# ARTICLES

## RECENT DEVELOPMENTS IN NEAR EASTERN CHRONOLOGY AND RADIOCARBON DATING

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### WHAT THIS ARTICLE IS ABOUT

*The chronologies of Mesopotamia and Egypt are often cited as a basis for substantiating a long history and prehistory for the development of civilization in the Near East. This article provides a state-of-the-art appraisal of ancient Near Eastern chronologies in Mesopotamia and Egypt. It focuses on recent developments in both fields by assessing the current astronomical and historical bases for these chronologies and addressing the relative nature of chronology before the second millennium B.C. It documents the trend over the past sixty years to shorten the historical chronology of the Near East. This causes a widening gap between historical dates and the most recent data from $^{14}C$ samples. This data has major implications for lengthening certain historical and prehistoric periods. The impasse between the historical methods of dating and $^{14}C$ dating will then be evaluated.*

The chronologies of Mesopotamia and Egypt are often cited as a basis for substantiating a long history and prehistory for the development of civilization in the Near East. It is often on the basis of the archaeological evidence that the arguments are made for the reinterpretation of the biblical chronological data (Kitchen 1966:36-37; Geraty 1974:16; Archer 1979:361; Blocher 1984:215-219; Stek 1990:223-225; Thompson 1991:228-229; Taylor 2000:98; Guy 2003:8). Recent archaeological and anthropological research has produced new data for the chronologies of Mesopotamia and Egypt. This study will evaluate: (1) whether the Egyptian and Mesopotamian history is set in an absolute framework; (2) some recent developments in the study of these chronologies and the trends for either lengthening or shortening the chronology; and (3) the relationship between $^{14}C$ dating and Near Eastern chronologies and how this relationship is currently understood. The purpose of this essay is to provide a state-of-the-art discussion of Near Eastern chronology

and its interface with $^{14}C$ dating in order to assess the framework upon which scholars place the events of early history.

## MESOPOTAMIAN CHRONOLOGY

The chronology of Mesopotamia is often spoken of as being "fixed" by astronomical observations. That is, when a scribe recorded a king's name in conjunction with a datable natural occurrence, such as an eclipse, that date may be referred to as *absolute* or "exact". For example an inscription from the tenth year of the Assyrian king Aššur-Dan III refers to an eclipse of the sun, and by precise astronomical calculations it can be determined that the eclipse must have occurred on June 14/15, 763 B.C. (Glass 1984:92; Millard 1994:2). Because of the existence of eponym lists which provide a complete sequence of events in the reigns of various Assyrian kings (Ungnad 1938a; 1938b; Millard 1994) it is possible to derive from this one fixed date an absolute chronology extending back to 910 B.C. It is important to observe that "when attempting to go back further in time than the first millennium, however, one encounters problems" for "it is not possible to simply extend the absolute dates of the first millennium back into the second millennium" (Glass 1984:92). The second millennium dates are decidedly *relative*. Furthermore, two historical gaps of unknown duration occur between the sixteenth and twenty-fourth centuries B.C. the former "at about 2000 B.C., the latter about 1600 B.C." so that "specific incidents and entire eras remain unanchored in *absolute* time" (Glass 1984:92; his italics). Before that "only approximate dates are possible: time estimations are derived from purely archaeological evidence, from paleographic data...and by all too-few radiocarbon dates" (Knapp 1992:716).

One reason that Mesopotamian historical chronology during the second and third millennium B.C. has faced increasing complexity concerns the cycle in which astronomical movement occurs. The discovery of the Venus tablet by Henry Austin Layard, and translated by Rawlinson and Smith (1870) received considerable attention (the history is documented by Langdon, Fotheringham and Schoch 1928:28-44; cf. Reiner and Pingree 1975) for mentioning the year formula for year 8 of Ammisaduqa. That tablet has become one of the key pieces of evidence to fix the chronology of the early second millennium B.C. by astronomical means (Poebel 1942; Rowton 1960; Huber 1987:5). Since the planetary movements of Venus occur in cycles of 56 or 64 years (Ungnad 1940), they offer a

series of possible dates rather than an agreed upon single date (Knapp 1992:716). Kugler (1912) concluded that the following years were candidates for Ammisaduqa Year 1: -2040, -1976, -1856. He settled for a middle chronology date of -1976, but later on preferred an -1800 solution (Kugler 1924; 622-627; Huber 1987:5). The next year five dates (-1976, -1920, -1856, -1808, -1800) were considered by Langdon, Fotheringham and Schoch before they settled on -1920 (1928:61-62; Huber 1987:6). Hence, experts differentiate between three and up to five distinctive chronologies for the second millennium: the ultra-high (Landsberger 1954),[1] the high (Goetze 1951; 1957; Thureau-Dangin 1942; Huber 1982; 1987),[2] the middle (Kugler 1912; S. Smith 1940; 1945; Rowton 1962),[3] the low (Albright 1956; Cornelius 1956; cf. Aström 1987),[4] and the ultra-low (Weidner 1945-51).[5] These competing chronologies allow for up to 226 years of flexibility.

