

# **Revised Age of Patriarchs**

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## **Abstract.**

Ages of patriarchs in Genesis 5 and 11 are usually interpreted as literal, symbolic or fictional. We suggest alternative interpretation of literal one. In Genesis 5 not only age of patriarch is abnormally long but also the ratio of maximal age to minimal begetting age is unrealistic from common human experience (the ratio is approximately 15). Ratio of maximal to begetting ages of postdiluvian patriarchs prior to Abraham does not make sense also.

We assume that age in source text was written by Hebrew letters. Numerical values of last three letters of Hebrew alphabet differed from their modern quantity (110, 120 and 130 instead 200,300 and 400). We recalculated age of patriarchs using these values of Hebrew letters. For all patriarchs ratio of maximal lifespan to minimal begetting age decreases to realistic value of 6.6.

We hypothesize that period of time used for age calculation (we'll call this period shanah) was 50 days before the Flood and 6 months after the Flood. Realistic values were obtained for age of all patriarchs. Ancient calendar based on 50 days period is traced in Hebrew holidays and tradition.

## **Introduction.**

Various theories have been advanced for explaining the abnormally long lifetime of patriarchs in Genesis. Ages of patriarchs are usually interpreted as literal, symbolic or fictional. Description of various interpretations may be found elsewhere<sup>1,2</sup>. This article proposes an alternative interpretation of literal one. We follow terminology of Zucer<sup>3</sup> and assume that what we today refer to as a year was once composed of few periods, each called a shanah. Kitchen<sup>4</sup> pointed out that pre and post Flood patriarchs must be analyzed separately. This means that the number of days in shanah before and after the Flood may be different.

List of antediluvian patriarchs in Gen 5 consists of ten patriarchs who lived hundreds of years. Genealogy of antediluvian patriarchs often compare with Sumerian King List on which several version had been found. Berossus in his Babilonica lists ten kings who rules 432000 years from the beginning of kingship until the Flood. The similarity in form with Genesis 5 is evident. Unreliable long reign duration may be explained by simple change of time scale because for each king the list contains only one age related number.

List of patriarchs in the Genesis contains two age related numbers: life span and begetting age. Hence, the problem is not only in extremely high age but in unreliable value of the ratio of lifespan to age of firstborn. Our study is a quest into finding out reality in the content of Hebrew Bible. We are dealing with history not with theology or dogma. It is assumed that there was a source text for modern version of Genesis 5 and 11. In the source text the ages were written using Hebrew letters. Numerical values of few letters differed from their modern quantity. We suggest possible ancient numerical values of these letters and work out ages of patriarchs using these values. Recalculated ratios of lifetime to age of first born are in the range of usual human experience.

We used different period of time (shanah) before and after the Flood. For antediluvian patriarchs number of days in shanah was 50 days. For postdiluvian patriarchs it was 6 months. A special analysis applied to the age of Shem, who was born before and died after the Flood. Realistic values were obtained for age of all patriarchs. Suggested definitions of shanah is checked by biblical texts and facts from Jewish tradition.

### **1. Longevity of life and begetting age.**

Maximal age of antediluvian patriarchs in Genesis was 969 years. Minimal begetting age of antediluvian patriarchs was 65 years. The ratio is approximately 15. It is impossible value. For example, a popular hypothesis assumes that lunar month was perhaps a “shanah” used for age calculations. In this case “real age” in solar years is obtained by dividing by 12.4. Maximal age is reasonable ( $969/12.4=78$ ), but this theory is nonsensical if one looks at the “begetting” ages of the patriarchs. It would mean that Seth became the father of Enoch when he was five years old, which is absurd. It's possible for a young male to begin producing sperm as early as age 9 for a few individuals, although ages 11–14 is more common. At age 5 it is impossible.

In the Septuagint (Greek translation of the original Hebrew holy books) this problem was solved by a simple way. If begetting age of Patriarch was less or equal 130 shanah then his age was increased by 100 shanah. As a result the ratio of maximal age to minimal begetting age decreases to reasonable value of 7.5. The solution is simple but does not have any historical basis. For postdiluvian patriarchs such a simple solution leads to unrealistic results.

