

April 2005

Review of:

The Genesis Calendar
The Synchronistic Tradition in Genesis 1-11
by Bruce K. Gardner

University Press of America 2001
ISBN 0-7618-1969-X
xx+374 pages

Dr. Bruce K. Gardner has written an extensive analysis of the calendars probably in use during the Second Temple period (520 BCE – 70 CE) in Israel. He places 'The Genesis Calendar' at the center of his presentation – a calendar which he finds to be encoded in the genealogical pedigree in the eleventh chapter of the Book of Genesis. He considers this calendar to be part of a synchronistic tradition, meaning that several different calendars like solar, lunar, luni-solar were in use simultaneously, like e.g. the calendars known from Qumran¹.

On page 171 we read what the author wants us to learn: "Discoveries of synchronistic calendars in Qumran have confirmed the impression that the solar calendar was intercalated, and so synchronised with the luni-solar year [...]. An examination of the available evidence for a valid and reliable intercalary pattern in this solar calendar, together with the attestation of new, satisfactory, evidence, is the main point of this thesis, along with a theory as to its provenance in the Zadokite tradition." What he believes to have found is: encoded information about a 7-day intercalation between a 364-day year and the solar year (ca. 365.25 days) in a 6-year cycle, as well as encoded information about the luni-solar intercalation.

Dr. Gardner's book touches on a subject that requires a detailed quantitative analysis of the numerical structure of the Genesis 11 – pedigree. The smaller part of his monograph is concerned with analysing the Genesis numbers, "*a numerical genealogy of Primeval History*"(p.179), the larger part is dealing with information on calendrics in general, discussing earlier contributions to calendrics research, theological and "socio-religious" aspects of calendar usage throughout the ages etc..

So, someone is really tackling the numbers in Genesis 11. Anybody who got acquainted with my homepage knows that I am mostly interested in the QSA (Quantitative Structure Analysis) of the numbers explicitly mentioned in the Pentateuch. So I invested 63 € and one and a half months' evenings and weekends to read these 300+ pages, and now there is no way around writing this review. :-)

¹ Cp. e.g. Wise, Abegg, Cook, "The Dead Sea Scrolls: A New Translation", 1996, or in German, dito, „Die Schriftrollen von Qumran – Übersetzung und Kommentar“, 1999. – There is a nice synopsis (approx. 4 pages) of the Qumran calendar features in this book.

As far as I know there is only one technical review so far, the one by Prof. Sacha Stern², and I strongly recommend to read it as well. He seems to agree with Gardner's hypothesis, however, he qualifies his agreement: "The argument needs to be tested further by others (in case I am rash to endorse it) [...]."

I will concentrate on the quantitative issues raised by Gardner's findings, especially his arguments for the 'Genesis Calendar' in Gen.11:10-26. The reasons for this restriction are:
-The 'Genesis Calendar' is the main feature of the book.
-QSA of biblical texts is the subject of my homepage, not ancient calendrics in general.
-I am *not* a calendrics specialist, so I simply *cannot* comment on many questions raised in Gardner's book, like those concerning ANE (Ancient Near East) – literature and history, hypotheses regarding redaction and tradition of biblical texts etc..

A very brief outline of "The Genesis Calendar"

A foreword (pp. xiii-xv), written by Prof. James C. VanderKam, gives a concise summary of Gardner's proposal, particularly in regard to the main numerical features.

The main part of the book is structured by "six related problems in the Hebrew calendar" (page v):

Problem 1: "understanding Hebrew lunar evidence"

Problem 2: "the Hebrew calendar's contexts"

Problem 3: "the Mishnah's out-of-step calendrics"

Problem 4: "364-day calendars and intercalation"

Problem 5: "the 'Key of Enoch' and PH [Primeval History] calendrics"

Problem 6: "pre-history of Qumran's synchronism"

At the core of the book is problem 5 (=chapter 6; p.183-300) where Gardner shows how he extracts his new information from the Genesis text using the 'Key of Enoch', i.e. the assumption that the *years* in the pedigrees should be taken to mean *days*.

The 'Key of Enoch'

The patriarchal ages in Genesis 5 have been interpreted already by Claus Schedl³ as textlengths of the primeval history measured in words for the purpose of securing the textual tradition. However, it is still interesting to further investigate *why exactly these* numbers were being used in the first place, especially 365, and if there are other quantitative structures to be found.

