The 'Astronomical' Chapters of the Ethiopic Book of Enoch (72 to 82)

TRANSLATION AND COMMENTARY
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With Additional Notes on the Aramaic Fragments
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Summary

Ethiopic literature has preserved the "*Book of Enoch*" which is, as we know, closely related to the Jewish sect that is represented in the "*Dead Sea Scrolls*". Ten chapters of this work are concerned with *astronomical* concepts of a rather primitive character (variation in the length of daylight, illumination and rising amplitude of the moon, wind-directions, etc.), dominated by simple arithmetical patterns.

The present paper gives a new translation of these chapters, followed by notes where the meaning of the text is not self-explanatory. An appendix, with additional notes, deals with related source material in the *Qumran astronomical scrolls*.

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Bibliographical Abbreviations

Charles, Enoch: R. H. Charles, The Book of Enoch, 2nd ed., Oxford 1912.
Dillmann, Henoch: A. Dillmann, Das Buch Henoch, Leipzig 1853.
Flemming, Henoch: J. Flemming, Das Buch Henoch, Leipzig 1902.
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P-Sm Payne Smith, Thesaurus Syricus, Oxford, 1879.
Th W NT Theologisches Wörterbuch zum Neuen Testament.

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Introduction

It has long been recognized that the astronomical chapters of the Book of Enoch constitute a composition of their own without much direct contact with the other parts of the treatise. This does not mean, however, that the astronomical book is unrelated to the rest of the Book of Enoch. On the contrary, its contents reflect faithfully, but in greater detail, the simple cosmologic concepts that prevailed in the communities which produced the Enochian literature.

I do not think, however, that one should consider the astronomical chapters as a literary unit composed by one author who followed some stylistic reasoning. It seems obvious to me that the text, as we have it, consists of two major versions, both covering essentially the same material, to which are added several still more fragmentary pieces. What we have is not the work of one author (or "redactor") but a conglomerate of closely related versions made by generations of scribes who assembled, to the best of their knowledge, the teaching current in their community about the structure and the laws of the cosmos. It is also important to note that purely calendaric rules on fasts and feasts are conspicuously absent, in marked contrast to the later Ethiopic "computus" of Judaic and Christian origin.

It is, of course, possible that there existed originally one treatise written to codify the astronomical doctrines of a religious sect. Such a treatise would then have reached us only in several more or less modified versions, two of which are reflected in the present chapters **72** to **76** and **77** to **79**,1 respectively. Fragments from additional versions are preserved in **79**,2 to **80**,1 while the description in **82** of the angelical hierarchy of the stars evidently belongs to a quite different source. Furthermore it should be remembered that innumerable fragments of Enochian "astronomy" (concerning the variation of the length of daylight, the "gates," the winds, etc.) are scattered all through the Ethiopian "computus"-treatises.

The several chapters of our treatise are grouped around only a small number of topics: solar year and lunar months, winds, the hierarchy of the stars, always hemmed in by a rigid schematism unrelated to reality. First the reader is told about the division of the "solar" year into four seasons of 30+30+31 days each. Then comes the variation of the length of daylight, based on a linear progression with extrema in the ratio 2:1. Then the lunar phases are also described by a linear pattern, assuming day 14 or day 15, respectively, as full moon dates. The variable

illumination of the moon is expressed either in terms of the moon's illuminated area (from 1 to 14 parts) or in relation to the sun's brightness, thus increasing from 1/98 (i.e. $1/7 \cdot 14$) to 1/7 (at full moon). Finally lunar months, alternatingly full and hollow, are related to the (schematic) solar year (but without any trace of a cyclic adjustment) and to the rising and setting in the "gates" at the eastern, respectively western, horizon. Unrelated to these gates are the twelve gates for the winds, four of which are beneficial, while eight bring discomfort and destruction. In contrast the stars are astronomically totally insignificant, being nothing but a replica of the division of the solar year. Neither constellations nor the zodiac nor planets are ever mentioned. This remains the rule also for the Ethiopic computus until the Arab conquest.

The search for time and place of origin of this primitive picture of the cosmic order can hardly be expected to lead to definitive results. The use of 30-day schematic months could have been inspired, e.g., by Babylonian arithmetical schemes (of the type of "Mul-Apin"), or by the Egyptian calendar. But the number and location of the epagomenal days was obviously chosen under the influence of the Jewish seven-day week and has no parallel elsewhere. The linear pattern for the variation of the length of daylight as well as the ratio 2:1 of its extrema suggests an early Babylonian background. But there is no visible trace of the sophisticated Babylonian astronomy of the Persian or Seleucid-Parthian period.

Dillmann's statement[1] that the astronomical part of the Book of Enoch is based on concepts extant in the Old Testament is simply incorrect: the Enoch year is not an old semitic calendaric unit; the schematic alternation between hollow and full months is not a real lunar calendar, and there exists no linear scheme in the Old Testament for the length of daylight, or patterns for "gates", for winds, or for "thousands" of stars, related to the schematic year. The whole Enochian astronomy is clearly an *ad hoc* construction and not the result of a common semitic tradition.

Summary of the Contents of Ch. **72** *to* **82**

First Version: **72** to **76** (with **74** probably being an intrusion)

72,2–5: Gates and Windows; winds drive the chariot of the sun (cf. **73**,2 and also **18**,4)

6–36: length of daylight, $M:m = 12:6$; year of $4 \cdot 91^{d} = 364^{d}$

37: brightness and size of sun and moon (cf. **73**,3; **78**,3,4)

73,1–3: winds drive the chariot of the moon (cf. **72**,5); brightness of sun and moon (cf. **72**,37; **78**,4)

4–8: increase of the area of illumination and of brightness of the moon from day 1

1: Dillmann, Henoch, p. 220.

to day 14 (incomplete); first visibility on the preceding day 30(i.e., after a hollow month)
74,1–4: illumination of the moon during 15 days (i.e., for a full month)
5–9: Gates and moon rise (incomplete)
10–16: garbled description of an octaeteris
75,1–7: stars ("thousands") and seasons (cf. **82**,4–20)
8,9: circumpolar stars
76,1–13: the 12 gates of the winds and their qualities (cf. the short version **33** to **36**)
14: concluding words to Methuselah (cf. **79**,1)

Second Version: **77** to **79**,1
77: Mythical geography
78,1: two-division of the year (cf. **78**,15,16; **79**,4,5)
2–5: lunar phases; size and brightness of sun and moon (cf. **72**,33–37); Gates
6–14: lunar visibility, waning moon; hollow and full months (cf. **73**,4–8 and **74**,1–4)
15,16: two-division of the lunar year (cf. **78**,1; **79**,4,5)
17: visibility of the moon during night and daytime
79,1: concluding words to Methuselah (cf. **76**,14)

Additional Fragments: **79**,2 to **80**,1; **82**,4–20 (**80**,2 to **82**,3 intrusion: apocalyptic)
79,2,3: Gates and lunar phases
4,5: two-division of the Enoch-year (cf. **78**,1,15,16) and Enoch epact
6,**80**,1: concluding speech of Uriel
82,4–20: hierarchy of stars ("thousands"), their leaders during the Enoch year (cf. **75**,1).

It seemed tempting to utilize in this commentary to the astronomical chapters of the Book of Enoch the numerous parallels and variants found in the Ethiopic "computus" treatises.[2] Since, however, practically all of these texts are unpublished and since only a detailed study could bring order and relative completeness to this huge mass of material,[3] I have usually abstained from referring to such "secondary" sources, though they may well contain information more reliable than the Book of Enoch in its present condition. I made good use, however, of the possibility of discussing my interpretations of the text with Professor Ephraim Isaac at the Institute for Advanced Study in Princeton.

In many ways every student of Enoch is indebted to Dillmann's pioneering work. When deviating from it in some technical details, however, I did not find it necessary always to quote Dillmann's translation and notes. In particular I did not refer to all the cases where the mix-up between the "gates" in the horizon and the modern concepts of orbital motion in the ecliptic produced misleading explanations. The insight into its archaic primitiveness is the key to understanding Enochian "astronomy."

2: Cf. for these texts my EAC.
3: The majority of printed catalogues deals only in a very unreliable fashion with treatises of this type.

Chapter **72**

1. Book on the Motion of the Luminaries of the Heaven, how each one of them stands in relation to their number, to their powers and their times, to their names and their origins and their months, as the holy angel Uriel, who is their leader, showed to me when he was with me. And he showed to me their whole description as they are, and for the years of the World to eternity, until the creation will be made anew to last forever.

2. This is the first law of the luminaries: the light (called) Sun has its exit among the gates of heaven in the east and it sets among the gates of heaven in the west.

3. And I saw six gates from which the sun rises and six gates where the sun sets; and (also) the moon rises and sets in these gates, as well as the leaders of the stars together with those which they lead. Six (gates) are in the east and six in the west and all of them are arranged in sequence. And there are many windows to the right and to the left of these gates.

4. And first comes out the great light called Sun and its roundness is as the roundness of heaven and it is all filled with fire that illuminates and heats.

5. And the chariot in which it rises the winds drive. And the sun goes down from the heaven and it turns toward north in order to travel toward the east; and it is guided in such a way that it enters in the (proper) gate and shines (again) in heaven.