Ratio of lifetime to begetting age does not depend on selection of time period for the shanah, Hence, due to the ratio problem, huge age of patriarchs cannot be explained by simple hypothesis that their age was calculated using another period of time then solar year. Additional concepts must

be used to solve the ratio problem. Review of various concepts interpreting age of patriarchs literally may be found elsewhere<sup>1</sup>.

We suggest alternative solution based on following assumptions:

1. In the original text the numbers were written by Hebrew letters. Numerical values of few letters differed from their modern quantity. This hypothesis allows obtaining realistic values for the ratio of lifetime to begetting age.
2. Life spans of the postdiluvian and antediluvian patriarchs measured in shana periods deviate significantly. Hence, number of days in shanah periods must be different before and after the Flood. Below it would be demonstrated that before the Flood a seven week calendar similar to Pentecontad calendar<sup>5-7</sup> was used. Shanah was seven weeks or fifty days. After the Flood shanah was half a year or a season as suggested by number of researches<sup>3,8,9</sup>.

## 2. Lifetime to begetting age ratio

The system of Hebrew numerals is an alphabetic numeral system using the letters of the Hebrew alphabet. The Hebrew numeric system operates on the additive principle in which the numeric values of the letters are added together to form the total.

Modern numerical values of Hebrew letters are presented in Table 1 in column “Arabic numerals”. Each unit (1, 2, ..., 9) is assigned a separate letter, each tens (10, 20, ..., 90) a separate letter, and the first four hundreds (100, 200, 300, 400) a separate letter. Last three Hebrew letters are multiples of 100. It is too complicated for ancient arithmetic. We assume that numerical values of each of these letters were obtained by adding 10 to previous letter value. Consequently, numerical values of these letters were multiples of ten — 110, 120 and 130 as in column “Corrected Arabic numerals (groups of 10 based numerals)” in Table 1.

Seven was a basic number for time calculation in ancient world. Days of week were named after the sun, the moon and the five known planets. For example, in English language Sunday is a day of Sun, Monday is a day of Moon, Saturday is day of Saturn. Number of these sky objects is seven. Hence, it is possible assuming that calendar numerals were based on seven. In this case separate letters are prescribed to numbers (1,2,...,7) and to multiples of seven (14,21, ..., 112). Corresponding values of Hebrew letters are listed in “Seven based Arabic numerals (groups of 7 based numerals)” of Table 1.

Corrected ages of patriarchs are obtained by following procedure. First of all age of patriarchs listed in book of Genesis is written by Hebrew letters base on modern numerical values. Then corrected numerical values of the letters are used and added. For example, age of Seth in Genesis 5 is 912 shanah. We assume that this age was written by Hebrew letters as תתקיב. If modern values of the letters are used then the age is  $2+10+100+400+400=912$ . For modified values of Hebrew letters age of Seth become 372 shanah ( $2+10+100+130+130$ ). Ages of patriarchs obtained by such calculations are presented in Table 2. For based on seven numerals age of Seth would be 345 ( $2+28+91+112+112$ ) shanah. Calculations below would be carried out for Hebrew letters values based on group of 10 based numerals. Ages of patriarchs recalculated using Hebrew letters values based on group of seven based numerals are presented in Appendix. Ages of patriarchs and the ratio of lifetime to begetting age are similar for both methods of recalculating Hebrew letters values.

For all patriarchs, excluding Noah, begetting age was less then 200 shanah. Changing numerical value of last 3 letters does not influence their age of firstborn. Begetting age of Noah is reduced to 232 shanah. Suggested hypothesis lead to decrease of the ratio of maximal age to minimal begetting age to realistic value of 6 – 6.5. Numeric values of lifespan and begetting age remain

unrealistically high. Hence, it is logical assuming that time period shanah which was used for age calculation differed from solar year.

