

The antediluvian patriarchs and the Sumerian King List

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The Sumerian King List records the lengths of reigns of the kings of Sumer. The initial section deals with kings before the Flood and is significantly different from the rest. When the kingdom durations of the antediluvian section are expressed in an early sexagesimal numerical system, all durations except two are expressed as multiples of 60^2 . A simple tally of the ciphers used yields six 10×60^2 signs, six 60^2 signs, and six 60 signs.

The lives of the biblical patriarchs, however, have a precision of one year. If Adam and Noah are not included (as in the King List), and the lives of the patriarchs are similarly rounded to two digits, the sum of the lives has six 10^3 signs, six 10^2 signs, and six 10 signs. In addition, if the number representing the sum of the ages was wrongly assumed as having been written in the sexagesimal system, the two totals become numerically equivalent.

It is suggested that the Sumerian scribe that composed the original antediluvian list had available a document (possibly a clay tablet) containing numerical information on the ages of eight of the patriarchs similar to that of the Genesis record and that he mistakenly interpreted it as being written in the sexagesimal system.

That the two documents are numerically related is strong evidence for the historicity of the book of Genesis. The fact that the Sumerian account shows up as a numerically rounded, incomplete version of the Genesis description, lacking the latter's moral and spiritual depth, is a strong argument for the accuracy, superiority and primacy of the biblical record. In addition, the parallels between the Sumerian and biblical antediluvian data open up the possibility of establishing chronological correlations between the rest of the King List and the book of Genesis.

Introduction

The early chapters of the book of Genesis contain numerical information about the ages of the biblical patriarchs and their chronological relationships during the antediluvian world. They also contain a description of the moral and spiritual condition as well as the history of that period. Although there are other, non-biblical, references to the antediluvian era, there is no other document in all of the extant records of the ancient world that provides the detailed and coherent information found in the book of Genesis. The Genesis account gives us a glimpse into that obscure portion of the history of mankind, and provides information for a chronology of that period. It has, nevertheless, been criticized by non-Christians as well as liberal theologians as being mythological, or at best symbolic and incomplete.

The Sumerian King List, on the other hand, contains an initial section that makes reference to the Flood and to Sumerian kings of extremely long reigns before the Flood.¹ The antediluvian portion of the King List is very different from the biblical account. It only contains eight kings, while Genesis has ten patriarchs. The Sumerian list assigns an average reign duration of 30,150 years, with a total duration for the period of 241,200 years, compared to an average age of the biblical patriarchs of 858 years and a sum of 8,575 years for their full lives. It also lacks the detailed information of Genesis and its moral and spiritual emphases.

Nevertheless, Walton², has pointed out that the antediluvian portion of the King List does not include the Sumerian first man nor the Flood hero. If Adam and Noah are dropped from the biblical list, the number of people in the two lists is then the same — eight. Walton has also noticed that the total of the durations of the kingdoms and the total of the ages of the patriarchs are numerically related and are equivalent if the number base of the Sumerian list is changed from sexagesimal to decimal.

This is an important result and would imply that the two records relate to the same events in the early history of mankind. If so, then finding numerically related elements of the biblical account in the Sumerian King List would open up important avenues of research into the relationship of biblical and Mesopotamian chronologies. This paper carefully and thoroughly examines the numerical relationships between the two documents. In Section 2, the Sumerian King List is surveyed in the light of its chronological context. In Section 3, a study is made of the Sumero/Babylonian numerical systems to ascertain the development of the different methods used to represent numbers and the peculiarities and limitations of the different systems that could have possibly been used to represent the original antediluvian Kings List. In Section 4, the two lists are expressed in one of the early numerical systems and compared. Attention is paid to the internal characteristics of the two sets of numerical values and their formal similarity. Section 5 summarizes the results, presents a hypothesis for

the similarities of both records, and comments on the importance of these findings.

The Sumerian King List

The Sumerian King List records in succession the names of most of the kings of Sumer and the lengths of their reigns.¹ The document begins at the beginning of history, the time when "kingship (first) descended from heaven," and goes up to the reign of Sin-magir (1827-1817 BC³) towards the end of the Isin dynasty. The list is characterized by extremely long durations for the different reigns, especially the earlier ones. One quarter of a million years is assigned to the first eight kings before the Flood and more than 25,000 years for the first two dynasties after the Flood. By comparison with other historical documents, inscriptions, and archaeological dating, it appears that the list does not correspond to a strict succession but that there is considerable overlap and contemporaneity between several of the dynasties that are presented in the list as having existed one after the other.

The documents

The first considerable fragment of the Sumerian King List was published in 1906⁴. It was found in the temple library of Nippur at the turn of the century. Since that date, more than 15 different fragments and at least one fairly complete list have been found and published. Most of these manuscripts have been dated to the 1st dynasty of Babylon. All the documents show extensive and detailed agreement among themselves. Thus it appears that the extant texts ultimately descend from a common original, i.e., that they are copies, or copies of copies, of a single original document.⁴ In a now classical example of textual criticism, Jacobsen⁴ developed the genealogy of all the different variants and reconstructed the most likely original text of the King List in 1939. That reconstruction has been accepted and used by most scholars. The following discussion of the King List is based to a large extent on his original work.

The antediluvian section

A few of the manuscripts seem to have had an initial section dealing with kings before the Flood. That section, however, is significantly different from the rest of the list which deals with kings reigning after the Flood. First of all, it has a large degree of independence. The postdiluvian sections do not appear in other Mesopotamian manuscripts that are not fragments of the King List, and their contents have only been found in the King List.

In contrast, the antediluvian section has been found as a separate entity in a tablet dated to the end of the 3rd millennium without reference to lists of other rulers. This tablet also has particular linguistic features that show that it is not an isolated part of the King List (such as the total absence of the grammatical formulas so characteristic of the

latter).

