MESOPOTAMIAN HISTORY AND ENVIRONMENT

SERIES II
MEMOIRS IV

DATING THE FALL OF BABYLON

A REAPPRAISAL OF SECOND-MILLENNIUM CHRONOLOGY

(A JOINT GHENT-CHICAGO-HARVARD PROJECT)

by

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Published by the University of Ghent and the Oriental Institute of the University of Chicago
1998

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PRESENT SOURCES FOR THE CHRONOLOGY OF THE SECOND MILLENNIUM

1.1. TEXTUAL AND ARCHAEOLOGICAL EVIDENCE

The chronologies for the first and second halves of the second millennium are based upon two distinct, non-overlapping sets of documentary materials. The chronology for the latter half of the second millennium — more precisely, from around 1400 on — is secured ultimately by Assyrian chronological sources.[2] When taken together, these sources allow us to determine nearly absolute dates for Assyrian rulers beginning in the latter part of the fifteenth century, dates that are fixed by the mention, in the later Assyrian eponym chronicle, of a solar eclipse in the eponymy of Bur-Saggilê (reign of Aššur-dān III).[3] This eclipse has been calculated to have occurred exactly on 15 June 763 BC.[4] A complex matrix of synchronisms between Assyrian and Babylonian rulers provides the relatively secure Babylonian chronology for this period, with dates that are precise within two decades from around 1400 on.[5]

Before 1400, stretching back to the end of the reign of Samsuditana, the situation changes dramatically for the worse. The native Mesopotamian chronographic sources pertaining to this period — which consist mainly of chronicles and lists of kings and dynasties — pose a number of problems for the modern interpreter. Many are in fragmentary condition, giving rise to considerable disagreement among editors about readings. Moreover, the ancients sometimes seem to have assumed that dynasties and reigns were consecutive when they in fact overlapped.[6] Also, texts were sometimes copied from originals that were damaged already in antiquity.[7] Finally, in the rare cases where multiple written exemplars of a native chronological tradition actually exist, these exhibit

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2 The Assyrian kinglists, the eponym lists, and the eponym chronicle. A good recent summary of the reliablity (and limitations) of the Assyrian chronological sources can be found in POSTGATE 1991.

3 See MILLARD 1994, 41.

4 See, for example, UNGNAD 1938b, 414 (with earlier literature); VAN DER MEER 1963, 6; and BRINKMAN 1968, 68.

5 BRINKMAN 1977, 335.

6 As in the Sumerian Kinglist and Babylonian Kinglist A.

7 As was the case in at least two Assyrian Kinglist manuscripts, where the ancient scribes have used the word *ḫīpu*, "break" (or *ḫepi*, "broken"), to indicate the presence of damage on the originals that they copied (see, for example, BRINKMAN 1973, 315). This was apparently also the case with the received text of Kinglist A, in which forty percent of the royal names appear in truncated form, probably indicating damage to the original (see, for example, GRAYSON 1980-83, 91; see also the remarks by BRINKMAN 1976, 426-427). The original of Babylonian Kinglist B was also broken (see FEIGIN and LANDSBERGER 1955, 140).

discrepancies.[8] In short, the textual sources for the period between the fall of Babylon and c. 1400 are scarce, non-contemporaneous, imperfectly preserved, of questionable reliability, and inconsistent with one another. It has thus far proved impossible to reconstruct definitively the chronology for this obscure period from such a basis.[9]

In contrast, the reign of Samsuditana marks the end of a more than 500-year-long block of time for which the internal chronology is relatively well fixed because of synchronisms. However, since the chronology of the post-Samsuditana period is unknown, the pre-Samsuditana period, comprising the dynasties of Babylon I, Larsa, Isin I, and Ur III, cannot be linked up directly with the chronology that prevails after 1400.

Investigators have therefore turned to the ancient astronomical records found in the so-called "Venus Tablet of Ammiṣaduqa" [10] for assistance. The "Venus Tablet," known only in copies from the seventh century and later, records astronomical observations placing Venus on the horizon [11] just prior to sunrise on the date of the new moon during the reign of Ammiṣaduqa.[12] On the assumption that these data are reliable, the Venus Tablet has been utilized to provide absolute dates for the succession of kings from the beginning of the Third Dynasty of Ur to the end of the First Dynasty of Babylon.

Unfortunately, the data of the Venus Tablet do not provide us with a single set of certain dates, but instead with several series of possible dates, the most frequently cited of which are the so-called "High" (or "Long"), "Middle," and "Low" (or "Short") Chronologies.[13] Scholars have chosen among the several potential chronologies generated by the Venus Tablet data based upon the relative weight they have assigned to other pieces of evidence, but they have still been unable convincingly to bridge the gap between the fall of the First Dynasty of Babylon and the more secure post-1400 chronology. According to the High Chronology, the final year of Samsuditana's reign was 1651 BC; according to the Middle, 1595; and according to the Low, 1531.

Returning to the period following the fall of Babylon, we observe that the final years of Samsuditana's reign and the decades that followed are shrouded in almost complete darkness. There are virtually no contemporary sources on which to base either a solid historical reconstruction or a reliable chronology. Babylon seems to have fallen to the Hittite king Muršili I [14] in a raid known to us from an inscription of Ṭelepinu, who ruled the Hittites perhaps as much as a century after the event. The collapse of Samsuditana's rule is assumed to have been the result of this raid, although these two events are nowhere directly connected in ancient sources. Confirmation of Babylon's fall in Babylonian records comes only in later copies of inscriptions of questionable authenticity and in

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8 See, for example, BRINKMAN 1973, 311-314.