| | | |
|---|---|---|
| **Ultra-High Chronology** | Hammurap reigni | 1930-1888 BC |
| **High Chronology** | Hammurapi reign | 1848-1806 BC |
| **Middle Chronology** | Hammurapi reign | 1792-1750 BC |
| **Low Chronology** | Hammurapi reign | 1728-1686 BC |
| **Ultra-Low Chronology** | Hammurapi reign | 1704-1662 BC |

Given the complexity of astronomical and historical reckoning for the period under discussion some experts have suggested that alternative methods be used for formulating the chronology of ancient Mesopotamia. While none would presume to limit or diminish the value and usefulness of historical chronology, $^{14}C$ dating has been suggested as a means to verify or supplement historical reckoning (Rowton 1960; Mellaart 1979; Hassan and Robinson 1987).[6]

***Mesopotamian Chronology and $^{14}C$ Dating.*** Several attempts have been made to correlate $^{14}C$ dating with the historical chronology of Mesopotamia (Rowton 1960; Mellaart 1979; Hassan and Robinson 1987; Schwartz and Weiss 1992). Arguments for a middle and ultra-high chronology have been posited.[7] The most extensive correlation of $^{14}C$ dating and historical chronology was published in 1979 by James Mellaart. Mellaart outlines three basic chronological schools, which according to our terminology would have been the ultra-high, middle, and low chronologies. In his view "historical chronologies are a unique record from the past, they cannot and should not be ignored, but they have not come

down to us in such a perfect state that only one chronological interpretation — the middle chronology — is possible. In the 1950s this may indeed have seemed the best choice: in 1979 it is not" (1979:11). Thus he proposes to utilize calibrated $^{14}C$ dates which would support the ultra-high chronology (1979:11).

The $^{14}C$ dates Mellaart cites are derived primarily from timber samples. The first dates for Shamshi-Adad come from his temple at Tell Rimah followed by Dinkha IVC which Mellaart claims is contemporary with the stratum at Tell Shemshara in which an archive of the period of Shamshi-Adad was found (1979:12).[8] They were published as follows:

| | | | |
|---|---|---|---|
| P-1117 Tell Rimah II | 3480+/-60 BP | 2020-1960+/-60 BC | *R* (1977) 19:208. |
| P-1452 Dinkha IV C | 3522+/-63 BP | 1925+/-63 BC | *Iran* (1974) 12:130. |
| P-1690 Dinkha IV C | 3645+/-61 BP | 1895+/-61 BC | *Iran* (1974) 12:130. |

The second set of dates derives from samples found in the Acemköy palaces. The burnt debris of the destruction contained, among others, bullae of Shamshi-Adad (1979:12). The other four dates come from two Kültepe Ib period buildings in western Anatolia. The dates for Shamshi-Adad I were published as follows:

| | | | |
|---|---|---|---|
| P-2041 Acemköy Palace | 3500+/-49 BP | 2030-2010+/-49 BC | *R* (1971) 13:369. |
| P-1555 Acemköy Palace | 3611+/-49 BP | 2110+/-49 BC | *R* (1971) 13:371. |
| BM-? Beycesultan V | 3450+/-150 BP | 1950-1920+/-150 BC | *B* (1962) II. |
| P-1647 Aphrodisias L.C | 3673+/-73 BP | 2155+/-73 BC | *R* (1971) 13:369. |
| P-1654 Aphrodisias R | 3587+/-82 BP | 2110+/-82 BC | *R* (1971) 13:370. |
| P-1646 Aphrodisias U.C | 3414+/-69 BP | 1875-1775+/-69 BC | *R* (1971) 13:371. |

Radiocarbon dates for the Ur III period are supplied from several sites. The date from Warka is taken from a sample of reeds attributed to the reign of Ur-Nammu. The date for Nippur Level IV is attributed to the reigns of Shu-Sin and Ibbi-Sin. The sample from Godin III is attributed to the beginning of the Ur III period, while the sample from Selenkahiye seems to date squarely within the Ur III period. The dates corresponding to the Ur III period were published as follows (1979:13):

| | | | |
|---|---|---|---|
| H 141-120/166 Warka | 3820+/-85 BP | 2330-2210+/-85 BC | *R* (1965) 7:188. |
| C-752 Nippur IV | 3943+/-109 BP | 2303+/-109 BC | *Iran* (1974) 12:130. |
| P-1464 Gedikli, Amuq J | 3767+/-50 BP | 2158+/-50 BC | *R* (1970) 12:580. |
| P-1798 Selenkahiye IV | 3730+/-57 BP | 2125+/-57 BC | *AAAS* (1973) 23:156. |
| GaK. 1971 Godin III | 3860+/-120 BP | 2217+/-120 BC | *AJA* (1969) 287-91. |