In addition, some of the phrases and information in the antediluvian section have been found in a Sumerian epic dealing with the beginning of the world.⁴ There is a close correspondence between the common phrases of these two documents, and the identical order of the primeval cities, which tends to indicate that they are literarily interdependent.

Furthermore, the antediluvian section has a particular set of formulas different from those used in the postdiluvian section. The formulas for the change of dynasty and the mention of their totals are very consistent in the postdiluvian part and are very different from those used in the antediluvian one. Jacobsen⁴ believes that the antediluvian section is a later addition to a King List that did not originally contain kings before the Flood. He stated that the new part was copied and adapted from information that

'was current in various settings in Sumerian literature at the time when most of our copies of the King List were written ... (and) that it was written later by a person different from the one who originally composed the postdiluvian section of the list... by a scribe who was bringing his copy of an older original up to date ...' (See Figure 1).

The following is the translation by Jacobsen⁴ of his critical edition of the Sumerian text of the antediluvian section of the King List together with a few selected lines of the postdiluvian section for comparison (see the text following for explanation of the italics, bold and underlining):

- 1 **When the kingship was lowered from heaven**
the kingship was in Eridu(g).
(In) Eridu(g) A-lulim(ak) (*became*) *king*
and reigned 28,800 years;
- 5 **Alalgar** reigned **36,000 years.**
2 kings
reigned its 64,800 years.
I drop (the topic) Eridu(g);
its kingship to Bad-tibira(k)
- 10 *was carried.*
(In) Bad-tibira(k) En-men-lu-Anna(k)
reigned **43,200 years;**
En-men-gal-Anna(k)
reigned **28,800 years;**
- 15 **divine Dumu-zi(d), a shepherd,** reigned **36,000 years.**
3 kings
reigned its 108,000 years.
I drop (the topic) Bad-tibira(k);
its kingship to Larak was carried.
- 20 **(In) Larak En-sipa(d)-zi(d)-Anna(k)**
reigned its **28,800 years.**
1 king
reigned its 28,800 years.
I drop (the topic) Larak;
- 25 *its kingship to Sippar was carried.*
(In) Sippar En-men-dur-Anna(k)

became king and reigned **21,000 years.**
 1 king
 reigned its 21,000 years.
 30 **I drop (the topic) Sippar;**
its kingship to Shuruppak was carried.
(In) Shuruppak Ubar-Tutu(k)
became king and reigned 18,600 years.
 1 king
 35 reigned its 18,600 years.
 5 cities were they;
 8 kings
 reigned their 241,200 years.
The Flood swept thereover.
 40 *After the Flood had swept thereover,*
when the kingship was lowered from heaven
the kingship was in Kish.

[end of the antediluvian section]

In Kish Ga...ur(?)
 became king
 45 and reigned 1,200 years;
 .
 .
 .
 Aka,
 reigned 625 years.
 .
 .
 .
 Kish was smitten with weapons;
 its kingship to E-Anna(k)
 was carried.
 In E-Anna(k)
 Mes-kiag-gasher,
 son of Utu, became high priest
 and king and reigned 324 years.

Jacobsen translation is based on his critically edited text of the Wendell-Blundell prism in the Ashmolean Museum of Oxford University (W-B 1923.444). This fairly complete text is referred to as WB. The line numeration refers to the lines of the WB prism.

The origin of the antediluvian section

The bold underscored lines are found in essentially the same form in the epic fragment referred to above. Thus it appears that the two documents are related. The phrases ending each dynasty (T drop Eridu(g)', T drop Bad-tibira(k)', etc.), however, are totally out of place in the epic. They are also very different from the phrases repeatedly used for the ending of the different dynasties in the postdiluvian sections (e.g., "Kish was smitten with weapons").

For those reasons, Jacobsen⁴ concludes that the scribe adding the antediluvian section was not copying directly from the epic but was using a different source (Document A) that was literarily related to the epic. There are three equally probable explanations for the relationship between the epic and Document A (see Fig. 1): (1) Document A was based on the epic but its author introduced the particular formulas. (2) The epic used A but dropped the formulas as they did not fit its style. (3) Both A and the epic were derived from a third document B that contained the common phrases and the formulas.

The information about the cities, the names of the kings, and their reigns are most probably also derived from source A, as there are strong indications that it was originally present in the complete text of the epic. All the text considered to have a high probability of been derived from source A is indicated above by bold letters. It is difficult to ascertain if the verb "he reigned" after the various reigns and the city summaries of the number of kings and the total duration of their reigns were derived from source A or if they were added by the scribe. Since there are some evidences for both, they are indicated by Roman but not bolded letters in the transcription shown above.

The italicized lines correspond to phrases that Jacobsen considers were written by the scribe as he added the material of the antediluvian section to an earlier version of the King