6. In this way (the sun) emerges in the first month from the great gate, the fourth of these six gates in the east.

7. And in this fourth gate from which the sun emerges in the first month there are twelve window-openings from which flames come forth when (these windows) are opened in their (proper) times.

a. [8] When the sun rises in the sky it rises from this fourth gate (during) 30 days; and the sun sets exactly in this (fourth) gate in the west. [9] And in these days the day increases over the (preceding) day and the night decreases from the (preceding) night during 30 days. [10] And on this (30th) day the day is two ninths, (i.e. two) "parts", longer than the night, the day being exactly 10 parts and the night exactly 8 parts. [11] And the sun rises from the fourth gate and sets in the fourth (gate).

b. (Then) the sun moves to the fifth gate in the east, for 30 days, and it rises from it and it sets in the fifth gate. [12] And then the day increases two parts and the day amounts to eleven parts and the night decreases and amounts to seven parts.

c. [13] And (the sun) returns to the east and enters the sixth gate and it rises and sets in the sixth gate (during) 31 days according to its (the gate's) characteristics (for the season). [14] And during these days the day increases over the night (until) the day is twice (as long as) the night, such that the day amounts to twelve parts

and the night decreases and amounts to six parts. [15] Then the sun sets out to shorten the day and to lengthen the night.

d. And when the sun returns to the east it enters the sixth gate and it rises from it and it sets (in it during) 30 days. [16] And when the 30 days are completed the day has decreased exactly one part and the day is eleven parts and the night is seven parts. [17] And then the sun leaves this sixth gate in the west and

e. travels toward east to rise in the fifth gate (during) 30 days and it sets also in the west in the fifth gate. [18] And on this day the day has decreased two parts and the day is ten parts and the night is eight parts. [19] And the sun rises from the fifth gate and it sets in the fifth gate in the west.

f. (And then) it rises in the fourth (during) 31 days (according to) its (the gate's) characteristics (for the season), and it sets in the west. [20] On this day the day equals the night and they are the same and the night is nine parts and the day is nine parts. [21] And the sun rises from this (fourth) gate and it sets in the west.

g. And (then) it returns to the east and it rises from the third gate (during) 30 days and it sets in the west in the third gate. [22] And on these days the night increases over the day and the night increases over the (preceding) night and the day decreases from the (preceding) day until 30 days and the night is exactly ten parts and the day eight parts. [23] And the sun rises from this third gate and it sets in the west in the third gate.

h. And (then) it returns toward the east and the sun rises (during) 30 days in the second gate in the east and it sets also in the second gate in the western sky. [24] And on this day the night is eleven parts and the day seven parts. [25] And in these days the sun rises from this second gate and sets in the west (also) in the second gate.

i. And (then) it returns to the east to the first gate (during) 31 days and it (also) sets in the first gate in the western sky. [26] And on this day the night has increased to become twice (the length of) the day and the night is exactly 12 parts and the day is 6 parts.

k. [27] [And the sun has (thus) completed its appearances (in all gates) and then returns to these (same) appearances and it rises (again) in all its gates (during) 30 days and it sets opposite to them in the west.]

l. [28] And (during) these days the night has decreased by a ninth part (of its mean length), that is by one part; and the night consists of eleven parts and the day of seven parts.

m. [29] And the sun returns and enters the second gate in the east [and it returns to these appearances] during 30 days, rising and setting (in the second gate). [30] And in these days the night decreases in its length and the night is ten parts and the day eight parts. [31] And in these days the sun rises from the second gate and sets in the west.

TABLE I*

[a] ⊙ rises and sets in G_4 for 30^d; d increases, n decreases. Finally $d = n + 2$, thus $d = 10$, $n = 8$. Sunrise and sunset in G_4.

[b] ⊙ returns to E, in G_5 for 30^d; d increases by 2 to $d = 11$, n decreases to $n = 7$.

[c] (⊙) returns to E, enters G_6; rises and sets in G_6 for 31^d, as appropriate; d increases to $d = 2n$, thus $d = 12$, $n = 6$.
⊙ begins to shorten d and lengthen n:

[d] ⊙ returns to E, enters G_6; rises and sets in it for 30^d. After completion of these 30^d, d has decreased by 1, thus $d = 11$, $n = 7$.
⊙ leaves G_6 in the W and

[e] travels to E, to rise and to set in G_5 for 30^d. Finally d has decreased by 2, thus $d = 10$, $n = 8$. Sunrise and sunset in G_5.

[f] ⊙ rises in G_4 for 31^d, as appropriate, sets in W. (Finally) $d = n$, thus $n = 9$, $d = 9$. Sunrise and sunset in G_4.

[g] ⊙ returns to E, rises and sets in G_3 for 30^d. Now n increases over d; n increases, d decreases, until (after) 30^d $n = 10$, $d = 8$. Sunrise and sunset in the W in G_3.

[h] ⊙ returns to E, rises in G_2 for 30^d, sets in the W in G_2. Finally $n = 11$, $d = 7$. Sunrise and sunset in the W in G_2.

[i] ⊙ returns to E, [rises and] sets in the W in G_1 for 31^d. Finally n has increased to $n = 2d$, thus $n = 12$, $d = 6$.

[k] {⊙ completed its appearances (in all gates), now returns to these appearances, rising in all gates for 30^d and sets in the W.}

[l] [⊙ rises in G_1 for 30^d Finally] n has decreased by 1, thus $n = 11$, $d = 7$.

[m] ⊙ returns to E, [rising] in G_2 returns to appearances, rising and setting for 30^d; n decreases, thus (finally) $n = 10$, $d = 8$. Sunrise and sunset in the W in G_2.

[n] ⊙ returns to E, rising in G_3 for 31^d, setting in the W; n decreases to 9, thus $d = 9$ and $n = d$. {The year is 364^d long.}

* ⊙ . . . sun, G . . . gate (its number as subscript), E/W . . . East/West, d . . . day, n . . . night { } . . . intrusion

n. And (then) it returns to the east and it rises in the third gate (during) 31 days and it sets in the western sky. [32] And in these days the night decreases and it is 9 parts and the day is 9 parts and the night equals the day. [And the year is exactly 364 days (long)].

33. And the length of the day and the night and the shorteness of day and night vary with the circuit of the sun,

34. because its course becomes longer day after day or shorter night after night.

35. And this is the rule for the circuit of the sun, when it returns (to the east) and rises (again). This great luminary is called "sun" for all eternity.

36. And what rises is the great luminary and it is named according to its appearance as the Lord has commanded.

37. And it rises and similarly it sets and it does not diminish (in brightness) and it does not rest, but travels day and night. And its light is seven times as bright as the (light of the full) moon but with respect to their size the two are equal.

Notes to Chapter **72**. *Sun and Moon*

The composition of this chapter is very simple: its core is formed by twelve strictly parallel verses that describe the variation of the length of daylight and night during the year. To this tabulation is added a general introduction (2 to 7) about the six "gates" on the eastern and western horizon where the sun rises and sets. Similarly the tabulation is followed by some general remarks (33 to 37) about the sun and its role in the universe.

This structure of the chapter has been obscured by dividing the text into twenty-five verses unrelated to the original tabulation. I have therefore compiled a table (opposite) which shows the original pattern. Needless to say, there are many small variations from sentence to sentence. A serious disturbance occurred in verse 28 where a gloss (27) intruded into the text (with a repercussion still visible in 29). But Table I makes it easy to restore the basic scheme for each month:

> "The sun returns (from the preceding gate) to the east and enters the next gate in which it rises – and sets in the west – for 30 (or 31) days. During that time the days increase/decrease and the nights decrease/increase such that the day becomes . . . (parts), the night . . . (parts). Sunrise – and sunset in the west – takes place in this gate".

Twelve such sentences are the exact equivalent of our Table II or of the graph Fig. 1. Similar verbal presentations of tabular material are not only found frequently in Ethiopic computus texts but also in Aramaic fragments (Milik,

TABLE II

month 1 in gate 4	during	30 days, ending in	10^p of daylight,	8^p of night
2	5	30	11	7
3	6	31	12	6
4	6	30	11	7
5	5	30	10	8
6	4	31	9	9
7	3	30	8	10
8	2	30	7	11
9	1	31	6	12
10	1	30	7	11
11	2	30	8	10
12	3	31	9	9

Enoch, pp. 278–281). I have no doubt that the same genesis underlies also the next chapter.

72.1. Preamble, giving a summary of topics concerning the celestial luminaries. The expression ḫezabihomu, literally "their tribes, populations", obviously refers to the hierarchical grouping of the stars. Similarly śelṭanomu means "their powers", exercised by the stars over the division of the year, the seasons and the epagomenal days. Cf. for all these influences **75**,1–7 and **82**,4–20.

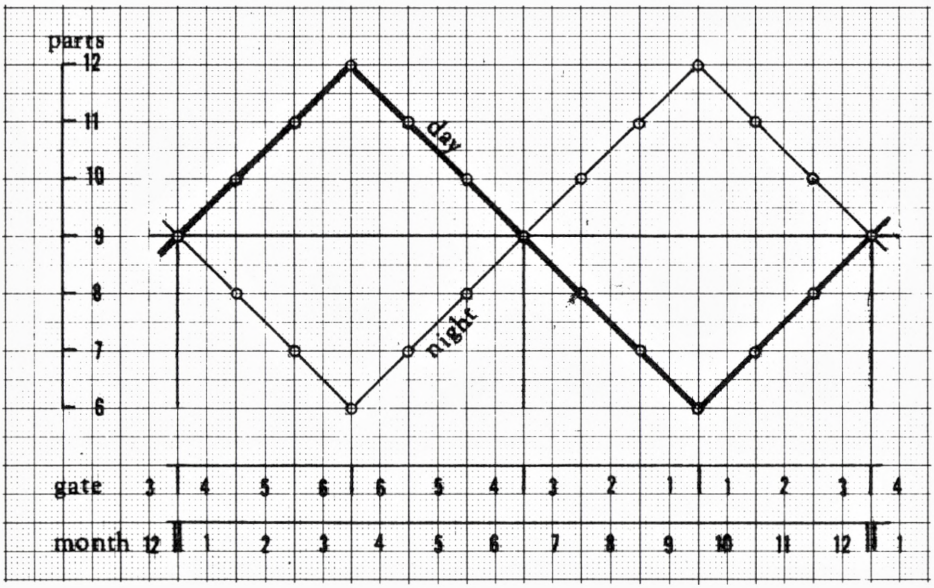
72,2,3. In the course of the year sun and moon rise and set in six "gates" on the eastern, respectively western, horizon. To the right and to the left of these gates are "windows", presumably for the stars (whereas in **36**,2,3 "small gates" are assigned to them). It should be noted that "right" and "left" are not the same as "south" and "north" since these associations are reversed with the change of direction of the observer.