9 BRINKMAN 1976, 75-78.

10 The most recent full publication is REINER and PINGREE 1975.

11 For an illustration of this phenomenon, see Pingree in REINER and PINGREE 1975, fig. 1 on p. 16.

12 REINER and PINGREE 1975.

13 Less frequently cited are an "Ultra-high" and an "Ultra-low" Chronology.
For an overview of all these chronologies, see the selected bibliography assembled by CAMPBELL 1979, to which may be added ROWTON 1976. See also, now, ÅSTRÖM (Ed.) 1987, HUBER *et al.* 1982, and HUBER 1987a.

14 HOFFMANN 1984, 18-19; cf. also HOFFNER 1975, 56-58.

later traditions. Thus, in the late Chronicle of Early Kings we are told that in the time of Samsuditana, the Hittites marched against the land of Akkad.[15] A possible school text of the first millennium, if authentic and interpreted correctly, seems to refer to a temple restoration by the first Kassite ruler, Gandaš, after his conquest of Babylon.[16] A seventh-century copy of what purports to be a royal inscription of Agum-kakrime records that this ruler, whose name is not preserved in the kinglists in this form, returned the statues of Marduk and Zarpanītum to Babylon [17] from the land of Ḫani,[18] where they were presumably left by Muršili I. Finally, the late "Marduk Prophecy" refers to Marduk's 24-year sojourn in Ḫatti, a presumed reference to these same events.[19]

The uncertainty of any reconstruction based on such evidence is apparent. The poverty of documentary sources for the rest of this obscure period is, if anything, even greater until Babylonia reemerges into relative light around 1400.[20]

Not coincidentally, archaeologists have had a difficult time identifying post-Old Babylonian levels on Babylonian sites. One reason for this is that the principal Old Babylonian sites — certainly those that have been most thoroughly excavated — were largely, if not completely, abandoned either during or at the end of the Old Babylonian Period. This process began well before the collapse of the First Dynasty of Babylon. Already by Samsuiluna year 10, about 140 years before the end of the reign of Samsuditana, urban centers in southern Babylonia began to be abandoned and the region passed out of the control of the Babylonian crown. Some data suggest that this was in part due to the loss of water in the branches of the Euphrates that served the southern and central parts of the country.[21] This process of deurbanization first struck, among others, the Euphrates cities of Ur, Uruk, and Larsa. Girsu and Lagaš, situated on the eastern side of the Šaṭṭ al-Ġarrāf, and therefore apparently at least partially dependent upon the Tigris for water,[22] were also

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15 GRAYSON 1975, 156, rev. 11.

16 BRINKMAN 1976, 127, H.3.1. WEIDNER (1957-71) asserts that the conquest of Babylon is not mentioned in this text.

17 BRINKMAN 1976, 97, D[D].3.1.

18 PINCHES 1880, Pl. 33 col. ii 9. It is uncertain whether the land of Ḫani mentioned in this text is the same as the land of Ḫana on the Middle Euphrates.

19 BOROER 1974, [illegible]

20 Even though they [illegible] in later archaeological contexts, two inscriptions from the post-Old Babylonian Period, each bearing the name "Ula-Burariaš, son of Burna-Burariaš," should be mentioned here: 1) a knob or macehead from a Parthian jeweller's hoard at Babylon that identifies Ula-Burariaš as "king of the Sealand" (WEISSBACH 1903, 7 and Pl. 1, No. 3), and 2) a frog-shaped shekel-weight found in an eleventh-ninth century BC (pers. comm. E. Khanzadyan) burial at Metsamor, Armenia that identifies Burna-Burariaš, father of Ula-Burariaš, as "king" (KHANZADYAN 1983; SARKISYAN and DIAKONOFF 1983). Ula-Burariaš apparently ruled as king of the Sealand at some point after the fall of Babylon, but he is not known to have ruled as king of Babylon (BRINKMAN 1976, 318-319).

21 GASCHE (1989b, 111-143) presents the basic data for the progressive abandonment of southern Babylonia in the Old Babylonian Period. He observes (1989b, 140-141) that when the south was experiencing a water crisis there were also serious inundations in northwestern Babylonia. For Nippur, see STONE 1977; GIBSON 1980, 199-200; and ARMSTRONG and BRANDT 1994. ADAMS' survey data (1981, 165-168, figs. 33-34) suggest that canals in southern Babylonia were reoriented after the Old Babylonian Period in order to tap more westerly channels of the Euphrates for water.

22 The present flow of water in the Šaṭṭ al-Ġarrāf depends upon a barrage and regulator on the Tigris near Kūt, an arrangement that obviously does not reflect the situation in antiquity. The impressive natural levee on top of which the modern-day Šaṭṭ al-Ġarrāf meanders is clearly visible in satellite images (see also BURINGH 1960, map 1, where the first 40 km of this levee south of Kūt are shown), and is from all evidence the result of [illegible]ge natural channel that carried a significant flow of water for centuries, if not for millennia. Although the possibility of a connection with a branch of the ancient Euphrates system has not yet been excluded, this channel most probably provided Girsu and Lagaš with water from the Tigris.

abandoned at this time. Some 20 years later, around Samsuiluna year 30, the central Babylonian cities of Isin and Nippur were lost. At that point things seem to have stabilized, and the urban centers of the more environmentally favored enclave of northwestern Babylonia continued to exist for another century or so. But, finally, during the reigns of Ammiṣaduqa and Samsuditana Babylon began to lose hydraulic, if not political, control over even this much diminished realm, and at least some of the northwestern cities were abandoned as well.