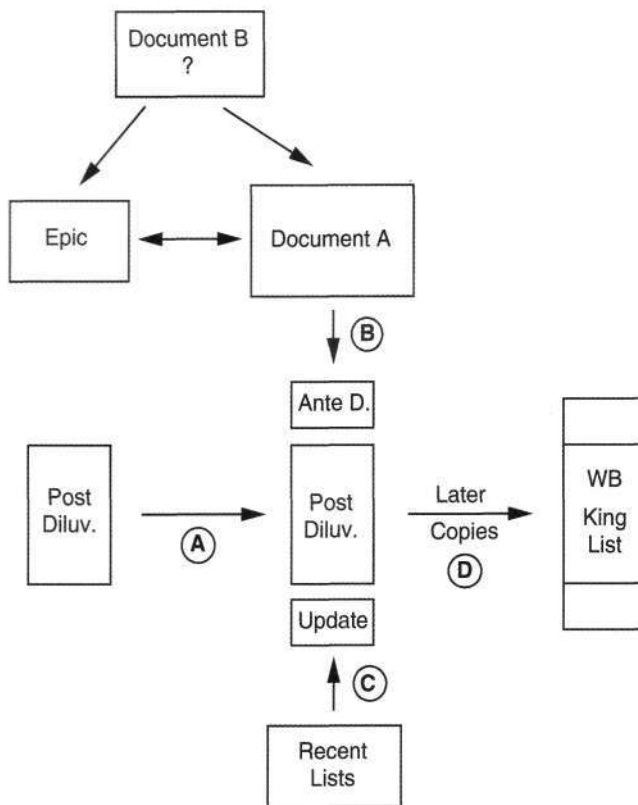


Figure 1. Relation between the sources of the Sumerian King List

List, which he was also bringing up to date, in the middle of the Isin dynasty. They essentially represent attempts to bring the added section into conformity with the style of the rest of the King List. Those phrases are not present in the epic nor in the isolated list of the antediluvian kings mentioned above. In addition, they contain grammatical peculiarities also present in the very last section of the King List which he appears to have added. Phrases and words attributed to the scribe are indicated by italicized letters.

The isolated antediluvian list that has been mentioned above has many similarities but also marked differences with the antediluvian section of the King List. It is a short and concise list of the type that probably the original author of WB used for his source (Document A). However, it gives the impression of being a further condensed version with emendations (some probably of a political nature) of the material used by WB.

A consideration of that list, and the reconstructed portion of the source used by WB (text in bold letters), shows that the original information about the antediluvian kings did not claim that the different kingships were successive. In fact, the language of the change of dynasty gives the impression that it was trying to avoid saying so. According to Jacobsen, "This view, that the antediluvian dynasties were more or less contemporaneous, is clearly incompatible with the King List proper, which directly aims at following the route of the "the kingship" from one city to another."⁴

The information contained in source A can then be summarized as follows:

When the kingship was lowered from heaven

(In) Eridu(g) A-lulim(ak)

reigned **28,800 years**;

Alalgar reigned **36,000 years**.

2 kings

reigned its 64,800 years.

I drop (the topic) Eridu(g);

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reigned **18,600 years**.

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reigned its 18,600 years.

5 cities were they;

8 kings

reigned their 241,200 years.

The Flood swept thereover.

Chronological considerations

Most of the existing manuscripts of the King List have been dated to the second half of the Isin dynasty. An examination of the grammar of the List, however, shows certain usages that had disappeared by that time. Jacobsen⁴ has compared these manuscripts with well-dated documents outside of the King List and has determined the time when these usages disappeared from the then current language. The postdiluvian portion of the King List shows that a large part of it has a high degree of stylistic similarity.

The concluding section of WB, however, shows a different style. By noting the date when these different grammatical usages also had disappeared from the language, and the dynasty in the List when the different writing style was introduced, Jacobsen⁴ came to the conclusion that the first part of the List was composed earlier than the reign of Utu-hegal of Uruk (2119-2112 BC)¹³ and that the later section of WB was added by a different scribe as he brought an older copy of the List up to date with information about new kings and dynasties. The style of the concluding sections is also very similar to that of the antediluvian section which has been seen above to be an addition to the main body of the King List.

Jacobsen concludes that "The man who added the antediluvian section is also responsible for the last part of the list; his literary peculiarities appear in both places."⁴ This scribe added the 3rd dynasty of Ur (2112-2004 BC)³ and the dynasty of Isin down to Sin-magir (1827-1817 BC), so the antediluvian section appears to have been also added after that time.

An inscription of Utu-hegal describing this victory over Gutium shows very close similarities in ideology and language to the earlier portion of the postdiluvian King List.⁴ The characteristic phraseology common to the inscription and the King List occurs in no other document. In both documents the idea is expressed that Babylonia had always been one single kingdom and that the capital had changed from city to city as rulers from different cities defeated the existing capital. It was considered that at no time was there more than one king. By defeating Gutium around 2119 BC, Utu-hegal had brought back the kingdom to Sumer. The Sumerian nationalism must have been stimulated by the newly-won independence from the barbarous Gutians. This would have been the right environment for the production of a work such as the King List that seeks to present the history of Babylonia as a succession of different national

kingdoms passing from one city to another.

A detailed analysis of the structure of the King List⁴ indicates that the author of the first part took his material from lists that gave the names of local rulers in chronological order and the length of time that each had reigned. Apparently, the different cities each had their own separate list of local rulers, irrespective of any overlord the city may have had at the time. There are evidences that some of these local lists existed in pre-Sargonic times even as far back as the Fara texts (c. 2500 BC).

The author appears to have merged the independent local lists to a sequential list produced under the theory that there was only one king at a given time in all of Babylonia. The form of the final list shows that the author did not reject any material from the local lists. He should have eliminated some kings because Targe sections in each of his sources would have been irrelevant because they dealt with rulers reigning at periods when their city was not in possession of the kingship.⁴

Thus, many of the dynasties listed as consecutive were in reality contemporaneous. He apparently divided the larger of his source lists into smaller dynastic units and interpolated them separately to try to ameliorate the large errors that obvious synchronisms between well known rulers would have exposed by strictly merging all the sources one after another. In most cases, however, he cut the individual lists for interpolation along dynastic groups.

It has been indicated above how the later scribe who added the concluding sections of the King List and the antediluvian portion also followed the dogma of only one king at a time for all of Babylonia and only one capital. It is not likely that the original antediluvian source he used tried to present the antediluvian kings in such a consecutive way; it seems that the scribe forced this concept of his own in order to conform his new material to the style of the copy of the King List he was adding to.