According to Gen.5:21-23 Enoch became 365 years old, a fact which reminds us of the approximate solar year length: 365 days. Gardner takes 365 to be a "factorial" calendrical reference (p.185). He calls for a consequent interpretation of this reference as a key to understanding the numbers in Genesis 5 and 11 (p.197): "A principle that is stated must also be explored, and – if correct - followed." In a "test application of the key of Enoch" (section 6.4), he applies this key to Gen.11:10-26, which is a little bit surprising since "surely the most

² Sacha Stern, review of: "The Genesis Calendar: The Synchronistic Tradition in Genesis 1-11, by Bruce K. Gardner", *Dead Sea Discoveries* 9/2 (2002) 254-258. – I am grateful to Dr. Johannes Schiller, Universität Graz, for calling my attention to this review.

³ See Akzent 6 "The Numbers in Genesis 5" on my homepage: www.ruediger-heinzerling.de .

consistent approach would be to use the correspondence in Genesis 5 only?"(p.197) The main reason for this seems to be, that he found a *simple* 'lock' for the key in Genesis 11 only.

Defining groups of numbers and new groups of numbers

It is impossible to find a solution to the Genesis numbers by simply *staring* at them and hoping for serendipity. In order to test an idea, like the 'Key of Enoch', one has to reasonably *arrange* the numbers so that possibly encoded information becomes visible.

The arrangement can be done by defining groups. (Gardner does not use the term 'group'. I do it to point out what is happening.) There are at least three group definitions that naturally 'flow' from the Genesis text as it is:

Group definition 1: Numbers from the pedigrees in Gen.5 and Gen.11 obviously belong to two comparable groups.

Group definition 2: The numbers belonging to one patriarch can be considered as a group, respectively.

Group definition 3: Procreative ages (ProcAs) can be combined to one group, as well as the interim ages (IntAs) to another, but similar group, and in Genesis 5 the full ages.

Then we have the three textual traditions:

Group definition 4: the numbers in the Massoretic Text (MT), in the Samaritan Pentateuch (SP) and in the Septuagint (LXX).

All of this is well known and did not lead to a solution so far.

Now Gardner divides the Gen.11 figures into three *new* groups (p.246ff.):

New group definition 1: the figures given for **Shem**

New group definition 2: the figures for **Arpachshad – Nahor** ("The **Heptad**")

New group definition 3: the figure for **Terah** (this 'group' has just one number.)

He explains:

"As a literary artifact, all the names and figures hold equal weight, but, even in literary terms, it has been noted that the MT version holds some features which distinguish between names."(p.246)

He defines the groups for Shem's and Terah's ages using the following observations:

-Terah has no interim age in Gen.11:10-26.

This is true, however, he has to give some additional explanation as to why he does not want to calculate the interim age from Terah's full age in Verse 32. (He discusses this as redactional aspects in section 6.4.4 of his book.)

-“Likewise, it is noted that 500, Shem’s IntA is vastly greater than the other numbers.” (p.247)

This is certainly wrong. In what sense is 500 “vastly greater” than 403, 430, 209, 207, 200 and 119? However, Gardner has more reasons to separate Shem’s numbers.

-There seems to be a similarity between the ages given for Noah and Shem:

Noah: ProcA: 500 + Interval to Flood: 100 = Age at Flood: 600

Shem: ProcA: 100 + IntA: 500 = Age at Death: 600

So there are 3 numbers that are used both with Noah and Shem. (However, there are 4 discrepancies as well.)

-Furthermore, for the numbers 100, 500 and 600, Gardner adopts the explanation given by Dwight Wayne Young⁴, who “finds that 100, 500 and 600 are common in Babylonian mathematics, as partial expressions of the problem of the rectangle” (p.248). “[...] there seems to be an ironic cover-up in using elementary mathematics in one’s holy literature” (p.250).

This explanation is far-fetched, in my opinion.

Shared totals

Before we consider the definition of more new groups of numbers, let us take a look at the “shared totals” of some of the groups. Gardner finds “a clue to the organisational principal of the genealogies” in these shared totals (p.252). I think it is important to take a closer look at this, because we will see what a bumpy road a quantitative analysis can be.