Table 1. Corrected Values of Hebrew Numerals

Hebrew numerals	Arabic numerals	Corrected Arabic numerals (groups of 10 based numerals)	Seven based Arabic numerals (groups of 7 based numerals)
א	1	1	1
ב	2	2	2
ג	3	3	3
ד	4	4	4
ה	5	5	5
ו	6	6	6
ז	7	7	7
ח	8	8	14
ט	9	9	21
י	10	10	28
כ	20	20	35
ל	30	30	42
מ	40	40	49
נ	50	50	56
ס	60	60	63
ע	70	70	70
פ	80	80	77
צ	90	90	84
ק	100	100	91
ר	200	<u>110</u>	98
ש	300	<u>120</u>	105
ת	400	<u>130</u>	112

Table 2. Corrected Years of Life in shanah.

Name	Begetting Age	Begetting Age by Hebrew numerals	Years of Life	Years of Life by Hebrew numerals	Corrected Years of Life (groups of 10 based numerals)
Adam	130	קל	930	תתקל	390
Seth	105	קה	912	תתקיב	372
Enosh	90	צ	905	תתקה	365
Cainan	70	ע	910	תתקי	370
Mahalalel	65	סה	895	תתצה	355
Jered	162	קסב	962	תתקסב	422
Enoch	65	סה	365	שסה	185
Methuselah	187	קפז	969	תתקסט	429
Lamech	182	קפב	777	תשעו	367
Noah	502 <sup>1)</sup>	תקב	950	תתקנ	410
Shem	100	ק	600	תר	240
FLOOD					
Arpachshad	35	לה	438	תלח	168
Shelah	30	ל	433	תלג	163
Eber	34	לד	464	תסד	194
Peleg	30	ל	239	רלט	149
Reu	32	לב	239	רלט	149
Serug	30	ל	230	רל	140
Nahor	29	כט	148	קסח	148
Terah	70	ע	205	רה	115
Abraham	100	ק	175	קעה	175
Isaac	60	ס	180	קפ	180

<sup>1)</sup> Begetting age of Noah recalculated using corrected values of Hebrew numerals was 232 shanah.

### 3. Reconstruction of time scale (number of days in “shanah”).

We assume that in ancient calendars only two digit values were used. Days count was based on moving sky bodies (Sun, Moon and 5 planets – Mercury, Venus, Mars, Jupiter and Saturn). Seven days week was a natural period of time. It is possible that initially age was calculated in weeks. It may explain thousands of years age of pharaohs from early dynasties (there are 1040 weeks in 20 years). If somebody wants using longer period of time he may give to each week name of the one of planets. Result is a period of 49 days. At the end of the period a holiday may be added.

Jews preserve such system for calculation of Omer period between Pesah and Shavuot holidays. Planets were called by name of Gods. Jews practiced monotheism, hence, used numbers instead. Days of Omer are numerated by two parallel numerical systems – or by total days or by mention both the number of days and the number of weeks (e.g. day 24 or third day of the fourth week). Omer count of seven weeks is ended by holiday. It is written in Book of Deuteronomy (16.9-16.10) “Count off seven weeks from the time you begin to put the sickle to the standing grain. Then celebrate the Festival of Weeks“.

We assume that shanah (time period used for age calculation) before the Flood was equal to 50 days. Recalculated ages of antediluvian patriarchs are presented in Table 3. Ages appear reasonable. Begetting age of Noah was corrected by using modified value of Hebrew letters. Shem lived 98 shanah before the Flood (Genesis, 11) and 142 shanah after the Flood. We’ll recalculate age of Shem after discussing longevity of shanah after the Flood.

Table 3. Age of antediluvian patriarchs for 50 days time scale.

Name	Begetting Age (groups of 10 based numerals)	Years of Life (groups of 10 based numerals)
Adam	18	53
Seth	14	51
Enosh	12	50
Cainan	9.5	51
Mahalalel	9	49
Jered	22	58
Enoch	9	25
Methuselah	26	58
Lamech	25	50
Noah	32 <sup>1</sup>	55
Shem	15	33 (85 <sup>2</sup> )

<sup>1</sup>Age is calculated by corrected values of Hebrew letters

<sup>2</sup>Age is calculated combining longevity of shanah before and after the Flood.