***Problems of Correlation.*** Based on these dates Mellaart concludes that "the so-called dilemma [between historical chronology and $^{14}C$ dating] then is a myth, a creation of supporters of the middle and low chronologies" (1979:18). However, his conclusions have met with vigorous resistance among Assyriologists and Egyptologists (Kemp 1980; Munn-Rankin 1980; Weinstein 1980). Before addressing these criticisms it is first necessary to make several general observations:

The first issue is the dating of the stratigraphy of Kültepe II and Ib. Mellaart's $^{14}C$ dates from Kültepe imply that the two strata (II and Ib) together have spanned a period of three or four hundred years (2010-1720 B.C.; 1979:13). However, from historical records, economic transactions from the trading colonies at the site, it is known that these periods of occupation could not have lasted longer than 175 years (Larsen 1976). Mellaart recognizes the problem but provides no explanation. He maintains that the $^{14}C$ dates support Shamshi-Adad's reign on the ultra-high chronology (ca. 1953-1921 B.C.), but the 300-year span suggested by the dates (2010-1720 B.C.) could also support a middle or low chronology. Mellaart also does not seem to be aware that there are actually five possible historical solutions to the information given on the Venus Tablet. He does not mention the "actual" high chronology accepted most widely (Goetze 1951; 1957; Thureau-Dangin 1942; Huber et al. 1982; 1987; Tuman 1987; cf. Munn-Rankin 1980:129) and instead argues for the ultra-high chronology of Landsberger (1954) which remains virtually unaccepted. His extreme position is forced *because* of the $^{14}C$ dates. Rather than attempting to solve the real problem of correlation he disregards the fact that the ultra-high chronology does not conform to the possible dates of the Venus cycle.

Mellaart has been criticized by historians and archaeologists as well (Kemp 1980; Munn-Rankin 1980; Weinstein 1980). According to the Assyriologist Munn-Rankin (1980:128) Mellaart makes the incorrect assumption that absolute dates can be assigned to third millennium dynasties by reckoning back from the first dynasty of Babylon. She points out that prior to the Third Dynasty of Ur, there is a paucity of independent evidence against which to assess the King Lists. The situation seems more complex than Mellaart admits.

Mellaart also makes the assumption that the Kassites ruled for 576 years after the destruction of Babylon by the Hittites. Munn-Rankin argues that this is incorrect (1980:128). This number is only given on

King List A, dated to the seventh century B.C., and in no text is the beginning of this dynasty explicitly connected with the raid of Muršili I (Brinkman 1968). The end of the Kassite dynasty has most recently been dated to 1155 (Brinkman 1976; cf. 1980).

Mellaart does not seem to be well acquainted with the complexities of reckoning chronological sequences from historical information. At one point he states that the only Near Eastern countries from which there are King Lists are Egypt and Babylonia. He does not seem aware that the historical reckoning of the period prior to 1450 B.C. is based primarily on the Assyrian King Lists (Poebel 1942; Weidner 1926; 1945-51; Gelb 1954) and that the Mesopotamian chronology hinges on Assyrian records for its chronological framework (Knapp 1992; Grayson 1992a; 1992b). Furthermore, the Akkadian King List remains the essential source of historical reconstruction for the third millennium B.C. (This is precisely the period he is assessing.)

Mellaart should be commended for his attempt to correlate the two apparently contradictory sources of information for the dating of early Mesopotamian periods. However, it seems apparent that this most recent attempt to reconcile $^{14}C$ dating and historical chronology fails to provide any conclusive new evidence. The $^{14}C$ dates were consistently too high for even the "ultra-high" chronology which completely lacks support from the Venus data and archaeological stratification. This is the case for other periods as well. Moreover, revised $^{14}C$ dates would suggest that the Uruk period, which conventionally begins around 3500 BC, "may have to be pushed back four or even five hundred years" (Crawford 1991:18; cf. Moorey 1987). The question remains whether the numerous variables and problems have been solved to the point where $^{14}C$ dating can be viable for the historical chronology of the ancient Near East.[9]

## EGYPTIAN CHRONOLOGY

The chronology of Mesopotamia and much of the remainder of the ancient Near East has been linked with Egyptian absolute dating (Knapp 1992:716). During the historic/dynastic period written sources in Egypt include king lists, royal annals, and biographic treatises (Redford 1986; Kantor 1992; Ward 1992). In the early twentieth century, W. F. Petrie, the recognized founder of Egyptology and the archaeological principles of stratigraphy and superimposition, published the beginning of the historic/dynastic period (Dynasty I) at 5510 BC (Petrie 1906:175). His

conclusions were based primarily on "the authority of the Turin papyrus and of Manetho," for "it is only reasonable to accept those lists as substantially accurate" (Petrie 1906:175). Other noted Egyptologists later placed Dynasties I and II at 3425-3000 BC (Weigall 1910: xvii) or 3400-2980 BC (Breasted 1916:419). It is significant that the most extensive adjustments have occurred in the Old Kingdom where relative dates allow for more change due to the length of the First Intermediate Period. However, the last century of Egyptological research, expanded by incredible amounts of new data from excavations and textual studies, has raised serious questions not only for the length of the historic periods, but also for the absolute nature of early dates. Several serious questions have been raised which necessitate revisions for the traditional absolute chronology prior to the Egyptian New Kingdom (Ward 1992:55).

