Alan C. Bowen and Bernard R. Goldstein, "Geminus and the concept of mean motion in Greco-Latin astronomy," *Archive for History of Exact Sciences* 50 (1996), pp. 157–185.

[20] B.R. Goldstein, "On The Babylonian Discovery of the Periods of Lunar Motion," *Journal for the History of Astronomy*, 33 (2002), pp. 1–13.

[21] Ibid., p. 3.

[22] Bowen and Goldstein, "Geminus," *Archive for History of Exact Sciences* 50 (1996), pp. 158–159.

astronomiae.[23] Extant Greek astronomical texts speak in terms of constant and smooth motion with respect to the heavenly bodies, and indeed in spherical astronomy a body will move uniformly if traveling equal angles in equal times as seen from the center of the sphere. The approach to astronomy as a problem of celestial motion, viewing the planets as moving continuously in arcs of the ecliptic with their periods as functions of time, was a significant departure from Babylonian methods.

It was not only a fundamental difference in cosmology but a different conception and function of circles, which played no role in the theoretization of celestial phenomena, that accounts for the difference between Babylonian and Greek astronomy. Eleanor Robson has discussed the conception of the circle in Babylonian mathematics, pointing out the lack of an interest in radii. She says, "in ancient Mesopotamia, by contrast [to the conception of a circle in modern mathematics as the locus of points equidistant from a central point], a circle was the shape contained within an equidistant circumference . . . There are many more examples of circle calculations from the early second millennium, and none of them involves a radius. Even when the diameter of a circle was known, its area was calculated by means of the circumference."[24] The meaning of the Akkadian word *kippatum* "thing that curves" is, she notes, both the figure of the circle itself as well as its circumference. In other words, the circle is defined by the circumference (from the outside, so to speak) not the area defined by the rotation of a radius (from the inside out, so to speak). Therefore, the analogy to the motion of a body around a circular path defined with respect to the center, i.e., the observer on earth, was not made by Babylonian astronomers, who were concerned rather with the return of certain phenomena to certain directions in the sky, calculated with respect to their periods of return. The goal of Babylonian astronomy was not the determination of the motion of a planet, much less the distinction between real and apparent motion such as characterizes Greek cinematic astronomy, but rather, the date and position of individual phenomena. This, as

[23] Ibid. Cf. B.R. Goldstein, "What's New in Ptolemy's Almagest?" *Nuncius* 22 (2007), pp. 261–285, especially p. 272.

[24] Eleanor Robson, "Words and Pictures: New Light on Plimpton 322," *American Mathematical Monthly* 109 (2002), p. 111.

Noel Swerdlow has emphasized, makes the idea of continuous motion along a circular path completely irrelevant.[25]

For the Babylonian celestial sciences periodicity was a central preoccupation and it was conceived of and dealt with in a quantitative but arithmetical way, through counting not geometry. Where a single cycle would yield a fractional quantity, the Babylonians favored larger cycles and integral periods, as in the Saros, where 1 eclipse possibility occurs every 5 + a fraction months but 38 eclipse possibilities occur exactly every 223 months. There is no physical, in the sense of spatial, background for the concept of period relations (the physical background lies in the actual behavior of celestial bodies). As a consequence there is no particular commitment to a cosmological framework essential to their derivation or use. Their cognitive substance is in counting and predicting the appearance or possibility of appearance of celestial phenomena, a goal that was fully consistent with the divinatory and astrological context of Babylonian astronomy.

---

[25] See N.M. Swerdlow, *The Babylonian Theory of the Planets* (Princeton: Princeton University Press, 1998), p. 30.

CHAPTER NINETEEN

CONDITIONALS, INFERENCE, AND POSSIBILITY IN ANCIENT MESOPOTAMIAN SCIENCE

If acts as a lever to lift us out of the world of actuality into the realm of imagination.
Konstantin Stanislavski

Introduction

The study of ancient Mesopotamian science is well developed from the standpoint of a reconstruction of its content, methods, and aims.[1] Its situation within a social and political context is less well known, but has been studied to a greater degree than has its nature from a comparative epistemological point of view. Few attempts have been made to comment on philosophical dimensions of cuneiform scientific texts, at least those aspects of such texts that can be related to some issues in the philosophy of science.

This essay focuses on a part of the corpus which is comparatively problematic from a modern classificatory standpoint, namely the omen texts. These present in extensive and formalized lists a corpus of knowledge that in large part seeks to describe what we would call "natural" or "physical" phenomena, though this category is not employed as such in the cuneiform written record. Consequently, no distinctions are made in the ancient sources between natural and other kinds of knowledge, or between physical and other phenomena, at least for the purpose of compiling lists of signs and their *significata*.

It is at least somewhat clearer in the case of the Greeks, where boundaries between the physical and the metaphysical are known. Still, for Greek antiquity, as D. Lehoux put it, "their ideas about what counts as *physical* are going to look a little different from ours, since

[1] See HAMA, N.M. Swerdlow, *The Babylonian Theory of the Planets* (Princeton: Princeton University Press, 1998), and H. Hunger–D. Pingree, *Astral sciences in Mesopotamia* (Leiden, Boston: Brill, 1999).

their physics is so very different."[2] Given the divinatory character of the Babylonian sources under consideration here, all phenomena of interest to the scribes were subject to the workings of the divine, as, for example, when they say that the moon-god "makes" the eclipse. Whether such divine manipulation of phenomena and events on earth were viewed as "physical" in nature is unknown, if only because no line demarcating the "physical" is drawn in the sources. That prayer, incantation and magic were accepted as viable means to deal with the impact of divine forces on the physical world further underscores the difficulty in defining boundaries between the physical and metaphysical in ancient Mesopotamia.

The following discussion takes up questions of logic and reasoning within the context of an ancient science whose outlines, interests, and cultural background are different from those of modern western science. The focus here is principally on the ancient study of celestial omens. Cuneiform omen texts were first classified in modern Assyriological scholarship as "scientific" because of their systematic character. Their presentation in lists is clearly related to other lists (lexical lists, sign lists) prepared by cuneiform scribes for purposes of teaching the cuneiform script. The systematic character of these corpora was found in their form and comprehensive nature, that is, in a desire to present everything worthy of knowing and recording and to do so with organizational and logical integrity. A more apt designation of what all these texts have in common might be a "scholastic" or "academic" character.[3] To be sure, Mesopotamian science was the product of an academic scribal culture. That is, the content and form of the cuneiform compilations of omen, magical, astronomical and medical texts, which we lump together under the rubric "Mesopotamian science," were the result of certain aims of the institutional context within which they were developed, i.e., the scribal school or "institute," whose purpose was to teach and preserve cuneiform learning, although, at the

---

[2] D. Lehoux, *Astronomy, Weather, and Calendars in the Ancient World Parapegmata and Related Texts in Classical and Near-Eastern Societies* (Cambridge and New York: Cambridge University Press, 2007), p. 37.

[3] Note the functionalist approach of A.L. Oppenheim that the lists do not embody "a quasi-mythological concept as *Ordnungswille*, according to which the scribes who made these lists aimed at 'organizing' the universe around them by listing what they saw of it in word signs written in narrow columns of clay," see A.L. Oppenheim, *Ancient Mesopotamia: Portrait of a Dead Civilization* (Chicago: University of Chicago Press, 1975), p. 248.

same time, one cannot be sure that social demands fully account for the deeper cognitive disposition of these texts' content and form.

Science in the context of the cuneiform scribal tradition had to do not only with certain subjects (celestial phenomena, medical phenomena, magical prescriptions, extispicy and other forms of divination from other kinds of signs) but the particular textual treatment given these subjects bear reflections of how phenomena were seen to relate to one another, and to humankind. Just how rigorous and or logical the cuneiform scientific corpus as a whole was has never been the subject of any focused discussion, nor is it the intent here to be comprehensive. By limiting discussion to omen texts, and particularly celestial omens, this paper will look at some features of the systematization of omen statements in terms of questions about its inherent logic. Quine and Ullian made the observation that

> Our word 'science' comes from a Latin word for knowledge. Much that we know does not count as science, but this is often less due to its subject matter than to its arrangement. For nearly any body of knowledge that is sufficiently organized to exhibit appropriate evidential relationships among its constituent claims has at least some call to be seen as scientific. What makes for science is system, whatever the subject. And what makes for system is the judicious application of logic. Science is thus a fruit of rational investigation...at root what is needed for scientific inquiry is just receptivity to data, skill in reasoning, and yearning for truth.[4]

The following does not intend to rehabilitate omens in terms of modern logic, but rather raises the question of the logic inherent in ancient Mesopotamian collections of what are throughout "if...then" statements, i.e., conditionals. The question is this: To what extent do Babylonian omens reflect a mode of inferential reasoning as a function of their syntactic and logical structure as conditionals? Further, in the field of Babylonian omen science, where each statement in the written corpus is unique (of many thousands of omens, no two are alike), the conditional form seems to have offered a useful and adaptable means for creating system. As D. Edgington said, "the conditional...is a systematic device: if you understand any conditional, you understand every conditional whose components you understand."[5] The present essay, therefore, explores in a preliminary way a number of aspects

[4] W.V. Quine and J.S. Ullian, *The Web of Belief* (New York: Random House, 1978), pp. 3–4.
[5] Dorothy Edgington, "On Conditionals," *Mind* 104 (1995), p. 241.

of the logical and epistemic nature of the conditional statement in Babylonian science.

Formal Attributes of Mesopotamian Scholarly Divination

A large portion of cuneiform scholarship belongs to the extensive tablet series for divination of various kinds. Detailed lists of signs (*ittātu*/GISKIM.MEŠ) with their correlated events of a public or private nature make up the corpus of cuneiform scholarly divination. The body of celestial signs corresponds by and large but not exclusively to visible phenomena (physical or optical, i.e., involving or related to light). It may be worth noting that the Sumerian writing of the word GISKIM (Akkadian *ittu*) "sign," is a compound logogram that includes the graphic element IGI "eye," or "to see." But in addition to certain kinds of visible phenomena, signs could be identified in possible, imaginable or conceivable phenomena as well, i.e., in things not limited to what we consider physical phenomena, though they are clearly grounded in consideration of physical realia. The purpose of the omen compilations appears to be to identify and systematize what, evidently, to the ancients seemed to be the interdependence of elements of their experience, that is, observable events in the environment, with events in social life. The written lists of omen statements, arranged into elaborate paradigms, in the structuralist sense of that term, preserve a Babylonian semiotics whose pre-history is entirely irretrievable. Once formalized in lists, however, the paradigms became traditional and were perpetuated by the faithful copying of the omen lists over the course of many centuries.

Divination series were written, therefore, to preserve a system (of indeterminable antiquity) of associations between signs and their consequences. The signs were compiled according to a variety of subjects, e.g., celestial signs, signs in the exta of sacrificed animals, physiognomic or medical diagnostic signs. The series vary widely in their content but are unified in form. Regardless of their content the lists of signs are formulated as "if…then" conditional statements. As D. Sanford says in the introduction to his study of the foundations of reasoning, "we use conditionals to decide what to do. We also use conditionals to decide what to believe, whether or not the belief is immediately relevant to any prospective alternative for action. Much of our inference from evidence is naturally cast in conditional form."[6] "If…then" formulations belong to a category of sentences known as indicative conditionals, which express the expectation of something (the consequent or apodosis) on the condition of something else (the antecedent or protasis). Such conditionals seem to have built into them a future state of affairs: "On the condition that (or supposing) P, Q happens, or will happen." P and Q are then related events, P being that which signifies and Q being that which is signified, that is, Q is expected to occur after P.

The question is not whether Mesopotamian omens reflect a conscious interest in the nature of conditionals or in the logic of conditional statements. They do not. The Assyro-Babylonian scribes did not comment on the form of the omens as such, but the fact remains that observational and theoretical interest in physical phenomena resulted in the creation of systematic and highly schematized lists of conditional statements. The question is what is the real function of the conditional phraseology in this context. In modern scholarship it has been regarded as a function of the use of omens in prognostication, the "if…then" being the way a diviner "divined" the future. In this sense the omens served the same purpose Sanford attributes to "our" use of conditionals, i.e., to help human beings decide whether or what action to take in the immediate future. This is indeed confirmed by evidence of scribal activity at the Neo-Assyrian court (7th century B.C.E.), in which learned scribes advised the Sargonid kings on their official business inside and outside the palace on the basis of celestial omens, as in the following passage:

> And the matter of the planet Jupiter is as follows: If it turns back out of the Breast of Leo, this is ominous. It is written in the Series as follows: 'If Jupiter passes Regulus and gets ahead of it, and afterwards Regulus, which it passed and got ahead of, stays within in its setting, someone will rise, kill the king, and seize the throne.' This aforesaid is the only area which is taken as bad if Jupiter retrogrades there. Wherever else it might turn, it may freely do so, there is not a word about it.[7]

[6] David H. Sanford, *If P, then Q: Conditionals and the Foundations of Reasoning*. (London and New York: Routledge, 1989), p. 4.

[7] Simo Parpola, *Letters from Assyrian and Babylonian Scholars*, SAA 10 (Helsinki: Helsinki University Press, 1993), pp. 9–10 rev. 12–22.

Apart from the omen lists, other written evidence for the practice of divination is available from letters referring to the observation of omens, reports of the observation of ominous signs, and rituals for averting the evil signaled by some. Such action could include prescriptions for ritual magic, as the scribe in the following example recommends:

> Let them find out where the evil (portended by) the eclipse has materialized, and eradicate it. Somebody should go and perform (the rituals) in Nineveh.[8]

As implied in the last passage, the reading of a sign and its interpretation prompted action to be taken to respond in the event the sign was considered dangerous. However, this use of omens does not necessarily mean that the omens themselves offer what we would call "predictions."

The formulation of individual omen statements, "if P, (then) Q," was already employed in the Old Babylonian period (ca. 1800 B.C.E.), sharing its form with so-called law codes, the casuistic statements of acts and their punitive consequences, "if a man does thus and such, he shall pay" to varying degrees (including, in capital offenses, with his life). The intellectual affinity between Mesopotamian law and divination is as yet under-explored. R. Westbrook has commented that the verb *barû*, whose basic meaning is "to see," is also used in the sense of "to establish facts of a case," noting the relation to its use in the context of divination in which the diviner "establishes the true meaning of ominous phenomena" and taking this to mean that the diviner "does justice, since a judgment has two aspects: the verdict or the facts and the orders that may flow from it for punishment, compensation, restitution, etc."[9] A. Guinan has also made mention of the similarity between the conditional formulation of law cases and omens, but judges the similarity "deceptive," because "when we read an individual law, we can understand the connection between the protasis and the apodosis," and "deduce the underlying principles that govern the

[8] Ibid., p. 40 rev. 2–7, broken passages are not represented in the translation here.

[9] Raymond Westbrook, "Judges in Cuneiform Sources," in *Judge and Society in Antiquity*, edited by Aaron Skaist and Bernard M. Levinson MAARAV 12 (2005), p. 35 and note 25.

structure of the text."[10] The relation between protasis and apodosis, or antecedent and consequent, is the working dynamic of Mesopotamian divination, and although to us that connection, at least semantically, is not readily understood, it is subject to certain relational (propositional logical) rules in the same way as are the casuistic statements of the cuneiform laws. I contend that the relation of antecedent and consequent in the omens can be understood as a matter of conditional logic, which applies independently of any semantic, causal, or empirical connection there may be (or not be) between the statements P and Q so related.

Some omens were not introduced with the word *šumma* "if," but merely stated as two conjoined statements "P:Q," with the implication that P, the antecedent clause was associated with or indicated Q, the consequent. The practice of writing *šumma* in Old Babylonian omens is by and large effected by writing BE-*ma* [to be read *šum$_4$-ma*] "if," but later, in the Neo-Assyrian period, by writing DIŠ, meaning "entry" after the fashion of the Sumerian lexical lists wherein the entries in the list are preceded by a single vertical wedge, meaning "item" or "entry." The translation of omens written with DIŠ can in fact be "P:Q," without "if." The *Chicago Assyrian Dictionary* s.v. *šumma*[11] explains that the logogram DIŠ, when introducing omens written with DIŠ alone, is "unlikely to have the reading *šumma*," since it sometimes happens that omens which are introduced by DIŠ can also be preceded by the word "if," written either *šum-ma* or BE-*ma*. With or without DIŠ the logical relationship between P and Q remains the same. P functions as the antecedent clause in which an ominous sign is posited, supposed, or given. We can therefore translate "if P," "on the condition that P," or "given that P."

The grammar of conditionals in Akkadian does not dictate that the posited event P should be expressed with the verb in the preterite, but in omen texts it normally is. The preterite verbs of the protases are in many editions of omen texts translated into English with the simple present, "if P happens." This is a matter of interpretation, that is of our interpretation of the way the ancients understood the relation between antecedent and consequent (protasis and apodosis) and

[10] A. Guinan, "A Severed Head Laughed: Stories of Divinatory Interpretation," in Leda Ciraolo and Jonathan Seidel, eds., *Magic and Divination in the Ancient World* (Leiden, Boston, and Köln: Brill/Styx, 2002), p. 19.

[11] CAD vol. Š III (Chicago: Oriental Institute Publications, 1992), p. 276.

how they used the omens. The idea is that whenever a sign should occur, meaning sometime in the future, Q is what one expects. Hence our translation of these verbs in the present tense with present-future aspect: "If, or on the condition that, P should ever occur…" The consequent is translated as following upon the event in the antecedent in the manner of a prediction. It is expressed as a subsequent occurrence with its verb in the present-future aspect: DIŠ MUL SAG.ME.GAR *ana* UL Á.MUŠEN *iṭeḫḫi* "If (or, 'given,' or, 'on the condition that') Jupiter approaches the Eagle Constellation (Aquila)" *miqittim būlim išakkan murṣānu ina mati ibašši zunnu arḫi* 1.KAM *ul izannun* "there will be (meaning 'there is as a result') disease of the cattle herds, sickness in the land (and) no rain for one month."

What strikes us as peculiar in relating P and Q in this way is that the relationship between the events P and Q bear (to us) no physical or causal connection. Whether the ancients thought that Q occurred because P occurred is never addressed in cuneiform sources, neither indicated in the evidence of the omens themselves nor in ancillary texts such as reports and letters to the king about ominous signs. To us the idea that this kind of (false) causality would apply to the omen texts is extremely discomfiting as it lays the entire system open to the charge of *post hoc ergo propter hoc* fallacious reasoning. But one would like to have a surer grasp of a Babylonian theory of causality, be it somehow physical or divine, for such a charge to make sense within the ancient context. While no appeal is made to physical reasons or forces to explain the connection between P and Q, a generalized acceptance of a divine causality in the world of phenomena does appear to be the case, though we have no conception of how that causality was understood to work. What can be established from the internal evidence of the omen texts is a strong paranomastic relation between antecedent and consequent clauses, suggesting that the relation between P and Q need not be physical, causal, or even divinely produced for P to indicate Q.[12] The point is, conditional statements need not be causal statements, though they certainly can be when P precedes Q. Moreover, the fact that "if…then" statements are commonly used for making

[12] For example, from the extispicy series (*bārûtu*) "If the coils of the intestine look like the face of Huwawa (written logographically [d]ḪUM.ḪUM): it is the omen of the usurper king (Akkadian *ḫammê*) who ruled all the lands." Antecedent and consequent are related by a word play based on the phonetic echo of ḪUM.ḪUM in *ḫamma'u*. See BRM 4 13 rev. 65.

causal statements does not mean that all conditionals make causal statements. What the omens do make are implications, in the logical sense, that is, "if P then Q" can be taken to mean "P implies Q," and this relation does not have to do either with causality or prediction.