At Nippur [23] and at Tell ed-Dēr [24] (Sippar-Amnānum) layers of wind- and/or water-deposited soil have been identified between Old Babylonian and Kassite levels, indicating an interlude of abandonment in the occupation of at least a part of these cities. Based on published descriptions, similar deposits may also be present between Old Babylonian and Kassite layers at Larsa [25] and between Old Babylonian and Isin II layers at Isin.[26]

Among the Babylonian sites that have been adequately excavated and published, those that were subsequently resettled after being abandoned during the Old Babylonian Period were on present evidence reoccupied some time after the Kassites took control in Babylon.[27] As a result, excavated, published material from the alluvial plain that can be securely placed in the period immediately after the fall of Babylon is for the present essentially nonexistent.

In this context, we must mention F. Højlund's placement of archaeological remains from the Gulf in the post-Old Babylonian Period we have been discussing here.[28] While we do not argue with Højlund's basic division of his Kassite materials into earlier and later groups, his assignment of the earlier Kassite group to a span of time extending from the fall of Babylon to 150 years later has no firm basis in the Babylonian evidence he cites.

The earliest contemporary documentary sources for the Kassite Dynasty have been found at Uruk and Nippur, and belong to a period beginning shortly before 1400.[29] From Uruk come building inscriptions of Kara-indaš,[30] all, unfortunately, recovered from secondary contexts.[31] Nippur

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23 ARMSTRONG and BRANDT 1994.

24 GASCHE 1989b, 8-9 ; 1991, 24, 31.

25 PARROT 1968a, 213-14, 217 : fig. 9 ; PARROT 1968b, 40, fig. 4 ; GASCHE 1989b, 129, n. 358.

26 KARSTENS 1981, 39.

27 Levels that can be associated with the earliest years of Kassite rule at Babylon have yet to be identified in excavations at that site.

28 "Failaka 3B" and "Qala'at al-Bahrain IIIA," see HØJLUND 1987, 157-161 ; 1989 ; and HØJLUND and ANDERSEN 1997, 50-62.

29 J.A. Brinkman has kindly called our attention to a text from Nippur (2NT 356 = UM 55-21-62) recently published by SASSMANNSHAUSEN (1994), which may be the earliest Kassite text known from the site. It contains many nouns with mimation clearly expressed (and not just in CVC signs), with words showing initial *w*, and personal names without a preceding determinative. In I' 5' is a reference to a [-B]uriaš, perhaps a ruler or an official.

Unfortunately, the provenience of this document (Area TB Locus 62 [McCOWN and HAINES 1967, Pl. 65]) is poorly defined and potentially disturbed. It provides no information to help date this text or to relate it to other Kassite artifacts and contexts at Nippur. Therefore, we have been unable to incorporate it into our discussion of the evidence from Nippur bearing on the Early Kassite Period.

30 BRINKMAN 1976, 169-171, N.2.1-N.2.2.

31 SCHOTT 1930, 53-54, Texts 12-13.

The inscribed brick that was used to identify the so-called Kara-indaš Temple was found in debris about 50 m away (SCHOTT 1930, 53, Text 12). The bricks of the relief-facade, although they are certainly Kassite in date, were all found in secondary contexts as well (JORDAN 1930, 33). Nothing from the building itself, nor any other structure presently published from Uruk, can be definitively attributed to the period of Kara-indaš's reign.

has yielded a legal text dated to the reign of Kadašman-Ḫarbe I,[32] an economic text from the reign of Kurigalzu I,[33] and another legal document dated to the reign of either Kadašman-Ḫarbe I or Kadašman-Enlil I.[34] Because the findspots of these items from Nippur are not known, they cannot be used directly to date specific contexts at this site, but they do provide evidence of the settlement's existence at the end of the fifteenth century.

The earliest Kassite levels from recent excavations have been found at Nippur [35] and Tell ed-Dēr.[36] We have dated these contexts from Nippur and Tell ed-Dēr to the fourteenth and late fifteenth centuries; some material from Tell ed-Dēr seems to be slightly earlier.[37] The artifacts from these levels and the issues surrounding their date will be discussed in detail in Chapter 2.

As can be seen, excavations in Babylonia have thus far failed to provide the resources necessary for a definitive reconstruction of the chronology, history, or archaeology of the period between the end of the First Dynasty of Babylon and about 1400, largely because of a widespread interruption in settlement. The shortest post-Old Babylonian gap known from published excavations is at Tell ed-Dēr. This hiatus begins around Ammiṣaduqa year 18, and as we shall argue in Chapter 2, extends to sometime in the latter half of the fifteenth century.