***Manetho as an Authority for Egyptian Chronology.*** During the third century B.C. a "history of Egypt" was written in Greek by a priest named Manetho (Waddell 1940; Helck 1956). It seemed almost certain that Manetho had compiled his history from some of the same lists that modern historians use for the reconstruction of Egyptian chronology (Knapp 1992:716). In spite of early reliance on Manetho (Petrie 1906; Weigall 1910; Breasted 1916 and others) and attempts to legitimize it as dependable (Helck 1956), an increasing number of errors and inaccuracies have been discovered (Redford 1986:231-332). This has caused some historians to abandon this tradition altogether (Wente and van Siclen 1976:217-218; Ward 1984:155-156) or to show that dependence on Manetho is not necessary, "at least not for the chronology of the new kingdom and later" (Hornung 1987). Because of these problems "his work ceased to be the basis of Egyptian chronology many decades ago" (Kitchen 2000:39). New evidence on the length of reigns and the existence of co-regencies have contributed to the abandonment of Manetho as a credible source.

***New Evidence on the Length of Reigns.*** New data about the length of certain reigns have caused revisions. For example, it has been established that Sesostris III reigned for 19 years rather than 39 as previously thought (Simpson 1972; 1984; cf. Kitchen 1992:329; 2000), and Amenemhet IV for 13 rather than nine years (Beckerath 1976:50). During the 19th Dynasty, Merenptah reigned no more than ten years rather than Manetho's 19 (Bierbrier 1975:118 note 2; on Merenptah's reign and see Hasel 1994; 1998; 2003; 2004). The general tendency of

new data that has come to light supports a shortening rather than lengthening of the chronology.

***The Question of Coregencies.*** The matter of coregencies remains unresolved (Ward 1992:54). One example will suffice. A short coregency between Thutmose III and Amenhotep II is often assumed (see Casperson 1986). Redford (1966:120) allows one and a third years, Wente and van Siclen (1976:227-228) two and a third years as does Murnane (1977:44-57) who insists that this coregency is "remarkably well attested." Krauss, on the other hand, (1978:174-175) allows for no such coregency. The existence of coregencies would also shorten Egyptian chronology which has tended to place rulers in consecutive rather than overlapping succession.

***Astronomical Bases for Egyptian Chronology.*** Finally, the most serious challenge to traditional chronology is the interpretation of astronomical data preserved in Egyptian texts (Neugebauer 1929; 1974; Hayes 1970; Barta 1979/80; Krauss 1985; Leitz 1989). This is a complex matter that has likewise given rise to a high, middle, and low chronology (Kitchen 1987; 1992; 2000). Like Mesopotamian chronology, the later dates of the New Kingdom are much more reliable than earlier dates because of more Egyptian documentation (Ward 1992:55), but unlike Mesopotamia "no relevant account of a solar eclipse survived from ancient Egypt" (Brein 2000:54). Dates are based largely on the calendrical system, whether this was according to agricultural (Neugebauer 1938), lunar, stellar (Krauss 1985), or civil years (Gardiner 1945; Parker 1950; Barta 1983).

The beginning of the Egyptian lunar year was tied to the heliacal rising of the star Sirius (*ꜥpd.t* was rendered *Sôthis* by the Greeks; Ward 1992:58-59; Krauss 1998; Brein 2000:53). The lunar and civil years were not opposed or in competition with each other (Ward 1992:57). The sidereal year (presided over by Sirius) is slightly more than a quarter-day longer than the civil calendar. Thus modern scholars have called the civil year the "wandering year" (Barta 1979/80; 1983; Beckerath 1986) since it regularly progressed backward so that the civil New Year's Day eventually fell on every first day of the sidereal year. The resulting period of 1460 years (365 x 4) is called the "Sothic Cycle". In reality the "Sothic Cycle" is somewhat shorter and scholars now use a figure of 1456 years (Hornung 1964:18; Ingham 1969). "Only six references to the heliacal rising of Sirius suitable for astrochronology survived in Egyptian sources" (see the references by Brein 2000:54-55).

