REINVESTIGATING THE ANTEDILUVIAN
SUMERIAN KING LIST

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Of the many fascinating and instructive artifacts that have been recovered from sites in Iraq where flourishing Sumerian cities once stood, few have been more intriguing than a prism now in the Weld-Blundell collection of the Ashmolean Museum in Oxford, England. Known more popularly as the Sumerian King List, it is held to have been compiled from as many as fifteen different texts.[1]

The King List traces the rulers of certain Sumerian cities in succession and is of immense value because it contains some very old traditions while at the same time furnishing an important chronological framework for the antediluvian period of the Near East.[2] The original form of the List is thought to have gone back to Utu-Hegal, king of Uruk, perhaps about 2000 BC, but who was certainly flourishing during the early stages of the celebrated Third Dynasty of Ur (*c.* 2070–1960 BC).[3]

The List commenced with an "antediluvian preamble": "When kingship was lowered from heaven, it was in the city of Eridu."[4] After two kings had ruled over Eridu, kingship was transferred to Badtibira,[5] where the reigns of three kings were duly recorded in succession. The antediluvian portion of the King List concluded with three rulers who reigned in Larak,[6] Sippar,[7] and Shuruppak[8] respectively. At this point the narrative broke off with the terse words: "the flood swept over (the earth)."

Thereafter the prism continued with the postdiluvian dynasties of Kish and other cities, but this material comes from a much later period and

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[1] Cf. S. Langdon, *Oxford Editions of Cuneiform Texts II* (Oxford, 1923), no. 444, pp. 13 ff.; pls. I–IV. A definitive critical edition was produced by T. Jacobsen, incorporating supplementary material, as *The Sumerian King List*, Assyriological Studies 11 (Chicago: Oriental Institute, 1939). Cf. A. L. Oppenheim in *ANET* 265.

[2] G. Roux, *Ancient Iraq* (London: Allen and Unwin, 1964) 97.

[3] There is some debate about the dating. See M. B. Rowton, "The Date of the Sumerian King List," *JNES* 19 (1960) 156–162; *CAH* 1/6 (2d ed., 1962) 30–31; C. J. Gadd in *CAH* 1/13 (2d ed., 1962) 15–17.

[4] Since the earliest traces of Sumerian culture have been recovered from the site of Eridu, this statement is of more than ordinary significance.

[5] Usually identified with Tell Medain near Telloh.

[6] Possibly Tell el-Wilaya near Kut el-Imara.

[7] The modern Abu Habba, twenty miles southwest of Baghdad.

[8] Identified with Tell Fara, some forty miles southeast of Diwaniyah.

translations are not entirely reliable in some areas. Because this section is not significant for the present discussion, it will be dispensed with.

It should also be noted that, some 2,000 years later, a Babylonian priest named Berossos furnished what has been regarded as a revised form of the Sumerian King List but reproduced the names in Greek rather than Sumerian. Berossos compiled the material in the time of Antiochus I (281–261 BC) and cataloged ten rather than the eight rulers on the original list. The identities of the kings on the revised list are difficult to confirm for the most part, but as with the ancient record the one Berossos compiled ascribed very long reigns to each ruler.

While the antediluvian section of the Sumerian King List has usually been regarded as important for establishing a chronology of early Sumerian kings, their amazingly long tenure of regal office has provoked many attempts at interpretation. At one extreme was the desire to dismiss the astronomically large figures as "completely artificial"[9] on the grounds that such a position could hardly be denied even by the most superficial examination.

Some other investigators, influenced by the mythological interpretation of Biblical and other ancient Near Eastern writings, relegated the numbers frankly to legend and folklore and regarded them as unworthy of serious consideration. Other scholars, however, feeling that they had some sort of basis in reality, thought of them in terms of epic or monumental description. There were in fact some grounds for this position, especially when it was learned that in ancient Egypt the phrase "he died aged 110" was actually an epitaph commemorating a life that had been lived selflessly and had resulted in outstanding social and moral benefits for others (cf. Gen 50:26; Josh 24:29). It was thus a poetic tribute and bore no necessary relation to the individual's actual lifespan.

At one time the present writer tended to interpret the large numbers associated with the Hebrew exodus from Egypt and also with the census lists in Numbers as "symbols of relative power, triumph, importance, and the like,"[10] a position that can be sustained to a degree from ancient Near Eastern literature but does not account satisfactorily for all the Biblical data involved.[11] Sensing that there might, after all, be a rationale underlying the very large figures, a few scholars adopted cautious positions reflecting that possibility.[12]

A serious mathematical investigation of the postdiluvian portions of the Sumerian King List was undertaken by D. W. Young,[13] in which he suggested that the total years for certain dynasties utilized squares or

[9] E.g. Rowton, "Date" 156.