Cohen<sup>9</sup> assume that six month calendar was widely used in ancient Middle East. Wagenaar<sup>10</sup> describes Babylonian calendar with two New Year festivals a year. We assume that shana was changed to half year after Flood (from Equinox to Equinox). Zucker<sup>3</sup> demonstrated that his two shanah for one year theory allows obtaining credible ages for biblical figures from Abraham to

Moses and Joshua. Our hypothesis allows obtaining credible ages for all postdiluvian patriarchs. Corresponding ages are listed in Table 4. It appears that the numbers are a little high, but possible. A wisdom text from Emar describes the stages of a man's life as follows: forty as prime, fifty as a short time, sixty as "wool" (that is, gray hair), seventy as a long time, eighty as old age, and ninety as extreme old age<sup>11</sup>.

Table 4. Age of postdiluvian patriarchs for shanah equal to half year.

Name	Begetting Age (Corrected numbers)	Years of Life (Corrected numbers)
Arpachshad	17	84
Shelah	15	81
Eber	17	97
Peleg	15	74
Reu	16	74
Serug	15	70
Nahor	14	74
Terah	35	57
Abraham	50	87
Isaac	30	90

Age of Shem recalculated for shanah equal to half a year is unrealistic (120 years). He lived 98 shanah before the Flood. During this period shanah was equal to 50 days. The Flood occurred when he was 14 years old. After the Flood he lived 142 shanah. During this period shanah was equal to half a year. Consequently, Shem died when he was 85 (14+142/2) years old in accordance with age of other postdiluvian patriarchs.

#### 4. Check of the hypothesis.

Most researchers concentrated on ages of antediluvian patriarchs. For postdiluvian patriarchs reasonable ages cannot be obtained by simple selection of period of time (shana) also. If one would use hypothesis of half a year shanah and recalculate ages of postdiluvian patriarchs using literally ages listed in Genesis 11 he would get unrealistic values for all ancestors of Nahor. Our hypothesis that ages were written by letters and that numerical value of the letters differ from their modern value allows obtaining reasonable ages for all postdiluvian patriarchs using half year shanah.

The seven week based calendar exists and is known as Pentecontad calendar<sup>5</sup>. Description of 50 days based Pentecontad calendar in which the year is broken down into seven periods of fifty days (a total of 350 days), with an annual supplement of fifteen or sixteen days. The calendar's use dates back to at least the 3<sup>rd</sup> millennium BCE in western Mesopotamia and surrounding areas. Used well into the modern age, forms of it have been found in Nestorianism and among the fellaheen of modern Palestine. Traces of such calendar may be found in Sukkot tradition. Sukkot is 7 days holiday. At first day 13 calves are sacrificed. At second day 12 calves are sacrificed. And so on. On seventh day 7 calves are sacrificed (Numbers, 29:13-36). One may assume that in ancient times it was 14 days holiday and calves were used for countdown.

Alternatively it is possible that holidays had been used to synchronize sequence of 7 week periods with solar year. So there must be ancient holidays 7 week apart. We'll try identifying these holydays in modern Hebrew tradition. Main Hebrew holidays are listed in tractate Rosh Ha Shana. If we are looking for Pentecontad related holidays, hence, all four New Years (Rosh haShana in Hebrew ) must be excluded as related to solar calendar. Remain Jewish holidays are: Passover, Shavuot, 9 Av, Yom Kipur, Succot, Hanukkah, Purim. We assume that initially these Holidays were fifty days apart. After mixing of Lunar, Solar and Pentecontad calendars into modern Hebrew calendar time intervals between holidays changed. Tractate Rosh HaShana (chapter 1) describes that messengers were sent out to proclaim that one of the following months begin. The months are Nissan, Av, Elul, Tishrey, Kislev and Arad. All holidays listed above occurs at this months. Only exclusion is Shavuot which occurs exactly 50 days after Passover and its date may be easily calculated.