Verse 3. "Arranged in sequence" probably refers to the numbering of the gates from one to six or from south to north.

72,4. The "roundness" (kebabu) of the sun corresponds to the roundness of the heavenly cupola. Neither "Umkreis" (Dillmann) nor "disc" (Knibb) are suitable descriptions of the sky.

72,5. Here we are told that the chariot of the sun (and of the moon, cf. **72**,2) is blown by winds, and that the sun, after setting in the west, returns via the north to the east. Independent of this motion of the luminaries is the (daily) rotation of the heaven, i.e. of the stars, which is also caused by winds (**18**,4). A slightly different picture is found in **41**,5 where sun and moon are said to come out from, and return to, "chambers" (mazāgebt). Similar differences are recognizable for the stars: "windows" in **72**,2,3, "gates" in **36**,2,3.

Fig. 1.



72,6 to 32. The essential content of these verses is summarized in Table II and in the graph of Fig. 1. Note that the linear pattern for the length of daylight and night ignores the epagomenal days (as is admitted in **75**,1).

The variation of the length of daylight and night during the solar year is here described by a numerical sequence that alternates, with constant difference, between a maximum M and a minimum m. If one chooses the simplest increment, i.e. if one makes the monthly difference "1 part" (p), then one has $M = m + 6$. If one furthermore assumes that $M = 2m$, then one finds finally $m = 6^{p}$, $M = 12^{p}$ (and always daylight + night = 18^{p}). This is exactly what we have in our text.

The use of such an alternating sequence (known as "linear zigzag function") suggests a Babylonian origin, since functions of this type play a fundamental role in Babylonian astronomy. For the length of daylight we find in cuneiform texts two ratios: one $M:m = 3:2$, the other (in earlier texts, e.g. in the series "Mul-Apin") $M:m = 2:1$. In the first case the units of time are "large hours" (i.e. 4 of our hours), in the second case we deal with "manas", i.e. weights of water, outflowing from a cylindrical water clock.[4]

In our texts the "parts" are never connected with any meteorological unit, neither hours, nor weights or volumes. Hence borrowing from Mesopotamia

4: Cf. Neugebauer, The Water Clock in Babylonian Astronomy, *Isis* 37 (1947), pp. 37–43.

remains only a possibility, though supported by another (slightly conjectural) feature, an 18-division of the day (counted in manas) in Mul-Apin.[5]

Of course a borrowing from comparatively early Babylonian material cannot be used as a chronological criterion for the time of composition of the astronomical section of the Book of Enoch. Methods of this kind have a life-span of many centuries and easily survive the development of more advanced methods.

72,6 to 11. In month 1 the sun emerges from gate 4 and the length of daylight increases during this month from 9^p to 10^p. Note that this implies that the year begins at the vernal equinox (as in Babylonia) whereas the Ethiopic calendar follows the Alexandrian year that begins with the month Thoth, roughly September.

Why is gate 4 called "large"? Dillmann[6] thinks of a comparison with the 12 windows which eject flames (**72**,7). Are other gates not provided with such windows?

Verse 11. After 30 days the sun returns (yegabe') from gate 4 in the west (via the north) to gate 5 in the east.

72,13 and 19. The translation of te'emerta zi'ahā as "its sign" is misleading since it could be taken as a reference to zodiacal signs[7] (which do not exist in Enoch's astronomy). The purpose of this remark, however, is to explain that 31 days of the sun's risings in the same gate is indicative for the position of the equinoxes and solstices. The Greek equivalent of te'emert is σημεῖον used in a technical sense,[8] in particular in relation to meteorological and calendaric dates (ἐπισημαίνειν).[9] Hence we may say that the rising of the sun in a specific gate is "indicative" or "characteristic" for the seasons. Cf. also **75**,6 and **82**,16 and 19.

Verse 19. As Fig. 1 (p. **11**) shows, the autumnal equinox occurs when the sun rises at the beginning of gate 3 in month 7.

72,27. Dillmann rendered 'ar'estihu by "Bahnabschnitte" (hence Knibb: "division of journey" – instead of "orbital segments"). It seems to me, however, that no reference to the sun's "orbit"[10] – at any rate a much too modern concept – is intended. In my opinion what is meant is simply the appearances (literally the "heads", the "beginnings") in the consecutive gates. This interpretation is supported by a variant in Ṭānā 9: 'ar'ayāhu, indicating something like "appearances". Cf. also next section.

5: This connection between Mul-Apin and the Book of Enoch was suggested many years ago by A. J. Sachs (cf. Neugebauer, *l.c* note 4, p. 40).

6: Dillmann, Henoch, p. 222.

7: So expressly by Charles.

8: Cf. e.g., also Matth. 16,3 σημεῖα τῶν καιρῶν "the signs of the time".

9: Cf. e.g., Ptolemy's work Φάσεις ἀπλανῶν ἀστέρων καὶ συναγωγὴ ἐπισημασίων (Opera minora, pp. 2–67). Cf. also RE Suppl. 7 col. 176–198 [Rehm].

10: Not to ask: the daily orbit? the yearly orbit? what are "Bahnabschnitte"?

72,33 to 35. The variability of the length of daylight and night is caused by the variability of the sun's positions in the gates (cf. verse 27), i.e. by the changing rising amplitude, as is indeed the case.

A number "60" (of risings and settings?) in verse 35 is omitted in several manuscripts (among them Ṭānā 9). This seems to be the better version.

72,37. The sun's brightness never changes (in contrast to the moon) and it is sevenfold the moon's greatest brightness[11] (cf. **73**,3 and **78**,4). Their apparent sizes, however, are equal (cf. **78**,3).[12]

Chapter **73**

1. And after the rule (concerning the sun) I saw another rule about the smaller luminary, called Moon.

2. And its roundness is as the roundness of heaven and the chariot on which it travels is driven by winds; and light is given to it in measure.

3. And each month its place of rising and of setting varies (through all gates) but its days are as the days of the sun. And when its light is evenly spread (over its disc) then it amounts to one seventh of the light of the sun.

4. And thus (the lunar month) begins, when (the moon) itself moves away (from the sun) toward east on the 30th day, and (when) on this day it becomes visible it is for you the beginning of the (lunar) month on the thirtieth day, (when the moon is setting) together with the sun in the gate from which the sun rises, [5] (but) at a distance (from the sun) of half of a seventh part.

And its whole disc is empty (i.e.) without light, excepting its seventh part of a fourteenth part (i.e. 1/98) of the light (of the sun).

6. And on (this) day (the moon) takes on a seventh part of one half (i.e. 1/14) of its light, and (thus) its light is the seventh of a seventh part and one half of it (i.e. 1/98 of the light of the sun).

7. (The moon) sets with the sun and when the sun rises, the moon rises with it and it takes on one half part (of 1/7) of its light. And in this night, at the beginning of the (lunar) day, which is the first day of the month, the moon sets with the sun, and it is dark in this night. – A seventh of a seventh part and one half.

8. And the moon rises and comes out on this day with exactly the seventh part (of its total light) and recedes from the rising of the sun and it (the moon) is

11: Dillmann (Henoch p. 226) suggests a derivation of this ratio from Isaiah 30.26. This passage (and similarly Enoch **91**,16), however, does not compare the sun with the moon but deals with some future events in the universe.

12: This is very nearly correct, as is common knowlege in ancient astronomy (based on evidence from solar eclipses).

illuminated during the remaining (part) of its day a sixth (?) and a seventh part (of the light of the sun).

Notes to Chapter **73**. *The Moon's Variable Illumination*

The original arrangement in this chapter was probably similar to the arrangement in the preceding chapter: a central tabulation preceded (and perhaps also followed) by general remarks. In the extant version, however, only the introduction is preserved (verses 1 to 3) while the tabulation breaks off after day 2. No doubt originally all days until full moon (day 14) had been listed. Instead we find now a disorganized chapter (**74**) which obviously does not belong to the original composition.

73,1 to 3. The moon's chariot is driven by winds (cf.**72**,5) and the roundness of the moon is as the roundness of the heavens.[13] Light is given to the moon (from the sun) and produces at full moon one-seventh of the sun's brightness (cf. **72**,37 and **78**,4). The rising and setting points of the moon change rapidly, but the number of "days" in a lunar calendar is the same as the corresponding number of solar days (**73**,3); for example, day 14 has the same distance from day 1 in a lunar calendar as a solar day 14 from solar day 1, in spite of the variability of the moments of moon-rise and moon-set in relation to sun-set. – For **73**,2 cf. also **78**,4.

73,4 to 8. In these verses we have a fragmentary description of a linear scheme for the increasing illumination of the moon during the first half of the lunar month. This increase is expressed in two scales: first, in absolute terms from 1^p to 14^p (hence proportional to the illuminated area),[14] and, secondly, in terms of solar brightness, hence increasing from $1/14 \cdot 1/7 = 1/98$ on the first day to $1/7$ at full moon (cf. **73**,3). Our text represents only a fragment of this scheme, which concerns the first two days. But the whole scheme is preserved in several computus texts (cf. EAC, p 196) the only difference being that a "full month", i.e. a 15-day increase, is contemplated.

Some trouble has been caused by an unfortunate terminology used in this section: the term ṣebāḥ "morning" here stands for "day" (as we sometimes count "summers" as "years", or winters" (keramt) in Ethiopic). To retain in astronomical context the literal meaning of an idiom of this type leads to senseless translations; e.g., "on that night at the beginning of its morning, at the beginning of the moon's

13: Knibb's MS has "sun" instead of "heaven". The parallel with **72**,4 shows that "heaven" is the better version.

14: The "parts" ('eda) here have nothing to do with the "parts" (kefla) in **72**,6 to 32.

day",[15] instead of "on that night, at the beginning of the (lunar) day, which is the first day of the month".

73,4. To say that a lunar month begins on "day 30" characterizes its predecessor as a hollow month.[16] At the beginning of the new month the moon has obtained enough (easterly) elongation from the sun to be visible at sunset. At conjunction, however, the moon is still nearer to the sun and thus rises and sets (invisibly) in the same gate as the sun. (Of course, all this is only that simple in the schematic lunar calendar which ignores, of necessity, all complexities of the actual lunar motion).