[10] R. K. Harrison, *Introduction to the Old Testament* (Grand Rapids: Eerdmans, 1969) 633.

[11] For the problems associated with large numbers in the OT see R. K. Harrison, *Numbers* (Grand Rapids: Baker, 1992) 45–47.

[12] E.g. D. O. Edzard, "Königslisten und Chroniken," *Reallexikon der Assyriologie und vorderasiatischen Archäologie* 6.77–85; Jacobsen, *King List* 138–140.

[13] D. W. Young, "A Mathematical Approach to Certain Dynastic Spans in the Sumerian King List," *JNES* 47 (1988) 123–129.

higher powers of numbers, perhaps in combinations. Thereafter his interests shifted to the problem of large numbers in the accounts of the Hebrew patriarchs,[14] but his studies in that area are not strictly relevant to the present problem. His great contribution was to take seriously the numbers of the ancient writings with which he dealt and to attempt to interpret them mathematically.

The ancient Sumerians were innovators in the areas of astronomy and mathematics as well as in other unrelated fields of investigation. It is now known that their arithmetical calculations were based upon the sexagesimal system, and thus when they considered the mathematics of time it was natural to divide the hour up into sixty units, and then to reduce each one of those units to a further sixty components or, in our language, minutes and seconds.

There is still very much to be learned about Sumerian mathematics, but from what is known of the pragmatic nature of the subject it appears increasingly clear that their numerical exercises were organized on the basis of rationality rather than mythology. Having regard to this situation, scholarship now has the responsibility of investigating the numerical problems of Sumerian times against such a background.

To the present writer it now seems evident that the solution to the large numbers found in the antediluvian Sumerian King List is disarmingly simple. It is obvious that, proceeding rationally, base-60 must be involved in numbers of the magnitude contained on the prism. The list of rulers and regnal years is as follows:

City	Ruler	Reign in years
Eridu	Alulim	28,800
	Alalgar	36,000
Badtibira	Enmenlu-Anna	43,200
	Enmengal-Anna	28,800
	divine Dumuzi	36,000
Larak	Ensipazi-Anna	28,800
Sippar	Enmendur-Anna	21,000
Shuruppak	Ubar-Tutu	18,600

Total: 241,200[15]

An inspection of this table shows two kings credited with reigns of 36,000 years each and three others recorded as having reigned for 28,800 years each. In the case of Alalgar and the divine Dumuzi, the numbers assigned to them contain two factors—namely, 3600 (the square of base 60) and 10—which when multiplied furnish the large number under investigation. In the

[14] D. W. Young, "On the Application of Numbers from Babylonian Mathematics to Biblical Life Spans and Epochs," *ZAW* 100 (1988) 331–361; "The Influence of Babylonian Algebra on Longevity Among the Antediluvians," *ZAW* 102 (1990) 321–335.
[15] Cf. J. Finegan, *Light From the Ancient Past* (Princeton: Princeton University, 1946) 25.

case of the triad comprising Alulim, Enmengal-Anna, and Ensipazi-Anna, the factors involved are the square of base-60 multiplied by 8. When the base is isolated from the calculation, the remaining factor constitutes the actual length of the king's reign.

This process can be expressed by a formula, as follows:

$$\frac{P_r}{B^2} = A_t$$

where P_r is the prism's record, B is base-60 raised to the power of 2 to give base-60 squared, and A_t is the actual length of the king's tenure. By employing this means of calculation, the above table can be rewritten as follows:

City	Ruler	Actual reign in years and months	
Eridu	Alulim	8	
	Alalgar	10	
Badtibira	Enmenlu-Anna	12	
	Enmengal-Anna	8	
	divine Dumuzi	10	
Larak	Ensipazi-Anna	8	
Sippar	Enmendur-Anna	5	10
Shuruppak	Ubar-Tutu	5	2

Notice may now be taken of the third-century-BC list compiled by Berossos. As observed earlier, the names are Greek and the total has been extended to ten rulers by the addition of two names. Xisouthros, the legendary hero who survived the flood, is one of these. It has also been suggested that Amelon and Ammenon may be corrupt forms of the name Enmenlu-Anna, but this cannot be demonstrated.