The last formal attribute relevant to the discussion of the conditional statements in omen tablets is the organizational character, which can be described in terms of the structures of paradigm and syntagm, two basic dimensions of the analysis of textual form going back to Jakobson and Saussure.[13] On the syntagmatic level, the horizontal axis so to speak, are the elements that come together to constitute the sign, such as "If [Jupiter] in the middle watch has a *ṣirhu* toward the North."[14] The syntagmatic relation of the elements of a given antecedent is constructed by combination. But the antecedents are also structured on the vertical axis such that elements of the syntagm can be replaced forming a new combination of elements, as the lines following the one just quoted demonstrate (only the antecedents are given here, and breaks in the tablet are not indicated):[15]

> If Jupiter in the middle watch has a *ṣirhu* toward the North
> If Jupiter in the morning watch has a *ṣirhu* toward the North
> If Jupiter in the evening watch has a *ṣirhu* toward the South
> If Jupiter in the middle watch has a *ṣirhu* toward the South
> If Jupiter in the morning watch has a *ṣirhu* toward the South
> If Jupiter in the evening watch has a *ṣirhu* toward the West
> If Jupiter in the middle watch has a *ṣirhu* toward the West
> If Jupiter in the morning watch has a *ṣirhu* toward the West

[13] F. de Saussure, *Course in General Linguistics*, edited by C. Bally and A. Sechehaye in collaboration with A. Reidlinger, trans. W. Baskin. (London: Peter Owen, 1974) and Roman Jakobson, "Two Types of Aphasic Disturbances," *Fundamentals of Language* (The Hague: Mouton, 1971). I use these terms in a strictly formal sense without subscribing to the overall program of structuralism's or post-structuralism's claims to the relation of culture and meaning, words and things, and in awareness of the critiques of structuralism offered, for example, by Slater and Pavel. None of this is relevant for my adoption of the terms and the ideas of paradigm and syntagm in Babylonian omen texts. Note that N. Veldhuis articulated this same idea, without invoking the terminology of the structuralists, but nonetheless described omens and lexical lists as both having "a horizontal and a vertical reading. The vertical reading [the paradigm] uncovers the system behind the individual items." See also N. Veldhuis, "Continuity and Change in the Mesopotamian lexical tradition," in Bert Roest and Herman Vanstiphout eds., *Aspects of Genre and Type in Pre-Modern Literary Cultures* (Groningen: Styx, 1999), p. 114.

[14] E. Reiner and D. Pingree, *Babylonian Planetary Omens*, Part 4. (Leiden: Brill, 2005), pp. 124–125 r. 1'.

[15] Ibid., pp. 124–125 r. 1'–11'.

If Jupiter in the evening watch has a *ṣirhu* toward the East
If Jupiter in the middle watch has a *ṣirhu* toward the East
If Jupiter in the morning watch has a *ṣirhu* toward the East

On the plane of the paradigm, new elements are introduced by substitution. A given paradigm will be expanded until it reaches a stopping point when the elements of that paradigm are exhausted. In the example given, nothing further can be added to the pattern of middle, morning, evening watch combined with the four directions.[16] The consequence of this structural method is that some "phenomena" will emerge within the paradigm that are purely imaginative constructions not possible in the actual world.

Conditionals and Inference Making in Cuneiform Omen Texts

Dorothy Edgington introduces her article "On Conditionals" with the following statement: "The ability to think conditional thoughts is a basic part of our mental equipment. A view of the world would be an idle, ineffectual affair without them. There's not much point in recognising that there's a predator in your path unless you also realise that if you don't change direction pretty quickly you will be eaten.

"Happily we handle ifs with ease. Naturally, we sometimes misjudge them, and sometimes don't know what to think. But we know what it would take to be in a position to think or say that B if A, what would count for or against such judgements, how they affect what we should do and what else we should think."[17]

This is an encouraging assessment if we are interested in defending a claim against the idea of a difference in cognition between the ancients and ourselves. But there is serious comparative work to do to in this regard, and while, as Edgington believes, conditional thought is "basic," the theory of the conditional statement is not. Furthermore, her own question "are there irreducibly different kinds of 'ifs'?" seems to me to require some careful analysis on our part with respect to Mesopotamian "ifs" before we issue any general statements about the cognitive in Mesopotamian omen texts.

[16] It isn't clear why no entry for a *ṣirhu* in the evening watch to the North is given. If it occurred in the break preceding line 1', it would be out of order. We expect it between lines 2' and 3'.
[17] Dorothy Edgington, "On Conditionals," *Mind* 104 (1995), p. 235.

We are not accustomed to approaching Babylonian omen texts from the point of view of what their form might suggest about their meaning and purpose because we tend to (or want to) view the omens as having, or being based on, an empirical connection. The following example will suffice: If/on the condition that Jupiter leaps in the middle of the (constellation) Fish and stands: no rain for one month.[18] On the standard view, this statement means that whenever the phenomenon is observed (the leaping and standing of Jupiter in the middle of the Fish), a conclusion (or prediction) is drawn (no rain for a month) on the basis of that observation. This interpretation presupposes an empirical foundation for the association of P and Q, namely, that at some time in the past it was observed that following the leaping and standing of Jupiter in the middle of the Fish constellation there was no rain for a month. Whether or not this was the case is not ascertainable from the omen text itself. Neither is there direct evidence outside the omen lists that this was ever the method by which some omens might have been generated, tempting as it is to presume so. The idea of an original empirical connection between sign and signified remains entirely speculative and is also occasionally shattered by the "impossible" phenomena which cannot have been observed at any time, as well as by the paranomastic relations clearly attested in the texts.

Perhaps a better approach would be to bracket altogether the problem of supposed empirical underpinnings of omens. If some signs were related to events without an empirical connection, which is certainly the case for the "impossible" phenomena, then perhaps whatever related the antecedent to the consequent in those instances held in other cases as well. Our presumption of an original empirical connection may be motivated by our difficulty in seeing as in any way logical conditional statements where there is no causal or empirical connection between antecedent and consequent. But the logic and the truth-functionality of conditionals (for details, see below) is not dependent upon the meaning of its component statements. R.J. Farrell commented, "students of truth-functional logic frequently regard material implication [that P implies Q] to be patently absurd. Most of us who teach elementary logic have encountered intelligent students who frustratedly exclaimed something to the effect that: Any

[18] Reiner-Pingree *Babylonian Planetary Omens*, Part 4, p. 43 r. 1', without marking break.

logic which pronounces true a sentence such as, "If the moon is a green cheese, John F. Kennedy was the 35th President of the United States," is illogical."[19] Even if the antecedent is not patent nonsense, as in the moon being a green cheese, the relation of antecedent to consequent, if unconnected by physical, causal, or experiential association (such as "If the moon is a satellite of Earth, John F. Kennedy was the 35th President of the United States"), still seems bizarre to us. Just as in these two deliberately bizarre conditionals, it is difficult to assess the nature of a Babylonian omen as a conditional statement when taken in isolation. Although the ancient omens were not constructed for the purpose of illustrating material implication in a conscious exploration of the logic of conditional statements, from a formal point of view they may functionally be viewed as a series of implications (P implies Q).

Seen in the context of the written list it is easier to see the difficulty of the question about a physical connection between antecedent and consequent particularly given the schematic (or paradigmatic) nature of the development of the list. The following is a section from omens for the planet Jupiter from the series *Enūma Anu Enlil*.[20]

> If ditto (=Jupiter) passes to the front of the Goat (= Lyra): [In Akkad...]
> If ditto passes to the rear of the Goat: [In Elam...]
> If ditto passes to the right of the Goat: in [Amurru...]
> If ditto passes to the left of the Goat: in S[ubartu...]
> If ditto passes to the navel of the Goat: in Guti [...]
> If ditto passes to the sting of the Goat: in all the lands [...]
> If ditto passes to the throat of the Goat: Enlil and [...] there will be confusion, a flood will sweep away the land, rain in the sky, flood in the spring will come, ditto: in that month, variant: in that year, Adad will beat down the crop of the land, there will be an eclipse of the Moon and the Sun, the king's land will revolt against him.
> If ditto passes to the in-between area of the Goat: *rapādu*-disease will [seize] the land.
> If ditto passes to the rear of the Goat: scarcity of barley and [straw?]
> If ditto comes close to the Goat: scarcity of barley and straw and....
> If ditto comes near to the Goat: the mind of the land will change, [...]
> If ditto leans against the Goat: Nergal will [...] the cattle.
> If ditto stands with the Goat: Gula will cause shivers.

[19] R.J. Farrell, "Material Implication, Confirmation, and Counterfactuals," in *Notre Dame Journal of Formal Logic* 20 (1979), p. 383.

[20] Reiner-Pingree, *Babylonian Planetary Omens*, Part 4, Group G K.8097:4'–19'. tablet number is unknown.

The purpose of the omen list seems to be to provide a series of cases that serve as a basis for knowing what happens if P, or, put another way, what is indicated or implied by P. Although the omen lists provide only the series of "If P then Q" statements, the use of the omen texts as reference works seems to be well indicated by other sources for the practice of divination, such as the letters and reports from the scholars. If ever P is observed, we presume, the omen statement in which P is mentioned permits the association to Q.

In effect, Q can be inferred from P in a manner that, at least from a formal standpoint, follows the logic of indicative conditionals as follows: "If P then Q. P: Therefore Q." This is the most common rule of inference, known as *modus ponens* ("the mode that affirms"). The *modus ponens* formulation will appear completely familiar to anyone with an acquaintance with Babylonian omen and other divinatory cuneiform texts. Logically speaking, two premises are brought into relation. The first is simply the conditional statement "if P then Q," where the logical relation is one of implication, that is, $P \rightarrow Q$ ("P implies Q"). The meaning of the conditional is then "if P implies Q." The second is the truth of P (when it is observed), from which, by the inferential rule of conditional logic, it is concluded that Q.[21] From a formal point of view, therefore, the written body of omens can be construed as

[21] Historically speaking, the logic of *modus ponens* was first situated in the context of the Greek philosophical tradition of the Old Stoa. Of the early Stoic authors, e.g. Zeno, Cleanthes and Chrysippus, virtually nothing is left. As discussed amongst their critics in later centuries, however, they seem to have developed a consistent logic of propositions and inference schemes. Stoic logic was influenced by the Socratic school of Megara, associated with the names of Diodorus of Cronus and Philo. As Mates stated, "the so-called 'first undemonstrated' inference-schema of the Stoics ran as follows: If the first, then the second. The first. Therefore, the second. As a concrete example of this type of inference, they were accustomed to give: If it is day, then it is light. It is day. Therefore, it is light." Mates distinguished the Stoic propositional logic from Aristotelian class logic, by showing that the Stoics substituted sentences for the ordinal numbers rather than another variable (such as a term, eg., man or animal or mortal). Mates further points out that whereas Aristotle gave his syllogisms nearly always in the form of conditionals ("If animal belongs to all ravens and substance to all animals, then substance belongs to all ravens"), those in his school expressed them as rules. See Benson Mates, *Stoic Logic* (Berkeley and Los Angeles: University of California Press, 1953), pp. 1–10 for a concise overview of the sources. See also A.A. Long, and D.N. Sedley, *The Hellenistic Philosophers, Vol. 1: Translations of the Principal Sources with Philosophical Commentary*. (Cambridge and London: Cambridge University Press, 1987), p. 2 on the more tightly systematic as well as the more specialized character of the post-Aristotelian philosophical systems of the third century and later, and pp. 31–38 on Stoic logic and semantics. I am grateful to Prof. Heinrich von Staden for drawing my attention to this reference.

a list of conditional statements that offer inferences from established premises.[22]

Apart from any empirical considerations of omen taking, or questions about the physical reality of the signs, the logical relationships between the signs and what they signify stem from the syntax of their conditional formulation. As Edgington pointed out, conditional thinking is a basic cognitive function and the logic of conditionals is tied to conditional statements. On this formal level of analysis, the cognitive nature of the Babylonian divinatory science can be said to be characterized by inferential reasoning. Although the omen lists provide only a series of "If P then Q" statements, the use of the omen texts as reference works seems to be implied by other sources for the practice of divination (the letters and reports from the scholars). From these texts it follows that when P is observed, the omen list is consulted. On the basis of the entry in the list in which P is found, a correlation to Q, i.e., the meaning of P, can be inferred. This reading of the omens, as just suggested, can also be expressed as $P \rightarrow Q$ ("P implies Q"), removing temporal, causal, empirical, or otherwise physical elements from their relation. On this view, the omens are not what we would understand as predictions.[23]

The relation established between P and Q is based on or determined by a paradigmatic structure, which becomes ossified by tradition and is subsequently taken as authoritative. And though the relation between

[22] That the inferential character of Assyro-Babylonian divination appears to coincide with what was known as the "first undemonstrated" inference scheme of Stoic logic seems on the face of it interesting, but not evidently interdependent. At least no textual (or other) evidence exists to link the two. Cuneiform omen texts continued to be copied throughout the Hellenistic period (4th–1st centuries B.C.) as exemplars from the late Babylonian collections stemming from Babylon, Uruk, and possibly Sippar attest. The fact of their contemporaneity with the activities of the Stoic philosophers in Athens and Alexandria of the 3rd century and later means nothing in and of itself. However, it must be at least mentioned that this was a period of significant transmission of science from Babylonia to the Greeks, as evidenced by the appearance of Babylonian astronomical methods in Greek astronomy later in the Hellenistic Greek astronomical papyri, but also possibly by the time of Hipparchus in the 2nd century, according to Ptolemy's *Almagest*. Already Euclid's *Phaenomena*, ca. 300 B.C., which is the earliest extant Greek treatise to take up the question of the rising times of the zodiacal signs and the corresponding values for length of daylight, indicates a knowledge of Babylonian astronomy. See J.L. Berggren, and R.S.D. Thomas, *Euclid's Phaenomena: A Translation and Study of a Hellenistic Treatise in Spherical Astronomy* (New York and London: Garland. Berggren and Thomas, 1996), p. 2.

[23] A similar reading has been given by N. Veldhuis "TIN.TIR = Babylon, the Question of Canonization and the Production of Meaning," JCS 50 (1988), pp. 77–85.

the signs and physical existence, much less observational reality, is not a requirement for a phenomenon to function as a sign, at least not to be included in the written list of ominous signs, we must allow that on the formal level, those antecedents which are obvious constructions of the imagination did function as signs. The consequents associated with them are still inferences to Q given P. This feature of the omen texts challenges our understanding of the connection between antecedent and consequent, particularly if we are looking for some kind of physical dependence (such as an empirical connection) of the consequent upon the antecedent; for how can we understand the establishment of a meaningful dependence on something that does not exist?

Possibility and Impossibility

As Gendler and Hawthorne explained in the context of the conceivable and the possible, "our faculty of perception reveals to us what is actual. And there is a widely accepted explanation of why this is so: our perceptual mechanisms are sensitive to features of the actual world, which impinge on them causally to produce systematic patterns of stimulus and response. Likewise, it seems, our faculty of conception reveals to us what is possible. But here there is no widely accepted explanation of why and to what extent this is so."[24] In reference to the omen texts, as pointed out above, ominous phenomena as entries in the lists do not carry observational weight, i.e., do not represent actual events. Even in the cases where some potential relation to physical reality exists, the omens in the lists are not observations. They are hypothetical statements representing a conditional belief that Q if P. Gendler and Hawthorne's indication that we are not on firm, or at least established, ground when it comes to accounting for the relation between the conceivable and the possible raises interesting questions that pertain to the ominous signs included in the cuneiform lists. Some ominous phenomena seem to have no actual properties in the world, yet in terms of their function as signs, and the fact that all ominous signs are correlated with consequents, it would seem that such actuality was at stake.

[24] Tamar Gendler and John Hawthorne, eds. *Conceivability and Possibility* (Oxford and New York: Oxford University Press, 2004), p. 3.

How certain an Assyro-Babylonian diviner would have been that Q would occur on the condition that P is a judgment we might make on the basis of our knowledge of the practice of scholarly divination. Rituals to ward off the consequences of observed signs were ordered with enough regularity in the correspondence to the Neo-Assyrian kings that we can surmise a high degree of belief in Q given P. But provided we refer only to the omen statements in the lists, any consideration of the empirical is irrelevant for an analysis of how P and Q are related. The modality of the statements P and Q that make up each omen allows us, for the sake of an analysis of the internal logic of the omen statements, to treat the antecedent and consequent of an omen statement as the conjunction of two propositions. The statements P and Q can be said to function like propositions in the sense that they do not represent actual empirically established events, but rather something more like beliefs or some other "propositional attitude."

The epistemic character, particularly of the signs themselves, is further complicated for us because some of them are imaginative constructions. On the criterion of empirical veridicality, therefore, such constructed or imagined phenomena are "impossible." If the omen lists constitute a body of knowledge, we ask ourselves, what would it mean to "know" such phenomena? Despite the fact that the omens as listed in the texts are not tied to observations, the signs by and large refer to phenomena with real properties. Occasionally, however, due to the completion of paradigmatic substitutions, such as the three watches, the four directions, or the five colors, some signs do not refer, but stand in the text as "mere" constructions. Examples of such "impossible" phenomena are the appearance of the sun at midnight or the lunar eclipse shadow that travels from west to east across the lunar disk. From our point of view, the criterion of empirical veridicality would have ruled out the inclusion of these phenomena. But they are included because they fulfil paradigmatic schemes and belong to the structure and logic of the omen lists. This presents a puzzle to our way of thinking because if we know that P cannot occur we wonder what purpose statements beginning "If P..." serve. If we know, for example, that Venus can never be seen at the zenith, a statement beginning "If Venus is seen at the zenith" seems pointless and wrong.

It may seem facile, but for purposes of analysis it might be more useful to speak of possibility rather than impossibility. To say certain phenomena in the omen lists are "impossible" or "absurd" because they do not occur and cannot be observed is our judgment and occurs nowhere in the ancient sources. That is to say, our definition of impossible (not in accordance with real properties) is not expressed in the texts. It seems more consistent with the overall makeup of the omen lists that recording a phenomenon as an entry in a codified omen list is evidence that it was regarded as epistemically possible. That is, the list of statements (P) constitute data, or knowledge, on the basis of which the diviner makes judgements and draws conclusions about what will happen. The use of the terms possible and impossible are, among other things, relative to one's accepted knowledge of how and what things are. Gendler and Hawthorne put it this way: "One might offer a *permissive* account of epistemic possibility, according to which P is epistemically possible for S just in case S does not know that not-P, or in a *strict* account, according to which P is epistemically possible for S just in case P is consistent (metaphysically compossible) with all that S knows."[25] There are as well intermediate definitions between the permissive and the strict accounts, where, for example, "P is epistemically possible for S just in case S's evidence does not warrant S's believing not-P; or P is epistemically possible for S just in case S could not reasonably be expected to ascertain not-P on the basis of what S knows."[26] This approach opens up the field for discussion of the epistemic character of the non-occurring phenomena that appear in the omen lists.

Taking the permissive account first, we might conclude that phenomena such as Venus appearing in the zenith or the sun appearing at midnight are conceived of within the omen list as possibilities because the scribes did not know that such phenomena cannot occur. The elaboration of the antecedents in the omen lists by means of paradigmatic substitutions, such as the three watches, the four directions, or the regions of the sky, produces such possibilities, extending known phenomena to possible phenomena. The paradigm then serves as a guide for the conception of possibilities. An Old Babylonian text (BM 97210) has the following lines:

^{d}*Utu ina bararti* IGI.DU$_8$ *šaḫluqti maš nīši* "If the sun appears in the evening watch: destruction of the herds of the people."

[25] Ibid.
[26] Ibid. p. 3 note 4.

[d]*Utu ina qablīti* IGI.DU$_8$ *bartum ana šarri* "If the sun appears in the middle watch: revolt against the king."
[d]*Utu ina šaturri* IGI.DU$_8$ *ina ali šuātu šarru šanumma ibašši* "If the sun appears in the morning watch: in that city there will be another king."

Another example of possibilities conceived in omen texts that have no physical properties are the eclipses that occur on days of the month when eclipses are not possible. The pressure of the paradigm produces lists of eclipse omens on days when they will never occur. The Babylonians' perspicacity in matters of periodicity is attested in the early ability to predict eclipses and so we hesitate to say that the scribes were unaware of the impossibility of a solar eclipse, say, on the 10th day of the month, or a lunar eclipse on the 20th. In fact, the high degree of the scribes' understanding of the behavior of phenomena suggests that such phenomena as had never been observed were included not because they were thought to be usual or likely occurrences, but because they stood at the extreme negative end of possibility, that is to say the extremely unlikely. How such phenomena were thought to "fit into" a (metaphysical) conception of the world is interesting to contemplate. Perhaps, as S. Yablo pointed out, there is a meaningful difference between conceptual and metaphysical possibility.[27]

On the strict account, P is epistemically possible for someone if it is consistent with everything that person knows. In such cases, epistemic possibility then corresponds to metaphysical compossibility. If there were such a metaphysics in ancient Mesopotamia that permitted the compossibility of all sorts of non-occurring phenomena, the divination corpus in effect constitutes one. There are in fact other texts to support the idea that the Babylonian scribes held a metaphysics allowing for the possibility of all sorts of freak occurrences. These are the texts that deal in obvious prodigies, phenomena that transgress rules of order either in "nature" or society.[28] But perhaps this is where we step into

[27] Where he distinguishes counterfactual worlds that are metaphysically possible from *counteractual* worlds that are conceptually possible, see Stephen Yablo, "Coulda, Woulda, Shoulda," in Gendler and Hawthorne *Conceivability and Possibility*, pp. 445 and 448.