On page 248, **Fig. 29**, the Gen.11 - totals of MT, SP and LXX are given:

Name:	MT ProcA	MT IntA	SP ProcA	SP IntA	LXX ProcA	LXX IntA
Shem	100	500	100	500	100	500
Arpachshad	35	403	135	303	135	400
Qainan	–	–	–	–	130	330
Shelah	30	403	130	303	130	330
Eber	34	430	134	270	134	270
Peleg	30	209	130	109	130	209
Reu	32	207	132	107	132	107
Serug	30	200	130	100	130	200
Nahor	29	119	79	69	79	125
Terah	70	–	70	–	70	–
TOTAL:	<u>390</u>	<u>2471</u>	<u>1040</u>	<u>1761</u>	<u>1040</u>	<u>2471</u>
Grand Totals:		<u>MT: 2861</u>		<u>SP: 2801</u>		<u>LXX: 3511</u>

⁴ Dwight Wayne Young, "On the Application of Numbers from Babylonian Mathematics to Biblical Life Spans and Epochs", ZAW 100 (1988) 331-361.

But the totals for LXX are inconsistent, and the grand total for LXX is wrong.

The total LXX ProcA = 1040 **excludes** Qainan,
 the total LXX IntA = 2471 **includes** Qainan,
 so the grand total $1040 + 2471 = 3511$ does not make sense.

The numbers should be:

Excluding Qainan: $1040 + 2141 = 3181$,

including Qainan: $1170 + 2471 = 3641$.

A few pages later, Gardner picks out the 'right' numbers to conclude a common textual tradition (p.251):

"To return to Fig. 29 (above), the most significant figures are the totals of the IntAs of MT and LXX (both 2471), and the parallels between the total ProcAs of SP and LXX (both 1040). This seems to imply they adopted the same tradition, and their data should be identical." (Emphasis BKG).

"Both 1040" supposes that Qainan is *excluded* in the LXX data, "both 2471" supposes Qainan to be *included*. So he chooses just the totals that fit into the schema he wants the reader to see.

We cannot make light of Gardner's choice, because he claims these totals to be "the most significant figures" in the table of the Genesis 11 numbers (Fig.29)! This is strange already, because these totals do not stand in the text, and Gardner insists "on the strictest of text-based reading"(p.279). And now we find, they seem to be chosen just to suit Gardner's intention. Coincidence? Or "tendentious" selection (to use one of Gardner's terms)?

And what is the reason behind putting so much emphasis on the calculated totals, anyway? As we will see later, the only piece of information about a 364-day calendar is the *interpretation* of a *sum total* of two specially defined columns of numbers. Can this be the motivation behind his choice? Or is it just a mistake? I don't know.

Apart from the fact that the numbers are inconsistent, I do not see how one or two coincident totals should amount to evidence for the same tradition anyway, let alone to evidence for "identical data". Instead, there are much better arguments for a common tradition: The identity of the names of the patriarchs, the overall literary structure, and the distribution of decimal digits. Nobody who ever saw the ProcAs of Gen.11 according to the three text traditions needs further explanation. The whole exercise seems to have had at least one effect: it confused Prof. James C. VanderKam (see below) who wrote the foreword to Gardner's book.

From genealogy to calendrics

In section 6.4.5.2 (p.252ff) Gardner looks for patterns in the second of his newly defined groups, i.e. the 14 numbers for the 7 patriarchs from Arpachshad to Nahor, the "Heptad", as he calls it. He sums up the ProcAs and IntAs and applies the 'Key of Enoch' (years -> days):

Sum of MT ProcAs	+	Sum of MT IntAs	=	Total
<u>220 days</u>	+	<u>1971 days</u>	=	<u>2191 days</u>

In doing so, he leaves the semantical level of the pedigree, where the genealogical figures are usually interpreted in a chronological sense, and he begins to interpret them calendrically. Chronologically, the sum of the ProcAs could be used to calculate the time (in years) between the Patriarchs. But the total 2191 does not make any sense as a chronological datum. Gardner states (p.254):

“The total of the two columns is 2191, a calendrically-meaningful number. If we apply the ‘Key of Enoch’ [...], then 2191 is a significant figure, in calendrical terms, for 2191 days are *within 12 hours of a period of six solar years.*” (Emphasis BKG.)

His interpretation extends the definition of the heptad: It is defined to be a representation of approx. 6 solar years.

So, after more than 250 pages, Gardner finally dares to show something of what he has found to be part of a synchronistic calendar tradition in Genesis. His line of argument has become so complicated that it pulled Prof. VanderKam off the track.