Regardless of the names, however, it is apparent that when the formula for calculating the actual length of reigns is applied, the figures on Berossos' list of ancient Sumerian kings are amenable to precisely the same treatment as the original Sumerian King List. This indicates that Berossos was thoroughly familiar with the Sumerian system of computing lengths of reigns, as expressed on the Weld-Blundell prism, and that he was representing the priestly tradition many centuries later in his own configurations.

The revised king list of Berossos is as follows:

.Name	Credited years of reign	Actual years of reign
Alorus	36,000	10
Alaparos	10,800	3
Amelon	46,800	13

Ammenon	43,200	12
Megalaros	64,800	18
Daos (Daonos)	36,000	10
Euedorachos	64,800	18
Amempsinos	36,000	10
Otiartes	28,800	8
Xisouthros	64,800	18
Totals	432,000	120

Berossos' figures constitute a remarkable tribute to the tenacity of ancient priestly traditions, since the Babylonians had normally used base-10 in their mathematical calculations for many centuries. Berossos, however, felt a commitment to honor the ancient heroes whom he was listing in the age-old Sumerian manner.

In attempting to provide a "rational" solution to the problem of large numbers in the antediluvian King List, I have said nothing as to precisely why base-60 squared was employed in the listing. Scholars who have checked the numbers are satisfied that they have been transcribed accurately, with the result that the issue must now turn on mathematical considerations, as Young has suggested. From a prima facie standpoint it is no longer legitimate to question the numbers themselves, but instead to recognize the possibility that base-60 squared was actually functioning as a mathematical constant.

So little insight has been gained into the theoretical dynamics of Sumerian mathematics that it is impossible to say with certainty what the reason was for employing base-60 squared as a constant, assuming that this was its actual function in the King List, as seems eminently probable. It was certainly integral to the structure of the various recorded reigns, unlike some constants in modern mathematics that grace an equation but are not indispensable entities.[16] Why base-60 should have been squared in order to perform its function satisfactorily is also problematical. Perhaps, after all, base-60 squared was intended to serve as a symbol of relative power and importance, which the compilers of the ancient Sumerian King List associated with those men whose reigns they recorded.

Regardless of the immediate answers to these queries, it seems clear that base-60 squared should be recognized as an "ideal" constant, which, however, must be factored out once it has been isolated so that it is not reckoned as part of the overall calculation. In any event, we know that the ancient Sumero-Babylonian sexagesimal system employed at least the following mathematical bases as units: 60^0 (= 1), which in Akkadian was called ištēn; 60^1 (= 60), which was called šūšu; 60^2 (= 3600), which was called šāru; and 60^3 (= 216,000), which was called šuššāru. The word šāru had a Sumerian antecedent (šár) that means not only "3600" but also

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[16] Thus in Einstein's famous equation $e = mc^2$, where e represents energy, m stands for mass, and c^2 is the velocity of light squared, the constant (c^2) is often dispensed with by modern astrophysicists and others.

"universe."[17] In later times the Greeks put the sexagesimal system to full use, "both in the familiar division of the circumference of the circle into 360 'degrees' of 60 minutes or 3600 seconds each, and in the division of the radius into units of consecutive sixtieths."[18] By employing the *šāru* as the key to unlocking the antediluvian numbers in the Sumerian King List as well as in Berossos, we find ourselves not only discerning "rational" numbers depicting the length of royal reigns in those ancient chronological tables but also walking in the footsteps of noble mathematical tradents.[19]

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[17] O. Neugebauer, *The Exact Sciences in Antiquity* (2d ed.; New York: Harper, 1957) 141. U. Cassuto, *A Commentary on the Book of Genesis. Part I: From Adam to Noah (Genesis I–VI 8)* (Jerusalem: Magnes, 1961) 258, has observed that the 241,200 of the antediluvian Sumerian King List equals one great *šāru* (*šuššāru*—i.e., 216,000—plus seven *šārū*—i.e., 7 × 3600 or 25,200) and that the 432,000 of Berossos equals 120 *šārū* (i.e., 120 × 3600) or two great *šārū* (= two *šuššārū*—i.e., 2 × 216,000).

[18] Neugebauer, *Exact Sciences* 13.

[19] I am deeply indebted to my daughters, C. Felicity Harrison and H. Judith Virta, for reviewing this paper critically, to my son, Graham K. Harrison, for technical advice involving the mathematical analysis, and to Ronald Youngblood for the Sumero-Akkadian and Greek information in the final paragraph and for the references in nn. 17 and 18.