The conclusion of this verse is incorrectly assigned in part to the next verse. It contains the statement that the elongation of the moon from the sun at the evening of first visibility is 1/14 of the total elongation (reached at full moon). The use of reḫeqa in the technical sense of "elongation" is well attested in computus treatises. We read, e.g., in BM Add 24995 (28[a] II,1): "On the second day (the moon) recedes (yerḫeq) from the sun and becomes visible at 8 kekros and illuminates 2 parts of 15 (of its greatest) light (at full moon) and 1 part of 98 (parts) of the light of the sun". Incidentally, this close parallelism supports our conclusion that verses **73**,4 to 8 are only a fragment of a complete table for the moon's illumination, both absolute and in relation to the sun.

73,5. The numerical data for day 1 are: darkness of the moon's disc excepting $1/2 \cdot 1/7$ of its area that shines with the brightness of $1/7 \cdot 1/14$ (=1/98) of the sun's light.

73,6 to 8. The numbers in these verses are obviously corrupt as the many variants show, in part probably caused by the usual confusion of sixes and sevens. Both translation and notes are therefore only tentative and show not much more than that we are dealing with the description of the moon's increasing illumination. The text ends abruptly after verse 8.

73,6. The daily increment of the moon's illuminated area is 1/14. Its brightness on the first day of the lunar month amounts to $1/7 \cdot 1/7 \cdot 1/2$ (=1/98) of the sun's light.

73,7 and 8. On day 1 the moon is still near conjunction and therefore (nearly) rises and sets at the same time as the sun (cf. **73**,4). The number $1/7 \cdot 1/7 \cdot 1/2$ at the end of verse 7 is perhaps a meaningless duplication from verse 6.

Turning to day 2 (in verse 8) the moon's illuminated area is 2/14 = 1/7. It follows again a remark about the increasing elongation, but one should expect a

15: Knibb, p. 172 (**73**,7). Cf. also *Gen.* 50,3 and *Num.* 13, 25 in the Ethiopic Bible (E. Isaac). "Mornings" for "days" is also well attested in computus texts.

16: This is standard terminology in Babylonian astronomy, cf. F. X. Kugler, *Die Babylonische Mondrechnung*, Freiburg 1900, p. 36.

motion "away from the sun toward east" (as in verse 4) instead of a "receding from the rising sun". Perhaps this is simply a scribal error. Why the "remaining part of the day" is mentioned in the present context I do not know. For the brightness of the crescent on day 2 one should expect $1/7 \cdot 1/7$ (of the sun's brightness) and, indeed, some variants contain these numbers.

Chapter **74**

1. And I saw another circuit and (another) rule for it (the moon), whereby according to that rule it produces the cycle of the months.

2. All this showed to me Uriel, the holy angel, who is the leader of all of them. And I wrote down their positions as he showed them to me and I wrote down their respective months and the phases of their illumination until full moon on the fifteenth day.

3. And in steps (of fractions) of sevenths (lit. single seventh parts) the full moon is completed in the east and in steps (of fractions) of sevenths complete darkness is reached in the west.

4. In certain months (the moon) changes (the location of) its settings (with the sun, but) in certain months it goes its own individual way.

5. In two months (the moon) sets with the sun in these two middle gates, that is in the third and fourth gate.

6. (The moon) comes out (from the same gate) during seven days and it turns and moves back to the gate from which the sun rises, and it completes its light. And (the moon) recedes from the sun and enters for eight days the sixth gate from which the sun rises.

7. And when the sun rises from the fourth gate (the moon) comes out (from the sixth gate) during seven days until it rises from the fifth (gate) and it returns again during seven days to the fourth gate and it completes its light and it recedes (from the sun) and it enters the first gate (during) eight days.

8. And again it returns (after) seven days to the fourth gate from which the sun rises.

9. Thus I saw their positions when the months begin at sunset. – It seems pointless to attempt to give an accurate translation of the confused nonsense which some scribes produced from some trivial arithmetical relations (for which cf. the notes on p. 19). Readers who wish to see some rendering of these scrambled verses may look up Charles Enoch pp. 149–161 or Knibb Enoch pp. 173–4.

10. We are dealing with five ("solar") years of 364 days each.

11. Five lunar years fall short of five solar or sidereal years by (50 days, similarly three lunar years by) 30 days.

12. In this way the length of the lunar years is not too long and not too short by a single day in all eternity in relation to the years of 364 days each.

13. Three years are 1092 days long, five years 1820 days, thus eight years 1912 days.

14. to 16. Three lunar years are 1062 days long, thus 30 days shorter than three solar years. Similarly for five and eight years.

17. And the year is correctly completed in relation to its position within (the era of) the World and to the positions of the sun that rises and sets in its gates for 30 days (each).

Notes to Chapter **74**. *The Lunar Year*

This chapter contains a fragmentary description of the shift from gate to gate of sun and moon, based on a simple arithmetical scheme that is well known from computus treatises.[17] The present text, however, covers only the discussion for the first month. The remaining tabulation is replaced by a badly bungled attempt to describe an octaeteris that would relate a lunar year to the Enoch-year. It is quite evident that these verses (10 to 17) are a later addition.

74,1 and 2. A reference to the angel Uriel supports our impression that this chapter was originally not connected with the preceding or following chapter. Also full moon is here associated with day 15, not with day 14, as in chapter **73** (but cf. **78**,6,7).

74,2 to 4. The text as it stands is not very clear. What was intended to be expressed may be formulated as follows: Enoch writes down the pattern for the gates traversed by sun and moon during the lunar year. In each month the moon is waxing and waning: first its light increases until 1/7 of the sun's brightness is reached at full moon, visible in the east when the sun sets in the west; then the moon returns to darkness at conjunction which normally takes place in the same gate with the sun, though occasionally the moon may appear in an adjacent gate (as can actually be the case).

74,5. The gates 3 and 4 correspond to the equinoxes (cf. Fig. 1, p. **11**).

74,6. We have here a general description of the relationship between the days of a lunar month and the gates: the moon comes out through one of the outermost gates during seven (or eight) days; there it turns and moves back to the gate from which the sun rises during this month, and its light becomes full (at sunset); then the moon recedes again from this gate.

At the end of this verse the words "enters for eight days the sixth gate" do not belong here and should be deleted.

74,7 to 9. The tabulation begins with month 1 at the vernal equinox. Con-

TABLE III

Months	1	2	3	4	5	6	7	8	9	10	11	12	1	Months
Gates														Gates
4	2													4
5	2	2												5
6	8	8	4	4										6
5	2	2	2	2	2									5
4	1	1	2	2	1	2								4
3	1	1	1	1	1	1	2							3
2	2	2	2	2	2	2	2	2						2
1	8	7	8	7	8	7	8	7	4	4				1
2	2	2	2	2	2	2	2	2	2	2	2			2
3	1	1	1	1	1	1	1	1	2	2	1	2		3
4	1	1	2	2	1	1	1	1	1	1	1	1	2	4
5		2	2	2	2	2	2	2	2	2	2	2	2	5
6			4	4	8	8	8	8	8	7	8	8	8	6
5					2	2	2	2	2	2	2	2	2	5
4						1	1	1	1	1	1	1	1	4
3							1	2	2	2	1	1	1	3
2								1	2	2	2	2	2	2
1									4	4	8	7	8	1
2											2	2	2	2
3												1	1	3
4													1	4
Days	30	29	30	29	30	29	30	29	30	29	30	29	30	Days

junction takes place in gate 4, then the moon's rising and setting moves on to gate 6 for a period of seven days. Moving back[18] to gate 4 we have full moon, followed by another delay (of 8 days) in gate 1. Thus the complete scheme for this month would look about as follows (cf. also Table III):

gates:	4	5	6	5	4	3	2	1	2	3	4	
	sun				sun						sun	
during days:	[2]	[2]	7	[2]	[1]	[1]	[2]	8	[2]	[1]	[1]	total: 29

The continuation of this tabulation is omitted just as in the preceding chapters.

74,10 to 17. These verses constitute an abortive attempt to describe an octaeteris. The scribe had obviously only a very vague idea of the working of such a cycle, remembering only a separation of 8 years into two groups, one of 5

years (with 2 intercalary full months – hence his 30 days in **74**,11) and one of 3 years (with 1 intercalary month).[19] However instead of operating with Alexandrian years he assumes Enoch years; and because this does not lead to any reasonable relationship, he ends up with some correct but irrelevant numerical identities, based on the comparison of 5+3 Enoch years with 5+3 lunar years:

$5 \cdot 364 = 1820$ days	$5 \cdot 354^{d} = 1770 = 1820 - 50$ days
$3 \cdot 364 = 1092$ days	$3 \cdot 354^{d} = 1062 = 1092 - 30$ days
$8 \cdot 364 = 2912$ days	$8 \cdot 354^{d} = 2832 = 2912 - 80$ days

I surmise that this whole group of verses is a late addition, written under the influence of some computus treatise, where a mix-up of Alexandrian and Enoch years is quite common.

Chapter **75**

1. And their leaders, at the head of (each) thousand (stars), who are appointed (to rule) over the whole creation and over all stars (have to do also), with the four additional (days), without deviating from their positions, corresponding to the computus of the year. And they render service (also) on these four days which are not counted in the computus of the year.

2. And with respect to these (four days) people err since these luminaries do true service (also) in the (following) positions of the cosmos: once in the first gate and once in the third gate and once in the fourth gate and once in the sixth gate, so that the accuracy (of return) of the world is achieved after 364 (days) (with respect to the) positions of the cosmos.

3. Thus the signs, the times, the years, and the days were shown to me by the angel Uriel whom the eternal Lord of glory has appointed (to rule) over all the heavenly luminaries in heaven and in the world, such that they rule on the face of the sky and are seen from the earth and are made the guides of day and night, (namely) the sun and the moon and the stars and all the servants who return on all chariots of heaven.