Seven periods of 49 or 50 days is less then solar year. So additional holidays must be added to synchronize Pentecontad and Solar calendars. For 50 days shanah fifteen days must be added.. Possible its were a week of Pesah, a week of Sukkot and second day of Purim. In the case of 49 days shanah 22 days must be added. Additional holidays may be a week of Pesah, a week of Sukkot and eight days of Hanuka. It is one of possible alternative explanations of duration of Hanuka.

It is possible that each seven week period had specific traditions. Part of this traditions is included in the modern Omer days. For example there is a strange tradition of bonfires on Lag Be Omer. Lag is English translation of Hebrew לָג. Using numerical values of Hebrew letters one may conclude that it is 33d day of Omer. A simple relation  $50 \cdot 3 + 33 = 183$  indicates that לָג day of fourth seven week period is exactly a half of solar year. If the year start at spring Equinox, than it is a day of autumn Equinox. In ancient times bonfires were used to celebrate this day.

Begetting ages and lifetime of postdiluvian patriarchs listed in table 4 are higher then ages of antediluvian ones. The patriarchs were pure shepherds moving one place to another place following seasons. It is logical assuming that shanah was a season. In the Middle East there are regions with two (Mesopotamia, Canaan), three (Egypt, Assyria) end even four (Anatolia) seasons<sup>12</sup>. Sometime patriarchs were in two season region, sometimes in three season region. Zucker<sup>3</sup> demonstrate that two shanah year allows obtaining eligible ages for biblical figures from Abraham to Moses. Ages of predecessors of Terah comply with ages of antediluvian patriarchs for three shanah year ( table 5).

Table 5. Age of Terah predecessors for 3 shanah year.

Name	Begetting Age (Corrected numbers)	Years of Life (Corrected numbers)
Arpachshad	12	56
Shelah	10	54
Eber	12	64
Peleg	10	49
Reu	10	49
Serug	10	47
Nahor	10	46

Real ages of patriarchs are between values listed in tables 4 and 5.



## Appendix

In ancient world calculations based on 7 and 12 were used widely. We reconstruct possible numeric values of Hebrew letters for groups of seven system (Table 1) and calculated ages of patriarchs in shanah. Results are presented in table A1.

Table A1. Corrected Years of Life in shanah for groups of seven based numerals.

Name	Begetting Age in shanah (groups of 7 based numerals)	Begetting Age by Hebrew numerals	Years of Life by Hebrew numerals	Corrected Years of Life in shanah (groups of 7 based numerals)
Adam	133	קל	תתקל	357
Seth	96	קה	תתקיב	345
Enosh	84	צ	תתקה	320
Cainan	70	ע	תתקי	343
Mahalalel	68	סה	תתצה	313
Jered	156	קסב	תתקסב	380
Enoch	68	סה	שסה	173
Methuselah	175	קפז	תתקסט	399
Lamech	170	קפב	תשעו	293
Noah	205	תקב	תתקנ	371
Shem	91	ק	תר	210
Arpachshad	47	לה	תלח	168
Shelah	42	ל	תלג	157
Eber	46	לד	תסד	179
Peleg	42	ל	רלט	161
Reu	44	לב	רלט	161
Serug	42	ל	רל	140
Nahor	56	כט	קםח	154
Terah	70	ע	רה	103
Abraham	91	ק	קעה	166
Isaac	63	ס	קפ	168

Ages of patriarchs in solar years obtained for 50 day shanah before the Flood and half year shanah after the Flood are presented in Table A2

Table A2. Corrected Years of Life in solar years for groups of seven based numerals.

Name	Begetting Age in years (groups of 7 based numerals)	Corrected Years of Life in years (groups of 7 based numerals)
Adam	19	51
Seth	14	49
Enosh	12	46
Cainan	10	50
Mahalalel	10	46
Jered	22	55
Enoch	10	25
Methuselah	25	57
Lamech	14	42
Noah	29	53
Shem	13	30 (69 <sup>1)</sup> )
Arpachshad	23	84
Shelah	21	78
Eber	23	89
Peleg	21	80
Reu	22	80
Serug	21	70
Nahor	28	72
Terah	35	51
Abraham	45	83
Isaac	31	84

<sup>1)</sup> Age for 50 day shanah before the Flood and half a year after the Flood.

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