Several factors influence dating by the rising of Sirius. The *arcus visionis* is the angle between Sirius and the sun when the star is first observed. The point of observation is not the horizon. Modern calculations show that the angle is 7.5 degrees, with Sirius 2 degrees above the horizon and the sun 5.5 degrees below it. The *time* of observation will cause variations in this angle and hence also the chronological conclusions drawn from assuming a 7.5 degree angle. Another problem in reckoning time concerns the *tetraeteris*, the four-year phase during which the heliacal rising was observed on the same day of the year. Every four years the phase moved backward one day and it is not possible to determine in which of the four years of the *tetraeteris* a given observation took place (Ward 1992:58).

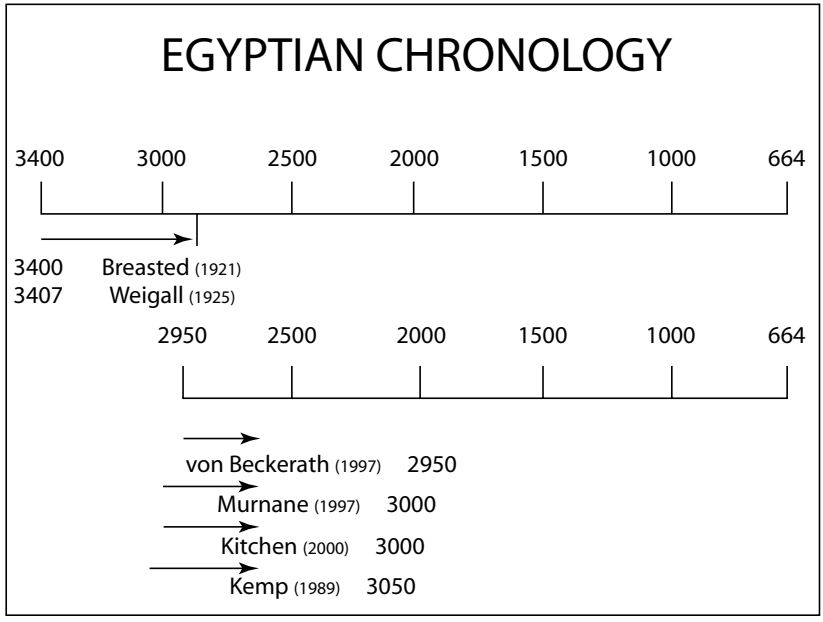
The most significant variable for astronomical calculations was *where* in Egypt such observations took place. As one moves south along the Nile, for every degree of latitude the heliacal rising is observed one day earlier. In terms of absolute chronology this means a reduction by four years per day per degree of latitude (Ward 1992:59). Due to this realization Egyptologists have proposed three possible locations for the observation of the heliacal rising of Sirius, namely Memphis or Heliopolis (Leitz 1989), Thebes (Ward 1992:59), and Elephantine (Krauss 1981; 1985; 1998; Franke 1988). Since there are about six degrees of latitude between Memphis/Heliopolis and Elephantine (Brein 2000:55; Krauss 1985:38-49), these three locations in turn have established three possible chronologies (Kitchen 1987; 1992:324-325; 2000), a high chronology (Sothic sighting in Memphis/Heliopolis; Leitz 1989; Ward 1992), a middle and low chronology (Sothic sighting from Thebes; Hornung 1964:20-21; Kitchen 1987:42-43) and an ultra-low chronology (Sothic sighting at Elephantine; Krauss 1985; 1998; Wells 1985; Franke 1988).

The effect for the 12th Dynasty would be divergence of 42 years (Kitchen 1987:45). W. A. Ward of Brown University maintains that due to these factors "precision is impossible when the sightings of the lunar crescent, for example, are individual interpretations of purely sensory data." In fact, this respected Egyptologist states that the "'precision' assumed by present-day scholarship is an illusion" (1992:62). While the astronomical evidence is important for Egyptian chronology, the most recent assessment is that "at the moment it seems impossible to gain reliable fixed absolute dates of Egyptian history by means of astrochronology alone"

(Brein 2000:56) "these merely help to limit the options in fine detail" (Kitchen 2000:39).

From these observations it must be understood that Egyptian chronology before the New Kingdom is increasingly relative. This has resulted in a great deal of adjustment over the past century as new evidence has come to light. The tendency, on the basis of new archaeological and historical evidence has been to drastically shorten the chronology of dynastic Egypt. As outlined above, this may be due to the adjustment in the length of reigns, in assuming co-regencies, and on the basis of astronomical data.

Based on this new archaeological and textual evidence, today the date for the beginning of the Egyptian historical period falls anywhere from 3050 (Kemp 1989:14) to as low as 2950 B.C. (Beckerath 1997: 187).[10] In other words, the chronology of dynastic Egypt has been reduced from Petrie's original suggestion by as much as 2,560 years while Breasted's chronology has been reduced more than 400 years by this new evidence in a total time-span that lasts only 2,346 years (see chart below; Taharqa was the last Egyptian king of Upper and Lower Egypt, 664 BC, Kitchen 2000:39). This is a significant reduction in time. One



should not underestimate its significance for further refinements. The discovery of a single new monument may cause untold further refinement in the discipline (Ward 1992:62).