4. Likewise Uriel showed me twelve openings, openings in the disc of the

17: Cf. Table III (p. 18), taken from EAC, p. 160. The positions of the numbers are not rigidly the same in all manuscripts; 7 and 8 as well as 1 and 2 can interchange places, as long as the proper totals 29 or 30 are preserved.

18: The assignment of seven days to the return to gate 4 (instead of 2 days) is a scribal error, perhaps caused by a similar passage in verse 8.

19: Cf. EAC, p. 83ff.

chariots of the sun in the sky, from which come forth over the earth the rays of the sun and its heat when they are opened at the proper time.

5. And (there are openings) for the winds and for the wind (that brings) dew, when the openings of heaven are opened at the boundaries (of the earth).

6. I have seen twelve gates in the heaven at the boundaries of the earth from which come out sun and moon and stars, and all the works of heaven from the east and from the west.

7. And (I saw) many window openings to the right and to the left and (each) one window emits heat at its time according to the gates from which the stars rise, as they are ordered, and in which they set according to their (the gates') numbers.

8. And I saw chariots in the heaven travelling in the world above the gates, where the stars revolve which never set.

9. And one of these (circuits) is larger than all of them and it is one which circles the whole world.

Notes to Chapter **75**. *The Stars*

75,1,2. The stars convey cosmic order to the calendar by their organization, which agrees exactly with the divisions of the Enoch year (ḥasāba ʿāmat), including the epagomenal days at the end of each season. Some people commit an error by ignoring these epagomenal days; this could refer to the lunar calendar of the Jews (which has no intercalary days), or to the Egyptian calendar (with five epagomenal days at the end of the year), or even to the schematic year of "Mul-Apin", which contains only twelve 30-day months.

In fact, however, the epagomenal days are "not counted in the computus of the year" since it would disturb the linearity of the scheme for the variation of the length of daylight (cf. note to **72**,6 to 32, p. **11**). This admission of a contradiction between theory and practice is obviously due to a gloss that intruded into the text.

The divisions between the seasons are marked by the rising of the sun in one of the following gates: winter solstice in gate 1, the equinoxes in gates 3 and 4 (autumnal and vernal equinox respectively, as is seen from the trend in the variation of the length of daylight – cf. **72**,6 to 32, p. **11**, Fig. 1), the summer solstice in gate 6. Cf. also **82**,6 and **74**,5. At these points the cosmos returns accurately to its previous position, 364 days earlier. Hence the (assumed) symmetry of the seasons of the solar year is taken as the ultimate basis for the calendar, and the stars reflect the same order.

75,3. The angel Uriel shows to Enoch all the things "about the signs and about

the times" (late'emert wala'azmān); this could refer to the role of the stars as indicators of the climatic changes from season to season (cf. above, **72**,13 p. **12**).

Sun, moon, and stars move "on the face of heaven" and thus are visible from the earth. The "servants[20] who return (ya'awdu – not, in this case, "revolve") on all chariots of heaven" are perhaps responsible for the return of the celestial bodies from their settings in the west to the eastern gates via the north (cf. **72**,5; **78**,5).

75,4. Once more Uriel explains the purpose of the gates and of the chariots: "twelve openings in the disc of the chariot of the sun ... from which the rays of the sun ... and heat ... come out". This picture has no parallel in the rest of the text and I suspect some confusion with the gates traversed by the sun (cf. also verse 7) or with the twelve windows from which flames are ejected (**72**,7).

75,5. Probably an intrusion,[21] in part duplicating verse 6.

75,6,7. Again 12 gates, east and west, but now not only for sun and moon but also for the stars. This makes little sense since the stars rise in all points of the eastern horizon. Then there are "windows" to the right and to the left (cf. **72**,3,7) from which heat comes out – a moment before (in **75**,4) the openings in the solar chariot performed this function – and also stars.

In verse 6 the "works of heaven" (gebrāta samāy) probably means the meteorological phenomena connected with the seasons. The "numbers" in verse 7 probably refer to the numbering of the gates, thus guaranteeing the proper positions of risings and settings.

75,8,9. There are chariots (obviously for stars) "above[22] the gates" for those stars which never set, i.e. circumpolar stars. One of their circuits is the greatest, encircling the whole (always visible) world.[23]

Chapter **76**

1. And I saw at the boundaries of the earth twelve gates, open to all winds, from where the winds come out and blow over the earth.

2. Three of them are open at the front of heaven (i.e. in the east) and three in

20: Dillmann's "dienstbare Geschöpfe" (in his time an idiom reminiscent of household help) became "serving creatures" in Knibb's translation.

21: Cf. Dillmann, Henoch, p. 233/4.

22: Some manuscripts add here "and below them", which makes no sense. Unfortunately Knibb accepted this version (following Dillmann but not Flemming).

23: Dillmann's "durchkreutzt die ganze Welt" (hence Knibb's "goes round through the whole world") is senseless. Obviously Dillmann was not familiar with the concept "greatest always visible circle". In his notes (p. 234) he even considers the "Morgenstern" or the Great Bear. In Greek astronomy this circle is known as the 'arctic circle.'

the west, and three at the right side of heaven, and three on the left side.

3. And the three first ones are in the direction of east, and (then) three are in the direction of north, and then those on the left, in the direction of south, and three in the west.

4. From four of them winds of blessing and prosperity come out, (but) through eight of them come winds (causing) calamities; when they are sent out they bring devastation over the whole earth and the water on it, and to all that inhabit it, to all that is in the water or on dry land.

5. And the first wind that comes out from these gates is called easterly. From the first gate in the direction of east, inclined toward south, devastation, drought, and heat and destruction come out.

6. And in the second gate, the middle one, (the wind) comes out straight; and from it rain and fruitfulness and prosperity and dew come out. And from the third gate, in the direction toward north, cold and drought come out.

7. And then the winds in the direction from south come out from three gates. First, from the first gate, that is inclined toward east, a hot wind comes out.

8. And from the middle gate, next to it, beautiful fragrance and dew and rain and prosperity and health come out.

9. And from the third gate, in the direction toward west, dew and rain and locusts and devastation come out.

10. And then the winds in the direction from north, (also) called baḥr (Sea),... From the seventh gate, (inclined) toward east, dew and rain, locusts and devastation come out.[24]

11. And from the middle gate, in a straight direction, health and rain and dew and prosperity come out. And from the third gate, (inclined) toward west, mist and hoar-frost and snow and rain and dew and locusts come out.

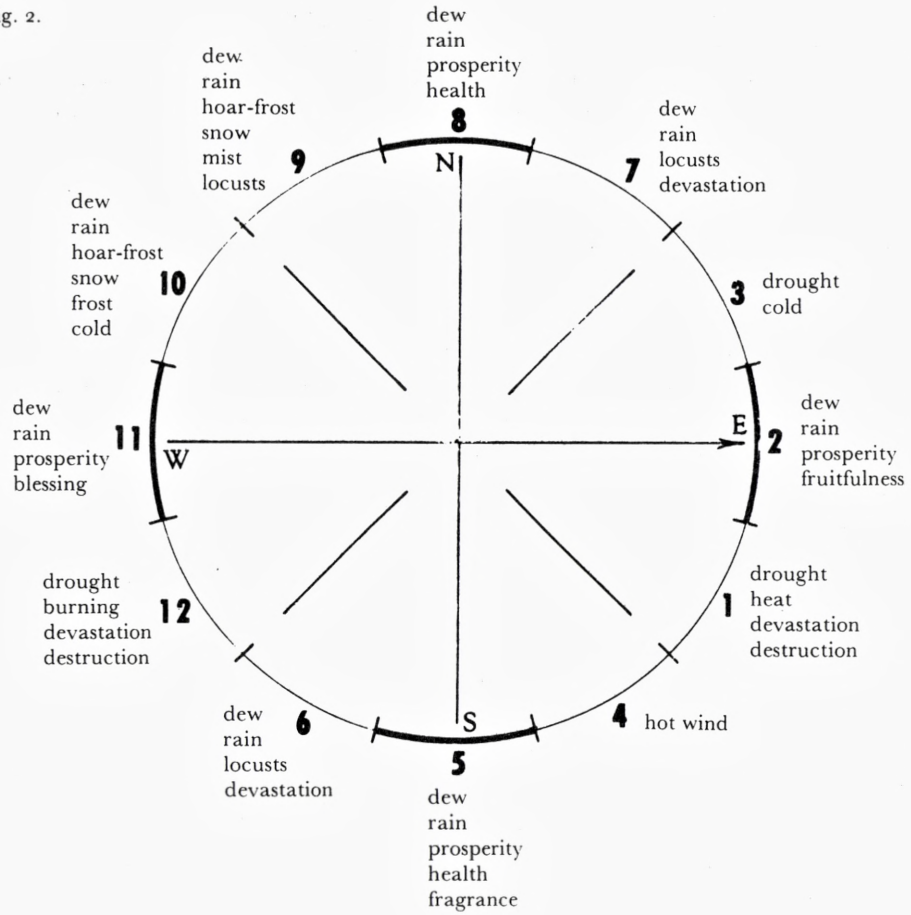
12. And then the fourth (group of) winds, in the direction toward west: from the first gate, in the direction of north, dew and rain and hoar-frost and cold and snow and frost come out.

13. And from the middle gate dew and rain, prosperity and blessing come out. And from the next gate, in the direction toward south, drought and devastation, burning and destruction come out from it.

14. And thus (the description of) the twelve gates in the four (quarters) of heaven is completed; and I have shown to you, my son Methusaleh, all their laws, (and all their) calamities and benefactions.

24: The text of this verse is corrupt but there is no doubt about the essential points, the order of the gates and the quality of the winds. A remark "inclined toward south" (and similarly "...toward north" in the next verse) makes no sense. The cause of all this trouble is probably the replacement of the eight-point rose of winds by twelve points, i.e. the duplication of the intermediate directions. Cf. the commentary (p. 24).

Fig. 2.