1.2. ASTRONOMICAL EVIDENCE

Ancient astronomical records offer the tantalizing possibility of determining precise dates in antiquity. Thus the observations recorded in the Venus Tablet have been used repeatedly to establish the chronology of the early second millennium. Indeed, if the data preserved therein were more complete and exhibited fewer corruptions, they would provide a compelling chronological argument. However, the data in the texts are incomplete and not totally reliable, as others have already asserted.[38] On the other hand, P.J. Huber has argued that, in spite of the problems with the Venus Tablet data, it is possible to extract statistically significant information from them.[39] He has concluded that the High Chronology is the most probable of the three traditional alternatives. However, he did not take into account the existence of other possibilities. The extent to which the Venus Tablet data can be used is considered below in Chapter 4. The conclusion reached there is that the only reliable chronological information that can be derived from the Venus Tablet is that year 1 of

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32 BRINKMAN 1976, 146, K[a] 2.1.1.388, Text 18.

33 BRINKMAN 1976, 239-240 (+) 2.1.15.168, and p. 402, published later by DONBAZ 1987, D. 85.

34 BRINKMAN 1976, 144, J.5.5; 391, Text 23.

35 FRANKE 1978, 80-81, fig. 66, 1-4; GIBSON 1978a, 12-13; fig. 19, 1 and 3; ARMSTRONG 1993, 75. On the basis of further work with the second-millennium pottery, we believe that the published dating of the early Kassite levels at Nippur to "as early as the latter part of the fourteenth century," (*ibid.*) is too conservative. This pottery may well be earlier in date. This matter will be discussed in greater detail below in Section 2.2.

36 PONS 1989, 22-23; GASCHE 1991; MINSAER 1991.

37 Especially the grave goods from Burial 392 found in Operation F (PONS 1989, 22-23, Pl. 5).

38 REINER and PINGREE 1975, 25.

39 HUBER *et al.* 1982; HUBER 1987a; 1987b.

Ammiṣaduqa must be identified with a year in which the Venus phenomenon (recurring every eight years) took place.[40]

Records of lunar eclipses also appear in ancient sources, and these have been used in the past to provide possible confirmation for chronological schemes based on the Venus observations.[41] Lunar eclipses, of course, occur comparatively frequently, and one needs to define as closely as possible the most likely time range before attempting to identify particular occurrences. This we have tried to do in the case of two Ur III eclipses, without first assuming that only the three traditional Venus Tablet-based chronological schemes are possible ; the results of this investigation also appear in Chapter 4.

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40 That is, it must be a multiple of 8 years subtracted from, or added to, 1646, the date of year 1 of Ammiṣaduqa according to the Middle Chronology.

41 For example, HUBER 1987a.

3.

THE TEXTUAL EVIDENCE

Introduction

The reconstruction of Babylonian chronology from textual sources is based upon an amalgamation of information gleaned from kinglists, chronicles, dated administrative documents, and royal inscriptions (particularly those that mention earlier rulers). For the period before the end of the First Dynasty of Babylon, the information about the lengths of kings' reigns that is derived from these sources can be checked against lists of year names.[200] Although year names continued to be used in Babylonia after this time — until at least the reign of Kurigalzu I (c. 1400) and perhaps as late as the reign of Burna-Buriaš II (1359-1333) [201] — there are no lists of year names from the period between the fall of Babylon and the reign of Burna-Buriaš II (by which time scribes had adopted a system of dating years by ordinal numbers within a reign).[202] Moreover, those portions of the native Babylonian chronological sources that pertain to this period are fragmentary. There is also an apparent absence of dated administrative documents against which these sources might be checked. Therefore, Babylonian chronology from the fall of Babylon until the early-to-mid fourteenth century (when significant numbers of dated administrative texts again appear) is enveloped in obscurity. Since Babylonian chronology is ultimately based on synchronisms with Assyrian sources, we will turn to them next.

Before the accession of Sargon II (721-705), Assyrian chronology is based principally upon the Assyrian Kinglist (AKL) tradition.[203] Between 911 and 722 BC, the regnal periods cited in the AKL can be checked against the eponym periods that correspond to them (because we have a continuous sequence of eponyms between 911 and 649).[204] Before 911, however, we have only one fragmentary

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200 The basic reference remains UNGNAD 1938a ; for subsequent additions and refinements, see especially TAHA BAQIR 1948 and 1949 ; FEIGIN and LANDSBERGER 1955 ; SOLLBERGER 1965, No. 66 ; ARO 1970, No. 8 ; HORSNELL 1974 ; STOL 1976, 2-4 ; DURAND 1977, 17-26 ; SIGRIST 1988 and 1990 ; AR-RAWI 1993. The Sumerian Kinglist, Ur-Isin Kinglist, Larsa Kinglist, and Babylonian Kinglist B record the regnal periods of the kings of the Ur III, Isin I, Larsa, and Babylon I Dynasties, but the figures in these texts are often at variance with the year name data.

201 See BRINKMAN 1976, 402-403. All dates in the introduction to this chapter are cited according to BRINKMAN 1977. The numbers after kings' names, which indicate their positions in dynastic sequences, are also cited according to this source.

202 This system probably began to be used during the reign of Kadašman-Enlil I ([1374]-1360 ; see BRINKMAN 1976, 402-403).

203 Five exemplars of the text are known, only two of which are well preserved (see BRINKMAN 1973, 306, n. 1 ; GRAYSON 1980-83, 101). The latest of the texts ("SDAS" ; see GELB 1954) terminates with the reign of Shalmaneser V (726-722).