***Radiocarbon Dating and Egyptian Chronology.*** Since the inception of $^{14}C$ dating in 1949, attempts have been made to correlate $^{14}C$ dates with the well-known historical dates in ancient Egypt. The publications stating positive results by Willard Libby, the inventor of the method (Libby 1955; 1963), were optimistic but, in the end, gained little support among Egyptologists (Hayes 1970; H. S. Smith 1964; Edwards 1970; Long 1976). This was due to more precise historical dates in the Egyptian New Kingdom (Kitchen 2000:39) and significant differences between the $^{14}C$ dates and the historical dates for the Old Kingdom (Bowman 1990:16). Several factors accounted for this. First, early $^{14}C$ dates reflected a half-life assigned to them by Libby (5568 +30 yrs. BP; 1955). This was later adjusted to 5730 +/- 40 years BP (Hole and Heizer 1973:252; Schwartz and Weiss 1992:189). Second, calibration had not yet been introduced (Bowman 1990:43-49; Clark and Renfrew 1973; Johnson 1973; Clark 1978; Pearson 1987), nor had it been refined (Shaw 1985; Hassan and Robertson 1987; Stuiver and Pearson 1986; Stuiver et al. 1998).

Even after these important adjustments were introduced and calibrations refined, the present status has not changed significantly. The impasse continues between Egyptologists, Assyriologists, and those working in $^{14}C$ dating.[11] According to the recent state-of-the-art articles from the Near East Chronology Symposium held in Jerusalem, Israel published in *Radiocarbon* (2001), the $^{14}C$ dates still vary significantly from historical dating. Bruins and van der Plicht (2001) show in a detailed case that high-quality stratified $^{14}C$ dates from Early Bronze Jericho are "100-300 years older than conventional archaeo-historical time estimates" (Bruins 2001:1151). Braun (2001:1279) concludes from another study that also resulted in high $^{14}C$ dates that "the logical outcome of an acceptance of these new dates [from the southern Levant and Egypt] puts such a strain on chronological correlations between the $^{14}C$ data and the archaeological record, that the entire system would no longer be tenable if accepted." Despite the cautionary remarks by Braun, Bruins (2001:1151) submits that "the new $^{14}C$ evidence is overwhelmingly in favor of an older Early Bronze Age and older dates for Dynasties 1-6."

In fact, it is precisely the $^{14}C$ dates that have increased the estimates of ages in prehistoric periods. Bruins and van der Plicht (2001:1330) write:

> *As a result of $^{14}C$ dating, the latter periods have indeed 'become' much older. In the 1950s and early 1960s, when Albright (1960) wrote the above time assessments, it became quite fashionable to assign the Chalcolithic on archaeological estimates to about 4000-3100 BC and EB-I to about 3100-2900 BC. However, $^{14}C$ dating has changed the picture completely! The Chalcolithic is now understood to have begun almost 1000 years earlier, close to 5000 BC-I. The transition between the Chalcolithic and EB-I has also been pushed back by many hundreds of years to somewhere in the early to mid-4th millennium.*[12]

This statement demonstrates that the most recent calibrated $^{14}C$ data from the ancient Near East continues to push the prehistory of the region further back in time. Bruins supports this trend and goes on to suggest that $^{14}C$ data should act as a corrective to early dynastic Egyptian history. In a paper presented to the American Schools of Oriental Research Bruins went over the recent publication of $^{14}C$ dates from 170 samples from building materials associated with the pyramids (Bonani et al. 2001:1297). The samples related to the Great Pyramid of Cheops, sent to two different labs, resulted in 45 % of calibrated dates ranging from 2783-2715 with a 95.4 % probability (Bruins 2003). Since this remains 200-300 years higher than the modern dates of this ruler, Bruins suggested that the $^{14}C$ dates be used as a corrective to Egyptian chronology and that Egyptologists should consider reverting to the chronology of Breasted proposed nearly a century ago.

In contrast, the present essay documents an increased caution among Egyptologists, Near Eastern archaeologists, and historians concerning the relative dates of the third millennium in Mesopotamia and Egypt. The revision proposed by Bruins ignores a century of scholarship and new data that has led to a significant decrease in the early dynastic history of Egypt during the past 40 years. This reduction points to the possibility that further refinements may yet come.

The dilemma between $^{14}C$ dating and historically based chronology has not been resolved. But the more serious question that has not yet been adequately addressed is this: If $^{14}C$ data remains imprecise and exceedingly high for the early historical periods and correlations fail where astronomical dates for verification exist, does this not cast serious

doubt as to their value for the prehistoric periods when "they deviate increasingly from actual calendar dates: from a 200-year error around 1000 B.C. up to a 900-year error around 5000 B.C." (Knapp 1992:715)? This question is one that will need to be addressed in the continuing debate over the relationship between Near Eastern chronology and $^{14}C$ dating.