In his foreword, VanderKam reports on several points Gardner has made in his view (p. xiv). Point 1 is particularly interesting:

“1. Though the MT and LXX have a different number of characters in their genealogies, the number of years for the individuals between Shem and Terah [*excluding these two*], adding their ProcA (procreative ages, that is, the ages of the patriarchs when they became fathers for the first time) and IntA (interim ages, that is, the number of years between the birth of the first son and the death of the patriarch), is 2191, a number equivalent to six solar years (364 days) + 7, in other words, a six year cycle.” - [Additions in square brackets are mine. RH]

This appears to mean: MT and LXX have different numbers of patriarchs, but the sum of the ages of the patriarchs - according to Gardner’s group definition - is 2191, in *both* cases.

Using the numbers given by Gardner, the sum total of the heptad, according to the MT, is in fact 2191, however, for the LXX we find:

	ProcA	IntA	Sum
Excluding Qainan:	870	1641	2511
Qainan:	130	330	460
Including Qainan:	1000	1971	2971

So, for LXX the sum is *not* 2191, regardless whether we include Qainan are not. And in the SP we find a sum total of 2131 ≠ 2191.

It may well be that VanderKam has been confused by Gardner’s wrong presentation on page 248 (Fig.29) or something. However, the sum 2191 occurs in the MT only, or, to be precise, it does not even occur in the MT but can be *derived* only from the MT’s numbers.

So, at the very outset of Gardner’s line of argument we find a considerable mistake. After correcting it, the observation of a rather insignificant fact remains. This strangely defined

group of $2 * 7$ numbers in the MT adds up to 2191, a number which can be interpreted as representing the following approximation:

$$6 * 364 + 7 = 2191 \text{ days} \approx 6 \text{ solar years} \approx 6 * 365.25 \text{ days} = 2191.5 \text{ days.}$$

Please note: This number, 2191, which does not stand in the text, is the one single lonesome piece of information about the 364-day year that Gardner found in Genesis 11!

The reader of this review will not be surprised to learn that Gardner makes no attempt at any statistical evaluation of his findings. So the 'appearance' of the number 2191 falls into the category of 'events tend to happen'.

So far, there are clever definitions of groups of numbers, and we will see below that there are even more group definitions which, however, become more and more inconsistent.

More new group definitions

"What exactly is the system within which 2191 days is *calendrically*, and not just numerically, significant?" Gardner asks on page 257. He begins to answer his question by cutting off the IntAs of the heptad and considering a fourth new group of numbers:

New group definition 4: the 7 *ProcAs* of the heptad only.

He compares these 7 numbers to a sequence of alternating 29s and 30s representing a bi-monthly lunation sequence typical for a lunar calendar:

Fig. 40. The Heptad and a series of conventional lunar months.

Line 1: A bi-monthly lunation sequence:	29, <u>30</u>, 29, <u>30</u>, 29, <u>30</u>, <u>29</u>
Line 2: The Heptad's sequence:	35, <u>30</u> , 34, <u>30</u> , 32, <u>30</u> , <u>29</u>

Obviously, there is a certain correspondence between these two lines, disregarding three of the numbers (35, 34 and 32), a feature that quite a few Bible readers must have observed already, and it is interesting to see Gardner's analysis:

"I hypothesize that these other three numbers are three lunar months of 29 days which have been disguised by the addition of a selected excess."(p.258)

So we have three discrepancies of

$$\begin{aligned}
 35 - 29 &= 6 \\
 34 - 29 &= 5 \\
 32 - 29 &= 3
 \end{aligned}$$

which yield a total excess of 14, while the other numbers are identical to the "bi-monthly lunation sequence" (line 1 in Fig.40).

Now we have a fifth new group definition:

New group definition 5: numbers of the ProcAs of the Heptad that correspond exactly with a hypothetical bi-monthly lunation sequence, and those that do not, but are "disguised by the addition of a selected excess".

Gardner continues: "For now, the first, most obvious, question must be: if a covert pattern of lunar months has been engineered in the current figures, why are there only *seven* months?", an important question, indeed. However, another, equally important, question would have been: what exactly is the system within which these seven lunar months are part of a cycle of 2191 days, because these figures belong to the same *previously* defined Heptad of $2 * 7$ numbers? The answer to *this* question would deliver valuable information about the possible synchronistic calendar tradition Gardner is looking for. But he does not answer this question, he does not even ask it, instead he defines *even more new* groups of numbers in order to 'explain' the seven lunar months as being part of *one* lunar year.

To my surprise, he implicitly *discards* his previous separation of Shem's and Terah's ages, i.e. the definition of the Heptad, by connecting the seven numbers with the ProcAs of these two patriarchs: 100 years (days) and 70 years (days). We arrive at:

New group definition 6: the 9 ProcAs which belong to the new groups one, two and three.