204 See MILLARD 1994 ; see also GLASSNER 1993, 161-170, for a translation of the entries corresponding to the period 858-699 BC. The sequence of the eponyms after 649 remains to be established (for a recent survey of the problem and new proposals, see WHITING 1994).

list (*KAV* 21 + 22),[205] which probably commenced with the reign of Tukulti-Ninurta I in the late thirteenth century [206] and supplies also the eponym periods of three kings in the eleventh century (Ashurnasirpal I, Shalmaneser II, and Aššur-nīrārī IV) and one king in the tenth (Tiglath-pileser II).[207] Only one discrepancy between citations of regnal and eponym periods may be significant for the interval between c. 1200 and 912 : Tiglath-pileser II is assigned a 32-year reign in the AKL, while in *KAV* 21 + 22 he is assigned a 33-year reign.[208] Therefore, this portion of the tradition is quite accurate.

The early sections of the AKL, however, have been shown to be less reliable.[209] This is especially true of the portions that list the predecessors of Šamši-Adad I. For the period after Šamši-Adad I, there are also discrepancies in citations of genealogies and lengths of reign among the various manuscripts of the AKL ;[210] and none of the regnal lengths cited for the period before the middle of the eleventh century can be verified by other evidence.[211] In addition, there is a virtual absence of documentation in Assyria — apart from approximately two dozen short building inscriptions and labels — between the end of the reign of Šamši-Adad I and the beginning of the reign of Aššur-nīrārī II (end of the fifteenth century BC).[212]

Nevertheless, there is no body of evidence more important for Mesopotamian chronology between the mid-second millennium and 600 BC than the Assyrian Kinglist tradition. In fact, as J.A. Brinkman has noted, "practically all dates in Mesopotamian history calculated over this time span are based directly or indirectly on the data contained in this tradition."[213] The AKL, therefore — because it provides a continuous sequence of reigns and a nearly continuous sequence of regnal periods over this interval — forms the backbone of Mesopotamian chronology.[214]

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205 This does not count the fragmentary Mari Eponym Chronicle, which seems to track the career of Šamši-Adad I (see BIROT 1985, 219-245 ; translated by GLASSNER 1993, 157-160). It has been proposed that the eponym-list fragments published as *KAV* 23 and 24 should be joined with *KAV* 21 + 22 (see MILLARD 1994, 18, A7).

206 POSTGATE 1991, 245.

207 See, respectively, *KAV* 21 iv 4', 17', and 22', and *KAV* 22 v 9''.

208 See, however, BRINKMAN (1973, 310), where it is pointed out that the balance of evidence points in favor of the regnal period attested in the AKL. It should also be noted that the regnal periods of Adad-nīrārī II (911-891) and Tukulti-Ninurta II (890-884) found in the AKL are also at odds with the corresponding eponym periods cited in certain of the eponym lists (BOESE and WILHELM 1979, 19-20 ; for other discrepancies, see POEBEL 1943, 88). These minor discrepancies will be left aside for the present.

209 In a lengthy study published over forty years ago, LANDSBERGER (1954) demonstrated that these portions of the AKL tradition are in conflict with certain royal inscriptions and with the kinglist *KAV* 14, which shows that an alternate line of rulers succeeded Išme-Dagan, son of Šamši-Adad I. Landsberger also argued that the early sections of the list assign too many generations to a relatively short period of time.

210 See BRINKMAN 1973, 311-314.

211 See, for example, POEBEL 1943, 86-88.

212 GRAYSON 1987, 77-98 ; PEDERSÉN 1985, 29, 89-90 (M9). Significant numbers of texts began to appear only during the reigns of Erība-Adad I and Aššur-uballiṭ I in the fourteenth century (according to SAPORETTI 1979, 29-55).

213 BRINKMAN 1973, 310.

214 The only gap in regnal periods arises from textual damage that has been suffered by all five sources in approximately the same location, which means that the lengths of the reigns of kings 65 and 66 (Aššur-rabi I and Aššur-nādin-aḫḫē I) must be reconstructed. This problem will be addressed below.

Babylonian reigns can be tied to this Assyrian sequence by a network of synchronisms, which are attested in a variety of sources that include (but are not limited to) the synchronistic kinglists, Assyrian royal annals, and the texts known as the Synchronistic History and the Chronicle of Early Kings ; see, in general, BRINKMAN 1976, 28-29 (Kassite Period) ; BRINKMAN 1968, 69-72 (post-Kassite Period) ; BRINKMAN 1972, 272-273 (c. 1500-600).

Hypothesis

We have argued on archaeological grounds that the interval between the fall of Babylon and the beginning of the relatively well-documented phase of the Kassite Dynasty (from c. 1400 BC on) should be reduced. It will now be argued that the chronological sources also allow a reduction. The question is, by how much?

We posit a reduction of some 85-105 years. The most decisive argument in favour of a reduction of this magnitude proceeds from our analysis of the data of the Assyrian Kinglist tradition itself. (The inscriptions of Assyrian kings that contain statements of the time-spans between successive rebuildings of the Aššur and Anu-Adad temples in Assur — *Distanzangaben* — also figure in our analysis but turn out to be much less helpful). Based on premises that will be set forth below, the evidence of the Assyrian Kinglist allows one to calculate approximate dates for the first and last regnal years of Šamšī-Adad I; his reign can then be linked by synchronisms with the reign of Hammurabi and therefore also with the entire ±520-year span from the beginning of Ur III to the fall of Babylon. The methods of reckoning are similar to those employed by previous historians interested in Mesopotamian chronology in the second millennium.[215] However, our approach to the problem differs considerably from those made previously, in that it proceeds from an argument adduced from stratigraphical and ceramic evidence, without the *a priori* assumption that the final result must be made to fit the High-Middle-Low scheme of reckoning. Our goal, it must be stressed, is simply to demonstrate that the textual sources, though often incomplete and difficult to interpret, permit a reduction.