[28] A. Guinan, "A Severed Head Laughed: Stories of Divinatory Interpretation," pp. 7–40.

the realm of the conceivable, or the conceptually possible, as differentiated from the possible, or at least the metaphysically possible. However, it is clear from the omen texts that refer to prodigious events such as a bearded woman being seen in the city or stars falling from the sky, that the same logic applies to prodigies as to omens constructed from regularly occurring events. The ominous nature of an event did not seem to correlate with its degree of regularity, conceptual or metaphysical possibility, though the severity of their consequents perhaps did. The prodigies discussed by Guinan all presaged the extremely grievous condition of the fall of the state.

The conception of possibility and impossibility, in addition to being relative to the things one knows through observation and experience, is also relative to one's understanding of the reasons for the variation in the things observed, e.g., why it is that certain celestial bodies appear at the horizon but not on the zenith, or why a lunar eclipse occurs at the middle not the beginning of a month. Only when one has such understanding of the reasons for a particular range in variation of certain phenomena can one begin to speak of possible versus impossible phenomena. On the face of it, however, the omen texts can be read in terms of a position that does not rule out certain variations whose particular character is grounded in the paradigms. What is taken into account, therefore, is not actual properties of the phenomenon, but rather paradigmatic "possibilities" (conceptual possibilities) The paradigms do not permit just any phenomenon, but only those whose variations belong within the fairly tightly reasoned parameters of each paradigm (right-left, four directions, three watches, etc.). The "possibilities" are not limitless. They are only possible on the basis of the assumptions given in the paradigmatic structure of the list. All phenomena given as antecedents in omen texts are epistemically possible by virtue of being consistent with the structural rules of the list. By this reasoning, we err in classifying as "impossible" phenomena in the omen texts that do not conflict with but rather satisfy and effect paradigmatic structure and for which some causality or justification must apply at some level.

In describing the convention for introducing omens with the sign DIŠ, a comparison was previously made to the Sumerian lexical lists. But there is further relation to lexical lists that should be made explicit here. N. Veldhuis explained in reference to the archaic lexical lists from Uruk, that "it has often been observed that these archaic lists contain much that seems utterly irrelevant and that may not be explained by the purely utilitarian reason of teaching a new generation of scribes how to compose an administrative record."[29] He notes that very few of the professions in the list Lu A ever appear in contemporary administrative texts. He has challenged the notion that the lexical lists reflect some ordering cosmological sensibility, the old idea that somehow the Sumerians were cognitively disposed to order the world through list-making. The lists clearly provide more than what is needed if we are to use actual administrative records as a guide. In response Veldhuis says, "the direct relevance of the lists for the practice of writing is, indeed, low because these are manuals that cover every possibility, including the unlikely and the very unlikely ones. The archaic lists betray the problem of creating a new bureaucratic system that is capable of recording every transaction that is possible or even imaginable within the bureaucratic context. Therefore, the scribes who created these lists went out of their way to invent signs for birds and fish and professional titles that some future scribe once upon a time might need to write down."[30] The idea of inventing items for a list because at some time there would be a need for such an item suggests the very opposite of a conception of "impossible" phenomena. Indeed, the phenomena or items in the list seem to have been thought of not only as conceivable but possible. They are epistemically possible not because they are consistent with actual physical properties in the world (our epistemological category) but because they are consistent with the conceptual rules of the list (their epistemological category).

In the context of physical science, in which physical laws allow or disallow certain phenomena to occur, to posit a non-occurring or "impossible" phenomenon seems to indicate a lack of knowledge of the laws involved. The eclipse omen in which the shadow makes its transit from right to left (or west to east) could be taken to demonstrate such a lack of understanding. That is, a failure to know that such a thing cannot occur. The character of omen lists, however, show the importance of a different kind of knowledge. The paradigmatic treatment of the ominous phenomena creates room for expansions into the realm not of the empirical but the conceivable. The conceivable (or conceptually possible) does not always map neatly onto the actual, and

[29] Veldhuis *http://cuneiform.ucla.edu/dcclt/intro/lexical_intro.html.*
[30] Ibid.

the meaning of "possible" does not necessarily refer solely to physical actuality.

Earlier the question was raised what purpose statements beginning "If P..." serve if we know that P cannot occur. It may seem as though the impossibility of P renders the entire omen statement senseless, but a closer consideration of the logical structure of indicative conditionals puts the ancient omen statements containing conceptually, if not metaphysically, possible phenomena in a different light.

Truth-Functionality of Conditionals in Babylonian Omens

As discussed in a previous section, the validity of inferences such as are allowed by conditional statements is syntactic not semantic. That the antecedent P proves not to occur (= is false), as in the sun appearing at midnight, is not damaging to the validity of the statement "if P, Q" to which it belongs. Inferential reasoning is one of the fundamental ways in which we describe a method for knowledge. But an inference makes no promise as to truth or falsity, correctness or incorrectness. It must only follow from a pre-existing statement or premise, but true premises are a necessary element in valid inferential reasoning. Other ingredients are sometimes thought to be necessary for valid inferences to be made. For example a causal relationship between the evidence and the conclusion or hypothesis drawn from it, such as my conclusion from the evidence of the darkened face of the moon that the earth's shadow has crossed it, or that the moon has approached very near to the ecliptic and is at opposition to the sun which is also very near a node. I could also conclude or hypothesize on seeing the darkened moon that the evil *Sibitti* (seven demons) were whirling 'round him in heaven. Any of these relationships could be defined as causal. Alternatively, I could see the darkened face of the moon and decide that the king was in danger because I believed a temporal connection applied between lunar eclipses and bad luck for kings. Or thirdly, I could determine that lunar eclipses signified a range of events because a traditional code existed for making such interpretations of the sign "lunar eclipse," and any such interpretation or conclusion had an inferential relationship to the evidence, that is, the sign.

From a logical standpoint, the truth-functionality of such conditionals entails that the statement "If P then Q" is independent of all such relations just mentioned, i.e., temporal, causal, empirical, or traditional. As Michael Woods has said, "One thing that gives rise to doubts about the truth-functionality of conditional statements is that it seems so easy to construct sentences which have no natural use but which would have to be counted as expressing truths if conditionals are understood truth-functionally."[31] We (mistakenly) see the omens as presenting nonsensical relationships between antecedent and consequent because of their counter-intuitive yet truth-functionally legitimate nature as conditionals. Woods cited as an example of a bizarre conditional "If Rome is the capital of Greece, there are no snakes in Ireland."[32] Yet, from a truth-functional point of view, a Babylonian example, such as "If Jupiter leaps in the (constellation) Fish, there is no rain for a month" can serve just as well. Each example exhibits a bizarre juxtaposition, but, in terms of the truth-functionality of conditionals, such juxtapositions are as true as other statements that seem more intuitively "reasonable."

A conditional statement of the kind "If P then Q" (as material implication $P \rightarrow Q$) is simply true in every case but when P is true and Q is false.[33] From this it is clear that no matter the truth or falsity of the individual statements, antecedent or consequent, it is their relation that determines the truth or falsity of the conditional. If we are to consider as a criterion for truth whether a phenomenon can actually occur or not, it is clear that even such "false" phenomena can be enjoined in true conditionals, provided the consequent's truth-functional value is true. P can be "false" in some sense, such as in the guise of a non-occurring phenomenon, and the statement "If P then Q" can still be true by virtue of conditional logic.

The seeming incompatibility of the possible and impossible phenomena can be reconciled by further formal analysis of the genre. As already briefly indicated, the organization of the omen tablets can be

---

[31] Michael Woods, in *Conditionals*, David Wiggins ed., with a commentary by Dorothy Edgington (Oxford: Clarendon Press, 1997), p. 3.

[32] Ibid.

[33] Truth-functionality can be schematized as follows:

P	Q	$P \rightarrow Q$
T	T	T
T	F	F
F	T	T
F	F	T

described in terms of the structures of paradigm and syntagm. On the syntagmatic level are the elements that come together to constitute the sign, such as [Jupiter] leaps in the middle of the Fish to the right and stands.[34] The syntagmatic relation of the elements of a given protasis is constructed by combination. But both antecedents (and consequents) are also structured on the vertical axis such that elements of the syntagm can be replaced forming a new combination of elements. On the vertical plane of the paradigm, new elements are introduced by substitution, as illustrated by the series of Jupiter omens cited above. The mechanisms by which paradigmatic structure is created in omen texts are not unique to the genre of omen texts, but can be seen in lexical texts, as in the following extract:[35]

[amar] calf
amar [ga] milk calf
amar ga [nag(-a] calf that drinks milk
amar ga gu_7-[a] calf that "eats" milk
amar ga sub-a calf that suckles milk
amar sah_4 playful calf
amar lirum strong calf
amar ban_3-da wild calf
amar mu-3 three years old calf
amar mu-2 two years old calf
amar mu-1 one year old calf
amar babbar white calf
amar $kukku_5$ black calf
amar su_4-a red calf
amar sig_7-sig_7 yellow calf
amar gun_3-a speckled calf

What the omen lists share in common with the lexical lists is an internal constructed nature and a certain resultant detachment of some of their content from external realia. These scholastic texts share a systematic and logical treatment of words and phenomena, and, seemingly, a point of view on what constitutes knowledge.

---

[34] Reiner-Pingree, *Babylonian Planetary Omens*, Part 4, p. 43: rev. 2'.
[35] Old Babylonian Nippur Ura 3: 222–237, see Veldhuis http://cuneiform.ucla.edu/dcclt/web/Q000001/xQ000001.html for composite text.

Conclusion

This essay has focused on formal considerations of Babylonian omen texts as a representative of one part of ancient Mesopotamian science. An attempt was made to put the predictive and empirical elements of the texts into a new frame of analysis. In the case of the former, the predictive element, it was suggested that prediction is not necessarily to be seen as inherent in the omens themselves. That the collections of omen statements were used for prognostication goes without saying, but this is a different claim from that which sees the consequents of the conditional omen statements as predictions. Instead, on a formal analysis, the omens appear to have a greater affinity with statements of material implication ($P \rightarrow Q$), and in fact, first-order logical statements of the form "P implies Q" are the equivalent of the conditional statement "If P then Q." Omens collected in the many tablets of the various divination series represent artificially constructed statements, products of the scholastic traditions of the cuneiform scribes. As such they do not represent a collection of "things said," about which one might expect less rigorous relations to apply between antecedent and consequent. The present argument has offered material implication as a possible way to view the logic of the omen statements. It has been used as a heuristic, without laying claim to a Babylonian awareness of this logic. Neither has it been put forward that the omens constitute precursors to such exercises in logic, the *modus ponens* inference scheme being first consciously defined by Stoic philosophers of the 4th and 3rd centuries B.C.E.

The empirical element of Babylonian divination can also be seen to have a subsidiary function. Obviously a significant part of the divinatory enterprise, observed phenomena are not, however, the exclusive purview of Babylonian omens. Far from being nonsensical or irrelevant to the enterprise of Babylonian divination, the unobserved, that is, the phenomena in the realm of the conceivable and the possible, are fully integrated within the system of the omens. The validity of the omen statements has been seen to be unaffected by the inclusion of unobserved or unobservable phenomena.

What implications are to be drawn from establishing in Babylonian omens the reflection of a mode of inferential reasoning as a function of their syntactic and logical structure as conditionals? Most significantly, it makes it no longer possible to explain on cognitive grounds why divination has had a troubled relationship to science, resting as it does on certain (metaphysical) assumptions about relations between phenomena in the world that do not depend upon the physical and causal connections we ourselves would make. It appears that such a difference in assumptions about the phenomenal world are unrelated to cognition, being a function rather of culture. The scientific, that is, logical and systematic, character of ancient Mesopotamian divination appears to be one important consequence of the use of the conditional as its form and mode of expression.

CHAPTER TWENTY

"IF P, THEN Q": FORM AND REASONING IN BABYLONIAN DIVINATION

From the features and marks on the sheep's liver and other entrails to the characteristics of the human body and face to the behavior of animals and the appearances of stars and planets, the investigation of the meaning of ominous signs in ancient Mesopotamia took shape in serialized lists of omens arranged as correlations between the signs and what they signified. An omen is a pair of interdependent elements, on the one hand a sign in the natural world or social environment, and on the other an event in social life. The connection between the two elements is expressed by means of a conditional statement "If P then Q." The signs collected in written lists of "If P then Q" statements corresponded to visible, imaginable or conceivable phenomena, but always grounded in consideration of or in relation to physical things. The following is concerned with form and its effect as a systematizing device in omen texts. Form and system are two key aspects of what constitute the general principles of Mesopotamian omen divination as represented in omen text series (entitled *šumma* P "If P"). These principles give us not only insight into the internal consistency and coherence of the texts, but also the styles of reasoning employed. The practice of divination is a separate issue and is not addressed here except in a minor way.

An omen statement, from a formal point of view, can be seen as a relationship between two propositions (P and Q) which function as premise and conclusion. Logically, the conclusion, or consequent, is inferable from the premise. In his study of theories of the sign in classical antiquity, G. Manetti drew the conclusion that, "From the point of view of a historical reconstruction of the discipline of semiotics, the most significant aspect of Mesopotamian divination is that it is centered precisely on a distinctive and individual notion of the sign, which is a scheme of inferential reasoning that allows particular conclusions to be drawn from particular facts."[1] One of the most basic of inference

[1] G. Manetti, *Theories of the Sign in Classical Antiquity*. Translated by C. Richardson, (Bloomington and Indianapolis: Indiana University Press, 1993) pp. 1–2.

schemes, or rules of inference, is *modus ponens*. It is defined by its form, thus: If P, then Q. P. Therefore, Q. This inference scheme was first defined as such in Stoic philosophy in the context of the investigation of the logic of propositions and inference from signs. All Babylonian omens qualify. Thus, If Jupiter is steady in the morning, enemy kings will reconcile.[2] Jupiter is steady in the morning. Therefore, enemy kings reconcile. The "If P then Q" statements of the omen lists relate sign and signified in the manner of the antecedent and consequent of inferences of this form. A temporal or sequential relationship between the sign and the signified may be read into the grammar of the Akkadian "if... then," or *šumma*-clause, the antecedent expressed in the preterite, the consequent in the durative, though the temporal relation seems to be mitigated by the fact that the entire statement is hypothetical and can even contain an antecedent which cannot occur (is unobservable). The relation between P and Q remains, therefore, somewhat abstract from a temporal standpoint. Further consideration of the connections between P and Q (below) will clarify this problem. Regardless of the temporal relation, antecedent and consequent in the omens maintain a certain logical relation, as any conditional statement does, and this logical relation will apply independently of phonetic, semantic, causal, or empirical connections between the statements P and Q.

The question of what the conditional form might suggest about the meaning and purpose of omens has not been adequately addressed because of certain assumptions about the origins of omens in empirical connections enabling the prediction of Q on the basis of P and rationalizing future predictions of Q from P. A former consensus on this point no doubt underpins Manetti, who allows that the empirical connection constitutes one form of connective tissue between P and Q, or what he calls the "passage from protasis to apodosis."[3] He said, "The first type of passage is linked to what is known as *divinatory empiricism*: the protasis and the apodosis record events which really occurred in conjunction in the past."[4] He takes as evidence of this divinatory empiricism the Mari liver models, whose interpretation has been subject to some difference in interpretation. Apart from this evidence, however Manetti recognized a tropic associative connection,

[2] E. Reiner, and D. Pingree, *Babylonian Planetary Omens, Part Four* (Leiden and Boston: Brill, 2005), p. 40:1, without indicating breaks.
[3] Manetti, *Theories of the Sign*, p. 7.
[4] Ibid., emphasis in the original.

usually based in analogies of various kinds, between protasis and apodosis as well as the schematic expansion of elements of the antecedents (which he calls "codes") familiar from all omen series. The empirical, however, is viewed as original to the conception of the ominous sign and the other modes of relating P and Q are of secondary origin in a historical evolution of Mesopotamian divination.

In basic agreement with Manetti concerning non-empirical modes of relating P and Q in omen statements, I differ with his historical conclusions about an original empiricism underpinning divination by signs, or at least I do not find it a necessary starting point. We need not question whether the signs themselves were observed, but only whether in the construction of the earliest omens an observed co-occurrence or association between the sign and its consequent was. In the absence of evidence for such empirical foundations and considering the abundance of the evidence in both Old Babylonian and Standard Babylonian omen texts for paranomastic relations between a word in the protasis and one in the apodosis, or where various analogies made between elements of the sign and its portent, or, indeed, where "impossible" phenomena which cannot have been observed at any time are presented in omen protases, omen divination's independence from empiricism can be accepted in principle. Though the non-empirical nature of the bulk of the cuneiform omens is clear, it is worth making explicit by a few examples. Let us again take the omen "If Jupiter becomes steady in the morning, enemy kings are/will be reconciled." To accept the empirical association of P and Q is to presume that at some time in the past it was observed that following the steadiness of Jupiter in the morning, enemy kings were reconciled, and further, to justify on the basis of that empirical connection future predictions about enemy kings being reconciled whenever Jupiter is "steady." But this omen is simply built upon an analogy drawn between the elements of the protasis, that is, Jupiter, Marduk's star, connoting rulership, and its "steadiness" (expressed with the verb *kânu*) connoting rectitude and stability, and the elements of the apodosis, that is, peace between enemy kings. The same is true for instances of paranomasia between words in the antecedent and consequent. For example, in the extispicy series (BRM 4 13:65) "If the coils of the intestine look like the face of Huwawa (written logographically ^{d}ḪUM.ḪUM): it is the omen of the usurper king (also written logographically, IM.GI =Akkadian *ḫammā'u*) who ruled all the lands." Here the antecedent is related to the consequent by a word play based on the homophonous echo of

ḪUM.ḪUM in *ḫammā'u*, not by any empirical connection between intestines coiled that way and a usurpation. The homophony pertains between the logogram ᵈḪUM.ḪUM in the protasis and the Akkadian reading of the logogram IM.GI in the apodosis. The antecedent-consequent connection, therefore, is based upon a homophonic play that requires and even presupposes a sensitivity to orthographic practice of the highly trained cuneiform scribe. Though the meaningful connection between antecedent (intestinal coils appearing as the face of Huwawa) and consequent (usurpation) is based on the phonetic play between words, the image refers to the visual aspect of the imagery conjured by the protasis alone. Regarding the connection between protasis and apodosis, the omens illustrate scribal invention involving the sounds, meanings, writings, literary allusions (e.g., BRM 4.13: 33 in which the coils looking like an eagle are read as "the omen of Etana," who ascended to heaven on the back of an eagle), as well as visual analogies between elements, such as might be constructed between the appearance of a cuneiform sign and what it signifies: "If the coils of the intestine look like a PAP-sign: your capital will prosper over the enemy's capital." Here the PAP-sign, two crossed wedges, is visually iconic for the notion of conflict. Or, coils that appear as a *kubšu*-cap (BRM 4 13:47), the headdress associated most particularly with royalty (or divinity), are read as significant for the "throne," again by an iconic means of sign representation.

To return to the question of the temporal relation of Q to P, then, if the omen consequent is meant to convey the meaning, or the reading (interpretation) of P, then we do not have a series of observation statements about what particular event in fact occurred following another particular event but a series of hypothetical statments showing that P indicates Q. From such statements, however, one could come to expect Q in the event of P, and it is here that the potential for prediction is located.

The analogies drawn from sign to portent represent attention to particulars, but not necessarily to observable particulars, though visual analogies between elements of the protasis and apodosis are also attested. Associations of elements such as the sounds or meanings of words are not dependent upon empirical observation, yet, as the examples just mentioned illustrate, they construct meaningful and valid signification between antecedent and consequent that depend instead upon cultural or linguistic conventions. Analogic relationships construed between phenomena, especially analogies based on the sounds, spellings, or meanings of words for phenomena, are certainly subject to, but not wholly determined by sensory perception. Correspondingly, such relations are limited not by perception but by conception. As seen in some of the examples given, analogic connections made between particular elements of the protases and apodoses justify the inferential character of Babylonian omens. But the particularity of the analogous referents in the statements of protasis and apodosis (e.g., the homophonic relation between ḪUM.ḪUM and *ḫammā'u*) in no way compromises the general force of the omen. As T. Czeżowski observed, "Mill claimed that reasoning by analogy—'from particulars to particulars,' as he put it—is the fundamental form of reasoning, while reasoning by induction is in a sense a synthesis obtained by embracing a number of analogical cases together. To Mill a general statement is a conjunction of singular sentences which are subordinated to it. The train of reasoning is as follows: on the basis of a number of similar observations saying 'a is b,' when there are no observations to the contrary 'we feel warranted—as Mill says—in concluding, that what we found true in those instances hold in all similar ones, past, present, and future, however numerous they may be.' "[5] The omen constructed by means of an analogical connection is assumed to apply "whenever P," and therefore has validity beyond any single occurrence.