Notes to Chapter **76**. *The Winds*

The Ethiopian rose of winds consists of a sequence of twelve openings, again called "gates", which encircle the whole horizon. The winds from the four cardinal directions are supposed to be beneficial, in contrast to the winds from the remaining eight gates that bring discomfort and devastation (cf. Fig. 2).[25] Lists of this type are also found in many Ethiopic "computus" treatises. An abridged version is preserved in **34**,2 to **36**,1 of the Book of Enoch.

25: The accuracy of the 12-division of the horizon as shown in Fig. 2 should not be taken seriously. No numerical data are ever associated in our texts with these "gates".

One might think that long experience with climatic conditions would be condensed in such lists. In fact, however, we have here again only a schematic pattern, as far removed from empirical data as the arithmetical schemes for the length of daylight or the shadow tables. In all these cases scribal tradition has wiped out any connection with reality, if one ever existed.

The purely schematic character of qualities enumerated in the present section is easily recognizable in spite of some omissions or additions.[26] This is quite obvious in the case of winds from the cardinal directions. All of them bring "dew, rain, prosperity" to which is added one more gift:

E: fruitfulness S and N: health W: blessing.

Only the southern wind has a fifth quality ("fragrance").

This list for the principal wind-directions strongly suggests that each wind should be associated with exactly four qualities. This is indeed confirmed for the destructive winds, listed here in the order of the text:

E	1	drought, heat, devastation, destruction
	3	drought, cold
S	4	hot wind
	6	dew, rain, locusts, devastation
N	7	dew, rain, locusts, devastation
	9	dew, rain, hoar-frost, snow (mist, locusts)
W	10	dew, rain, hoar-frost, snow (frost, cold)
	12	drought, burning, devastation, destruction.

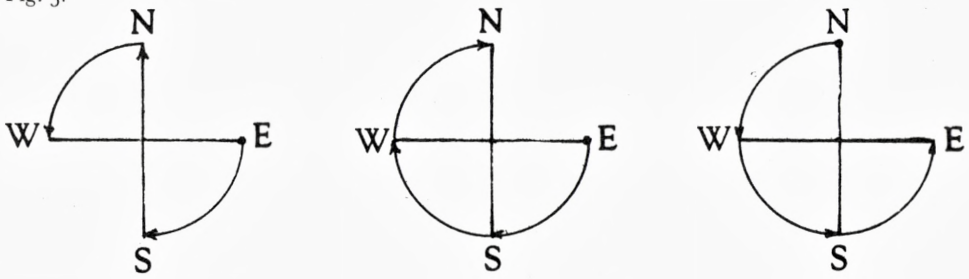
Excepting E 3 and S 4 and the rather senseless additions (shown in parentheses) in N 9 and W 10, we always have exactly four qualities mentioned. But this list reveals one more structural pattern. The third wind in one group has the same qualities as the first wind in the next: S 6 = N 7, N 9 = W 10, W 12 = E 1, thus closing the cycle. Only E 3 and S 4 are exceptions, which is not surprising since both entries are obviously defective.

Summarizing these regularities we can now say that the twelve-wind arrangement contains four beneficial gates and only four qualities for the remaining eight gates. This suggests an historical evolution from an 8-point rose of winds to a 12-point arrangement, the latter probably recommending itself by the formal similarity to the 6 + 6 "gates" for the risings and settings of sun and moon. Both eight-division and twelve-division are well known in hellenistic and Roman schemes, e.g., in geographical or architectural context.[27]

26: The order of the qualities listed in Fig. 2 for each individual wind can differ from the order (or rather disorder, which tends to obscure parallelisms) in the text.

27: Cf. (with caution) RE 8A, 2 cols. 2351f. and 2378 for the 12-division and col. 2364 for 8-division [Böker].

Fig. 3.



76,1 to 13 77,1 to 3 34 to 36

Finally, a remark should be made about the order in the text of enumerating the gates for the winds. Since little consistency is found in computus texts in matters of orientation, it is not surprising to meet the same situation in the present treatise. Fig. 3 illustrates two instances from the "astronomical" book (Ch. **76** and **77**) and compares them to the short version in Ch. **34** to **36**. In **76** and **77** the speaker faces east, the "front of heaven" (gaṣa samāy), thus north is "left" and south is "right". In **34** to **36**, however, the enumeration starts with north and proceeds counter-clockwise. In the astronomical sections the enumeration is either clockwise or E-S-N-W, as shown in Fig. 3, revealing one of the differences between the two versions to which **76** and **77**, respectively, belong.

On the other hand the existence of an overall common background is visible in the fact that the only qualities associated with a wind-direction in **34** to **36** are "dew, rain, hoar-frost, snow (hail)", ascribed in **34**,2 to the north (in general) and in our chapter to N 9 = W 10 (cf. above).

Concluding words to Methuselah (**76**,14) mark the end of the first version of the "astronomical" book, similar to **79**,1 for the second version.

Verse 7 is corrupt, as is evident from the restriction to only one quality (heat = moq, in some MSS misread to mot = death). Several computus treatises have here nafās meweq zasemu netug (or natig[28]), "hot wind called netug/natig". A similar gloss disturbed verse 10 by giving the north wind a special name, bāḥr = sea or ocean. With bāḥr is commonly associated as its counterpart the wind libā, i.e. λίψ, a southerly wind. Perhaps netug is a substitution for λίψ and is derived from νότος, the south wind.

In **77**,2 netug is assigned to the west and derived from the meaning "diminish." I suspect, however, that the transformation of this wind from the SE to the W is caused by this etymology, rather than explaining it. The shift from the eight-point rose of winds (still reflected in the restriction to only eight names – cf. EAC,

28: Cf. Littmann, Zeitschr. f. Assyriol. 16 (1902), p. 384.

p. 199, Fig. 4) to the twelve-point scheme (above Fig. 2) could only augment the confusion of directional terminology.

In fact the name bāḥr, "north," being unrelated to any great sea, may also be the result of a learned scribal interpretation of βόρεας. All these explanations are glosses, introduced by zasemu "which is called . . .", based on the same principle of assimilation of foreign words to semitic roots, exemplified by the change of τῶν θεῶν to ṭentyon and explained by the scribes as meaning "at the beginning".

Chapter **77**

1. The first quarter is called east because it is the chief (quarter); and the second is called south because there the Most High descends {and there in particular descends the one blessed in eternity}[29].

2. And the quarter in the west is called netug (diminished) because all celestial luminaries decrease there and go down.

3. And the fourth quarter which is called north is divided into three parts. The first of them is the habitat for man, the second (contains) the oceans and gorges and forests and rivers, darkness and mist. The third part (contains) the Garden of Justice.

4. I saw seven high mountains, higher than all mountains on the earth, and hoar-frost comes from them. {And days and seasons and years traverse them.}[29]

5. I saw seven rivers on the earth, greater than all other rivers; one of them, coming from the west, sheds its waters into the Great Sea.

6. And two (of them) come from the north to the sea and shed their waters into the Erythrean Sea in the east.

7. And the remaining four (rivers) come from the northern side toward the sea, two to the Erythrean Sea, and two empty into the Great Sea – and (some) say: into the desert.

8. I (also) saw seven large islands in the sea and on land; two on land and five in the Great Sea.

Notes to Chapter **77**. *Mystical Geography*

77,1 to 3. The cardinal directions are here enumerated in the order E-S-W-N, in contrast to **76** and **33** to **36** (cf. Fig. 3, p. 25). As in **76**,2 we are facing east. For the wind netug, cf. the note to **76**,7 (p. 25).

29: Probably a gloss.

The description in verse 1 of the south as "where the Most High descends" is explained in an Amharic (unpublished) commentary as a reference to Mt. Sinai (communication by Prof. Ephraim Isaac). In verse 3 one might expect the human habitat to be located between ocean and paradise, not to the west of the ocean.

77,4 to 8. In verse 4 the traditional translation of yaḥalf[30] as "schwinden dahin" (Dillmann, Flemming), "pass away and vanish" (Charles), makes no sense in the present context. I therefore suggest a translation "days and seasons and years traverse (them)", meaning that the sun, the cause of days, seasons, and years, traverses the space above the mountains.

The tendency of this geography is too mythological to allow accurate identifications. It seems plausible, however, to take the Erythrean Sea for the Persian Gulf into which the Euphrates and Tigris empty their waters. The two islands "on land" (verse 8) could be land between rivers, as Dillmann suggested (p. 238), Mesopotamia and Meroe. Milik assumed[31] a Greek version meaning "near (ἐπὶ) land."

Chapter **78**

1. The names for the sun are as follows: the first ʾOryārīs and the second Tomās.

2. The moon has four names: the first name is ʾAsonyā, the second ʾEblā, the third Benāsē, and the fourth ʾErāʿe.

3. These are the two great luminaries. Their roundness is as the roundness of the heavens and the amount of the roundness of the two is the same.

4. In the disc of the sun is combined seven times what is of light in the moon, and according to measure (light) is injected (from the sun into the moon) until the seventh part (of the light of the sun) has been transmitted.

5. And they set and they enter the gates in the west, and they return via the north to the eastern gates and (thus) come out (again) at the front of the sky (i.e. in the east).

6. And when the moon rises it becomes (first) visible on the sky when it contains the light of one-half of one-seventh part (of its total) and in fourteen (steps) it completes its full light.

7. And fifteen (parts of) light are put into it until in fifteen (days) its light is completed according to the character of the year and it makes fifteen parts while the moon is at its fourteenth part.

8. And when (the moon) is waning it decreases on the first day (to) fourteen

30: Some MSS (but not Ṭānā 9) have here wayaḥawer: "and proceed," "go", etc.
31: Milik, *Chronique d'Égypte* 46 (1971), p. 333.

parts of its light, on the second day it decreases to thirteen parts, on the third it decreases to twelve parts and on the fourth it decreases to eleven parts, and on the fifth it decreases to ten parts and on the sixth it decreases to nine parts, and on the seventh it decreases to eight parts, and on the eighth it decreases to seven parts, and on the ninth it decreases to six parts, and on the tenth it decreases to five parts, and on the eleventh it decreases to four parts, and on the twelfth it decreases to three parts, and on the thirteenth it decreases to two (parts), and on the fourteenth it decreases to half of one-seventh of its total light, and on the fifteenth is consumed what remains of the total.