## ENDNOTES

1. The ultra-high chronology proposed by B. Landsberger (1954) has not gained much support (Hallo and Simpson 1971:103; Dever 1992:11). The difficulty is that this chronology does not correspond well with the evidence of reigns at Alalakh (Albright 1956) or with the current consensus of Hittite chronology (Astour 1989). Most importantly, it does not agree with any of the solutions required by the Venus Tablets. No solutions are said to be available between 1947 and 1848 (Rowton 1960: 98). Thus it has been pointed out by almost all involved in the discussion that this chronology is far too high to be considered possible (but see Mellaart 1979).
2. The high chronology was first suggested by D. Sidersky (1941) and continues to be supported and defended (Goetze 1951; 1957; Thureau-Dangin 1942; Huber et al. 1982; Huber 1987; Tuman 1987). Most recently Huber (1987) has made a convincing case for this position on the basis of statistical analysis. According to Huber, "If we assume that one of the four Venus chronologies is correct, the odds favoring the Long chronology over the other three are about 1000 to 1. If we drop the assumption that one of them is true, we can still assert that the long one is correct, with a probability of error below 1%" (1987:5). Tuman (1987) has also argued on the basis of astrological omens and lunar eclipses that the long chronology must be correct. Others have argued strongly against the high chronology (Rowton 1960; Kitchen 1987). The statement made by Tiglath-Pileser I that the temple of Anu and Adad, built by Shamshi-Adad, son of Ishme-Dagan, had become dilapidated after 641 years provides an important *Distanzangabe*. Figuring back from Tiglath-Pileser's sixth year and adding 641 should result in the date of Shamshi-Adad's first year (Na$^{\supset}$aman 1984:117-118). The problem is that this does not correlate well with either the ultra-high or high chronologies (Rowton 1960:110; Na$^{\supset}$aman 1984). Furthermore, Rowton has shown that the high chronology requires totals (of years) which on the generation count are far in access of the average (1960:100-101). Nevertheless, the high chronology remains possible on the basis of the Venus Tablets and continues to be a viable option.
3. The Middle Chronology has the most supporters (Kugler 1912; S. Smith 1940; 1945; Rowton 1960; 1962; Porada et al. 1992; Schwarz and Weiss 1992). Some believe that the middle chronology is a convenient compromise or balance between two extremes (Mellaart 1979). However, such statements can be rather misleading. The majority of scholars who have written on the chronology of Mesopotamia have opted for this position (S. Smith 1940; 1945; Rowton 1960; 1962; Porada et al. 1965; 1992; Schwartz and Weiss 1992). There are valid reasons for choosing the middle chronology. The chronological statement by Tiglath-Pileser I supports it (Na$^{\supset}$aman 1984:122). Some have argued that the negative evidence against other chronologies also need to be considered (Rowton 1960:110-111). Certainly it has valid support from the Venus Tablets and other synchronisms of the period, especially Egypt (Kitchen 1987).
4. The low chronology was first proposed by W. F. Albright (1942) and followed by others (Cornelius 1956; cf. Aström 1987; Dever 1992). Albright sought to revise the "*apparently* stabilized" (1942:28) Babylonian chronology on the basis of the Khorsabad King List which appeared in that same year (Poebel 1942). While previously defending

the then low chronology of S. Smith (1940), Albright saw the need to further lower the chronology based on the new list. He correlated the reigns of Asshur-ubalit I of Assyria (dated by the Khorsabad King List to 1362-1327 B.C.) and Amenhotep IV of Egypt (1942:30). He thus dates the reign of Shamshi-Adad I about 1726 = 20 or ca. 1746 B.C. In an analysis of the Venus Tablets Albright descended another 275 years below Langdon, Fotheringham and Schoch (1928) and placed Hammurapi's reign at 1728-1686 B.C. He used the usual correlations with Zimri-Lim of Mari (whom Hammurapi defeated in his 32nd year). He later defended the low chronology again, this time going to stratigraphic evidence from the archaeological excavations at Alalakh (Albright 1956). Stratum VI provided the key, according to Albright, since the ceramics from this stratum dated to 1550-1450. In Stratum VII texts were found corresponding to the reign of four kings. Albright assumed that they ruled about 20 years each since all were a direct line of descent (1956: 28). The pottery from Stratum VII dated to the reign of the last king of that dynasty of Alalakh (ca. 1640 B.C.). The middle chronology for Hammurapi (1792-1750 B.C.) would then be excluded because it would push the fall of Alalakh back to about 1700. According to Albright, this was impossible from the standpoint of pottery and seals found in Alalakh Strata VII. Recent studies of Hittite chronology (Astour 1989) and specifically studies on the chronology of Alalakh Stratum VII (McClellen 1989) indicate that the chronological sequence of Woolley's initial excavations demonstrate certain inconsistencies. Goetze (1951) argues against Albright that the high chronology seems to fit best. Gurney (1974) claims that any of the proposed chronologies would be compatible with Hittite chronology although the middle chronology cannot be invalidated by any new data. In the most recent treatment on Hittite history, the chronological scheme followed fell "within the Middle to Low range" (Bryce 1998:414).