The use of schematic relationships such as up-down, the four directions, the five colors, has been cited as a reason why ominous "phenomena" are not always observable in actuality. The celestial omens exhibit this characteristic. Phenomena such as the eclipse where the shadow moves in a direction opposite to that which occurs in reality, indeed, most of the extant Jupiter omens of *Enūma Anu Enlil* are "impossible." These have the planet "entering," "passing," "coming close to" or "being in the middle of" fixed stars whose latitudes which respect to Jupiter's path prevent this from ever occurring. In fact, as David Pingree pointed out, "this choice of constellations far removed from the path of Jupiter seems to be deliberate,"[6] because when the planet is north of the equator (between the spring and fall equinoxes) the constellations it is associated with in these omens are to the south and vice versa. This can be explained in terms of the value placed by

[5] T. Czeżowski, *Knowledge, Science, and Values: A Program for Scientific Philosophy*, ed. L. Gumański, Amsterdam and Atlanta, GA: Rodopi, 2000), p. 110, citing Mill 1886.
[6] E. Reiner and D. Pingree, *Babylonian Planetary Omens*, Part 4. (Leiden and Boston: Brill, 2005), p. 28.

the scribes on conception as well as perception, and the omen corpus forces us to try to understand just what the relation is between the conceivable and the possible in ancient Mesopotamian thought, and how these categories map onto physical actuality. The character of the omen lists, which is the result of its formal as well as schematic nature, shows the importance not only of a different kind of knowledge, but also a different way of categorizing the physical.

That the relationships between the empirical, the actual, and the possible should be constructed differently in the Babylonian conception almost goes without saying. In later antiquity, for example, one can refer again to the Stoics, whose views on the actual and the possible also map differently from ours. The Stoic definition of the possible is rooted in the investigation of propositions (possible vs. necessary) and therefore has to do with the nature of predicates and their relation to principal (as opposed to initiating) causes. That the Stoic definition of possibility took shape in the context of the logic of propositions and how truth functions with respect to past or future events was furthermore of importance to the analysis of oracles and omens.[7] As in the Stoic discourse the significance of the possible in cuneiform divination applies as well to the connection between antecedent and consequent in the context of making statements concerning future events. In light of the evident interest in possibility represented by the omens resulting from schematization without regard for actuality, the empirical dimension of omens hardly applies at the level of the connection between P and Q, even when the phenomenon of the protasis is observable. But in addition to the schemata which expand the possibilities for constructing signs, the many analogies and word plays that connect P to Q by virtue of cuneiform cultural conventions, some of the nature of word play only evident to scribes (or Assyriologists), are also evidence of the relative unimportance of the empirical on the level of the connections made between P and Q. That each omen forms a valid conditional, however, is of the essence.

The analysis of the conditional form of Babylonian omens shows that though the omen statements certainly posit relations between phenomena that do not depend upon the physical and causal connections we ourselves would make, the relation between protasis and

---

[7] M.E. Reesor, "Fate and Possibility in Early Stoic Philosophy," *Phoenix* 19 (1965), p. 293.

apodosis is a logically valid one that furthermore can be classified with inferences expressed in the form of conditionals. Inferential reasoning, sometimes embedding analogic reasoning, thereby lies at the basis of the connections between the propositions of antecedent and consequent. The claim that divination proceeds by means of a rational and systematic method is nothing new but perhaps shows from yet another standpoint that the particular difference in assumptions about the phenomenal world that we find in cuneiform divination texts are unrelated to cognition, being a function rather of culture. Second, and more interesting I think, is that the logical and systematic features of ancient Mesopotamian divination appear to be direct consequences of the use of the conditional as its form and mode of expression. Of course it is above all the logical and systematic nature of omen divination that has justified its classification as an ancient science.

Given the previous observation that despite its logical and systematic nature Mesopotamian divination does not conform to (modern) scientific standards of causality or knowledge, we might question whether the term "science" is too loaded, or simply anachronistic and inapplicable to an investigation of the human (cognitive) interaction with physical phenomena in ancient Mesopotamia. The same question has been addressed with respect to pre-nineteenth century sciences in general.[8] But to limit the discussion of what the nature of ancient Babylonian divination is by erasing the term science from our discourse about it leads us back to the dichotomy of science and non-science, science and religion, or worse, science and superstition. If the term science is confined to the modern era, as Peter Dear has discussed in his critque of Cunningham's thesis, mediaeval and renaissance science, including natural philosophy, physical and mathematical sciences also end up on one side of a great divide between science and non-science.[9] Dear's sensitive critique argues for further refinement of the categories science and natural philosophy, and their relation to religion, and a finer

[8] A. Cunningham, "Getting the Game Right: Some Plain Words on the Identity and Invention of Science," *Studies in History and Philosophy of Science* 19 (1988), pp. 365–389, A. Cunningham and P. Williams, "De-centring the 'Big Picture': The Origins of Modern Science and the Modern Origins of Science," *British Journal for the History of Science* 26 (1993), pp. 407–432, and A. Cunningham and R. French, *Before Science: The Invention of the Friars' Natural Philosophy* (Aldershot: Scolar Press, 1996).

[9] P. Dear, "Religion, Science, and Natural Philosophy: Thoughts on Cunningham's Thesis," *Studies in History and Philosophy of Science* 32 (2001), pp. 377–386.

grained empirical as well as historicist treatment of sources in terms of which the sciences are defined.

Attempting such a finer grained analysis of the sources for Babylonian divination as well as other ancient sciences (for example, astronomy, magic, medicine) is a worthy goal. Focussing on formal considerations of the omen texts has uncovered the logical and systematic nature of these texts as a direct result of their conditional form. Their logical, systematic, and inferential character, I would argue, warrants classification with science. Other aspects of cuneiform divination, particularly those involving the practice (as opposed to the nature) of divination, indicate other possible classifications, for example with magic, or religion. The problem is that none of these categories are found in Akkadian terminology, though there are words for observe (*naṣāru*) and predict (*qabû*), apotropaic ritual (*namburbû*), incantation (*šiptu*), and gods (*ilū*).

The category "non-science," on the other hand, does not seem to be useful as its purpose is to set what we now hold to be justified correct scientific knowledge apart from unjustified or wrong belief. This has the mouthfeel of morality rather than history. For analyzing cuneiform omen texts, dichotomous models only generate and then perpetuate unnuanced ideas about what the nature of Mesopotamian divination was, reminiscent of early anthropological characterizations of other divination systems as pre- or non-logical (such as Spencer, Frazer, Tylor and, most famously, Lévy-Bruhl)[10] and therefore as invalid explanations of phenomena.

In light of the above analysis of the effect of the conditional on the logical structure of omens it would be difficult to sustain claims to pre-logical thinking, or the notion of a different rationality. It must be said that more recently it has been pointed out that Lévy-Bruhl did not promote a racist agenda, as did some in the early 20th century, and ultimately under pressure from some of his critics, came to think that his two types of "mentalités" (the pre-logical and the rational) coexisted within all societies. The result of this wholesale revision was that magical thinking, which was not genetic, cognitive, or evolutionary, was not replaced by non-magical thinking through the inexorable progress of cognitive evolution. Anthropology rid modern cognitive

---

[10] L. Lévy-Bruhl, *Le fonctions mentales dans les sociétés inférieures* (Paris: Alcan, 1910/1922), and Lévy-Bruhl, *La mentalité primitive* (Paris: Retz, 1922/1976).

historians of the idea that "primitives" had a tremendous oral memory but a limited power of abstract reasoning.[11]

Correspondingly, the history of the use of the term superstition further demonstrates its inapplicability to Mesopotamia. The pejorative meaning of Latin *superstitio* stems from the first century B.C.E. Roman condemnation of divination not sanctioned by the State, later having the force of "unreasonable religious belief" as opposed to *religio*, the reasonable, or proper, fear of the gods.[12] Legislation in 297 C.E. against illicit divination and *superstitio* was an ideological and political tool, aimed against sorcerers and Manichaeans, not against the practice of divination in principle. Because of its origins, the use of the term superstition in historical analysis, unlike that of the term science, can only have an invidious effect, connoting wrong belief. Despite the diversity of the cuneiform divination corpora, there is no evidence of ideological conflict such as that between orthodox and unorthodox divination in the Roman principate. More importantly, no distinction was ever invoked in cuneiform texts between say, astronomy and astrology. This is clear in the late Uruk tablet which gives effective rules not only for predicting month lengths and lunar eclipses from empirical data available in the astronomical diaries, but also contains sections for use in predicting worldly events of a political nature, such as we have in omen apodoses, and concludes with the subscript BE-*ma* EŠ.BAR 3,20 *ana* IGI-*ka šá* ^{d}UDU.IDIM.MEŠ *ina lu-maš* KIN.KIN-*ma* "In order for you to see a divine decision (*purussû*) about the king you seek (the positions) of the planets within the (zodiacal) constellations, and."[13] Whatever issues around which the terms astronomy and astrology later came to be distinguished, including implications about the nature of their knowledge, do not apply in cuneiform texts.

Furthermore, D. Martin has argued that the rejection of superstition was not "due to the rise of 'rationalism' or 'empiricism' in the ancient

[11] R. van der Veer, "Primitive Mentality Reconsidered," *Culture and Psychology* 9 (2003), p. 183; cf. P.M. Peek, ed. *African Divination Systems: Ways of Knowing* (Bloomington and Indianapolis: Indiana University Press, 1991).

[12] M.R. Salzman, "'Superstitio' in the Codex Theodosianus and the Persecution of Pagans," *Vigilae Christianae* 41 (1987), p. 174 and notes 10 and 14.

[13] TU 11 rev. 37, see L. Brack-Bernsen, L. and H. Hunger, H. (2002) "TU 11: A Collection of Rules for the Prediction of Lunar Phases and of Month Lengths, *SCIAMVS* 3 (2002), p. 12.

world."[14] He showed that the investigation of the natural causes of disease was due to a shift in belief about the nature of the gods, that they were incapable of perpetrating evil. He said, "ancient intellectuals never *demonstrated* that the gods were good; they assumed it. They did not discover new "evidence" about the nature of the divine...No, the rejection of divine and daimonic causation of disease did not come about simply because certain Greek men were suddenly "rational" thinkers whereas all their countrymen were "irrational," nor because they suddenly became "empiricists" whereas their countrymen couldn't see nature in front of their faces. The modernist depiction of ancient "science" as caused by a development of "empiricism" or "rationality" is misleading and ultimately not supported by the evidence. Rather, we must look to ancient *social* and *cultural* sources for the invention of "superstition."[15] Why this observation is relevant to the study of Mesopotamian divination is precisely that even though our evidence does show an underlying rationality, its classification as science on that basis is only part of the story. We still need to look to the larger social and cultural context and put the rational dimension into a more complex whole of meanings, methods, and practices that constituted prognostication by means of ominous signs in ancient Mesopotamia. In fact, the very dichotomy between the rational and the irrational becomes somthing of an obstacle for historical understanding.

The last generation of historians of science has rejected the science/superstition dichotomy and other such binaries as not terribly useful, especially when placed in an evolutionary scheme that has science's objective truths and transcendent achievements as triumphing over lower forms of thought. But science is no longer viewed as signaling a liberation from primitive or archaic thought. In fact, as G.E.R. Lloyd put it, "the ideas that rationality is distributed unevenly across peoples or populations, that some are better endowed in this respect than others, that there are groups that exhibit an inferior rationality or are otherwise deficient in this faculty, those ideas look like the very worst kind of cognitive imperialism."[16] We do not want to project the defining features of modern science back into antiquity where knowledge

[14] D. Martin, *Inventing Superstition: From the Hippocratics to the Christians* (Cambridge, MA: Harvard University Press, 2004), p. 230.

[15] Ibid.

[16] G.E.R. Lloyd, *Cognitive Variations: Reflections on the Unity and Diversity of the Human Mind* (Oxford: Clarendon Press, 2007), p. 151.

takes other forms, is based on other methods, and has other aims. Nevertheless, in full awareness of the anachronism, ancient divination, astrology, and magic are now readily classified as sciences, on the grounds that some characteristics of science are considered to be continuous over the course of history even while its content or aim is discontinuous.

The purpose of the foregoing discussion was primarily intended to establish a formal unity across omen text genres by the use of the conditional statement and the implementation of reasoning styles (by analogy, and by inference). Anchored by its tight logical structure, the lists of conditionals "If P then Q" proved to be an effective instrument for making connections, and also served as a systematizing device. If these applications of the conditional warrant categorization as science, perhaps it is more useful for the history of science, as illustration of its diversity, than it is for an analysis of Mesopotamian culture. But as science, to paraphrase Quine and Ullian,[17] reveals what for a particular community constitutes knowledge, skill in reasoning, and, in some relative way, truth—specifically, truth derived from such reasoning—the thousands of conditional statements compiled in omen series are of the essence for understanding how Babylonian and Assyrian scribes perceived and conceived the world in which they functioned, how they thought about what connected or related the propositions comprising conditionals, and, consequently, what for them constituted knowledge, skill in reasoning, and even truth.

[17] W.V. Quine and J.S. Ulllian, *The Web of Belief* (New York: Random House, 1978), pp. 3–4.

CHAPTER TWENTY-ONE

DIVINE CAUSALITY AND BABYLONIAN DIVINATION

When Cicero, in his treatise *De Fato*, focused on the nature of propositions, particularly those which "make a statement about a future event and about something that may happen or may not" (*De Fato* 1.1), a two thousand year long tradition of such propositional statements about future events in the form of Babylonian omen texts stood in the background and was well-known to him (*De Divinatione* 1.1, cf. 19). We are fortunate to have Cicero's works on divination because of his engagement with other thinkers, especially Stoics such as Diogenes of Babylon[1] and Chrysippus, whose works are not otherwise preserved. Consequently we know the terms of a certain portion of the ancient discourse on divination, the Greco-Roman portion, some of which was contemporary with the late, i.e., 3rd century and later, continuation of Babylonian divination, especially astrology. Because some of the philosophical argument among Greeks and Romans interested in prognostication from signs has an underlying polemic attached, i.e., does divination really work, and if so, how, their discussion touches upon the subject of causality and how signs and their portents are thought to be connected. I would like to redirect the question of causality to the other portion of ancient divination, that is of the ancient Near East. Of interest to me here are the questions of how in ancient Mesopotamia signs and portents were thought to be connected, and whether there was anything viewed as causal in these connections.

The difficulty of accounting for causality has had a long and distinguished career, made particularly acute in the eighteenth century by David Hume. "The problem," quoting Wesley Salmon, "is that we seem unable to identify the *connection* between cause and effect, or to find the *secret power* by which the cause brings about the effect. Hume is able to find certain *constant conjunctions*—for instance, between fire and heat—but he is unable to find the connection. He is able to see

[1] Cicero *De Senectute*, 23, *De Divinatione*, i. 3, ii. 43, *De Natura Deorum*, i. 15, *De Officiis*, iii. 12, 13, 23; *De Finibus*, iii. 10, 15.

the spatial contiguity of events we identify as cause and effect, and the temporal priority of the cause to the effect—as in collisions of billiard balls, for instance—but still no *necessary connection*. In the end he locates the connection in the human imagination—in the psychological expectation we feel with regard to the effect when we observe the cause."[2]

The way connections between things are conceived in cuneiform omen texts is unlike that of fire and heat or the collisions of billiard balls. Nonetheless, sources for Mesopotamian divination are, if nothing else, a reflection of the imagination, of culturally particular ways of imagining the connections between events, between phenomena in nature and society, and how phenomena bear meaning for human beings who observe or know them. Omen texts therefore seem to me to be a prime body of evidence for our consideration of ancient Mesopotamian thinking about causality, at least among the scribal intellectuals of the Neo-Assyrian period, from which most of the sources come. But as long as we seek from our own physical perspective the connection between sign and portent it remains difficult to meet the Assyrian and Babylonian scholars on their own terms.

The first significant difference is that the events paired in the "if P then Q" statements of cuneiform omens appear to represent a series of inferences not causes.[3]

In the vast corpus of such omens, inference from P to Q is made on the basis of a variety of relations construed between them. For example, analogies are used to relate or connect P and Q in ways analyzable in terms of Mesopotamian cultural norms. Other techniques of encoding meaning in the elements of omens are also utilized, but let us for the moment consider that of analogy, for instance in omens concerning a star standing in the halo of the moon. One such omen pairs an unnamed star trapped inside the moon's halo with the situation of the king and his troops being besieged (SAA 8 376:4–5). This seems to be a connection based on a visual analogy. Another concerns a particular star, the King Star, standing in the lunar halo, paired with the birth of male children. Why the sign of the King Star inside the halo is not taken to signal the king's being besieged, in accordance with the visual analogy of the other omen, we cannot know. We can explain the prediction of male children perhaps by the star enclosed in a halo being

---

[2] Wesley C. Salmon, *Introduction to the Philosophy of Science* (Indianapolis/Cambridge: Hackett Publishing Co, 1999), p. 35.

[3] See above, Chapter Nineteen.

analogous to an unborn child inside the womb, and the King Star which is male means the birth of boys (SAA 8 278:1–4).[4] There is also an omen for Sipazianna "True Shepherd of Anu" (Orion) standing in the lunar halo, which portends the exercise of world rule for the King of Assyria (SAA 8 302 rev. 4–5), on the basis, one might suggest, of the analogy between the king and a shepherd or protector of his people, a metaphor common throughout cuneiform royal inscriptions.[5] Finally, in another fairly obvious assocation, the omen for the Bow Star in the halo of the moon is connected to violence among men (GURUŠ.MEŠ *innaddarūma*) (SAA 8 378:1–2). Each of these omens presents a star appearing inside a lunar halo, yet each has its own particular way of employing analogy to yield a different consequent.

Connections made by analogies between some aspect of the sign and its consequent lack the dimension of necessity that connect cause to effect according to our way of thinking. We therefore would rather say the omens reflect a system of correlation not causation. But this is because we define a "cause" as something which directly and necessarily produces an effect, that is, that the antecedent should be directly, physically, and necessarily responsible for the consequent. Elizabeth Anscombe said, "It is often declared or evidently assumed that causality is some kind of necessary connection, or alternatively, that being caused is—non-trivially—instancing some exceptionless generalization saying that such an event always follows such antecedents."[6] In such cases, an event Q is related to its antecedent or sign P, as in the gopher hole signifying the presence of gophers because gophers cause gopher holes. This, however, is clearly not the kind of sign relationship the cuneiform scribes used in constructing omen texts.

In the realm of Mesopotamian divination, the idea of "exceptionless generalization," from a mechanical-causal standpoint, is clearly not found, but in consideration of the schemata and patterns of association, such as in the analogies just illustrated, a certain resonance can

---

[4] The same apodosis is found in SAA 8 5 rev. 2 but paired with the Pleiades in the halo of the moon. D. Brown has noted that a celestial body within the halo of the moon could have been "thought to represent a foetus in the womb," clearly another kind of analogy and entirely possible. See D. Brown, *Mesopotamian Planetary Astronomy-Astrology* (Groningen: Styx, 2000), p. 135.

[5] Kings, like gods, are called shepherd of their people, for example Hammurapi, "the shepherd called by Enlil (to rule)," Codex Hammurabi I 51, and other references in CAD R s.v. *rē'û* usage 2b, p. 310.

[6] G.E.M. Anscombe, "Causality and Determination," in *Causation* ed. E.Sosa and M. Tooley, (Oxford: Oxford University Press, 1993, repr. 2005), p. 88.

be noted. Inherent in analogies is a generalizing force, in the sense that similar things behave in similar ways. And although the aim of interpreting signs, seemingly, was not to generalize but to relate a sign of a particular character to a particular portent, the connections established in the omen texts were in fact held generally. If they were not, the utility of the omen list for future reference and guide to the interpretation of signs would have been nil, and the fact that the lists continued to be copied and cited by the scribes in letters and reports concerning observed signs plainly testifies to their general application.

If we are not concerned with exceptionless general physical causality, or with causality in a mechanical way, is there a place for causal thinking within the Mesopotamian divinatory system? Perhaps the signification of phenomena and the causality of phenomena are not mutually exclusive, but operate on different and not incompatible levels. That we can identify the techniques by which an omen signifies should not mean that the system is reducible to the mere manipulation of words, symbols, analogies, or any of the other linguistic devices that create meaning. Divination, for those who divine, is fundamentally a technique of communication with divinities. It is perhaps in terms of this that we can see the emergence of a causal language, revealing where causality is located in the framework of thought and experience to which divination belongs.