9. And in certain months the moon (is visible) for each one of twenty-nine days and at times for twenty-eight days.

10. Then Uriel showed me another rule how light is put into the moon and where it is put into it from the sun.

11. The whole time in which (the illumination of) the moon progresses, light is transmitted to it, facing the sun, until the fourteenth day when its light is complete. And when the (lunar disc) is completely aflame (then) its light in the sky is complete.

12. On the first day it is called New Moon because on the day light appears on it (for the first time).

13. And (the light) becomes exactly complete on the day when the sun sets in the west and when in the east (the moon) rises at (the beginning of) night. And the moon is illuminated all night until the sun rises opposite it and the moon is seen opposite the sun.

14. And where the light for the moon entered it, there again it wanes until all its light is consumed and the days of the (lunar) month are used up and the moon's disc remains empty without light.

15. And in three months their duration amounts to thirty days and in three months it amounts to twenty-nine days each, in which it makes its recession, in the first time and in the first gate, in 177 days.

16. And in the time of its waxing it becomes visible in three months for thirty days each, and it becomes visible in three (other) months for twenty-nine days each.

17. At night it is visible for twenty(nine) (days) each like a man and at daytime (it is) like the sky because without its light there is nothing else in it.

79,1. And now, my son, I have shown you everything and completed is (the story about) the law of all the stars in the sky.

Notes to Chapter **78**. *Lunar Phases*

Much in this chapter duplicates the preceding versions.

78,1. A two-division of the year in reflected in the attribution of two names to the sun. For the etymology, cf. Charles, Enoch, p. 166, notes; also Milik Chronique d'Égypte 46 [1971] p. 338, commentary to line 7.

78,2. Corresponding to its four major phases the moon is given four names; cf. Charles, Enoch, p. 166/7, notes.

78,3 to 5. Equality of the apparent diameters of sun and moon (cf. **72**,37) and brightness 7:1 (cf. **72**,37 and **73**,3). Setting of the luminaries in the western gates and return via the north (cf. **72**,5 and **75**,3) to the east.

78,4. The transfer of light "according to measure" (here and in **73**,2) probably means the steady increase of illumination, proportional to time.

78,6 to 9. Verses 6 and 7 deal in a general fashion with the waxing moon, allowing either day 14 or day 15 as full moon date. What the character of the "year" has to do in this context (verse 7) I do not understand. Error for "month" (hollow/full)?

Verse 8 concerns the waning moon, describing the day-by-day decrease of the moon's illuminated area in terms of "parts", from 14 on the first day to invisibility on the 15th day. For a fragment of a Greek version cf. Milik, *Chronique d'Égypte* 46 (1971), p. 339.

Verse 9 offers the possibility that a "month" may contain 29 or 28 days (of visibility), being either full or hollow.

78,10 to 14. Once more a general description of the lunar phases, introduced by Uriel. In verse 11 one should not say that the moon is "opposite" the sun during the whole time of waxing in order to avoid misinterpretation as "opposition" (which is the proper term in verse 13). Prof. E. Isaac suggests, therefore, translating baqedma ḍaḥay as "facing the sun".

Verse 14 states correctly darkness of the waning moon begins on the same side (the western rim) on which the illumination of the waxing moon begins.

78,15,16. The lunar year is schematically divided into two halves, each containing three full and three hollow months, thus a total of 177 days. Apparently in analogy to the two halves of a lunar month these two halves of the lunar year are denoted as "waning" and "waxing" (why in that order?). Cf. also **79**,3,4.

78,17. During 2[9] nights,[32] when the moon is visible, "it looks like a man". At daytime, however, the moon is invisible, apparently because it has no corporality, being only a receptacle of the solar light. Cf. also the Aramaic version.[33]

79,1. Final words of Methuselah, similar to the end of the first version (**76**,14).

32: The reading 20 in the MSS is obviously a scribal error, unfortunately not emended by Dillmann and thus retained ever since. The Aramaic version has no number.

33: Milik, Enoch, p. 295/5. Cf. also Claire Préaux, La lune dans la pensée grecque, Ch. III. (Académie Royale de Belgique, Mémoires de la Classe des Lettres, 2e sér. t. 61, fasc. 4 [1973]).

Chapter **79**

2. And he (Uriel) showed me every one of their rules for every day and for every season with its power, and for every year, and about the places of exit (i.e. the gates), and concerning the rules for every month and for every week;

3. and the decrement of the moon that accumulated in the sixth gate, because in the sixth gate its (the moon's)light is completed. The beginning of the decrement

4. that accumulates (is) in the first gate (and it is counted) at its (proper) time, (i.e.) when 177 days are completed – or, after the reckoning with weeks, 25 (weeks) and two days.

5. And how it (the moon) falls behind in relation to the sun – or, after the reckoning with the stars, exactly five days in one single (period of) time, (i.e. half a lunar year) and when this position which you see has been traversed (by the stars).

6. Such is the appearance and the picture for each luminary shown to me by the great angel Uriel who is their leader.

80,1. And in these days the angel Uriel spoke to me and said to me: see, I have shown to you, O Enoch, everything and I have revealed to you everything to be seen about the sun, the moon, and everything about those who guide the stars in heaven and all who turn (back) their works, (and about) their times, and their places of exit (i.e. the gates).

Notes to Chapter **79**. *The Lunar Year*

79,2. "He showed me" refers, of course, to the angel Uriel, not to Methuselah, who was addressed in **79**,1. Cf. also **79**,6–**80**,1.

The "power" of each season (lit. "time") refers to the stars which during stretches of 91 days represent the seasons, as we are told in **82**,15 to 20.

79,3,4. The verses 3 to 5 assume a two-division of the lunar year, similar to **78**,15,16. Details remain obscure since the text is obviously corrupt.

In the present context "sixth gate" and "first gate" do not refer to the numbering of the gates from south to north but probably mean here "a sixth gate" and "a first gate", thus describing an interval of six gates traversed by the sun, i.e. the time of half a lunar year (cf. **78**,15).

During this time the lunar months develop a "decrement" (tāḥṣāṣita) with respect to the calendar months. How the changing illumination of the moon got involved with this problem I do not know. Actually this whole chapter is only an expanded (and therefore more obscure) version of **78**,15.

79,5. One half lunar year is now compared to one half of the Enoch-year. The

latter is considered to be a "sidereal" year. Indeed, "the law of stars" is identical with the order of the Enoch-year (cf. **75**,1,2 and **82**). The difference in question is, of course, 5 days; cf. also **74**,10 to 17.

The "position traversed" (by the stars) marks the completion of the two seasons; cf. **82**,9 and 10.

79,6; **80**,1. Concluding speech of the angel Uriel, referring to his teaching about sun, moon, and stars (cf. also **82**,7,8), i.e. the topics which constitute the core of the "astronomical" Book of Enoch. The remaining topics (including the winds?) appear to be later accretions.

The "turning back" probably refers to the return of the celestial bodies to the east after their setting; cf. for parallels **75**,3 (p. 19).

80,2 to **82**,3 is an intrusion of non-astronomical material: apocalyptic and again concluding words to Methuselah.

Chapter **82**

4. Blessed are all the righteous ones, blessed are those who walk in the path of righteousness and do not err, like the sinners, in counting all their days in which the sun travels in the sky, entering in and coming out from the doors for thirty days, together with the leaders of the thousands of the orders of the stars, together with the four (days) that are added in order to separate the intervals (of the year, i.e.) the four intervals, the parts of the year, which lead them and with which they make their entry on four days.

5. There are people who err concerning them (the epagomenal days) by not counting them in the reckoning of the year, for such people err and do not know them correctly,

6. although they belong to the computus of the year and are truly recorded forever: one in the first gate and one in the third and one in the fourth and one in the sixth (gate) and the year is completed in 364 days.

7. For (this) account is true and the computation exact as (here) recorded, since (everything) concerning the luminaries, the months and the festivals and the (years) and the days Uriel has shown to me and revealed it as he was ordered by the Lord of the whole creation of the world and about the host of heaven.

8. And he has power in heaven over night and day, so as to make light visible to men, sun and moon and stars and all the powers of heaven which revolve in their circuits.

9. And this is the law of the stars which set in their (proper) places, and at their times and their festivals and at their months.

10. And these are the names of their leaders, who watch them that they enter at their times, who guide them in their positions and their order, in their times and their months and their powers and their positions.

11. Their four leaders who separate the four parts of the year enter first; after them (enter) the twelve leaders of the orders who separate the months; and the 360 heads over thousands (of stars) are the ones who separate the days; and for the four epagomenal days those are the leaders who separate the four parts of the year.

12. And concerning these heads over thousands: always one (of the four main leaders) is placed at the position between the leaders (of thousands) and their followers; but these (single) leaders separate (the seasons).

13. And these are the names of the leaders who separate the four fixed parts of the year: Melk'ēl, Hel'ememēlēk, Mel'ēyal, Nārēl.

14. And the names of those whom they lead are 'Adnār'ēl, 'Iyāsusa'ēl, and 'Iyelumē'ēl. These three follow the leaders of the orders (of thousands); (then again) one (of the four main leaders) follows the three leaders of the orders which (in turn) follows after those (main) leaders (who are placed) at the positions which separate the four seasons of the year.

15. At the beginning of the year Melk'ēl rises first and rules – to whom is (also) given the name "Southern Sun". And the total of days during which he exercises his power is 91 days.

16. And these are the signs of the days which are to be seen on earth in the days of his period of rulership: sweat, heat, and dryness (?). And all trees bear fruit, and leaves appear on all trees (and there will be) good harvest, and rose-flowers and all the flowers which blossom in the fields; but the trees of winter are withered.