5. The ultra-low chronology has been defended most recently by Weidner (1945-51), though others have suggested it in the past (Böhl 1946). Weidner also produced his chronology shortly after the Khorsabad King List was published (Poebel 1942). Weidner (1945-51) did not have access to Cornelius or Albright's low chronology at the time of his formulation, but he preferred later to let his dates remain unchanged. The ultra-low chronology seems to have no modern adherents. Nevertheless, unlike the ultra-high chronology, it does fit within the cycle of Venus making it a possible candidate.

6. In the early 1940s the Khorsabad Assyrian King List (Poebel 1942; Weidner 1945-51; Naʾaman 1984) and the SDAS Assyrian King List (Gelb 1954) were published which established the contemporary regency of Hammurapi of Babylon and Shamshi-Adad I of Assyria. This forced a downward revision of the historically feasible dates. For the last four decades, the chronological dates seem to have centered on the following four possibilities for Ammisaduqa Year I: -1701 (Thureau-Dangin 1942; Goetze 1951; 1957), -1645 (Smith 1940, 1945; Rowton 1962), -1637, and -1581 (Albright 1956; Cornelius 1956).

7. Rowton (1960) first suggested that $^{14}C$ dates from Nippur could aid in establishing a preferable chronology. He begins his argument by stating "Libby's radio-carbon method can be used for relatively close dating when the sample has been put through an especially long run" (1960:97). Using two samples (charcoal and reed mat) from Nippur he begins by making a case for the middle chronology over against the ultra-high, high, and low chronologies. He is careful to use other historical arguments for his case, but refers to the $^{14}C$ dates in support of his conclusion (1960:110-111). The dates are as follows: Hammurapi accession year = 1757+/-106 (Charcoal); Hammurapi accession year = 1581+/-133 (Reed mat). Rowton cannot be faulted for publishing insufficient data for his time, since he used the best data available. However, the $^{14}C$ dates which he provides cannot be accepted uncritically for the following reasons: (1) the dates are uncalibrated and, therefore, once calibrated, would not correlate with a middle chronology; and (2) the dates, as they stand, vary significantly enough to allow for a middle, low, or ultra-low chronology. They do not exclusively support the middle chronology. Rowton recognizes this and uses other arguments to account for

the imprecision of the $^{14}C$ dates. His main emphasis is to discredit the ultra-high and high chronologies. This seems well founded although the $^{14}C$ dates are insufficient to stand alone.

8. Abbreviations: *AJA = American Journal of Archaeology*; *B = Beycesultan*; *R = Radiocarbon*.

9. Hassan and Robinson (1987) have provided the most recent contribution to the problem. Their study is primarily concerned with the chronology of ancient Egypt (1987:119-126), nevertheless, in their comparisons with Mesopotamian chronology they cite Mellaart with insignificant changes. They provide no new data for Mesopotamia. Their uncritical acceptance of Mellaart's conclusions (1987:130) make their study suspect as well.

10. Other variations that fall between 3050 (Kemp 1989:14) and 2950 BC (Beckerath 1997:187) include: 3100/3000 (Kitchen 2000:48); 3000 BC (Murnane 1997:22).

11. For Egypt Weiner et al. (1995) state they are, "mistrustful.... [$^{14}C$] dating does not often match with historical dating." Egyptologist J. Weinstein (1989:101; cf. 1980) notes the "incompatibility between...radiocarbon dates and the archaeologic/historic dates of Mesopotamia and Egypt" and submits that "For the Middle and Late Bronze age, Iron age, Persian, Hellenistic, Roman, and Byzantine periods, $^{14}C$ dating has only limited value because the technique is less precise than the normally available archaeologic and historic materials" (Weinstein 1984:297). For the Aegean and Cyprus, P. Åström submits that they "are not useful for exact dating" (1986:39). R. Merrillees, then director of the Cyprus American Archaeological Research Institute (CAARI), concludes blandly "radiocarbon dates are invoked if they support a particular hypothesis...and dismissed if they do not" (1992:51). These are serious scholars who recognize the inaccuracies and difficulties that still prevail after fifty-five years of refining the method.

12. The support for this increase in time by $^{14}C$ dating is summarized by A. Joffe and J. P. Dessel (1995; cf. Gilead 1994; Bourke et al. 2001; Burton and Levy 2001).

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