That the gods do speak to human beings within the Mesopotamian divinatory system is expressed in a variety of ways, for example, in constructions with verbs performed by gods such as *parāsu* "to decide (a decision)" or "make a judgment (as in a legal case)," *dânu* "to make a judgment (in court)," *šâmu* "to decree (as in fate)," and *wamā'u* or *amû/ awû* "to speak," *tamû* "to swear an oath," or *ṭêmu* "to inform, give orders, command," and their related nouns, the objects of the gods' performative speech: *purussû* "decision, judgment, or verdict," *dīnu* "judgment," *šīmtu* "fate," *tamītu* "speech, or oath," *tāmītu* "oracle query" and *ṭēmu* "report, decision, or counsel." T. Abusch has shown the parallelism between *ṭēmu* and *alaktu* in the meaning "decision," "decree," or "oracle,"[7] suggesting specifically that this oracular decision is conveyed through ominous celestial signs, as the request for

[7] Note the lexical equivalents *ṭēmu* and *alaktu* for a.rá, see Tzvi Abusch, "*Alaktu* and *Halakhah* Oracular Decision, Divine Revelation," *Harvard Theological Review* 80 (1987), 19, and further discussion, pp. 18–23.

such a divine pronouncement is addressed to the gods of the night, or to specifically named astral deities. In the opening lines of *Maqlû* Abusch translates *dīni dīna alaktī limdā*: judge my case, grant me an (oracular) decision."[8] The synonymy of *alaktu* with *dīnu, ṭēmu*, and *purussû* also extends the legal metaphor in play within the semantics of divination.

Omen divination therefore evinces a fundamental anthropomorphism, where what we call nature is perceived as divine speech, matter turned expressive, meaning materialized in the world of phenomena. In an omen, celestial bodies (or other phenomena) function as parts of divine speech, elements of meaning that can be "read" and interpreted in accordance with a grammar of repeating structures of sense. Focusing on the ancient metaphor of divine speech is one way in which we might understand how divination by omens from the phenomena of nature, surely one of the primary vehicles for what we think of as Babylonian science, fits within a broader religious view of the connections between observed or imagined phenomena and human social life.[9]

The crux of the omens lies in the relation between the antecedent P and the consequent Q. The grammar of the conditionals that form omen statements, with the verb of the *šumma*-clause in the preterite and the verb of the apodosis in the durative, suggests that P is temporally antecedent to Q. This implies that whatever is given in the second clause is expected to occur after or in some sense "as a result of" the phenomenon in the first clause. But this is a matter of logic, specifically conditional logic, not physics and so does not constitute a causal relationship from a mechanical-causal point of view. In semantic terms, the conditional mode of the antecedent infects the meaning of the consequent: Should P occur, Q (should also) occur. The linguistic modality of these conditional statements—if, were, should P happen, then Q—is balanced by the use of magical means in the form of ritual and incantation, that is by verbal appeal to the gods who will hear human speech and respond.[10] That magic was thought to be

[8] Abusch, "*Alaktu*," p. 17.

[9] Consider the following aphorism of Aviad Kleinberg, on the painful transcendence of the sacred and its remoteness from the (profane) world of human beings: "Human beings cannot bear the sound of God's utter silence. They need noise to calm down. They seek to make God speak." Aviad Kleinberg, "Apophthegmata," *Critical Inquiry* 35 (2009), p. 711.

[10] For further discussion, see Stefan M. Maul, "How the Babylonians Protected Themselves against Calamities Announced by Omens," in T. Abusch and K. Van der

efficacious by virtue of divine-human communication further suggests that Babylonian omens functioned as defeasible conditionals, that is, P implies Q unless something else obtains, such as an apotropaic ritual appealing to the divine to undo the consequent, again pointing away from a mechanical-causal connection between P and Q.[11]

One of the more telling indications of the force of divine agency in the antecedent/consequent relation is that the Akkadian term for the consequent is *purussû* "(divine) decision" or "verdict."[12] EAE Tablet 20 includes an instruction to the diviner at the close of each omen to observe the moon god's eclipse and to "hold wind such-and-such in your hand"; thereby a decision (*purussû*) is given for such-and-such land and the king of that land.[13] Indeed, many comparable references to the apodosis clause, the consequent, as a divine decision or verdict (*purussû*) are to be found in omen commentaries, reports and letters from scholars concerning omen texts, as well as other genres. It occurs in Neo-Assyrian divinatory magical texts, e.g., STT 73 passim, as discussed by Reiner.[14] There the conjurations and rituals are for the purpose of "seeing a divine decision," the subscripts to the prayers ending with the statement that "if you do such-and-such, you will see a divine decision" (*purussâ tammar*/EŠ.BAR IGI.TUḪ). It is still found in this usage in the subscript to a late astronomical text from Uruk, which reads BE-*ma* EŠ.BAR 3,20 *ana* IGI-*ka* "In order for you to see a divine decision concerning the king..." (TU 11 rev. 37).[15]

Toorn, eds., *Mesopotamian Magic: Textual, Historical, and Interpretatitve Perspectives*, Studies in Ancient Magic and Divination, 1 (Groningen: Styx, 1999), 123–129 and also Niek Veldhuis on the nature of magical language in his, "The Poetry of Magic," in T. Abusch and K. Van der Toorn, eds., *Mesopotamian Magic*, pp. 35–48.

[11] R.J. Hankinson, *Cause and Explanation in Ancient Greek Thought*, (Oxford: Oxford University Press, 1998), p. 371 pointed out that astrology, "deals in defeasible conditionals...rather than adamantine categoricals."

[12] See E. Reiner's discussion of *purussâ parāsu* as a technical term in divination in "Fortune-Telling Mesopotamia," JNES 19 (1960), p. 25. See also my discussion in *The Heavenly Writing: Divination, Horoscopy, and Astronomy in Mesopotamian Culture* (Cambridge: Cambridge University Press, 2004), pp. 194–196 and 266–267, and Jeanette C. Fincke, "Omina, die göttlichen 'Gesetze' der Divination," JEOL 40 (2006–2007), pp. 131–147.

[13] See ABCD, chapter 10 *passim*. See also ACh Suppl.I 1:1–8 and the discussion above, Chapter Thirteen, pp. 261–262.

[14] See note 10.

[15] See Lis Brack-Bernsen and Hermann Hunger, "TU 11: A Collection of Rules for the Prediction of Lunar Phases and of Month Lengths," *SCIAMVS* 3 (2002), p. 12.

The depiction of Mesopotamian gods as judges, who issue decrees that establish the way things are is well-known. Divine epithets such as "the ones who judge the law of the land," "who determine the nature of things," "who draw the cosmic designs," "who decree the destinies,"[16] all exemplify the gods' ultimate power to decide, control, and command. Considering that written omens and written laws in cuneiform culture share the same casuistic "if…then" formulation, this suggests that in dealing with omens we are not only in the realm of signification but, conceptually speaking, of case judgment as well, and that, in the manner of the so-called law codes, the omen compendia represent a kind of codification of divine judgments. In this sense the omens in the cuneiform texts reflect a written record of what has been promulgated through divine speech. But before the omens were codified on cuneiform tablets, the signs themselves had an explicitly literate character, being an inscriptional record of divine will in the natural world. Thus communication between god and human was made possible. Natural phenomena, by this reasoning, not only represented the divine written word, but embodied the further notion that the future is written by the gods on the physical world.

The conception of ominous phenomena themselves as a written language is well attested in first millennium scholarship. Whether it goes back to the third millennium to the description of the goddess Nisaba's tablet, the dub mul-an, attested both in the Gudea Cylinder[17] and in the Sumerian composition "The Blessing of Nisaba" is another question.[18] The meaning of dub mul-an, literally "tablet of the 'star of heaven'," can be read as employing a complex metaphor. The reading of mul not simply as "star" but also "script" can be made on the basis of an Old Babylonian lexical correspondence between mul and

[16] LKA 109:1–8.

[17] Gudea *Cyl.*A iv 26 and v 23, see D.O. Edzard, *Gudea and His Dynasty*, Royal Inscriptions of Mesopotamia Early Periods 3/1, (Toronto: Toronto University Press, 1997), p. 72.

[18] For The Blessing of Nisaba, see W. Hallo, "The Cultic Setting of Sumerian Poetry," in André Finet ed., *Actes de la XVIIe Rencontre assyriologique internationale* (1970), 125:29–31, and see also Å. Sjöberg and E. Bergmann, *The Collection of the Sumerian Temple Hymns*, Texts from Cuneiform Sources 3 (Locust Valley, New York: J.J. Augustin Publisher, 1969), 49:538–39, also cited in W. Horowitz, *Mesopotamian Cosmic Geography* (Winona Lake, Indiana: Eisenbrauns, 1998), 166–7. For MUL = šiṭirtum, see CAD s.v. lexical section.

šiṭirtum, thus "the tablet of heavenly writing,"[19] or "the tablet of the star (which is) the writing of heaven." It is tempting to read the metaphor back even further and extend it to the "tablet of the 'star of heaven'" itself, in which case dub is metaphoric for the sky as its script is for the stars. The metaphor of the celestial bodies as signs written on the heavens extends itself as far as Neo-Babylonian royal inscriptions,[20] and beyond the cultural boundaries of Mesopotamia in the magical and religious-philosophical literature of late Hellenism. The divinity of script, in Greek and Late Antiquity, seen as the letters of the alphabet (στοιχεῖα), was projected onto the heavenly cosmos in much the same way. Notably, in a passage arguing for a linguistic signification through analogy, reminiscent of what has been defined above as the antecedent-consequent relation in Babylonian omen texts, rather than for a causal nature of the heavenly phenomena, Plotinus said:

> ...those who know how to read this sort of writing can, by looking at them as if they were letters, read the future from their patterns, discovering what is signified by the systematic use of analogy.[21]

[19] Å. Sjöberg and E. Bergmann, *Sumerian Temple Hymns*, p. 138b, citing MSL II p. 132 VI 57 mul = *šiṭirtum*. Nisaba holds the "holy tablet of the heavenly star/writing (dub-mul-an-kù)" as well in the composition "Nisaba and Enki" lines 29–33, see W.W. Hallo, "The Cultic Setting of Sumerian Poetry," in André Finet ed., *Actes de la XVIIe Rencontre* 17 (1970), pp. 125, 129, and 131. 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." Roaf and Zgoll, "Assyrian Astroglyphs," ZA 91 (2001), p. 289. Cf. The notion of the god (often Šamaš) "writing" the signs on the exta of sheep is well-known, see e.g., *ina libbi immeri tašaṭar šērē 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.

[20] In the following inscriptions of Nebuchadnezzar: VAB 4 187 i 39, also 74 ii 2, YOS 1 44 i 21; cf. BBSt. No. 5 ii 28. Also in the form *šiṭir burūmê*, literally "writing of the firmament," for which, see CAD s.v. *burūmû* usage b, predominantly in Neo Assyrian royal inscriptions, but also in a hymn to Aššur, see A. Livingstone, *Court Poetry and Literary Miscellanea*, SAA 3 (Helsinki: University of Helsinki, 1989), 4 Text No. 1:21. See also W. Horowitz, *Mesopotamian Cosmic Geography*, p. 15, note 25, and p. 226.

[21] Plotinus *Ennead* 3.1.6, see A.H. Armstrong, *Plotinus Ennead III*, Loeb Classical Library 434 (Cambridge, MA: Harvard University Press, 1967). See also the remarks of Patricia Cox Miller, that "astrologers...found more and more correspondences between human writing and heavenly phenonema; when they contemplated the skies, they saw what one modern scholar has called 'Himmelsschrift,' a celestial text whose lights formed the moving script of divine order." See "In Praise of Nonsense," in A.H. Armstrong, ed., *Classical Mediterranean Spirituality: Egyptian, Greek, Roman*, p. 497.

Omens and divinatory texts support an even more general Mesopotamian conceptualization of the cosmic order of things as being the result of divine command and utterance. Illustrative of this broader conception, that the world order is produced by the creative power of divine word, is a passage from *Enūma Eliš*: "By your (meaning Marduk's) utterance let the star be destroyed, command again and let the star be restored."[22] And in a prayer accompanying an interrogatory divination, a request for an oracular consultation in a Sultantepe text, the diviner says "The gods, your fathers, listen to your sublime words... Since you have been so kind (before) as to let me know your divine decision (*ṭēmu*), so (again) send me your decision (*ṭēmu*) and let my mouth pronounce it!"[23]

Further reference to divine speech is found in the oracle queries, called *tāmītu*. In a prayer to Sin the great gods ask the moon god to "give the divine answers to the oracular questions (*tāmītu*)," specifying the day of the disappearance of the moon on the 29th as the day of Sin's responses. As Lambert points out in his recent edition of the *tāmītu* texts, the various usages of the term *tāmītu* have in common the basic root meaning of "formal speech or judicial utterance."[24] The linguistic underpinning of what we might call the Babylonian theory of divination seems also to be reflected in the use of the term *pišru* (from *pašāru* "to release, undo, or solve.") by the scholars to refer to interpretive elements of an omen, including the quotation of an omen (preceded by the phrase *anniu piširšu* "this is its interpretation") for the purpose of elucidating an observed sign.[25] The verb has a number of usages, including "to recount" as of a dream, and "to explain or report" what someone said.[26] The root has the force of releasing or revealing, in this case, one form of speech by means of another. The noun *pišru*,

[22] EnEl IV 23f.

[23] *ṭēm ilūtiki rabīti* "your great divine decision," STT 73:19, 33 and 41, see E. Reiner, "Fortune-Telling in Mesopotamia," JNES 19 (1960), p. 32.

[24] Lambert, *Babylonian Oracle Questions*, (Winona Lake: Eisenbrauns, 2007), p. 6.

[25] The relationship between the specifically divinatory hermeneutical practice denoted by Akkadian *pišru* and the practice of pesharim in the Qumran community has been noted and discussed by Martti Nissinen in "Pesharim as Divination: Qumran Exegesis, Omen Interpretation and Literary Prophecy," in K. De Troyer and A. Lange, eds., *Prophecy after the Prophets? The Contribution of the Dead Sea Scrolls to the Understanding of Biblical and Extra-Biblical Prophecy* (Leuven: Peeters, 2010), pp. 43–60.

[26] CAD P s.v. *pašāru*, mng 8. Cf. the interpretation of Annette Zgoll, *Traum und Welterleben im antiken Mesopotamien: Traumtheorie und Traumpraxis im 3.-1. Jahrtausend v. Chr. als Horizont einer Kulturgeschichte des Träumens*, AOAT 333 (Münster: Ugarit-Verlag,

used in the scholars' reports overwhelmingly with reference to celestial omens, is defined in the CAD as "interpretation" or "hidden meaning." In a letter from the scholar Balasî, the meaning, or interpretation (*pišru*), of monthly omens—*šume ša urḫāni* (ITI.MEŠ) are said to be "not comparable" (*la mušul*), and that each goes its own way. Each omen having its own interpretation, if that is what this means, affirms the importance not of generality but of particularity in the system. How causality figures in the scribes' language with regard to divination is supplied in the statement from the same letter that "the one who 'made' (*epēšu* 'caused') the earthquake also made the *namburbi* against it." The responsible party is Ea: "Ea has done/caused (*epēšu*), Ea has undone/solved (*pašāru*)." Both the sign and the ritual are thought to come from the same divine source. The connection between the sign P and its portent Q, so we may then infer, is attributable to divine intent, presumably actualized by divine verbal pronouncement.

There seems to be little meeting ground between what we can extract from Balasî's letter or other evidence of Assyro-Babylonian divination and more familiar parts of the history of the investigation of causality. In Greco-Roman antiquity the discussion about causality was often tied to various commitments regarding necessity.[27] But the classical philosophical tradition is rife with ambiguity on the question of whether the relation between the antecedent and consequent of astrological divination involved necessity and its implied determinism. Cicero, in his literary dialogue with the Stoic Chrysippus, discusses the deterministic implication of the omen about Fabius' birth at the rising of the Dogstar, namely, that he will not die at sea. Having already occurred in the past, Cicero argues, Fabius' birth at the rising of the Dogstar cannot be changed and so is necessary (on the grounds that "what is past cannot turn from true into false" and "all things true in the past are necessary" [*De Fato* 7.14]). But the necessity of the occurrence of the second proposition, that he will not die at sea, depends on whether one thinks (as Cicero claims the Stoic Diodorus does) that

2006), pp. 383–96 in which *pašāru* means to be released from rather than to recount a dream.

[27] See for example in Cicero *De Divinatione* 1.125–127, *De Fato* 13–14, and Sextus Empiricus *Adversus mathematicos* 8.

there is a correspondence between the necessity of the antecedent and the inevitability of the consequent.[28]

These are not concerns of the Assyro-Babylonian scholars. In the absence of grounds for seeing any interest in determinism or necessity with respect to the signs and portents, the Mesopotamian theory of the connections between the sign and portent is closer to the Humean idea of constant conjunction, though Hume referred to conjunctions between physical things (Hume 2.3 1739 book I part III sections IV and XIV), not as in the omen texts, physical and social phenomena.[29] In Richard Sorabji's words, the Humean idea is that "If A causes B on a particular occasion, this implies that events like A are constantly conjoined with events like B,"[30] and he draws the distinction bewteen deterministic laws and constant conjunctions, where A's causing B implies that a deterministic law relates A to B. The deterministic law is the equivalent of the "covering law model of explanation," associated with philosopher Carl Hempel.[31] This model consists of three elements, the universal generalization (law statement) in the form of "whenever an event of type b happens, an event of type a happens,"[32] the initial conditions or occurrence of event of type b, and the consequent, which is the occurrence of a.[33] On the surface this model bears formal resemblance to the reconstruction of how an omen works, though one would be reluctant to see the pairing of the events in the omen statement as the equivalent to the "law statement," if the basis of the universally general law is physical. But it also bears resemblance to the Stoic "first undemonstrated inference scheme." It is interesting, however, given the Assyro-Babylonian legalistic terminology of divine "verdict" to think about the resemblance to a "law" given by divine command. Though the signs and their portents seem to imply that the connection between the specific sign and its specific portent will occur repeatedly, Sorabji concluded, in his study of causality in Greek philosophy, that the idea of a cause as a necessitating condition,

---

[28] R.N. Sorabji *Necessity, Cause, and Blame: Perspectives on Aristotle's Theory* (Chicago: University of Chicago Press, 1980), chapter 4 "Stoic Embarrassment over Necessity."

[29] Hume 2.3 1739 book I part III sections IV and XIV.

[30] Sorabji, *Necessity, Cause and Blame*, p. 37.

[31] C.G. Hempel, *Aspects of Scientific Explanation and other Essays in the Philosophy of Science* (New York, Free Press (1965), ch. 12.

[32] See Daniel M. Taylor, *Explanation and Meaning: An Introduction to Philosophy* (Cambridge University Press, 1970), p. 8.

[33] Again, see Taylor, *Explanation*, p. 8.

or part of one, is original to the Stoics, but had substantial longevity after Hellenistic antiquity.[34] Babylonian omens bear a formal resemblance to later Greek formulations of the relation of two events by logic, determinism, necessity or law, but do not share the philosophy, physics, or cosmology that underpin them. Both do share, however, a drive to create a rational system which can apply generally to a great many and various particulars.

If the idea of necessity is not a part of the Mesopotamian theory of divination, the notion of fate, attributed to the verbal decrees of gods, is. Fate is attached to divine will, which, when pronounced or decreed, is responsible for (causes) the signs and portents as well as the magical means to dispel them. Divine will trumps physical necessity and determinism. Even the omens can be changed by the gods, as in the line from a prayer to Nabû: "You (Nabû) are able to turn an untoward physiognomic omen into (one that is) propitious."[35] The scholars are equally unambiguous about the role of the gods in changing the interpretation of a sign, as in this statement from Nabû-nadin-šumi: "the king, my lord, should not be worried about this omen (*ittu*). Bēl and Nabû can make a portent (GISKIM) pass by. They will cause it to bypass the king, my lord. The king, my lord, should not be afraid."[36]

The question of fate and causality in Mesopotamian intellectual culture seems to have been attributed to the gods, specifically through their judicial decision-making role. Divine decisions were conceived of as being inscribed in or on the world and the learned elite scholars who were trained to read and interpret the divine script thereby had access to knowledge of future events. In his work on divination, Cicero (*De Div*. I 127) said: "... since everything happens by fate ... if there were a human being who could discern the connection of all causes with his mind, surely he would never err. For someone who grasps the causes of future things necessarily grasps what the future thing will be. But as nobody can do this except god, it is left to human beings to gain their foreknowledge by means of signs which announce what will follow."[37] I read this as fitting rather comfortably with the Babylonian omens

---

[34] Sorabji, *Necessity, Cause, and Blame*, p. 39.