Sumerian and Semitic number systems

Before comparing the Antediluvian portion of the King List to the Genesis record, it is important to review the characteristics of the number system used in Mesopotamia as deduced from the earliest archaeological findings. The following survey is based principally on the descriptions of Friberg,⁵ Flegg,⁶ Nissen,⁷ Walker,⁸ and the University of Wisconsin⁹ among others. Dates correspond to the conventional chronology which is probably quite accurate in the later periods but tends to give dates that are too old in the earlier ones.

Proto-Sumerian Period (3300-2900 BC)

The first indications of writing and numbers are found in the Late Uruk Period.⁷ At the beginning of this period, however, tally stones or tokens made of clay of different shapes have been found. These appear to represent different

counting units and the objects being counted.¹⁰ The token method of counting was combined with the use of cylinder seals. The tokens were enclosed in a ball of clay covered on the outside with impressions of usually only one seal. In some cases there were also oblong impressions on the outside of the ball that represented numbers that corresponded to the tokens within the ball. In some instances, flat clay slabs have been found with the oblong symbols for numbers impressed on their surfaces together with many impressions of cylinder seals. Some tablets have compartments marked off with incised lines, each one containing a different number.

Tablets with true writing appear at the end of the Late Uruk Period (Uruk Level VI), where numbers are accompanied by pictorial and curvilinear symbols made with a pointed stylus. The texts found appear to relate to both simple and complex economic transactions. Although they are still not completely legible, they can be seen to correspond to allotments of food, lists of sacrifices, division of fields, herds of animals, and textile and metal manufacture. Writing is well developed when it first appears in the archaeological records. Nissen⁷ rejects the theories that the earliest known writing must have had more primitive predecessors. He hypothesizes, however, that once the idea of writing arose somewhere in the administration, its value was immediately recognized and it was very quickly developed into a functional instrument.

Many tablets have been found with the information divided into three different sections. On one side of the tablet are many individual entries of numbers accompanied by pictorial symbols, probably signifying the objects being counted or the names of persons. On a separate section, are entries that correspond to subtotals of the individual numbers. Usually on the back side of the tablet, a third section contains a final total that adds up the previous subtotals. This practice, which Nissen⁷ calls 'a strict bookkeeping mentality,' was prevalent throughout the Middle East and is also found in the Kings List. Joshua 12:9-24 is an example of its use in the Bible.

Very early, an oblong impression was used as the symbol for one. This oblong numeral was repeated several times to represent small numbers and this can be considered an extension of the method of *tallying* where there is a one-to-one correspondence between the objects counted and the inscribed marks. The indentations on clay were made by pressing a blunt stylus of circular section at an angle and had the appearance of a bullet (Fig. 2). The symbols were grouped by threes for a quick communication of the numerical information. For numbers larger than nine, a collective symbol that represented 10 units was used. This is the practice of *cipherization* found in all numeral systems around the world.

The existence of a sign for 10 does not prove that the system employed the base ten or that it had a combination of bases. Ten was essentially an intermediate cipher to avoid the need for extensive repetition of the sign for 1. An example of the use of intermediate ciphers is found in the Roman

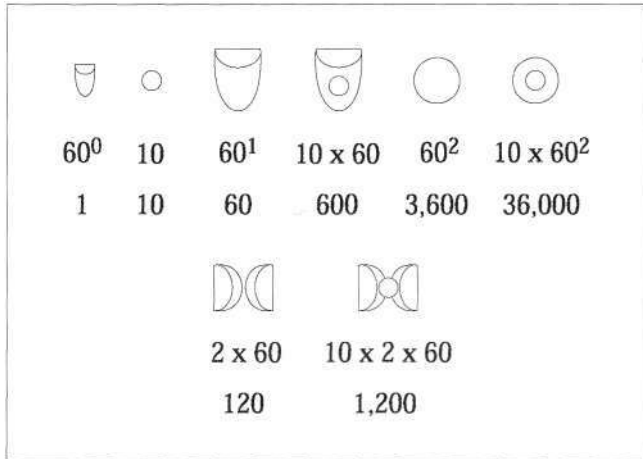


Figure 2. Number symbols used during the Proto-Sumerian and Early Dynastic Periods (3300-2334 BC).

number system, where ciphers for 5 times the powers of 10 were developed even though the system was fundamentally decimal (V, L, and D for 5, 50, and 500). The symbol for 10 was made by pressing the stylus vertically into the clay and had the appearance of a circle. The presence or absence of symbols defined the number unambiguously and the order of the symbols did not matter. However, it was the convention to write the symbols for 10 together and not mix them with the symbols for 1. Thus, the early numeral system followed an *addition* principle and there was no need for a zero.

The early Sumerians used the base 60 for their number system. The reason for the adoption of such a large base is probably a reflection of the various units of measure used for commercial, administration, and religious purposes. These were mostly sexagesimal because they afforded many convenient factors of the unit (halves, thirds, quarters, fifths, sixths, tenths, twelfths, fifteenths, twentieths, and sixtieths) all expressed as whole numbers of the next lower denomination.⁶

The next power of the base (60^1) was expressed as a large version of the units (60^0) symbol. This was done by pressing the other end of the stylus at an angle. This end was also blunt but had a larger diameter, so it would produce the shape of a larger bullet. These symbols were repeated until 600 was reached when the symbol used for ten (a small circle) was impressed inside the large oblong symbol for 60.

For the next power of the base (60^2), a large circle was used that was made by vertically pressing the larger end of the stylus into the clay. As with the symbol for 600, a small circle was impressed inside the larger circle (3,600) to multiply it by ten and represent 36,000. Although the Sumerian system had a sexagesimal base, the symbol for ten (the small circle) was used as an intermediate symbol between powers of sixty. This simplified the tallying procedure by grouping by ten the ciphers for the different powers. The resulting number was very easy to understand and used the *multiplicative* principle.