(This is similar to the old definition of all ProcAs of Gen.11, but the numbers of Shem and Terah are still to be considered somehow special, as we will see immediately.)

Then he uses the epact between one approx. lunar year of 354 days and one approx. solar year of 365 days, i.e. 11 days, to subtract this number from both Shem's ProcA ($100-11 = 89 = 30+29+30$) and Terah's ProcA ($70-11 = 59 = 30+29$). By implication he so defines:

New group definition 7: The ProcAs of 2(!) patriarchs (Shem and Terah), from which to subtract the luni-solar epacts of 2(!) years(!), in order to deliver $3+2 = 5(!)$ missing months(!), which in turn complete the 7 months of half of the heptad (which itself is an ill-defined part of a cycle of 6 solar years) to 12 months of 1(!) lunar year.

Are you still with me? He needs 5 additional months to get 1 lunar year. He generates them by subtracting the luni-solar epact of 2 years (i.e. 2 times 11 days) from Shem's and Terah's ProcAs ($100-11=89$ and $70-11=59$). Then he redistributes these days to generate 5 month-lengths: $89=30+29+30$ and $59= 30+29$. - And one must never forget that the 7 months of the 'heptad' still are part of the cycle of 6 solar years!

After discussing the 'right' sequence of month-lengths to be selected, he arrives at the following construction:

Fig. 49. The Basic Genesis 11 Synchronistic Calendar (GXISC)

SH1	SH2	SH3	AR	SH	EB	PE	RE	SE	NA	TE1	TE2
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>
<u>30</u>	<u>29</u>	<u>30</u>	<u>29</u>	30	<u>29</u>	30	<u>29</u>	30	29	<u>30</u>	<u>29</u>

I emphasize in ***bold and italic*** letters the figures that do ***not*** stand in the Genesis text, in contrast to the figures that do. So the 9 names of the patriarchs and 4 of the 12 numbers in the last line of Fig.49 are directly taken from Genesis 11, nothing else.

This is what Gardner calls "the basic Genesis 11 synchronistic calendar". To be honest, this is much less than what I was hoping for.

I summarize some of the problems so far:

- There are only 9 patriarchs, but 12 months.
- There are only 4 month lengths mentioned in the text, instead of 12.
- The new group definitions 1 and 7 are overlapping in the case of Shem's ProcA. According to new definition 7 and Fig.49, Shem's ProcA is the sum $30+29+30+11 = 100$. According to new definition 1, Shem's ProcA is explained by the similarity between the ages given for Noah and Shem, just a Babylonian mathematics example intended to be an "ironic cover-up". This is not impossible, but it is an overdetermination, and as such it is less probable than any *unique* definition.
- The new group definition 6 (the 9 ProcAs which belong to the new groups one, two and three) overlaps, and thereby kind of destroys, the new group definition 5 (the 7 ProcAs of the 'left half' of the heptad).
- The new group definition 7 (the ProcAs of 2 patriarchs minus the luni-solar epacts) mixes up several disparate periods of time in an almost absurd way (see above).
- None of the IntAs themselves is explained, with the exception of the IntA 500 of Shem as part of a mathematics example. However, this is not a calendrical explanation. The other IntAs are part of the sum 2191, but we do not learn why exactly these numbers were chosen.
- We do not learn, why exactly the numbers 35, 34 and 32 were chosen to generate an excess of 14.
- There is no statistical test whatsoever on any of the quantitative structures analysed in this book.
- The 'decoded' information concerning calendrical characteristics does not amount to a synchronistic calendar at all.

The last point may be surprising to anyone who did not read the book. There is only one single presentation of a synchronistic calendar in form of a table to be found in Gardner's book, and it is *not* the "Genesis 11 Synchronistic Calendar (GXISC)", but the Egyptian 25-year cycle from the demotic papyrus Carlsberg 9 (Fig. 15, p.118). Even in an explicitly "speculative" section about "Seasons in the GXISC, and a possible pre-history" (p.292ff) he does not dare to show us even a hypothetical example of how a "GXISC" could have looked like in practice. This is one of the most surprising features of the book: there are 374 pages, but the synchronistic "Genesis Calendar" is still hidden between the lines. However, this corresponds nicely with the information Gardner found in Genesis 11: It does not add up to a synchronistic calendar.