[35] STT I No. 71:20, and see W.G. Lambert, "The Sultantepe Tablets: A Review Article," RA 53 (1959), p. 135.

[36] SAA 10 278:12-rev. 7.

[37] Cf. *De Div*. I 12–13, 16, 23, 25, II 47. Susanne Bobzien, *Determinism and Freedom in Stoic Philosophy* (Oxford: Clarendon Press, 1998), p. 165 commented on this particular passage as follows, "we do not know how far this reflects early Stoic thought,

and the cuneiform scholars' language of divine causality. Indeed, it is the idea that signs are not themselves causes but rather convey divine decisions about what will happen that makes for common ground.

Babylonian divination, and particularly celestial divination and astrology, was known to Hellenistic intellectuals. Although the texts are mostly no longer extant, titles of Greek works concerning the problem of signs, fate and causality attest to the continuing interest in these subjects for at least four hundred years, beginning with Chrysippus in the third century B.C.E.[38] Evidence for the transmission to and influence on this tradition from Babylonian ideas about divination, fate, and divine causality, is indirect but compelling. The idea of the linguistic character of ominous signs persisted into much later antiquity, as for example when St. Augustine, influenced by and echoing Plotinus,[39] said, the positions of stars are "some kind of speech which foretells the future." This comment is found in Augustine's argument against stellar influence, that is, against the idea of astrological signs as causes.[40]

It is significant that Babylonian scholars sought to formalize their understanding of the gods' judicial role in the cosmos in a vast system of conditional statements. The meaning of conditional statements can vary widely, from co-occurrences without an understood causal connection (Hume's "constant conjunctions," such as fire and heat) to certain events in the future necessarily following certain events in the past (Cicero's analysis of the omen of Fabius being born at the rising of the Dogstar),[41] to certain kinds of causal relations (where "if P, then Q" can mean Q occurred because P occurred, often taken as an explanation of the form "Q would not have occurred but for P," e.g.,

but it comfortably fits with all we know about early Stoic theories of divination and causation."

[38] Bobzien, *Determinism and Freedom in Stoic Philosophy*, p. 6.

[39] See note 18.

[40] Augustine, *Civ.* V 1, 191.25–34, ed. Dombart and Kalb, apud Bobzien, *Determinism and Freedom*, p. 166 : "Now it could be said that the stars indicate those <human actions> rather than bring them about, so that their position is *some kind of speech* which foretells the future, and not an active power…but the astrologers do not usually say, for example, 'Mars in this position indicates a murderer', but 'brings about a murderer'. However, let us concede that they do not express themselves as they should, and that they ought to take from the philosophers the rule of how to formulate their predictions of what they believe they find in the position of the stars." (My emphasis)

[41] Cicero, *De Fato* 6.12–7.14, and Sorabji, *Necessity, Cause and Blame*, pp. 72–78.

if he trips, then he will fall.). We can look at the omen statements and say that P and Q are not causally related, since they bear no physical or mechanical relationship. But a different causal language can be derived, both from the omens and from related literature which draws another picture altogether, one of divine causality effected not only through speech in the form of judicial verdicts, but also through a kind of writing on the tablet of the world in the form of the ominous phenomena themselves. If divine causation, described this way, subsumes all other forms of causal links between events, then Babylonian ideas about causality are simply a part of their metaphysics concerning the role and effect of the divine in the world, and distinctions between god, causality, and fate are not sharply drawn, but make possible the statements about future events and about what may happen that we find preserved in the textual record of cuneiform divination.[42]

[42] See R.W. Sharples, "Soft Determinism and Freedom in Early Stoicism," *Phronesis* 31 (1986), pp. 266–267, where he discusses the Stoic chain of causes and its various identification or distinction from the idea of god as *pneuma*, the active principle in the universe. And despite philosophical argument and polemics among later Greek or Greco-Roman philosophers on the nature and effect of causes, divine causality remained a principal and pervasive conception throughout the ancient world of West Asia and the Mediterranean. Dale Martin argues that the acceptance of divine causality did not end with Greek Hippocratic explorations of the "natural" (humoral) causes of disease and that this development only has, to modern eyes, the surface appearance of the repudiation of the irrational. The evidence, he shows, points not to the philosophers' disavowal of divine causality, but only of the claim that disease is caused by gods (or demons), who were causes of good and of blessings, not evil. See Dale B. Martin, *Inventing Superstition: From the Hippocratics to the Christians* (Cambridge, Mass and London: Harvard University Press, 2004).

BIBLIOGRAPHY

Aaboe, A. (1964) "On Periods Relations in Babylonian Astronomy," *Centaurus* 10, pp. 213–231.

—— (1980) "Observation and Theory in Babylonian Astronomy," *Centaurus* 24, pp. 14–35.

—— (2001) *Episodes from the early history of astronomy*. Berlin and New York, Springer Verlag.

Aaboe, A., Britton, J.P., Henderson, J., Neugebauer, O., and Sachs, A.J. (1991) *Saros Cycle Dates and Related Babylonian Astronomical Texts*. TAPS, 81/6. Philadelphia, American Philosophical Society..

Aaboe, A. and Henderson, J. (1975) "The Babylonian Theory of Lunar Latitude and Eclipses According to System A," *Archives internationales d'histoire des sciences* 25, pp. 181–222.

Abusch, Tzvi (1987) "*Alaktu* and *Halakhah* Oracular Decision, Divine Revelation," *Harvard Theological Review* 80, pp. 15–42.

—— (1995) "Marduk," in *Dictionary of Deities and Demons,* Karel van der Toorn, Bob Becking, and Pieter van der Horst, eds., pp. 544–549. Leiden, E.J. Brill.

Ackroyd, P.R. and Evans, C.R. (1970) eds., *The Cambridge History of the Bible*, 1: *From the Beginnings to Jerome*. Cambridge and New York, Cambridge University Press. ACT.

Adams, Marilyn McCord and Kretzmann, Norman (1969) transl., *William of Ockham: Predestination, God's Foreknowledge, and Future Contingents*. New York, Appleton-Century-Crofts.

Albani, M. (1994) *Astronomie und Schöpfungsglaube: Untersuchungen zum astronomischen Henochbuch*. Neukirchen-Vluyn, Neukirchener Verlag.

Allen, James (2001) *Inference from Signs: Ancient Debates about the Nature of Evidence*. Oxford, Clarendon Press.

Anjum, Rani Lill, "Conditionals and Truth Functionality," *http://uit.no/getfile.php?PageId=1669&FileId=36*.

Anscombe, G.E.M. (1993, repr. 2005) "Causality and Determination," in *Causation*, E. Sosa and M. Tooley, eds., pp. 88–104. Oxford, Oxford University Press.

Aristotle, *De Caelo*, see W.K.C. Guthrie (1971).

Armstrong, A.H. (1967) *Plotinus III. Ennead III*. Loeb Classical Library, 434. Cambridge, MA: Harvard University Press, and London, William Heinemann.

—— (1986) ed., *Classical Mediterranean Spirituality*. New York, The Crossroad Publishing Company.

Balzer, N. (1990). "The Logic of Implication," *The Journal of Value Inquiry* 24, pp. 253–268.

Beaulieu, P.-A. (2003). *The Pantheon of Uruk During the Neo-Babylonian Period*, Cuneiform Monographs, 23. Leiden, Brill and Styx.

Ben-Dov, J. and Saulnier, Stéphane (2008) "Qumran Calendars: A Survey of Scholarship 1980–2007," *Currents in Biblical Research* 7, pp. 124–168.

Ben-Dov J. and Horowitz, W. (2003) "The 364-Day Year in Mesopotamia and Qumran," *Meghillot* 1 (2003), pp. 3–24 (in Hebrew)

Ben-Dov J. and Horowitz, W. (2005) "The Babylonian Lunar Three in Calendrical Scrolls from Qumran," ZA 95, pp. 104–120.

Bennett, Jonathan (2003) *A Philosophical Guide to Conditionals*. Oxford, Clarendon Press.

Berggren, J.L. and Thomas, R.S.D. (1996) *Euclid's Phaenomena: A Translation and Study of a Hellenistic Treatise in Spherical Astronomy*. New York and London, Garland.

Bezold, C. and Boll, F. (1911) *Reflexe astrologischer Keilinschriften bei griechischen Schriftstellern*, Sitzungsberichte der Heidelberger akademie der wissenschaften, Philosophisch-historische klasse, 2, 7. Heidelberg, C. Winter.

Bigwood, J.M. (1993), "Aristotle and the Elephant Again," *American Journal of Philology* 114, pp. 537–555.

Bobzien, Susanne. (1998) *Determinism and Freedom in Stoic Philosophy*. Oxford, Clarendon Press.

Böck, B. (2000) *Die Babylonisch-Assyrische Morphoskopie*. AfO Supplement 27. Vienna, Institut für Orientalistik der Universität Wien.

den Boeft, J. (1970) *Calcidius on fate: his doctrine and sources*, Leiden, Brill.

Boll, F. (1911) "Zur babylonischen Planetenordnung," ZA 25, pp. 372–377.

—— (1913) "Neues zur babylonischen Planetenordnung," ZA 28, pp. 350–51.

Boll, F., Bezold, C. and revised by Gundel, W. (4th ed. 1931, 1977 repr.) *Sternglaube and Sterndeutung: Die Geschichte und das Wesen der Astrologie*. Leipzig and Berlin, Teubner.

Bouché-Leclercq, A. (1899) *L'astrologie grecque*. Paris, E. Leroux.

Brack-Bernsen, Lis (1993) "Babylonische Mondtexte: Beobachtung und Theorie," in *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, H. Galter ed., pp. 331–358. Beiträge zum 3. Grazer Morgenländischen Symposion. Graz, GrazKult.

—— (1999). "Goal-Year Tablets: Lunar Data and Predictions," in *Ancient Astronomy and Celestial Divination*, N.M. Swerdlow ed., pp. 149–178. Cambridge and London, The MIT Press.

Brack-Bernsen, Lis and Hunger, H. (2002) "TU 11: A Collection of Rules for the Prediction of Lunar Phases and of Month Lengths, *SCIAMVS* 3, pp. 3–90.

Brack-Bernsen, Lis and Brack, M. (2004) "Analyzing Shell Structure from Babylonian and Modern Times," *International Journal of Modern Physics E* 13, pp. 247–260.

Brack-Bernsen, L. and Hunger, H. (2007) "The Babylonian Zodiac: Speculations on its invention and significance," *Centarurus* 41, pp. 280–292.

Bram, Jean Rhys (1975, repr. 2005) *Ancient Astrology Theory and Practice: Matheseos Libri VIII.* Abingdon, MD, The Astrology Center of America, and Astrology Classics.

Brinkman, J.A. (1990) "The Babylonian Chronicle Revisited," in *Lingering Over Words: Studies in Ancient Near Eastern Literature in Honor of William L. Moran*, Abusch, T., Huehnergard, J., and Steinkeller, P. eds., pp. 73–104. Harvard Semitic Studies, 37. Atlanta, GA, Scholars Press.

Britton, J.P. (1989) "An Early Function for Eclipse Magnitudes in Babylonian Astronomy," *Centaurus* 32, pp. 1–52.

—— (1993) "Scientific Astronomy in Pre-Seleucid Babylon," in *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, H. Galter ed., pp. 61–76. Beiträge zum 3. Grazer Morgenländischen Symposion. Graz, GrazKult.

—— (2002) "Treatments of Annual Phenomena in Cuneiform Sources," in *Under One Sky: Astronomy and Mathematics in the Ancient Near East*, John M. Steele and Annette Imhausen eds., pp. 21–78. AOAT, 297. Münster, Ugarit Verlag.

—— (2007) "Calendars, Intercalations and Year-Lengths in Mesopotamian Astronomy," in *Calendars and Years: Astronomy and Time in the Ancient Near East*, John M. Steele ed., pp. 115–132. Oxford, Oxbow Books.

Britton, J.P. and Walker, C.B.F. (1991) "A Fourth Century Model for Venus: BM 33552," *Centaurus* 34, pp. 110–112.

Brown, David. (2000) *Mesopotamian Planetary Astronomy-Astrology*. Groningen, Styx.

Burstein, S.M. (1978) *The Babyloniaca of Berossus*. Sources from the Ancient Near East, 1/5. Malibu, Undena.

Bury, R.G. (1952) *Plato. Laws Books 7–12.* Loeb Classical Library, 192. Cambridge, MA, Harvard University Press and London, William Heinemann.

Cagni, L. (1969) *L'Epopea di Erra*. Studi Semitici, 34. Rome, Istituto di Studi del Vicino Oriente.

Cahn, Steven M. (1969) *Fate, Logic, and Time.* New Haven, CT, Yale University Press.
Cassuto, Umberto (1973) "The Israelite Epic," in *Biblical and Oriental Studies*, 2, pp. 80–102. Jerusalem, Magnes Press.
Childs, B. (1979) *Introduction to the Old Testament as Scripture.* Philadelphia, Fortress Press.
Civil, M. (1976) "Lexicography," in *Sumerological studies in honor of Thorkild Jacobsen on his seventieth birthday, June 7, 1974.* Assyriological Studies, 20. Chicago, University of Chicago Press, 1976.
Cicero, *De Divinatione*, see W.A. Falconer (1979).
——, *De Fato*, see H. Rackham (1977).
——, *De Natura Deorum*, see H. Rackham (2000).
Cioffari, V. (1935) *Fortune and Fate from Democritus to St. Thomas Aquinas*, doctoral diss. Columbia University.
Clay A.T. (1923) *Babylonian Records in the Library of J. Pierpont Morgan*. New Haven, Yale University Press.
Colson, F.H. (1932) *Philo, IV. On the Confusion of Tongues. On the Migration of Abraham. Who Is the Heir of Divine Things? On Mating with the Preliminary Studies*, Loeb Classical Library, 261. Cambridge, MA: Harvard University Press, and London: Heinemann.
Cornford, F.M. (1975) *Plato's Cosmology: The "Timaeus" of Plato*. Indianapolis, Bobbs-Merrill.
Cunningham, A. (1988) "Getting the Game Right: Some Plain Words on the Identity and Invention of Science," *Studies in History and Philosophy of Science* 19, 365–389.
Cunningham, A. and Williams, P. (1993) "De-centring the 'Big Picture': The Origins of Modern Science and the Modern Origins of Science," *British Journal for the History of Science* 26, 407–432.
Cunningham, A. and French, R. (1996) *Before Science: The Invention of the Friars' Natural Philosophy*. Aldershot, Scolar Press.
Czeżowski, T. (2000) *Knowledge, Science, and Values: A Program for Scientific Philosoph*y, L. Gumański, ed. Amsterdam and Atlanta, GA, Rodopi.
Davidson, Maxwell J. (1992) *Angels at Qumran: A Comparitive Study of 1 Enoch 1–36, 72–108 and Sectarian Writings from Qumran*. Sheffield: Sheffield Academic Press.
Day, John (1985) *God's Conflict with the Dragon and the Sea: Echoes of a Canaanite Myth in the Old Testament*. Cambridge, London, New York, New Rochelle, Melbourne, Sydney, Cambridge University Press.
De Falco, V., Krause, M.K. with O. Neugebauer (1966) ed. and trans. *Hypsikles: Die Aufgangszeiten der Gestirne*. Abhandlungen der Akademie der Wissenschaften in Göttingen, philologisch-historische Klasse, Dritte Folge, 62. Göttingen, Vandenhoeck & Ruprecht.
Dear, P. (2001) "Religion, Science, and Natural Philosophy: Thoughts on Cunningham's Thesis," *Studies in History and Philosophy of Science* 32, 377–386.
Denningman, Suzanne (2005) *Die astrologische Lehre der Doryphorie: eine soziomorphe Metapher in der antiken Planetenastrologie*. Beiträge zur Altertumskunde, 214. Munich, Saur.
Des Places, Edouard (2003) *Oracles chaldaïques*, 4th ed. Paris, Belles Lettres.
Dietrich, M., Loretz, O. and Sanmartín, J. (1995) *The Cuneiform Alphabetic Texts: From Ugarit, Ras Ibn Hani and Other Places*. Abhandlungen zur Literature Alt-Syrien-Palästinas und Mesopotamiens, 8, 2nd enlarged ed. Münster, Ugarit.
Dietrich, M. (1996) "Altbabylonische Omina zur Sonnenfinsterniss," WZKM 86, pp. 99–106.
Dodds, E.R. (1947) "Theurgy and its Relationship to Neoplatonism," *Journal of Roman Studies* 37, pp. 55–69.
Donbaz, V. and Koch, J. (1995) "Ein Astrolab der dritten Generation: NV. 10," JCS 47, pp. 63–84.

Drower, E.S. (1949) *The Book of the Zodiac*. Oriental Translation Fund, 35. London, Royal Asiatic Society.
Duhem, P. (1914) *La cosmoloie hellenique (suite) L'astronomie latine au Moyen Age*. Vol. 2 of *Le système du monde: histoire des doctrines cosmologiques de Platon à Copernic*. Paris, A. Hermann.
Edgington, Dorothy. (1995) "On Conditionals," *Mind* 104, pp. 235–323.
Edzard, D.O. (1997) *Gudea and His Dynasty*, Royal Inscriptions of Mesopotamia Early Periods, 3/1. Toronto, Toronto University Press.
Englund, R.K. (1988) "Administrative Timekeeping in Ancient Mesopotamia, JESHO 31, pp. 121–185.
Epping, J. (1889) *Astronomisches aus Babylon*. Freiburg, im Breisgau, Herder.
Euclid, *Phaenomena*, see J.L. Berggren and R.S.D. Thomas, (1996).
Evans, James and Berggren, Lennart J. (2006) *Geminos's Introduction to the Phenomena: A Translation and Study of a Hellenistic Survey of Astronomy*. Princeton University Press, Princeton.
Falconer, W.A. (1979 repr.) *Cicero. XX. De Senectute, De Amicitia, De Divinatione*. Loeb Classical Library, 154. Cambridge, MA, Harvard University Press, and London, William Heinemann.
Falkenstein, A. (1966) "'Wahrsagung' in der sumerische Überlieferung," in *La divination en Mésopotamie ancienne*, CRRA, 14, pp. 45–68, Paris, Presses Universitaires de France.
Farber, W. (1993) "Zur Orthographie von EAE 22: Neue Lesungen and Versuch einer Deutung," in *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, Hannes D. Galter, ed., pp. 247–257. Grazer Morgenländische Studien, 3. Graz, GrazKult.
Farrell, R.J. (1979) "Material Implication, Confirmation, and Counterfactuals," in *Notre Dame Journal of Formal Logic* 20, pp. 383–394.
Feldman, W.M. (1978) *Rabbinical Mathematics and Astronomy.* New York, Hermon Press.
Fincke, Jeanette C. (2006–2007) "Omina, die göttlichen 'Gesetze' der Divination," JEOL 40, pp. 131–147.
Firmicus Maternus, *Mathesis*, see W. Kroll et al. (1998, repr.)
Foster, Benjamin (2005[3]) *Before the Muses*. Bethesda, MD, CDL Press.
Freedman, Sally M. (1998) *If A City is Set on a Height: The Akkadian Omen Series Šumma Ālu in Mēlê Šakin*, Vol. 1: Tablets 1–21. Occasional Publications of the Samual Noah Kramer Fund, 17. Philadelphia: Babylonian Section, University Museum.
Funck, B. (1984). *Uruk zur Seleukidenzeit: eine Untersuchung zu den spätbabylonischen Pfründentexten als Quelle für die Erforschung der sozialökonomischen Entwicklung der hellenistischen Stadt*. Schriften zur Geschichte und Kultur des alten Orients, 16. Berlin, Akademie-Verlag.
Gehlken, Erlend (2005) "Die Adad-Tafeln der Omenserie *Enūma Anu Enlil*. Teil 1: Einfuhrung," *Baghdader Mitteilungen* 36, pp. 235–273.
—— (2008) "Die Adad-Tafeln der Omenserie *Enūma Anu Enlil*. Teil 2. Dei beiden ersten Donnertafeln (EAE 42 und 43)," *Zeitschrift fur Orientarchäeologie* 1, pp. 256–314.
Gendler, Tamar and Hawthorne, John, eds. (2004). *Conceivability and Possibility*. Oxford and New York, Oxford University Press.
Glessmer, U. (1996) "Horizontal Measuring in the Babylonian Astronomical Compendium mul.apin and in the Astronomical Book of 1 Enoch," *Henoch* 18 (1996), pp. 259–282.
Goldstein, B.R. (2002) "On the Babylonian Discovery of the Periods of Lunar Motion," JHA 33 (2002), pp. 1–13.
—— (2007) "What's New in Ptolemy's Almagest?" *Nuncius* 22, pp. 261–285.
Goldstein, B.R. and Bowen, A.C. (1991) "The Introduction of Dated Observations and Precise Measurement in Greek Astronomy," *Archive for History of Exact Sciences* 43, pp. 93–132.