A lower Assyrian chronology of course has implications for Babylonian chronology after 1500 due to the synchronisms that tie the two sequences together.[216] These implications will also be addressed below, after the main argument has been set forth.

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215 POEBEL 1942a, 289-306, WEIDNER 1945-51, LANDSBERGER 1954, 39-42, and numerous others.

216 Beginning with the link established between Puzur-Aššur III and Burna-Buriaš I in the Assyrian composition known as the Synchronistic History (GRAYSON 1975, 158-159, col. i 5'-7').

4.

THE ASTRONOMICAL DATA

Introduction

V.G. Gurzadyan has examined two sets of ancient astronomical data in order to determine their usefulness in helping to establish an absolute Mesopotamian chronology for the second millennium BC :

a) information concerning the first and the last visibilities of Venus recorded in the so-called "Venus Tablet of Ammiṣaduqa" ;[283] and

b) two lunar eclipses mentioned in *Enūma Anu Enlil* Tablets 20 and 21.[284]

The results of the examination of this material are discussed in this chapter.

Gurzadyan has also identified possible candidates for a lunar eclipse mentioned in two texts excavated at Tell Muḥammad, a site near Tell Harmal in Baghdad. Information about this eclipse and its wider chronological significance will be presented below in Chapter 5.

Before turning to the discussion of the "Venus Tablet" and the lunar eclipses of *Enūma Anu Enlil*, we should briefly review the basics of Babylonian astronomical methodology. In contrast with the Ptolemaic system, the Babylonian system is purely positional. Although sequences of astronomical events — lunar phases, eclipses, stationary points, and the first and last appearances of planets — were recorded, no attempt was made to explain the apparent motion of the celestial bodies involved. The observed periodicity or semiperiodicity of certain sequences was itself sufficient for the prediction of future events. In practice, when a long sequence was involved — for example, the 19-year calendric cycle, which consisted of 12 years of 12 lunar months each and 7 years of 13 lunar months each — the need for accurate observational data was secondary to the need to account for the entire period under consideration. As a result, the tabulated numbers in the astronomical texts do not always represent a sequence of real events. In other words, the "observations" recorded in these texts are not necessarily true observations at all, but rather just the numbers that were required to fit the cycle.[285] It is not impossible that such methods were utilized by Ptolemy as well.[286]

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283 REINER and PINGREE 1975.

284 WEIDNER 1954-56 ; ROCHBERG-HALTON 1988.

285 NEUGEBAUER 1967 ; 1975, 354-363 ; 1983a, 18-19.

286 NEWTON 1976 ; 1977.

As for the fundamental accuracy of the data, even the positional information in the tablets cannot be traced with absolute confidence. For example, the horizontal coordinates are off by more than 45 degrees in one-sixth of the observations. Even for the late periods no evidence exists that would permit the secure matching of the Babylonian coordinates with modern ones.[287]

Therefore, because of interpretational, methodological, and terminological uncertainties, the information recovered from such texts is ambiguous. In the case of the Venus Tablet, the later sections are also clearly corrupted and distorted. The data of this tablet will therefore remain problematic until new evidence is brought to light. The problems involving the motion of celestial bodies, however, do not apply to the eclipse observations.

4.1. THE "VENUS TABLET OF AMMIṢADUQA"

The so-called Venus Tablet, which is incorporated in the astrological series known as *Enūma Anu Enlil*, contains information on the first and the last visibilities of Venus during a 21-year period that has been assumed to correspond with the reign of Ammiṣaduqa. The data in this text are incomplete and frequently distorted, and opinions have differed over the text's usefulness in providing a basis for second-millennium chronology. Thus, REINER and PINGREE (1975) seem to believe that it is difficult to extract reliable data from the later portions of the tablet,[288] while Huber asserts that through statistical methods a trustworthy "signal" can be discerned in the "noise" of incompleteness and distortion.[289]

The analysis undertaken by HUBER (1987b) led him to the conclusion that the High Chronology (Ammiṣaduqa year 1 = -1701 [290] [1702 BC]) best fits the data. He concluded that the Middle Chronology (Aṣ 1 = -1645 [1646 BC]) produces the poorest match, while the Low Chronology is somewhere between the previous two (Aṣ 1 = -1581 [1582 BC]). Huber's analysis is biased principally by the *a priori* assumption that at least one of these three chronologies is correct. However, because the observational data on Venus also depends on local conditions, the 8-year cycle, in the absence of this information, is the only reliable data that can be extracted from the Venus Tablet. In other words, the 56/64-year cycle upon which the High-Middle-Low scheme of chronological reckoning is based is not necessarily established on the basis of the evidence presently found in this text.

To avoid misinterpretation and erroneous evaluation of the information contained in the Venus Tablet, we must first know what characteristics to expect in Babylonian astronomical records.

The periodicity of Venus — 5 synodic periods = 8 sidereal years — is in reality only approximate because the Venus/Earth resonances yield :

$$\omega_V/\omega_E = 1152/720$$

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287 See HUBER 1987b.