Two more steps to go: Regarding the biblical numerical basis of this 'calendar': Gardner utilizes the epact of 14 from the heptad by defining 2 new groups of numbers: numbers of cycles and intercalary days.

New group definition 8: 14 is the number of cycles-of-6-solar-years (of 2191 days each) in a 84-year cycle. - "[...] in analysing the calendrics of Genesis 11, I posit that it covertly denotes a longer cycle: i.e. *the number of sexennia in the calendar's long cycle.*"(p.269)

By "long cycle" Gardner means the hypothetical 84-year cycle, where:

$$84 \text{ solar years} \approx 14 * \text{approx.-cycle-of-6-solar-years (2191 days)} + 7 \text{ days}$$

And last, not least:

New group definition 9: 14 days are the intercalary period in the 84th year,
7 days for the 14th 6-year-cycle:
2184+7=2191≈6*365.25
+ 7 days for the 84-year-cycle:
30674+7=30681=84*365.25
where 30674 = 14*2191.
(p.269/270)

Conclusion so far:

There are many free parameters in Gardner's 'system'. Free parameters make it very likely to find many fitting correspondences between one's hypotheses and the given data, so that their occurrence in all likelihood can be attributed to pure chance. I pointed them out by showing how many disparate group definitions are being used. Rearranging the numbers without statistical backing has lead Gardner to accept improbable explanations as proof.

Excursus: The Meton cycle in Genesis 11

The reader of this review may be interested to learn how easy (or difficult) it is to come up with calendrical interpretations, given Gardner's methodology. Just a quick ad hoc example: I suppose the data in Fig. 40 (see above) : "The Heptad and a series of conventional lunar months", and the excess of 14, including all of Gardner's assumptions necessary for this construction. Here is my interpretation: The 7 ProcAs hint to the 7 intercalary months in the Meton cycle ("Surprise!"), which is defined:

$$235 \text{ lunations} = 19 \text{ tropical years} \quad (\text{Meton cycle})$$

where

$$235 * 29.53059 \text{ days} = 6939.69 \text{ days}$$

$$19 * 365.2422 \text{ days} = 6939.60 \text{ days}$$

and

$$235 \text{ lunations} = (19 * 12 + 7) \text{ lunations}$$

So there are 7 lunations in 'excess' of 19 * 12 = 228. Calendrically, these 7 lunations are usually accounted for by one additional month in 7 intercalary years:

$$19 \text{ years} = 12 * 12 \text{ months} + 7 * 13 \text{ months}$$

Now we consider the Meton cycle with higher resolution, days instead of months. Let all months be of a *theoretical* length of 29.5 days, then:

$$6939.69 \text{ days} \approx 235 * 29.5 \text{ days} + 7 \text{ days}$$

We see that the 235 months are lacking ca. 7 days to achieve 6939.69 days. These 7 days can be accounted for by declaring 14 29.5-day-months to be 30 days long, without having a 29-day-counterpart:

$$6939.69 \text{ days} \approx 221 * 29.5 \text{ days} + 14 * 30 \text{ days}$$

So there are 7 intercalary months in the Meton cycle, and there are 14 30-day-months in excess of 29-day months. And all of a sudden we have an explanation for the 7 and 14, at least as fine as Gardner's explanation!

Genesis 11	Astronomical / calendrical interpretation
7 'months'	7 intercalary months in 1 Meton cycle
14 days 'excess'	An 'excess' of 14 30-day-months in 1 Meton cycle

Of course, there is a residual error of ca. 0.5 days in this calendrical representation of the Meton cycle, because there is an odd number of 29.5-day-months. But this error can easily be compensated by concatenating 2 Meton cycles. I leave it to the interested reader to carry out this calculation. ;-)

Finally, we can interpret the numbers 35, 34, and 32! As we have seen above, the discrepancies between these numbers and 29 are 6, 5, and 3. 'Obviously' these figures are intended to be read as one number: 365, and this number is a clear hint to the solar year that the Meton cycle is intended to approximate, is it not? ;-)

The Meton cycle interpretation is a considerably more modest 'solution' than the synchronistic calendar, since we use only 7 ProcAs and leave aside the IntAs completely. But we have dubious suppositions (the 'heptad', the excess of the ProcAs, and more), and we have free parameters quite similar to Gardner's approach. However, the Meton cycle can *really* answer Gardner's question: "[...] why are there only *seven* months?" They are the intercalary months in one Meton cycle.