Goldstein, Bernard R. and Bowen, Alan C. (1996) "Geminus and the concept of mean motion in Greco-Latin astronomy," *Archive for History of Exact Sciences* 50, pp. 157–185.

Goody, J.R. ed., (1968) *Literacy in Traditional Societies.* Cambridge, Cambridge University Press.

Goody, Jack (1977) *The Domestication of the Savage Mind*. Cambridge, Cambridge University Press.

Goody, Jack and Watt, Ian (1968) "The Consequences of Literacy," in *Literacy in Traditional Societies*, J.R. Goody, ed., pp. 27–68. Cambridge, Cambridge University Press.

Goold, G.P. (1977) *Manilius. Astronomica*. Loeb Classical Library, 469. Cambridge, MA, Harvard University Press, and London, William Heinemann.

Grafton, Anthony (1983) *Joseph Scaliger: A Study in the History of Classical Scholarship*, 2 vols. Oxford, Oxford University Press.

Granger, F. (1931–34) *Vitruvius. De Architectura*. Loeb Classical Library, 251, 280. Cambridge, MA, Harvard University Press, and London, William Heinemann.

Gragg, Gene B. (1969) The Keš Temple Hymn, in *The Collection of the Sumerian Temple Hymns*, Texts from Cuneiform Sources, 3. Locust Valley, N.Y.: J.J. Augustin Publisher.

Grant, Edward (1994) *Planets, Stars, & Orbs: The Medieval Cosmos 1200–1687*. Cambridge and New York, Cambridge University Press.

Green, Alberto R.W. (2003) *The Storm-God in the Ancient Near East, Biblical and Judaic* Studies from the University of California, San Diego, 8. Winona Lake, IN., Eisenbrauns.

Grenfell, B.P. and Hunt, A.S. (1906) *The Hibeh Papyri*, Part I. London and Boston, Egypt Exploration Fund.

Guinan, A. (2002) "A Severed Head Laughed: Stories of Divinatory Interpretation," in *Magic and Divination in the Ancient World*, Leda Ciraolo and Jonathan Seidel, eds., pp. 7–40. Leiden, Boston, and Köln, Brill/Styx.

Guthrie, W.K.C. (1971) *Aristotle VI. On the Heavens*. Loeb Classical Library, 338. Cambridge, MA, Harvard University Press, and London, William Heinemann.

Hallo, William W. (1962) "New Viewpoints on Cuneiform Literature," *Israel Exploration Journal* 12, pp. 13–26.

—— (1970) "The Cultic Setting of Sumerian Poetry". In *Actes de la XVIIe Rencontre Assyriologique Internationale.* Université Libre de Bruxelles 30 Juin-4 Juillet 1969. Publications de Comité belge de recherches historiques, épigraphiques et archéologiques en Mésopotamie 1, 117–134. Edited by André Finet. Ham-sur-Heure, Comité belge de recherches en Mésopotamie.

—— (1991) "The Concept of Canonicity in Cuneiform and Biblical Literature: A Comparative Appraisal," in *The Biblical Canon in Comparative Perspective: Scripture in Context*, 4, K. Lawson Younger, Jr., William W. Hallo, and Bernard F. Batto eds., pp. 1–19. Lewiston, Queenston, and Lampeter, The Edwin Mellen Press.

Halpern, Baruch (2003) "The Assyrian Astronomy of Genesis I and the Birth of Milesian Philosophy," *Eretz Israel* 27, pp. 74–83.

Hankinson, R.J. (1998) *Cause and Explanation in Ancient Greek Thought*. Oxford, Oxford University Press.

Harper, R.F. (1902) *Assyrian and Babylonian Letters*. Chicago, University of Chicago Press.

Hempel, C.G. (1965) *Aspects of Scientific Explanation and other Essays in the Philosophy of Science.* New York, Free Press, 1965.

Houlden, M.A. and Stephenson, F.R. (1986) *A Supplement to the Tuckerman Tables*. Memoirs of the American Philosophical Society, 170. Philadelphia, American Philosophical Society.

Horowitz, W. (1994) "Two New Ziqpu-Star Texts and Stellar Circles," JCS 46, pp. 89–98.

—— (1998) *Mesopotamian Cosmic Geography*. Winona Lake, Indiana, Eisenbrauns.

—— (2000) "Astral Tablets in the Hermitage, Saint Petersburg," ZA 90, pp. 203–206.

Houtman, Cornelius (1993) *Der Himmel im Alten Testament: Israels Weltbild und Weltanschauung*, Oudtestamentische Studien, 30. Leiden, New York and Köln, E.J. Brill.

Huber, Peter J. (1987) "Dating by Lunar Eclipse Omina, with Speculations on the Birth of Omen Astrology," in *From Ancient Omens to Statistical Mechanics: Essays on the Exact Sciences Presented to Asger Aaboe*, J.L. Berggren and B.R. Goldstein, eds., pp. 3–13. Copenhagen, University Library.

Huber, Peter J. and De Meis, Salvo (2004) *Babylonian Eclipse Observations from 750 BC to 1 BC.* Milan: IsIAO-Mimesis.

Hübner, W. (1988), "Zum Planetenfragment des Sudines (Pap. Gen inv. 203), *Zeitschrift für Papyrologie und Epigraphik* 73, pp. 33–42 and 109–110.

Hunger, H. (1968) *Babylonische und assyrische Kolophone*, AOAT, 2. Neukirchen-Vluyn, Butzon u. Bercker Kevelaer.

—— (1969) "Kryptologische astrologische Omina," in *Lišan mithurti. Festschrift Wolfram Freiherr von Soden zum 19. VI. 1968 gewidmet von Schülern und Mitarbeitern,* M. Dietrich and W. Röllig eds., pp. 133–145. AOAT, 1. Neukirchen-Vluyn: Butzon und Bercker Kevelaer.

—— (1992) *Astrological Reports to Assyrian Kings*. State Archives of Assyria, 8. Helsinki, University of Helsinki Press.

—— (2001) *Astronomical Diaries and Related Texts from Babylon: Vol. V. Lunar and Planetary Texts*, with an Appendix by John M. Steele. Denkschriften der philosophisch-historischen Klasse, 299. Vienna, Österreichische Akademie der Wissenschaften.

—— (2006) *Astronomical Diaries and Related Texts from Babylon: Vol. VI. Goal Year Texts*. Denkschriften der philosophisch-historischen Klasse, 346. Vienna, Österreichische Akademie der Wissenschaften.

—— (2006) *Astronomical Diaries and Related Texts from Babylon: Vol. VI. Goal-Year Texts*. Denkschriften der philosophisch-historischen Klasse, 471. Vienna, Österreichische Akademie der Wissenschaften.

Hunger, H. and Dvorak, R. (1981) *Ephemeriden von Sonne, Mond und hellen Planeten von –1000 bis –601*. Österreichische Akademie der Wissenschaft, phil.-hist. Klasse, 155. Vienna, Verlag der Österreichischen Akademie der Wissenschaften.

Hunger, H. and Pingree, D. (1989) "*MUL.APIN—An Astronomical Compendium in Cuneiform*, Archiv für Orientforschung Beiheft, 24. Horn, Ferdinand Berger & Söhne.

Hunger, H. and Sachs, A.J. (1996) *Astronomical Diaries and Related Texts from Babylon: Vol. III 164 B.C. to 61 B.C.* Denkschriften der philosophisch-historischen Klasse, 247, Vienna, Österreichische Akademie der Wissenschaften.

Hunger, H. and Pingree, D. (1999). *Astral sciences in Mesopotamia*. Leiden, Boston, E.J. Brill.

Huxley, Margaret (2000) "The Gates and Guardians in Sennacherib's Addition to the Temple of Assur," *Iraq* 62, pp. 109–137.

Jackson, Frank. (1987) *Conditionals*. Oxford: Basil Blackwell.

Jacobsen, Thorkild (1968) "The Battle between Marduk and Tiamat," JAOS 88, pp. 104–108.

Jakobson, Roman (1971) "Two Types of Aphasic Disturbances," *Fundamentals of Language*. The Hague, Mouton.

Jones, Alexander. (1999) *Astronomical Papyri from Oxyrhynchus*, 2 vols. Memoirs of the American Philosophical Society, 233, Philadelphia, PA, American Philosophical Society.

Jones, H.L. (1966 repr.) *The Geography of Strabo. VII. Books 15–16*. Loeb Classical Library, 241. Cambridge, MA, Harvard University Press, and London, William Heinemann.

Kaiser, Christopher B. (1997) *Creational Theology and the History of Physical Science: The Creationist Tradition from Basil to Bohr*. Leiden, New York, Köln, E.J. Brill.

Kaiser, O. (1982–) *Texte aus der Umwelt des Alten Testaments*. Gütersloh, G. Mohn.

Kilmer, A.D. (1978) "A Note on the Babylonian Mythological Explanation of the Lunar Eclipse," JAOS 98, pp. 372–374.
King, L.W. (1902) *The Seven Tablets of Creation*. Luzac's Semitic text and translation series, 12–13. London, Luzac.
—— (1912) *Babylonian Boundary Stones*. London, Trustees of the British Museum.
Kleinberg, Aviad. (2009) "Apophthegmata." *Critical Inquiry* 35, pp. 711–714.
Kloos, Carola (1986) *Yhwh's Combat with the Sea: A Canaanite Tradition in the Religion of Ancient Israel*. Amsterdam, G.A. van Oorschot and Leiden, E.J. Brill.
Koch-Westenholz, U. (1995) *Mesopotamian Astrology*. Copenhagen, The Carsten Niebuhr Institute of Near Eastern Studies, Museum Tusculanum Press.
Kraus, F.R. (1967) *Texte zur babylonischen Physiognomatik*. AfO Beiheft 3. Osnabrück, Biblio-Verlag.
Kroll, W., Skutsch, F., and Ziegler, K. (1998 repr.) *Matheseos, vol. I: Libri I–IV*. Bibliotheca scriptorum Graecorum et Romanorum Teubneriana. Munich, K.G. Saur Verlag.
Kubitschek, W. (1928) *Grundriss der antiken Zeitrechnung*, Handbuch der Altertumswissenschaft, Abt. I, Teil 7, München.
Kugler, F.X. (1907, 1909–1924) *Sternkunde and Sterndienst in Babel*, 2 vols. 3 Ergänzungshefte, Münster, Aschendorff.
Kuhrt, A. (1982) "Assyrian and Babylonian Traditions in Classical Authors: A Critical Synthesis," in *Mesopotamien and seine Nachbarn*, H.-J. Nissen and J. Renger, eds., pp. 539–554. Berliner Beiträge zum Vorderen Orient I/2. Berlin, Dietrich Reimer Verlag.
Kvanvig, H.S. (1988) *Roots of Apocalyptic: The Mesopotamian Background of the Enoch Figure and the Son of Man*. Neukirchen-Vluyn, Neukirchener Verlag.
Labat, R. (1951) *Traité akkadien de diagnostics et pronostics médicaux*. Académie internationale d'histoire des sciences. Collection de travaux 7. Paris, Académie internationale d'histoire de sciences.
—— (1965) *Un calendrier babylonien des travaux des signes et des mois (séries iqqur îpuš). Bibliothèque de l'École des hautes études*, 4. Sciences historiques et philologiques, 321. Paris, H. Champion.
Lambert, W.G. (1959) "The Sultantepe Tablets: A Review Article." RA 53, pp. 119–138.
—— (1957) "Ancestors, Authors, and Canonicity." JCS 11, pp. 1–14.
—— (1962) "A Catalogue of Texts and Authors," JCS 16, pp. 59–77.
—— (1967) "Enmeduranki and Related Matters," JCS 21, pp. 126–138.
—— (1970) "Fire Incantation," AfO 23, pp. 39–45.
—— (1972) "Destiny and Divine Intervention in Babylon and Israel," *Oudtestamentische Studiën* 17, pp. 65–72.
—— (2007) *Babylonian Oracle Questions*. Winona Lake, Eisenbrauns.
Langdon, Stephen, (1935) *Menologies and the Semitic calendars,* London, Pub. for the British Academy by H. Milford, Oxford University Press.
Lehoux, D. (2004) "Observation and prediction in ancient astrology." *Studies in Hist and Phil of Science* 35:227–246.
—— (2007) *Astronomy, Weather, and Calendars in the Ancient World Parapegmata and Related Texts in Classical and Near-Eastern Societies*. Cambridge and New York, Cambridge University Press.
Leichty, Erle (1970) *The omen series Šumma izbu*. Texts from Cuneiform Sources, 4. Locust Valley, N.Y., J.J. Augustin.
Leiman, S.Z. (1976) *The Canonization of Hebrew Scripture: The Talmudic and Midrashic Evidence*. Transactions of the Connecticut Academy of Arts and Sciences, 47. Hamden CT, Archon Books.
Lemay, Helen Rodnite (1977) "Science and Theology at Chartres: The Case of the Supracelestial Waters," *British Journal for the History of Science* 10, pp. 226–236.

Lewy, Yochanan (1978) *Chaldean Oracles and Theurgy: Mysticism, Magic and Platonism in the Later Roman Empire* of Hans Lewy, rev. ed by Michel Tardieu, Paris, Études augustiniennes.

Lévy-Bruhl, L. (1910/1922) *Le fonctions mentales dans les sociétés inférieures* Paris, Alcan.

—— (1922/1976) *La mentalité primitive*. Paris, Retz.

Lindberg, David C. (1986) "Science and the Early Church," in *God and Nature: Historical Essays on the Encounter between Christianity and Science*, David C. Lindberg and Ronald L. Numbers, eds., pp. 19–48. Berkeley, Los Angeles and London, University of California Press.

Livingstone, A. (1986) *Mystical and Mythological Explanatory Works of Assyrian and Babylonian Scholars.* Oxford, Clarendon Press.

—— (1989) *Court Poetry and Literary Miscellanea*. State Archives of Assyria, 3. Helsinki, University of Helsinki.

Lloyd, G.E.R. (1979) *Magic, Reason and Experience: Studies in the origins and development of Greek science*. Cambridge, Cambridge University Press.

—— (1990) *Demystifying Mentalities*. Cambridge and New York, Cambridge University Press.

—— (2007) *Cognitive Variations: Reflections on the Unity and Diversity of the Human Mind*. Oxford, Clarendon Press.

Long, A.A. (1986) "Epicureans and Stoics," in *Classical Mediterranean Spirituality*, A.H. Armstrong, ed., pp. 135–153. New York, The Crossroad Publishing Company.

Long, A.A. and Sedley, D.N. (1987) *The Hellenistic Philosophers, Vol. 1: Translations of the Principal Sources with Philosophical Commentary*. Cambridge and London, Cambridge University Press.

Magdalino, P. and Mavroudi, M. (2006) *The Occult Sciences in Byzantium.* Geneva, La pomme d'or.

Majercik, R. (1989) *The Chaldean Oracles*. Studies in Greek and Roman Religion, 5. Leiden, Brill.

Manetti, G. (1993) *Theories of the Sign in Classical Antiquity*. C. Richardson, trans. Bloomington and Indianapolis, Indiana University Press.

Martin, Dale B. (2004) *Inventing Superstition: From the Hippocratics to the Christians*. Cambridge, Mass and London, Harvard University Press.

Mates, Benson. (1953) *Stoic Logic*. Berkeley and Los Angeles: University of California Press.

Maul, Stefan M. (1999) "How the Babylonians Protected Themselves against Calamities Announced by Omens." In *Mesopotamian Magic: Textual, Historical, and Interpretatitve Perspectives*, T. Abusch and K. Van der Toorn, eds., pp. 123–129. Studies in Ancient Magic and Divination, 1. Groningen, Styx.

McEwan, G.J.P. (1981) *Priest and Temple in Hellenistic Babylonia*. Freiburger Altorientalische Studien 4, Wiesbaden, Steiner.

Meeus, J. and Mucke, H. (1983, 1992^3) *Canon of Lunar Eclipses –2002 to +2526,* Vienna, Astronomisches Büro.

Millar, F. (1993) T*he Roman Near East: 31 B.C.–A.D. 337*. Cambridge, MA and London, Harvard University Press.

Miller, Patricia Cox. (1986) "In Praise of Nonsense," in *Classical Mediterranean Spirituality: Egyptian, Greek, Roman*, A.H. Armstrong, ed., pp. 481–505. New York, The Crossroad Publishing Company.

Momigliano, A. (1963) Ed., *The Conflict between Paganism and Christianity in the Fourth Century*. Oxford-Warburg studies. Oxford, Clarendon Press.

—— (1977) "Tradition and the Classical Historian," in *Essays in Ancient and Modern Historiography*, Middletown, CT., Wesleyan University Press.

—— (1971, repr. 1993) *Alien Wisdom: The Limits of Hellenization*, Cambridge and New York: Cambridge University Press.

Moran, William H. (1978) "Puppies in Proverbs-From Samsi-Adad I to Archilochus?" *Eretz Israel* 14, pp. 32–37.

Mucke, H. and J. Meeus, J. (1983²) *Canon of Solar Eclipses –2003 to +2526*, Vienna, Astronomisches Büro.

Müller-Kessler, Christa (1999) "Aramäische Beschwörungen und astronomische Omina in nachbabylonischer Zeit. Das Fortleben mesopotamischer Kultur im Vorderen Orient, in *Babylon: Focus Mesopotamischer Geschichte, Wiege früher Gelehrsamkeit, Mythos in der Moderne*. 2, J. Renger, ed., pp. 427–443. Internationales Colloquium der Deutschen Orient-Gesellschaft 24.–26. März 1998 in Berlin. Saarbrücken, SDV, Saarbrücker, Druckerei und Verlag.

Needham, Rodney (1972). *Belief, Language, and Experience*. Chicago and London, University of Chicago Press.

Neugebauer, O. (1936) "Jahreszeiten und Tageslangen in der babylonischen Astronomie," *Osiris* 2, pp. 517–550.

—— (1941) "Some Fundamental Concepts in Ancient Astronomy," *Studies in the History of Science*, pp. 13–29. Philadelphia, PA, University of Pennsylvania Press

—— (1942) "On Some Astronomical Papyri and Related Problems of Ancient Geography", TAPS, 32/2, pp. 251–263. Philadelphia, American Philosophical Society.

—— (1947) "Studies in Ancient Astronomy. VIII. The Water Clock in Babylonian Astronomy", *Isis* 37, pp. 37–43.

—— (1950) "The Study of Wretched Subjects," *Isis* 41, p. 374.

—— (1950) "The Alleged Babylonian Discovery of the Precession of the Equinoxes," JAOS 70, pp. 1–8.

—— (1953) "The Rising Times in Babylonian Astronomy," JCS 7, pp. 100–102.

—— (1955) "The Egyptian 'Decans'," in *Vistas in Astronomy* Vol. I., A. Beer ed., pp. 47–51. London, New York, Pergamon Press.

—— (1975). *A History of Ancient Mathematical Astronomy*. 3 vols. Berlin and New York, Springer Verlag.

—— (1979) *Ethiopic Astronomy and Computus*. Denkschriften der philosophisch-historische Klasse, Sitzungsberichte, 347. Vienna, Österreichischen Akademie der Wissenschaften.

—— (1983) *Astronomy and History: Selected Essays.* Berlin, Heidelberg, and New York, Springer Verlag.

Neugebauer, O. and Van Hoesen H.B. (1959) *Greek Horoscopes*. Memoirs of the American Philosophical Society, 48. Philadelphia, PA, American Philosophical Society.

Neugebauer, O. and Sachs, A. (1945) *Mathematical Cuneiform Texts*, *American Oriental Series*, 29. New Haven, CT., American Oriental Society and the American Schools of Oriental Research.

Neugebauer, O. and Parker, R.A. (1960, 1964 and 1969) *Egyptian Astronomical Texts*, 3 vols., Providence, R.I., Brown University Press.

Neugebauer, O. and Sachs, A. (1967) "Atypical Astronomical Cuneiform Texts, I", JCS 21, pp. 183–218.

Neugebauer, O. and Sachs, A. (1969) "Atypical Astronomical Cuneiform Texts, II", JCS 22, pp. 92–111.

Neugebauer, O. and Horowitz, W. (1997/98) "The 30-Star Catalogue HS 1897 and The Late Parallel BM 55502," AfO 44–45, pp. 176–185.