The system actually contained only two symbols in two sizes. The small number of symbols made the system very intuitive and available to the masses but needed a fair number of repetitions. Thus, to write the numbers up to 59, as many as 14 individual symbols were needed for the individual numbers. The small number of numerical symbols was, to a large extent, controlled by the method of writing numbers using a blunt stylus with a circular section to impress marks on wet clay.

The next archaeological phase, represented by the Jamdet Nasr, Proto-Elamite and Uruk Level III Periods, was marked by a simplification and acceleration of operations in every sphere.⁷ The pictographic signs began to lose their pictorial appearance, becoming more abstract and linear. In this phase, the first use of symbols with determinative value has been found. The language represented was probably Sumerian but that is not certain. Nevertheless, the tablets were written in an archaic pictographic script that can be recognized as a precursor of the Sumerian cuneiform script. The writing system was logographic, where one sign or sign-group was used for each term or concept without adding grammatical elements. The numbers as a rule were still made with the round end of a stylus and are easy to identify. A special bi-sexagesimal notation has also been found⁵ where two of the same large bullet signs, but with a less elongated impression, were pointed towards each other to signify 120. The same symbol with a small circular impression represented $10 \times 120 = 1200$ (Fig. 2).

Early Dynastic I-II Periods (2900-2600 BC)

The first identifiable use of purely phonetic elements and grammar appeared during this time. In this stage some signs were used to represent syllables. The language used is clearly Sumerian. Most of the material for this period comes from the Archaic Ur tablets. The same number system as in Jamdet Nasr is used. The script was not yet cuneiform, but the signs are more linear.

Early Dynastic II-III Periods (2600-2334 BC)

During this interval, writing became much easier and simpler to use, mostly through a change in writing techniques. The earlier method of incising to make the curvilinear pictorial symbols was gradually replaced by the technique of making impressions of short, straight lines by holding a stylus of triangular section at an angle. Writing now became much faster. The same symbols were used, but many had their form completely changed because the new method only allowed short straight lines. Superfluous details were omitted, and curved lines were replaced by short straight segments. The short strokes had a head, which was more deeply impressed and therefore wider. The lines resembled a wedge, and this became the reason for the name 'cuneiform' given later to this script. Many earlier complicated symbols disappeared.

Nissen⁷ speculates that the changes in the technique of writing may have had their basis in the increased demand for scribes in an expanding economy. The major groups of tablets for this period come from Fara (Shuruppak), Abu-Salabikh, and Ebla in Syria. From about 2500 BC onwards, the cuneiform script was also used to write Akkadian and Eblaite, which are Semitic languages. About eighty percent of the words written on the approximately 10,000 tablets found at Ebla are in Sumerian. Interspersed are the remaining twenty percent in Eblaite. At that time, the calendar used at Ebla was Semitic and the counting appears to be in Semitic units which were decimal.¹¹⁻¹⁴ The same is observed in Mari and Abu-Salabikh. The number system for representing the counting, however, remained the same as in the previous periods, with the same two different symbols (the bullet and the circle) and the same two sizes (Fig. 2).

Dynasty of Akkad (2334-2154)

During the period of the Semitic dynasty of Akkad, the Akkadian language replaced Sumerian as the administrative language, as Sargon I of Agade conquered all of Mesopotamia and extended the empire to the Amanus Mountains to the West, and to the Zagros and Taurus mountains to the East and North.¹⁵ The Sumerian signs were used to write the Old Akkadian language which was Semitic. The wedges of the cuneiform symbols now appear only at the top or the left of the sign. This is a culmination of the tendency started in the Early Dynastic II Period of restricting the impressions of the triangular stylus 'within a narrow segment of the possible directions the stylus could theoretically take.' This meant that few changes in the direction of writing were necessary and the speed of writing could be increased.⁷

The number symbols, however, could be written in two ways: either as cuneiform signs, inscribed with a stylus of triangular section, or as circular signs made with the blunt end of a circular stylus.⁵ That means that two different types of stylus were used simultaneously.

The new cuneiform numerals tried to reproduce with wedges the rounded impressions of the earlier numerals. Thus, an elongated wedge represented the number one and a vertically impressed triangular shape represented the number ten. These symbols were the equivalent of the small bullet and circle of the earlier system. The earlier large circle which stood for 60² was now represented by four long wedges making a diamond shape, and the large bullet with the small circle inside (10x60) was written with an elongated wedge and a triangular impression superimposed on its right side (Fig. 3). Similarly, the large circle with the small circle inside (10x60²) was substituted by a diamond made with four long wedges with a triangular impression inside. Sixty was represented by an elongated wedge which sometimes was larger than the wedge for one, but most of the time had to be differentiated from it by the context or the arrangement of the other numeral symbols.

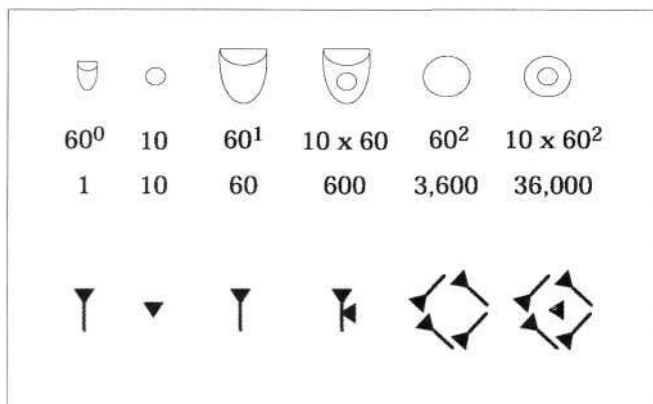


Figure 3. Number symbols used during the Akkadian Period (2334-2154 BC).