288 In their words : "That the majority of the dates of the first 8-year cycle and the beginning of the second form a valid negative argument for establishing the date of the beginning of Ammiṣaduqa's reign seems to us to be admissible. We do not see the absolute necessity of accepting the hypothesis that the dates preserved in the rest of the text must also belong to Ammiṣaduqa's reign" (REINER and PINGREE 1975, 25).

289 HUBER *et al.* 1982 ; HUBER 1987a ; 1987b.

290 -1701 takes in account that there is no year 0.

The corresponding difference in -2.30 *mod*60° leads to a -4.10 day shift in the 8-sidereal-year period. This is termed System A_1 by NEUGEBAUER (1975, 463). However, Babylonian astronomers also employed a second system, System A_2, (*ibid.*) which assumes a -2.40 change in the longitudes and a -4 day shift for the period.

Thus, one encounters the situation where in a single astronomical text [291] the phases ψ, Ω, and ϕ fit System A_1, while the coordinates of the first and last appearances of Venus Γ and Σ are presented according to System A_2. As a result, an inevitable distortion will appear in the data, and any probability analysis using ephemerides tables will be meaningless. This corroborates the view that one should not expect all tabulated data in Babylonian astronomical records necessarily to represent real observational events, and that it is not justifiable to draw chronological conclusions from such data (VAN DER WARDEN 1957).

In view of these difficulties, one cannot expect to obtain unbiased statistical information from the Venus Tablet data. To check this, we first calculated the parameters of the first and last visibilities of Venus corresponding to the year we will propose in Chapter 5 for the beginning of Ammiṣaduqa year 1, -1549 (1550 BC), by means of the integration of the orbits.[292] We then carried out a statistical analysis of the early and late departures from the calculated coordinates of the appearances, both for the High, Middle, and Low Chronology dates for Ammiṣaduqa year 1 (-1701, -1645, and -1581) and then for our Ammiṣaduqa year 1 (-1549). The following table represents the results for the *average deviation* (a), the *standard deviation* (σ), the *variance* (*var*), and *the 3rd moment* (s):

$$s = 1/N \sum (x_j - \bar{x})^3 / \sigma^3 ;$$

also *the 4th moment* (k):

$$k = 1/N \sum (x_j - \bar{x})^4 / \sigma^4 - 3.$$

Statistics of the Late Departures of Venus [293]

Ammiṣaduqa year 1 =	-1701	-1645	-1581	-1549
a	2.0	1.2	1.25	2.0
σ	2.64	1.73	1.73	2.42
var	7.0	3.0	3.0	6.0
s	-0.32	-0.57	-0.65	-0.22
k	-2.0	-1.77	-1.74	-2.28

291 NEUGEBAUER 1983b, No. 420 + 821b.

292 For the method, see NEWHALL *et al.* 1983, 150 ; and LASKAR 1994, 183.

293 Only the results for the late departures are given here ; but the situation is similar for the early departures.

It is readily apparent from the above tabulations that the statistical analysis does not indicate any preference for the High Chronology, thus demonstrating that we are dealing with absolutely noisy data, from which we cannot reach any reliable conclusions.

4.2. THE UR III LUNAR ECLIPSES

Enūma Anu Enlil Tablet 20 [294] describes a lunar eclipse that is associated with the death of an Ur III king (almost certainly to be identified as Šulgi) and the succession of his son (understood to be Amar-Sîn).[295] According to the text, the eclipse was observed in the month *Simānu* (May-June), day 14, beginning in the first watch of the night. It began on the "upper" [296] east side and cleared the moon on the "lower" west side.

Enūma Anu Enlil Tablet 21 describes an eclipse that was observed in the month of *Addaru* (February-March), also on day 14.[297] It is believed to be associated with Ibbi-Sîn's penultimate or final year, inasmuch as it predicts the fall of Ur.[298] This eclipse began on the south side of the moon during the first watch.

The eclipses are described in considerable detail. The day of the month is given — in both cases the 14th — along with the specific watch of the night in which each began. The direction of each eclipse is also described. Therefore, since it is known that 41-44 years separated the two events,[299] it would seem to be a straightforward matter to identify the eclipses in question. However, as has already been observed by ROCHBERG-HALTON (1988), the 14th day of the month is the most probable day of lunar eclipses and, therefore, cannot be taken seriously into account. Therefore, the description of the direction of the eclipses and the description of the watch period in which they began seem to be our most reliable data.

Assuming that the so-called High Chronology is correct (Ammiṣaduqa year 1 beginning in -1701 [1702 BC]), HUBER (1987a) dated the two Ur lunar eclipses as follows :

> -2094 (2095 BC), July 25 : total eclipse (occultation 1.32 [300]) ; started on the east-north (103) at 19.54 and reached totality at 20.77 [301] (corresponds with the eclipse mentioned in *Enūma Anu Enlil* Tablet 20) ;

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294 ROCHBERG-HALTON 1988, 189-192.

295 See Section 5.1.

296 In this context, "upper" means "above the horizon" ; it does not indicate a geographical direction. Therefore, this detail is of no help for the characterization of the eclipse (if it began on the "lower" east [= "below the horizon"] the eclipse could not, of course, have been observed).

297 Both eclipses are said to have occurred the 14th day of the month, which is the most probable day of a lunar eclipse.