We see how easy it is to come up with solutions like this, given the freedom of changing group definitions at will. Of course, this 'solution' is just as unreliable as Gardner's. I, too, do not try to evaluate this statistically because I do not believe it is worth it.

Stuff of this kind should not be taken too seriously as long as no statistical test has been applied, regardless whether such a test is possible, has been carried out, or not.

So it comes as a surprise to read (p.270):

"Enough has been said to prove clearly that the Genesis 11 synchronistic calendar exists in some form: it is time to consider its viability as a cycle, if 6 and 14 [84?] years be taken as a reasonable hypothesis derived alone from the MT text."

There is no clear proof of this calendar to be found in the numerical considerations in Gardner's book, the numbers could as well encode the Meton cycle or something.

Calendrical cycles and numerical exactness

(This section is concerned with pages 178/9, 266/7, 271, 274-277 of Gardner's book, where he discusses Uwe Glessmer's hypothesis and the numerical exactness of the GXISC in regard to the "lunar aspect".)

Although there is no proof for a synchronistic calendar, it is interesting to consider Gardner's handling of numerical precision in order to get an impression of the reliability of his information about the calendar cycles. Numerical exactness seems to mean much to Gardner. On page 271 he writes: "All factors combine, showing the Genesis 11 synchronistic calendar to be no product of the imagination. The numerical exactness is too high for accident [...]."

Of course, there is no such thing as a numerical exactness preventing random chance processes. And even if all numerical errors were zero, the calendar can still be fantasy. But we can take his point as meaning a potential element of a *statistical* consideration. So here we go:

On page 178 Gardner introduces the $14 * 6 \text{ year} = 84 \text{ year}$ cycle relationship, i.e. Uwe Glessmer's proposal concerning the interpretation of 4QOt⁵. Glessmer's hypothesis is concerned with possible intercalations of 7-day-weeks into a 6-year and 84-year cycle. Gardner goes beyond that (p.179):

"I also find it quite compelling, given the notably synchronistic aspect of the later tradition [...], *that the sum of 84 years virtually coincides with 1039 lunations* [emphasis BKG]. So far as I know, I am the first to note this parallel, and will supply more evidence of this later [...]."

This lunar aspect of the 84-year-cycle seems to be very important. However, he remarks, it does not work in the 6-year cycle (p.266/7):

"A challenge therefore is this: 6 years cannot by any means be a lunar-related cycle, for the viability of a bare 6-year cycle is highly questionable in this respect."

The factual problem is: The 6-year cycle equals $2191 \text{ days} \approx 74 \text{ lunations} + 5.7 \text{ days}$, so this cycle is quickly shifting its phase against the lunation cycle, approx. 6 days / 6 years. But this does not seem to be what Gardner has in mind.

On p.276 he writes:

"The error in this cycle, in lunar terms, is thus only ca. 1.3 days in 84 years, or a theoretical error of $1.3/14 = 0.093$ days per sexennium (2.23 hours)."

⁵ Uwe Glessmer, „The Otot-Texts (4Q319) and the Problem of Intercalations in the Context of the 364-Day-Calendar“, in: H.-J.Fabry, A.Lange, H.Lichtenberger, „Qumranstudien – Vorträge und Beiträge der Teilnehmer des Qumranseminars auf dem internationalen Treffen der Society of Biblical Literature, Münster, 25.-26-Juli 1993“, pp. 125-164, esp. 155/156.

Gardner does not seem to mind that he himself rejected the viability of a 6-year-cycle as a lunar cycle, and with good reason as we have seen. What is going wrong here? He takes the absolute error of 1.3 days between 84 years and 1039 lunations, and kind of redistributes it on the 14 6-year-cycles, which makes no sense. The 1.3 days are the error only for exactly 1039 lunations and 84 years. With regard to the 6-year-cycles the error - i.e. the distance to the nearest lunar phase - changes according to the phase shift as seen above, and is typically several days long, not 2.23 hours.

The numerical exactness of 1.3 days means a relative error of $\pm 1.3 \text{ days} / 29.53 \text{ days} \approx \pm 4.4\%$, which is not breathtaking. It is plus or minus, because the negative distance would be seen as equally 'good'. So it is quite probable to find the lunation phase of reference in a vicinity of ± 1.3 days, regardless whether a cycle is 6 or 84 years long, or even longer.