Nissinen, Marttii (2010) "Pesharim as Divination: Qumran Exegesis, Omen Interpretation and Literary Prophecy," in *Prophecy after the Prophets? The Contribution of the Dead Sea Scrolls to the Understanding of Biblical and Extra-Biblical Prophecy*, K. De Troyer and A. Lange, eds. Leuven, Peeters, pp. 43–60.

North, John (1986) *Horoscopes and History*. London, The Warburg Institute, University of London.

Oelsner, J. (1986) *Materialien zur Babylonischen Gesellschaft und Kultur in Hellenistischer Zeit*. Assyriologia, 7. Budapest, Eötvos University.

Oldfather, C.H. (1985) *Diodorus Siculus: Library of History, Volume I, Books 1–2*. Loeb Classical Library, 279. Cambridge, MA, Harvard University Press, and London, William Heinemann.

Oppenheim, A.L. (1970) *Glass and Glassmaking in Ancient Mesopotamia: The Cuneiform Texts*. The Corning Museum of Glass monographs, 3. Corning, New York, Corning Museum of Glass Press.

—— (1974) "A Babylonian Diviner's Manual," JNES 33, pp. 197–220.

—— (1975) *Ancient Mesopotamia: Portrait of a Dead Civilization*, rev. ed. E. Reiner. Chicago, University of Chicago Press.

Ormerod, M.A. and Jones, W.H.S. (1918) *Pausanias. Description of Greece*, 4 Vols. Cambridge, MA, Harvard University Press.

Parker, R.A. (1959) *A Vienna Demotic Papyrus on Eclipse- and Lunar-Omina, Brown Egyptological Studies*, 2. Providence, R.I., Brown University Press.

Parpola, Simo. (1971) *Letters from Assyrian Scholars to the Kings Esarhaddon and Assurbanipal,* AOAT 5/1, Neukirchen-Vluyn, Verlag Butzon & Bercker Kevelaer.

—— (1983) *Letters from Assryian Scholars to the Kings Esarhaddon and Assurbanipal*. AOAT 5/2, Neukirchen-Vluyn,Verlag Butzon & Bercker Kevelaer.

—— (1993) *Letters from Assyrian and Babylonian Scholars*. State Archives of Assyria, 10. Helsinki, Helsinki University Press.

—— (2000) "Monotheism in Ancient Assyria," in *One God or Many? Concepts of Divinity in the Ancient World*, Barbara N. Porter, ed., pp. 165–209. Transactions of the Casco Bay Assyriological Institute, 1. Chebeague Island, ME, Casco Bay Assyriological Institute.

Peek, P.M., ed. (1991) *African Divination Systems: Ways of Knowing*. Bloomington and Indianapolis, Indiana University Press.

Pelikan, Jaroslav (1993) *Christianity and Classical Culture: The Metamorphosis of Natural Theology in the Christian Encounter with Hellenism*. New Haven, CT, Yale University Press.

Pépin, Jean (1986) "Cosmic Piety," in Classical Mediterranean Spirituality: Egyptian, Greek, Roman, A.H. Armstrong, ed., pp. 408–435. London: SCM Press, Ltd. and New York: The Crossroad Publishing Co.

Philo, *The Migration of Abraham*, see F.H. Colson (1932).

Pingree, D. (1968) *The Thousands of Abū Ma'shar*. London, The Warburg Institute, University of London.

—— (1978) *The Yavanjātaka of Sphujidhvaja* 2 vols., Harvard Oriental Series 48, Cambridge, MA, Harvard University Press.

—— (1981) *Jyotiḥśāstra: astral and mathematical literature*. A History of Indian literature, 6/4. Wiesbaden, O. Harrassowitz.

—— (1982) "Mesopotamian Astronomy and Asral Omens in other Civilizations," in *Mesopotamien und seine Nachbarn*, H.Nissen and J. Renger, eds., pp. 613–3. Berlin: Dietrich Reimer Verlag.

—— (1997) *From Astral Omens to Astrology, From Babylon to Bīkāner*. Serie Orientale Roma, 78. Rome, Istituto Italiano per l'Africa e l'Oriente.

—— (1998) "Legacies in Astronomy and Celestial Omens," in *The Legacy of Mesopotamia*, S. Dalley ed., pp. 125–137. Oxford, Oxford University Press.

—— (2001) "From Alexandria to Baghdad to Byzantium. The Transmission of Astrology," *International Journal of the Classical Tradition* 8, pp. 3–37.

—— and Walker, C.B.F. (1988) "A Babylonian Star-Catalogue: BM 78161," in *A Scientific Humanist: Studies in Memory of Abraham Sachs* E. Leichty, M. de J. Ellis, and P. Gerardi, eds., pp. 313–322. Occasional Publications of the Samuel Noah Kramer Fund, 9. Philadelphia, University Museum.

Pliny, *Natural History*, see H. Rackham (1979).

Plotinus, *Ennead*, see A.H. Armstrong (1986).

Popović, M. (2007) *Reading the Human Body: Physiognomics and Astrology in the Dead Sea Scrolls and Hellenistic-Early Roman Period Judaism*. Leiden and Boston, Brill.

Powell, M. (1973) "Sumerian Area Measures and the Alleged Decimal Substratum," *Zeitschrift für Assyriologie* 62, pp. 199–201.
Quine, W.V. and Ulllian, J.S. (1970, 1978) *The Web of Belief*. New York, Random House.
Rackham, H. (1979 repr.) Pliny. Natural History I. Books 1–2. Loeb Classical Library, 330.
—— (2000 repr.) *Cicero XIX. Nature of the Gods, Academics*. Loeb Classical Library, 268. Cambridge, MA, Harvard University Press, and London, William Heinemann.
—— (1977 repr.) *On the Orator: Book 3. On Fate. Stoic Paradoxes. Divisions of Oratory*. Loeb Classical Library, 349. Cambridge, MA, Harvard University Press, and London, William Heinemann
Reesor, M.E. (1965) "Fate and Possibility in Early Stoic Philosophy," *Phoenix* 19, 285–297.
Reiner, Erica (1960) "Fortune-Telling in Mesopotamia," JNES 19, pp. 23–35.
—— (1985) *Your Thwarts in Pieces Your Mooring Rope Cut: Poetry from Babylonia and Assyria*. Ann Arbor, Michigan, University of Michigan Press.
—— (1993) "Two Babylonian Precursors of Astrology," N.A.B.U., pp. 21–22.
—— (1995) *Astral Magic in Babylonia*, TAPS, 85/4. Philadelphia, American Philosophical Society.
—— (2000) "Early Zodiologia and Related Matters," in A.R. George and I.L. Finkel eds, *Wisdom, Gods, and Literature: Studies in Assyriology in Honour of W.G. Lambert*, pp. 421–27, Winona Lake, Indiana, Eisenbrauns.
Reiner, E. and Pingree, D. (1977) "A Neo-Babylonian Report on Seasonal Hours," *Archiv für Orientforschung* 25, pp. 50–55.
—— (1981) *Babylonian Planetary Omens 2: Enuma Anu Enlil, Tablets 50–51*. Bibliotheca Mesopotamica, 2. Malibu, Undena.
—— (2005) *Babylonian Planetary Omens, Part 4*. Leiden, Brill.
Robbins, Frank Egleston (1912) *The Hexaemeral Literature*. Chicago, University of Chicago Press.
—— (1980) *Ptolemy, Tetrabiblos*. Loeb Classical Library, 435. Cambridge, MA, Harvard University Press, and London, William Heinemann.
Robson, Eleanor (2002) "Words and Pictures: New Light on Plimpton 322," *American Mathematical Monthly* 109, pp. 105–120.
Rochberg, Francesca (1998) *Babylonian Horoscopes*. TAPS, 88. Philadelphia, American Philosophical Society.
—— (2004) *The Heavenly Writing: Divination, Horoscopy and Astronomy in Mesopotamian Culture*. Cambridge and New York, Cambridge University Press.
—— (2005) "Mesopotamian Cosmology," in *Blackwell's Companion to the Ancient Near East*, Daniel Snell, ed., pp. 316–329. Oxford, Blackwell Publishing.
—— (2007). "Marduk in Heaven," *Wiener Zeitschrift für die Kunde des Morgenlandes* 97, pp. 433–442.
Rochberg-Halton, F. (1987) *Language, Literature and History: Philological and Historical Studies Presented to Erica Reiner*. American Oriental Series, 67. New Haven, CT, American Oriental Society.
—— (1988) *Aspects of Babylonian Celestial Divination: The Lunar Eclipse Tablets of Enuma Anu Enlil.* Archiv für Orientforschung Beiheft, 22. Horn, Ferdinand Berger & Söhne.
—— (1989) "Babylonian Horoscopes and Their Sources," OrNS 58, pp. 102–123, pls.1–II.
Sachs, A.J. (1948) "A Classification of the Babylonian Astronomical Tablets of the Seleucid Period," JCS 2, pp. 271–90.
—— (1952) "A Late Babylonian Star Catalog," JCS 6, p. 146–150.
—— (1952) "Babylonian Horoscopes," JCS 6, pp. 49–72.

—— (1955) with the co-operation of J. Schaumberger, *Late Babylonian Astronomical and Related Texts* copied by T.G. Pinches and J.N. Strassmaier, Providence, Brown University Press.

—— (1974) "Babylonian Observational Astronomy," in F.R. Hodson, ed., *The Place of Astronomy in the Ancient World*, Philosophical Transactions of the Royal Society of London A. 276, pp. 43–50. London, Oxford University Press for the British Academy.

Sachs, A.J. and Hunger, H. (1988) *Astronomical diaries and related texts from Babylonia, Volume I: Diaries from 652. BC to 262 BC.* Denkschriften der Österreichischen Akademie der Wissenschaften. Denkschriften der philosophisch-historische Klasse, 195. Vienna, Österreichische Akademie der Wissenschaften.

Sachs, A.J. and Hunger, H. (1989) *Astronomical Diaries and Related Texts from Babylon Volume II: Diaries from 261 B.C. to 165 B.C.*, Denkschriften der philosophisch-historische Klasse, 210. Vienna, Österreichischen Akademie der Wissenschaften. For Vols. III–VI, see under Hunger.

Salmon, Wesley C. (1999) *Introduction to the Philosophy of Science*. Indianapolis/Cambridge, Hackett Publishing Co.

Salzman, M.R. (1987) "'Superstitio' in the Codex Theodosianus and the Persecution of Pagans," *Vigilae Christianae* 41, 172–188.

Sanders, Seth L., editor (2006) *Margins of Writing, Origins of Cultures*. Chicago, Oriental Institute Publications.

Sanford, David H. (1989) *If P, then Q: Conditionals and the Foundations of Reasoning*. London and New York, Routledge.

Saussure, F. de (1916, 1960, rev.ed. 1974) *Course in General Linguistics*, C. Bally and A. Sechehaye, eds., in collaboration with A. Reidlinger, trans. W. Baskin. London, Peter Owen.

Schaumberger, J. (1952) "Die *Ziqpu*-Gestirne nach neuen Keilschrifttexten," ZA 50, pp. 214–229.

—— (1955) "Anaphora und Aufgangskalender in neuen Ziqpu-Texten," ZA 51, pp. 237–251.

Schott, A. and Schaumberger, J. (1941) "Vier Briefe Mar-Ištars an Asarhaddon über Himmelserscheinungen der. Jahre –670/668," ZA 47, pp. 89–130.

Scott, A. (1991) *Origen and the Life of the Stars: A History of an Idea*. Oxford, Clarendon Press.

Sharples, R.W. (1986) "Soft Determinism and Freedom in Early Stoicism." *Phronesis* 31, pp. 266–279.

Sidersky, D. (1929) "La division de la circonférence en 360 parties," RA 26, pp. 31–2.

Šileiko, W. (1927) "Mondlaufprognosen aus der Zeit der ersten babylonischen Dynastie," *Comptes-Rendus de l'Academie des Sciences de l'URSS*, pp. 125–28.

Sjöberg, Åke W., and Bergmann, E. (1969) "The Collection of the Sumerian Temple Hymns", in *The Collection of the Sumerian Temple Hymns*, Åke W. Sjöberg, ed., with Gene B. Gragg. *Texts from Cuneiform Sources*, 3. Locust Valley, New York, J.J. Augustin.

Sjöberg, Åke W. (2002) "In the Beginning," in *Riches Hidden in Secret Places: Ancient Near Eastern Studies in Memory of Thorkild Jacobsen*, T. Abusch ed., pp. 229–239. Winona Lake, IN, Eisenbrauns.

Slotsky, A. (1993) "The Uruk Solstice Scheme Revisited," in *Die Rolle der Astronomie in den Kulturen Mesopotamiens*, *Beitrage zum 3. Grazer Morgenlandischen Symposion*, Hannes D. Galter, ed., pp. 359–366. Graz, GrazKult.

Smith, Mark S. (2001) *The Origins of Biblical Monotheism: Israel's Polytheistic Background and the Ugaritic Texts*. Oxford, Oxford University Press.

Smith, S. (1924) *Babylonian Historical Texts*. London, Methuen & Co.

—— (1969) "Babylonian Time Reckoning", *Iraq* 31, pp. 74–81.

Sorabji, R.N. (1980) *Necessity, Cause, and Blame: Perspectives on Aristotle's Theory*. Chicago, University of Chicago Press.

Sosa, E. and Tooley, M. eds. (1992, repr. 2005) *Causation*. Oxford, Oxford University Press.

Stadelmann, Luis (1970) *The Hebrew Conception of the World: A Philological and Literary Study*. Analecta Biblica, 39. Rome, Pontifical Biblical Institute.

Steele, John M. (2000) *Observations and Predictions of Eclipse Times by Early Astronomers.* Dordrecht/Boston/London, Kluwer Academic.

—— (2000) "A 3405: An Unusual Astronomical Text from Uruk," *Arch. Hist. Exact Sci.* 55, pp. 103–135.

—— (2007) "Celestial Measurement in Babylonian Astronomy," *Annals of Science* 64, pp. 293–325.

Stock, Brian (1972) *Myth and Science in the Twelfth Century: A Study of Bernard Silvester*. Princeton, N.J., Princeton University Press.

Strabo, *Geography*, see H.L. Jones (1966).

Strassmaier, J.N. (1890) *Inschriften von Cambyses, König von Babylon*, Leipzig, E. Pfeiffer.

Swerdlow, N.M. (1998) *The Babylonian Theory of the Planets*. Princeton, Princeton University Press.

Szarzyńska, K. (1993) "Offerings for the Goddess Inana in Archaic Uruk," RA 87, pp. 7–27.

Taylor, Daniel M. (1970) *Explanation and Meaning: An Introduction to Philosophy*. Cambridge, Cambridge University Press.

Tallqvist, K. (1974) *Akkadische Götterepitheta*. Hildesheim and New York, Georg Olms.

Teske, Roland J. (1991) *On Genesis: Two Books on Genesis against the Manichees; and, On the Literal Interpretation of Genesis, An Unfinished Book*. Fathers of the Church, 84. Washington, D.C., Catholic University of America Press.

Thompson, R.C. (1900) *The Reports of the magicians and astrologers of Nineveh and Babylon in the British Museum*. Semitic text and translation series, 6 and 7. London, Luzac.

—— (1900, 1977 repr.) *The Reports of the Magicians and Astrologers of Nineveh and Babylon*,vols. 1–2. London, Luzac, and New York, AMS Press.

Thureau-Dangin F. (1921) *Rituels accadiens*. Paris, E. Leroux.

—— (1928) "La Division du cercle," RA 25, pp. 187–8.

—— (1930) "Encore un mot sur la division du cercle," RA 27, pp. 53–4.

Toomer, G.J. (1984) *Ptolemy's Almagest,* New York, Berlin, Springer Verlag.

—— (1988) "Hipparchus and Babylonian Astronomy" in *A Scientific Humanist: Studies in Memory of Abraham Sachs*, Erle Leichty, Maria de J. Ellis, and Pamela Gerardi, eds., pp. 353–365. Occasional Publications of the Samuel Noah Kramer Fund, 9. Philadelphia, University Museum.

Uehlinger, Christoph (1999) "Leviathan," *Dictionary of Deities and Demons in the Bible*, Karel van der Toorn, Bob Becking, and Pieter van der Horst, eds. Leiden and Grand Rapids, MI, Brill and Eerdmans.

Ungnad, Arthur (1936) *Subartu*, *Beiträge zur Kulturgeschichte und Völkerkunde Vorderasiens*. Berlin/Leipzig, W. de Gruyter & Co.

—— (1941–44) "Besprechungskunst und Astrologie in Babylonien," AfO 14, pp. 274–82.

Veer, R. van der (2003) "Primitive Mentality Reconsidered," *Culture and Psychology* 9, pp. 179–184.

Veldhuis, N. (1998). "TIN.TIR = Babylon, the Question of Canonization and the Production of Meaning," JCS 50, pp. 77–85.

—— (1999) "Continuity and Change in the Mesopotamian lexical tradition," in *Aspects of Genre and Type in Pre-Modern Literary Cultures*, Bert Roest and Herman Vanstiphout, eds., pp. 101–118. Groningen, Styx.

—— (1999) "The Poetry of Magic," in *Mesopotamian Magic: Textual, Historical, and Interpretatitve Perspectives*, T. Abusch and K. Van der Toorn, eds., pp. 35–48. Studies in Ancient Magic and Divination, 1. Groningen, Styx.

Verderame, L. (2002) *Le Tavole I–VI della serie astrologica Enūma Anu Enlil*. Nisaba 2. Messina, Dipartimento di science dell'antichità, Università di Messina.

Virolleaud, C. (1911) *L'Astrologie Chaldéenne*. Paris, Paul Geuthner.

van Dijk, J.J. (1969) "Gott," *Realexikon der Assyriologie* 3, pp. 532–43.

van Driel, G. (1969) *The Cult of Aššur*. Assen, Van Gorcum.

van der Spek, R.J. (1985) "The Babylonian Temple during the Macedonian and Parthian Domination," BiOr 42, pp. 547–554.

van der Waerden, B.L. (1949) "Babylonian Astronomy. II," JNES 8, pp. 6–26.

—— (1951) "Babylonian Astronomy. III. The Earliest Computations", JNES 10, pp. 20–34.

von Soldt, W.H. (1995) *Solar Omens of Enuma Anu Enlil: Tablets 23 (24)–29 (30)*. Leiden, Nederlands Historisch-Archaeologisch Instituut te Istanbul.

Wakeman, Mary (1973) *God's Battle with the Monster*. Leiden, E.J. Brill.

Walker, C.B.F. and Hunger, H. (1977) "Zwölfmaldrei," *Mitteilungen der deutschen Orient-Gesellschaft* 109, pp. 27–34.

Wallis, R.T. (1972) *Neo-Platonism*. London, Duckworth.

Weidner, E. (1915, repr. 1976) *Handbuch der babylonischen Astronomie.* Band I. Leipzig, J.C. Hinrichs.

Weidner, E.F. (1963) "Astrologische Geographie im alten Orient," AfO 20, pp. 117–21.

—— (1967) *Gestirn-Darstellungen auf Babylonischen Tontafeln*. Österreichische Akademie der Wissenschaften. Philosophisch-Historische Klasse. Sitzungsberichte, 254. Bd., 2. Graz, Vienna, Köln, Böhlau in Kommission.

Westbrook, Raymond. (2005) "Judges in Cuneiform Sources," in *Judge and Society in Antiquity*, Aaron Skaist and Bernard M. Levinson, eds., MAARAV 12, pp. 27–39.

Wippel, J.F. (1985) "Thomas Acquinas on the Distinction and the Derivation of the Many from the One: A Dialectic between Being and Nonbeing," *The Review of Metaphysics* 38, pp. 563–590.

Woods, Michael (1997) *Conditionals*, David Wiggins, ed., with a commentary by Dorothy Edgington, Oxford, Clarendon Press.

Wright, John (1925) *The Geographical Lore of the Time of the Crusades: A Study in the History of Medieval Science and Tradition in Western Europe*. American Geographical Society Research Series, 15. New York, American Geographical Society.

Yablo, Stephen (2004) "Coulda, Woulda, Shoulda," in *Conceivability and Possibility*, edited by T.S. Gendler and J. Hawthorne, pp. 441–492. Oxford, Clarendon Press.

Yamauchi, E.M. (1967) *Mandaic Incantation Texts*. New Haven, CT, American Oriental Society.

Zgoll, Annette. (2006) *Traum und Welterleben im antiken Mesopotamien: Traumtheorie und Traumpraxis im 3.-1. Jahrtausend v. Chr. als Horizont einer Kulturgeschishte des Träumens.* AOAT, 333. Münster, Ugarit-Verlag.

INDEX