298 ROCHBERG-HALTON 1988, 248.

299 We assume that the aforementioned eclipse descriptions in *Enūma Anu Enlil* refer to real lunar eclipses that happened shortly before the events they predict — that is, we assume that they took place either in the last or next-to-last years of the reigns of Šulgi and Ibbi-Sîn, respectively. Therefore, 41 years, 42 years, 43 years, and 44 years represent the possible intervals between the penultimate or final year of Šulgi and the penultimate or final year of Ibbi-Sîn, the last king of the Ur III Dynasty, depending on whether the latter's reign was 24 or 25 years (Middle Chronology : 2048/47-2006/05/04 BC).

300 An occultation of over 1.0 is a total eclipse.

301 HUBER 1987a, table 1.

-2052 (2053 BC), April 13 : partial eclipse (maximum occultation 0.6) ; started on the south-east at 21.34 (corresponds with the eclipse mentioned in *Enūma Anu Enlil* Tablet 21).

Huber considers these two eclipses as a crucial supporting argument for his adoption of the High Chronology on the basis of the Venus Tablet. However, as has already been mentioned, eclipses are comparatively common occurrences, so if one wants to make use of eclipse data, one must first determine the time-span in which to look for them. Huber, for example, chose only the three principal Venus chronologies.

In the present study, archaeological and historical arguments have been used to conclude that the correct chronology is, at the very least, shorter than the Middle Chronology. Since the Venus data may be too problematical to use, we have also turned to the data of the Ur III eclipses to see if they support a shorter chronology.

We scanned not only the 150-year period before the traditional Middle Chronology date for the fall of Ur — which, according to the date list set forth by J.A. Brinkman,[302] would have taken place in either -2004 (2005 BC) or -2003 (2004 BC) — but also the 150-year period afterwards ; in other words, we examined a 300-year period between -2150 and -1850, inclusive. Our aim was to locate, in terms of absolute chronology, an eclipse that matched the description of the one predicting the fall of Ur found in *Enūma Anu Enlil* Tablet 21, and that could also be placed 41 to 44 years after an eclipse matching the description of the one predicting the death of Šulgi found in *Enūma Anu Enlil* Tablet 20. Only two of the eclipses that could have been observed in Babylonia during this 300-year period were found to accord with the observations preserved in *Enūma Anu Enlil* :

-1953 [303] (1954 BC) June 27 : total eclipse (occultation 1.4) ; started on the east (77,3) at 18.10 (and ended at 20.06) ;

-1911 (1912 BC) March 16 : partial eclipse (maximum occultation 0.6) ; started on the south (339) at 18.09 (and ended at 21.07).

It will be observed that these two eclipses not only perfectly satisfy the condition of the "first watch" (18.00-22.00) specified in the Simānu and Addaru eclipses of *Enūma Anu Enlil* Tablets 20 and 21, but they also perfectly fit the information concerning their direction.[304] Huber's two eclipses of -2094 and -2052, by contrast, cannot be decisive in supporting the High Chronology, since the two eclipses of -1953 and -1911 fit the ancient descriptions at a higher confidence level. Moreover, Huber's estimations of statistical significance seem to be somewhat simplified. Along with simple combinatorics one also has to estimate the contribution of distortion in the identification of eclipses that are determined by too many free parameters.

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302 BRINKMAN 1977, 336, and 346, n. 3.

303 We assume that the change of the rotation period of the Earth due to lunar and solar tides — about 2 milliseconds/century — as well as lunar deceleration — 26 arcsec/(century)^2 — which are shown to be adequate at least up to 700 BC (STEPHENSON and SAID 1989 ; STEPHENSON and YAU 1992 ; STEPHENSON 1996) remain valid also to 2000 BC.

304 These descriptions in *Enūma Anu Enlil* fit better with the modern reconstruction than do some of those recorded by Ptolemy (from Babylonian evidence) for the first millennium BC (see TOOMER 1984, 191-192 [Merodach-baladan II eclipses] and 253-254 [Cambyses eclipse]). For various reasons not all the astronomical data quoted by Ptolemy are accurate (see NEWTON 1976). For example, the description of the Cambyses eclipse in STRASSMAIER 1890, No. 40, l. 45-46 fits the modern reconstruction better than does the Ptolemaic text.

4.3. SUMMARY

The analysis above enables us to draw the following conclusions :

1. Because of distortions in the Venus Tablet data we cannot draw from them any statistically significant unbiased conclusions that would allow us to choose one particular chronological scheme over another. Moreover, the recognizable features of similar Babylonian tabular astronomical information indicate that numerical evaluations of confidence levels for the various possible chronological systems derived from the Venus Tablet data are not justified. The only reliable information extractable from the Venus Tablet is the condition that Ammiṣaduqa's first regnal year must be identified with a year in which the Venus phenomenon (recurring every eight years) took place.
2. The data from *Enūma Anu Enlil* Tablets 20 and 21, describing two eclipses connected with historical events of the Ur III Period, though incomplete, contain sufficient information to identify them with the two eclipses of -1953 and -1911. These eclipses, 141 years later than those proposed by Huber, fit the time-range suggested by the archaeological and historical information we have adduced to show that the correct chronology is, at the very least, lower than the Middle Chronology. They also fit the ancient eclipse descriptions at a higher level of confidence than those that have been put forward to substantiate the High Chronology.

With this information — the eight-year cycle of Venus and the absolute dates of the two Ur III eclipses — we can fix the date of Ammiṣaduqa's first year of reign and, by extension, the date of the fall of Babylon. It is to these tasks that we now turn in Chapter 5.