Sumerian Period (2112-2004 BC)

This period is marked by the hegemony of the Sumerians under the leadership of Ur-Nammu, founder of the Third Dynasty of Ur, who conquered other Sumerian and Akkadian city-states. As a consequence, there was a revival of the Sumerian language, but only in religious and literary areas, as the language remained unimportant for administrative purposes. The scribal art reached an exceptional stage of precision. The round numerals, that had to be made with a different circular stylus, disappeared from current use and only the cuneiform representations, made with the triangular stylus, were employed from now on (Fig. 4).

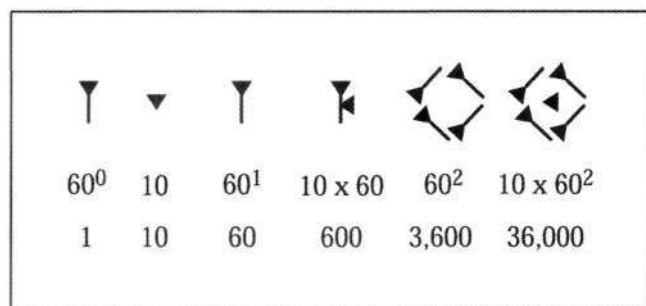


Figure 4. Number symbols used during the Sumerian Period (2112-2004 BC).

Old Babylonian Period (2004-1595 BC)

Up to this time, a positional notation for sexagesimal numbers had not become established and separate signs were used for 1, 10, 60, 10x60, 60², and 10x60². A special sign for zero was not necessary. During the Babylonian Period, however, a quasi-positional notation was used that depended on only two signs: the elongated wedge used for the number one and the triangular impression used for 10. The wedge now also stood for the powers of 60 and the triangle for ten times the powers of 60 depending on their position within the sequence of ciphers representing the number (Fig. 5).

Eventually a sign for zero was adopted in the Babylonian







					
60^0	10	60^1	10×60	60^2	10×60^2
1	10	60	600	3,600	36,000

Figure 5. Number symbols used during the Babylonian Period (2004 BC-AD 75).

system, but it was only used to denote internal empty places, the new numerical symbol was not used to the right of a number as the last symbol.⁶ This meant that the numbers were not unambiguous and the actual value had to be determined very carefully from the context.

Summary of Number Systems

In conclusion, there were two different but related systems for representing numbers in the Sumero-Babylonian culture. An earlier one, based on round impressions using a blunt circular stylus, and a latter one, based on cuneiform impressions made with a stylus of triangular section. The first system appears during the Proto-Sumerian Period and was in use until the time of the Akkadian Dynasty. By the Sumerian Period of the Third Dynasty of Ur, the cuneiform system had totally replaced it. Because both systems were sexagesimal and had a limited number of signs, frequent repetitions of the same sign were necessary. An intermediate cipher for 10 was developed to ease the need for repetition and it was used by itself and to multiply the different powers of 60. The individual signs representing a number had to be added together to obtain the actual value of the number. The earlier system used only two different signs in two different sizes to write the numbers. The cuneiform system also employed only two elements, the wedge and the triangle, but used four wedges to represent the large circle of the earlier system. In both cases, the largest value represented by a single symbol was 36,000, although very large numbers could be expressed by the repeated use of the symbol for 36,000.

During the Babylonian Period, however, a quasi-positional notation was developed that allowed for the convenient representation of very large numbers. Only two signs, the wedge and the triangle, were used to represent the different powers of 60 and 10 times the different powers of 60 depending on the position of the symbol in the number string. A sign for zero was used to indicate internal empty positions.

No other culture in the ancient world used the base 60 for their number system. The Egyptians, for example, used a pure decimal notation as well as the Romans and the Greeks.⁶ The latter adopted the sexagesimal base for astronomical computations but a decimal notation was

employed for other purposes. The Elamites apparently adopted the sexagesimal system from the Sumerians and only used a decimal notation when counting animals.⁵ Although the Semitic kingdoms of Ebla, Mari, and Abu-Salabikh adopted the cuneiform writing and the cuneiform numbers, the calendar was Semitic and the counting appears to be in Semitic units which were decimal.

King List and patriarchs chronology

The antediluvian portion of the King List appears to have been originally composed very early in Sumerian history. Therefore, the early number system, based on rounded signs, has been used to represent the numerical part of the list in Fig. 6. A representation based on the non-positional cuneiform system, however, would have been very similar. It can be seen that the majority of the symbols needed to express the duration of the reigns of the antediluvian kings are the large circle ($60^2 = 3,600$) and the large circle with the small circle inside ($10 \times 60^2 = 36,000$). Only the last two numbers would have needed the symbol of the large bullet with a small circle inside ($10 \times 60 = 600$). The symbols for one, ten, and sixty would not have been needed. Thus, in six of the eight numbers, the durations were given as units of 60^2 , and in the last two with a precision of 10×60 . Notice that all the numbers taken together yield three 10×60^2 signs, thirty-six 60^2 signs, and six 10×60 signs. To obtain the total of the eight reign durations, the scribe would have used the









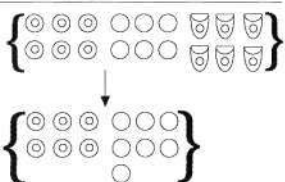
King	Sexagesimal	Cuneiform
Alulim	28,800 $8 \times 3,600$	
Alagar	36,000 $10 \times 3,600$	
Enmenluanna	43,200 $12 \times 3,600$	
Enmengalanna	28,800 $8 \times 3,600$	
Damuzi	36,000 $10 \times 3,600$	
Ensipazianna	28,800 $8 \times 3,600$	
Enmenduranna	21,000 $5 \times 3,600 + 5 \times 600$	
Uburtutu	18,600 $5 \times 3,600 + 1 \times 600$	
Sum	241,200	