Knut Stenring and Gerhard Larsson (p.232-240)

"The Genesis Calendar", is the title of Gardner's book. So I had high expectations what he would write about the calendar-hypothesis developed by Knut Stenring⁶ and statistically evaluated by Prof. Gerhard Larsson⁷. Stenring's chronology is based on three different theoretical calendars according to which every single date - in a certain part of the Hebrew Bible - can be interpreted consistently, however, not in regard to a 'realistic' history, but on a literary level only. Larsson writes in his introduction to Stenring's book⁸: "The chronological information is to be read exactly as it stands in the text. Thus, if 5 years is mentioned, this means 5 years to the day. Naturally *this may not be in agreement with historical fact.*" (emphasis RH) - Stenring, in his preface⁹, writes in regard to the lunar calendar to be found in his book: "[...] the reader will find a Biblical lunar-year calendar, which *has no connection whatever with the lunar-year calendars in practical use* in the third century before Christ, [...]" (emphasis RH), which is the assumed time of formation of this chronology.

So it comes as a surprise that Gardner wastes most of the pages about this chronology and its calendars on showing that they have no connection with historical reality. "Real science is absent. With regard to Larsson's exact dating, for example, to what does a lunar month refer here if there is no tie-in to *real* lunations?" A question easily to be answered by reading Larsson's publications.

He belittles Larsson's comments on Stenring's remarkably successful hypothesis: "With such arguments, this present book has little to do, since they are not accurate calendrical." (p.237). Instead, he later postulates: "[...] if the Key of Enoch is to reveal calendars in the text, they must be realistic, and verifiably accurate in their form and detail." (p.239) So Gardner's hypothesis of a 'Key of Enoch' *forces* a possible calendar in the Bible text to be *realistic*? This must be wishful thinking.

⁶ Knut Stenring, "The Enclosed Garden", Almqvist & Wiksell, Stockholm 1966, 101 pages.

⁷ Gerhard Larsson, "The Secret System - A Study in the Chronology of the Old Testament.", Leiden (E.J.Brill) 1973, VIII + 119 pages.

⁸ Knut Stenring, "The Enclosed Garden", p.8.

⁹ Knut Stenring, "The Enclosed Garden", p.24.

Unfortunately, Gardner did not understand what Stenring and Larsson have written. He even goes so far to surmise: "Larsson expresses no awareness that [larger] cycles [for intercalary purposes] even existed."

Finally, Gardner does not mention Larsson's impressive statistical work at all, so his considerations are almost completely useless to find out if Stenring's hypothesis is valid or not. This is particularly disappointing! Given 374 pages, it should have been possible to write *something* about the most formidable opponent's best argument.

Abstract

(Review no. 3: "The Genesis Calendar - The Synchronistic Tradition in Genesis 1-11" by Bruce K. Gardner)

Dr. Bruce K. Gardner has written an extensive analysis of the calendars probably in use during the Second Temple period in Israel. His book is structured by 6 problems: (1) "understanding Hebrew lunar evidence", (2) "the Hebrew calendar's contexts", (3) "the Mishnah's out-of-step calendrics", (4) "364-day calendars and intercalation", (5) "the 'Key of Enoch' and PH [Primeval History] calendrics", (6) "pre-history of Qumran's synchronism". The chapter about problem 5 is the center of his presentation, which is the part of the book this review is concerned with only. Gardner believes to have found 'The Genesis Calendar' in the genealogical pedigree in the eleventh chapter of the Book of Genesis, encoded by the 'Key of Enoch': the *years* of the ages of the patriarchs are to be counted as *days*. He considers this calendar to be part of a synchronistic tradition, meaning that several different calendars like solar and luni-solar were in use simultaneously, like e.g. the calendars known from Qumran.

However, the only piece of information hinting at a 364-day year is the sum total of all the ages of the 7 patriarchs from Arpachshad to Nahor in the Massoretic Text, which is 2191, a number which does not occur in the text. 2191 days can be interpreted as an intercalated 6-year-cycle of 364-day-years being an approximate 6-year-cycle of solar years:

$$6 * 364 + 7 = 2191 \text{ days} \approx 6 \text{ solar years} \approx 6 * 365.25 \text{ days} = 2191.5 \text{ days}$$

In a detailed analysis of the other numbers of Gen.11, Gardner 'finds' 12 months of a lunar year as well. The proof for the existence of this synchronistic calendar tradition in Genesis 11, which Gardner believes to have found, can not be confirmed by this reviewer. Gardner's procedures to obtain his results are really smart, but it is very likely to find similar solutions, like e.g. the Meton cycle, by allowing so many free parameters to enter the system as he did. Unfortunately, he does not do any statistical tests at all.