Figure 6. List of the duration of the Antediluvian Sumerian reigns.

tallying method. So, for example, he would have counted ten of the large circle signs and written an additional large circle with a small circle inside. In case there were less than ten symbols of the same kind left, they were usually arranged in up to three rows of three symbols each. Thus, the thirty-six 60² signs would have yielded three more 10x60² signs for a total of six, with six individual 60² signs left. The six large bullets with a small circle inside could have been written as two rows of three signs each, following the convention of the maximum of three rows of three. However, because of the peculiarities of the system, six large bullets with the small circle inside also make a large circle. So, the six 10x60 signs could have been also expressed as an additional 60² sign for a total of seven (see Fig. 6). The resulting total is equivalent to 214,200 years. This number also has a precision of 3,600. It is curious that the 10x60 signs of the last two durations add up exactly to one of the 60² signs, the basic unit of all the other numbers and the overall total, and that the 10x60 unit was not used until the last two reign durations of the list.

A table with the total ages of the antediluvian biblical patriarchs is shown in Fig. 7. For comparison with the Sumerian King List, Adam and Noah are not included. The King List does not include the Sumerian first man nor the Sumerian Flood hero (Ziusudra). The third column is the representation of the ages as decimal-counting Semites would have written them using the early rounded stylus. Exactly what the convention would have been is not known. However, following the same rules for the selection of

Papers

symbols to represent the different powers of the base as in the sexagesimal system, it would follow that the small bullet and the small circle would represent one and ten, the large circle the next power of the base (10²), and the large circle with the small circle inside ten times that power (10³). There would have been no use for the large bullet impression because the first power of the base was already represented by the small circle, and no use for the large bullet with the small circle inside because ten times the first power of the base was the square of the base which was represented by the large circle. According to that convention, the total ages of the antediluvian patriarchs would have been expressed as shown in column three. The precision of the ages is one year, and the majority of the ages have units.

A comparison of Figs. 6 and 7 shows that the ages have no relationship between themselves, and neither do the totals. However, if the ages of the Patriarchs are rounded to the two highest digits as in the Sumerian list (that appears to be rounded to the two highest sexagesimal ciphers), their representation would be as shown in column 4 of Fig. 7. A total of the eight ages of the patriarchs can also be obtained by tallying all the symbols employed in the individual numbers. The total would then have six 10³ signs, six 10² signs, and six 10 signs for a sum of 6600 years. If we do not incorporate the six 10x60 signs (large bullet with small circle inside) of the Sumerian total into an additional next higher order sign, the Sumerian total has 6 signs for 10x60², six signs for 60², and six signs for 10x60.

Thus, the totals of both the rounded Genesis and Sumerian lists obtained by a straight tally have six of the signs for ten times the square of the base, six of the signs for the square of the base and six signs for the next lower symbol. It should be noted that, although the particular form of the symbols used to represent the decimal numbers has been assumed, the relationship of the arithmetic structure of the totals is inherently independent of the symbols used. Nevertheless, the choice of signs employed in Fig. 7 to represent decimal numbers is entirely reasonable as it follows the same rules of the sexagesimal system. If this was indeed the system used, the resemblance between the totals would have been not only inherently but formally true as well.

A Sumerian scribe looking at a document containing the Genesis total would have interpreted the signs as sexagesimal. Thus, the first 6 signs would have represented 216,000 years (6 x 10x60²), and the next six, 21,600 (6 x 60²) for a total of 237,600 years. This is very close to the total in the Sumerian antediluvian document. The scribe would have been puzzled at the last set of six small circle signs. That sign was generally recognized as the cipher for 10. But why introduce 60 years (6 x 10) when already the first two sets of signs amount to more than two hundred thousand years? Also, it would have appeared very strange that no intermediate ciphers between 60² and 10 were used in the total. The scribe would have expected to see the next smaller cipher of the system, namely the large bullet with the small circle inside (10x60). It would have seemed very reasonable to assume that the signs were

Patriarch	Age	Cuneiform	Rounded to Two Figures
Seth	912		
Enosh	905		
Kenan	910		
Mehalael	895		
Jared	962		
Enoch	365		
Methuselah	969		
Lamech	777		
Sum	6695		= 6660

Figure 7. List of the ages of the antediluvian biblical patriarchs.

wrong and that the large bullet had been dropped. Given that assumption, the last three signs would have represented 3,600 ($6 \times 10 \times 60$) for a grand total of 241,200 years, the total appearing in the Sumerian list.

Our hypothesis for explaining the similarities in numerical structure and magnitude of the two totals is as follows: The Sumerian scribe that composed the original Antediluvian list had at his disposal a document (possibly a clay tablet) containing numerical information on the ages of eight of the patriarchs similar to that of the Genesis record. The numbers denoting the lifespans of the individual patriarchs were missing or obliterated. However, the document had a rounded total of the lifetimes of the patriarchs (possibly on the back of the tablet). Although this number was written using a decimal number base, the scribe assumed it was sexagesimal and incorporated it into his document after making some slight emendations. He then proceeded to assign approximate reign durations to the perceived antediluvian kings in an arbitrary manner but keeping the sum equal to the total he had copied from the decimal (Semitic) tablet. He only used two high order ciphers to represent the durations (in units of 3,600 years) but used a third smaller cipher in the last two reigns to conform to the structure of the total he had adopted.

Although this hypothesis cannot be proven at this time, it seem to afford a reasonable explanation of the similarities and differences between the two documents. The probability that the resemblance is fortuitous is very small in view of the fact that the two lists:

- mention the Flood;
- refer to the same (adjusted) number of personages;
- have totals that are made up of the same number of symbols for ten times the square of the base, the square of the base, and the next lower symbol of the two different numerical systems involved;
- and their totals correspond to each other numerically.

On the other hand, it is highly unlikely that the biblical account was derived from the Sumerian because:

- the Genesis account has more numerical precision and more detailed information,
- the ages of the patriarchs are much more reasonable than the extremely long reigns of the kings of the Kings List,
- the account is much more realistic and true to life,
- and the moral and spiritual qualities are immensely superior. For example, in the Sumerian account of the Flood (as given in the Gilgamesh epic) there is no reason given for the decision of the gods to destroy mankind. There are no allusions at all to a fault committed by man. The Flood appears as a capricious act of the gods rather than a divine punishment. In Genesis, however, God purposes to purge mankind because the thoughts and designs of men were continually evil, and the Earth was full of violence.

Another possible explanation is that, instead of a written document, the Sumerians had an oral tradition referring to the antediluvian account which was used in composing the early part of the Kings List, but that they had

available only the general setting of the story, the number of personages involved (interpreted as kings), the rough magnitude of their ages (interpreted as durations of reigns), and the rounded total; originally in a decimal numerical system, but incorrectly assumed to be in a sexagesimal one at a later date. The main problem with this explanation is that there is a detailed numerical correspondence between the two lists that would have been difficult to remember from one generation to the other. On the other hand, the total of the lifetimes (which provides the principal numerical correspondence) has a structure (three sets of six ciphers each in strict decreasing arithmetical order) that would have made remembering that number much easier.

Discussion and summary

The Sumerian King List records in a chronological succession the names of most of the kings of Sumer and the lengths of their reigns. The composition is based on the theory that there was always only one king at a time for all of Babylonia, and a single capital. A few of the existing manuscripts of the List have an initial section dealing with kings before the Flood that is significantly different from the rest of the list. This antediluvian section was a later addition written by a person different from the one who composed the postdiluvian section of the list. This scribe appears to have adapted an earlier list of antediluvian kings to conform to the style and philosophy of the document he was bringing up to date. However, it is evident that his source for the antediluvian kings did not claim that the different kingships were successive. The original King List was probably composed during the reign of Utu-hegal of Uruk (2119-2112 BC) and the antediluvian section added after the reign of Sin-magir (1827-1817 BC) of the Isin dynasty.

Sumerians and Babylonians employed a sexagesimal number system. There were two non-positional ways of representing the different ciphers: an earlier one using a round stylus, and a later cuneiform way using a triangular stylus. In both systems the number of ciphers was very small requiring many repetitions of the same symbol, although grouping of the sexagesimal symbols by tens was employed. Later, during Babylonian time, a quasi-positional system was devised. No other culture of the ancient world developed a sexagesimal number system, although non-Sumerian groups adopted the Sumerian script to represent their languages and used their numerical system. This was the case of Semitic groups such as at Ebla and Mari, but although they used the cuneiform system, they retained a Semitic calendar and decimal counting.

When the kingdom durations of the antediluvian portion of the King List are represented with the early Sumerian numerical system, the total and all of the numbers except two need only two different symbols. These are the two largest units of the system, so that the numbers are expressed as multiples of 3,600. The total (241,200) needs six 10×60^2 signs, six 60^2 signs, and six 10×60 signs. The duration of the

lives of the biblical patriarchs, however, have the precision of one year, and the majority of the ages have units. If Adam the first man and Noah the Flood hero are not included to match the contents of the Kings List, their total ages would be 6695. If the ages are rounded to the two highest digits as in the Sumerian list, the final number has six 10^3 signs, six 10^2 signs, and six 10 signs for a total of 6660. Thus, the totals of both the adjusted Genesis and Sumerian lists have six of the signs for ten times the square of the base, six of the signs for the square of the base, and six signs for the next lower value of their respective system. In addition, when the number representing the sum of the ages of the biblical patriarchs is interpreted as having been written in the sexagesimal system, the two totals become numerically equivalent.

The probability that the resemblance between the two documents is fortuitous is very small. On the other hand, it is highly unlikely that the biblical account was derived from the Sumerian in view of the differences of the two accounts, and the obvious superiority of the Genesis record both in numerical precision, realism, completion, and moral and spiritual qualities. It is much more likely that the Sumerian scribe that composed the original antediluvian list had available a document (possibly a clay tablet) containing numerical information on the ages of eight of the patriarchs similar to that of the Genesis record and that he mistakenly interpreted it as being written in the sexagesimal system. Another possibility is that the Sumerians had an oral tradition of the antediluvian world that only provided the general setting of the story, the number of personages involved, the rough magnitude of their ages and the rounded total, and that these numbers were originally decimal but were incorrectly assumed to be sexagesimal at the time of writing the antediluvian list.

The fact that numerical elements of the biblical antediluvian account appear so distinctly in the context of a secular Sumerian historical document such as the Kings List, is strong evidence for the historicity of the early chapters of the book of Genesis. The biblical description is not limited to the Hebrews, but it appears that there was an ancient tradition of the antediluvian world in the early stages of the Mesopotamian culture as well. On the other hand, the fact that the Sumerian account shows up as a numerically rounded, incomplete version of the Genesis description, lacking the latter's precision and wealth of details, as well as its moral and spiritual depth, is a strong argument for the priority, accuracy and superiority of the biblical record. And finally, the clear parallels between the Sumerian and biblical antediluvian data, qualitative as well as numerical, open up the possibility of establishing some chronological correlations between the rest of the Kings List and the early chapters of the book of Genesis.

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