17. And these are the names of the leaders who are the subordinates: Berke'ēl, Zēlebsā'ēl, and another one who is added, (as) head of thousands, called Hēloyāsēf; and completed are the days of rulership (over this season) with this one.

18. And the second leader after him is Hel'ememēlēk whom they (also) call "Luminous Sun"; and the total of the days of his light are 91 days.

19. And these are the signs of these days on earth: heat and drought; and the trees bring their fruit to ripeness and maturity and make their fruit dry; and the sheep mate and become pregnant; and men gather all the fruits of the earth, and everything which is in the fields, and the vats of wine. (And this) will take place in the days of his rulership.

20. And these are the names, and the orders and the subordinates, the leaders of thousands: Gēda'ēyāl, Kē'ēl, and Hē'ēl and the name of one who is added to them as a head of thousands called 'Asfā'ēl, and completed are the days of rulership with this one.

Notes to Chapter **82**. *The Hierarchy of the Stars*

As before, e.g. in **75**,1 and 2, the arrangement of the stars follows exactly the pattern of the Enoch-year.

82,4,5. There are "leaders of thousand (stars)", responsible for each month of 30 days and four leaders of higher rank who are associated with the four epagomenal days. Again people are mentioned who do not deal correctly with these days (cf. **75**,2).

In verse 4 'anqaṣ "door" (also "division," "chapter" and "cycle") probably means here not the gates but the divisions between the seasons.

82,6. The epagomenal days are associated with gates 1, 3, 4, 6, i.e. with the solstices and equinoxes (cf. **75**,2).

82,7,8. All this is handed down on the authority of the angel Uriel, who is set over the luminaries, sun, moon, and stars. Cf. the similar epilogue in **80**,1.

What follows in the remaining verses of Chapter **82** is obviously an addition taken from a different source.[34] It contains one of those lists of freely invented names which enhance the authority of cosmologic revelations. The text as we have it is slightly in disorder, which is not surprising for a meaningless list of (angel-) names. Nevertheless it seems to be clear that the original structure was simple enough: first are listed the leaders of the four seasons, then the twelve subordinate commanders for the single months. The text is incomplete only in the case of the last season, perhaps owing to an early mutilation of the manuscript.

82,9,10. Introductory remarks to the following (but not "headings" as Dillmann, p. 249, says).

82,11. Different ranks are given to the "leaders" (marāḥyān) of the stars. There are four leaders of the seasons, associated with the four epagomenal days, each one on duty for 91 days; then follow four groups of three leaders of the "orders" (śer'atāt) corresponding to the twelve months of 30 days each; finally, the "leaders of the thousand (stars)", concerned with the 360 single days. These leaders are presumably angels. Dillmann expressed their ranks by hellenistic titles: 4 toparchs, 12 taxiarchs, 360 chiliarchs.[35]

82,12,13. The names of the leaders of the seasons, represented by the epagomenal days, are:

Melkiel Helemmemelek Meleyal Narel

82,14,15. The first season, spring, is ruled over by Melkiel. The subordinate leaders are:

Adnarel Iyasusael Iylumiel.

34: Also Dillmann, Henoch, p. 239 (and p. 248) assumes the "Unächtheit" of **82**,9 to 20.
35: Dillmann, p. 52, notes; p. 248, n. 1.

It is the function of the fixed stars to signal by their (heliacal) rising the beginnings of months and seasons. The cyclic order of these phenomena is expressed in the text by indicating that the season-stars can be considered either as preceding or following the three subordinate stars which initiate the three months of each season. The second half of verse 14 seems to express in a clumsy fashion the fact that it is immaterial in a circular sequence of stars to distinguish between leading and following positions.

82.15 and 18. The names "Southern Sun" and "Luminous Sun", associated with seasonal leaders, do not fit very well, respectively, spring and summer, where they are mentioned.

82,16,19. The "signs" are here clearly referring to climatic and agricultural characteristics (cf. **72**,13).

82,17,18. The second season has the following subordinate rulers:

Berkeel Zelebsael Heloyasef.

82,20. The subordinate rulers of the third season are:

Gedaeyal Keel Heel.

Only the name Asfael is preserved for the last season.[36] Here the text ends abruptly.

Although the text of this verse, as we have it, is in disorder, the preserved words nevertheless suffice to show that the original version was an exact parallel to **82**,17: the names of two subordinate leaders are given, followed by a third one who brings the three months of the season to a conclusion.

Additional Notes on the Aramaic Fragments

by Matthew Black

72.1 With šelṭānomu cf. שלטן **82**.10, Enastr^{b}28.2, Milik, *Enoch*, p. 295 (לטנהו[ו בש]?).

72.27 Milik, Enoch, p. 282, equates 'ar'estihu with חרתיה 'its sections' at Enastr^{b}iii.2.

72.4–8 This linear scheme is found in the Aramaic fragments (Milik, Enoch, p. 278 f.; EAC, p. 195 f.). That the Ethiopic texts go back ultimately to this Aramaic Enoch is amply demonstrated by the surviving fragment of En **78**.6–8, 9–12 etc. (Milik, Enoch, p. 292 f.). The terminology of these texts has given rise

36: Charles, Enoch, p. 178, n. 20, considers the name Asfael as "merely an inversion" of Heloyaseph (of the second season). There is, of course, no reason visible for such a reduction of the number of leaders (not to mention the inept execution of the "inversion").

to a certain amount of confusion in the Ethiopic, e.g. the fractions 1/2 of 1/7th (1/14th) or 6/7ths and 1/2 (13/14ths) (see note on 73.6). For the general pattern of the Aramaic texts, consult Milik, Enoch, p. 274f. and EAC, p. 196, n. 6.[37]

73.6 The correct translation of 1/14 is found at **78**.6, manfaqa sāb'eta'eda, lit. 'half of a seventh part': so Enastr^{b}6.8, פלג שביע חד (Milik, Enoch, p. 284).

76.3–10 are preserved (fragmentarily) at Enastr^{c}1.ii.1–10(Milik, Enoch, p. 284f.).

76.3 Enastr^{c}1.ii.1 (Milik, Enoch, p. 285) has 'and the three (gates) which are after them are on the north (lit. the left)': (ותלתה די בתריהון על שמול) This corresponds to the clause in Ethiopic, 'and then those on the left'. Charles bracketed this clause (Charles, Enoch, p. 163) as 'nonsense'. It is undoubtedly original: the preceding clause 'and (then) three are in the direction of the north' seems to be a doublet. In this verse the Ethiopic text follows the order ENSW which does not correspond to the order ESNW in verses 5–14;[38] for a discussion of this problem and possible explanations, see Charles Enoch, p. 163, Martin Le Livre d'Hénoch, p. 176, Knibb, Enoch, p. 176. (Milik claims (p. 286) that it is the order [S] N [W] which is found in the Aramaic, but there is no evidence in the fragment for this – only the north is mentioned.)

76.4–5 Cf. Enastr^{c}1.ii.2, Milik, Enoch, p. 285. The Aramaic has a fuller form of text. For these destructive winds, see above, p. 23.

76.6 relates to the favourable East wind (above, p. 23). Enastr^{c}1. ii.5: '... by the second gate comes forth the east wind, the chief (of winds) (נפקא רוח קדים [קד]מיא)'. Milik reconstructs (p. 285) רוח קדים קדימא, 'the east-east wind', comparing line 6 רוח קדים גרבה, 'the east-north wind' which comes from the third eastern gate. But 'east-east' is a meaningless tautology. At **77**.1 Eth. the wind is called 'east' because it is qadāmāwi, 'chief, first': here Enastr^{c}1.ii.15 reads קדמיא and the line is restored by Milik: '[And they call the east (quarter) East] because it is the first (בדי הוא קדמיא) (Eth. has translated 'quarter' as 'wind': see below, note on **76**.13, **77**.1.) This east wind is said to be 'in the middle', i.e. between the two destructive winds of gates 1 and 3, and according to Eth. it 'comes forth in a straight line', i.e. blowing due E–W,

37: The expression rendered in EAC 'keeping (in darkness) a remainder of 2/7 (= 4/14)' is a curious one in the original. It occurs twice in this passage Enastr^{b}7.iii.4 and 8: thus line 4 נפק . . . ושלט בשאר יממא דן שביעין תרין ופלג . . . rendered by Milik 'it (the moon) emerges ... and it keeps during the rest of this day two sevenths (parts of its light) and a half'. Milik explains ושלט (p. 282), 'lit. 'and it reigns (over such and such a fraction of its light)'. May we not rather have here the lost root שלט behind Heb. שֶׁלֶט 'a shield', and meaning 'to cover' velare? (cf. Th WNT s.v. ἐξουσία Bd. II., p. 570 (Foerster).) We should then translate: 'it emerges and covers during the rest of this day 5/14'.

38: See EAC p. 198 for Ethiopic directional terminology.

unlike the two other east winds which are deflected to the south or the north. (See Flemming-Radermacher, p. 99.)

76.13 Enastr^{c}1.ii.14, Enastr^{b}23.1 (cf. Milik, Enoch, pp. 228, 289, 290) [א]בדן ומות [. . .] וחרבן 'devastation, death, [heat?] and destruction'. Cf. **76**.5 where several manuscripts read mot ('death') for moq ('heat'); mot may have fallen out of Eth. by haplography. (The reading מות seems reasonably certain.)

76.14 Enastr^{c}1.ii.14, Enastr^{b}23.2 'And (the description of) the twelve gates of the four quarters of heaven (רוחי שמיא) is completed; their full number and explanation I have shown to you, my son Methuselah'. Eth.'s 'four gates' (ḫewāḫewe) is a scribal error for nafāsāt = רוחות 'quarters' (Flemming Henoch, p. 103). (Milik reads שלמהון ופרשהון as a hendiadys 'their complete explanation'.)

77.1 Cf. Enastr^{c}1.ii.13–20, Enastr^{b}23, Milik, Enoch, p. 287 f. *The first quarter is called east.* That nafās translated 'region, quarter' is clear from Enastr^{b}23.4 'And the great quarter (רוח רבא) (they call) the west quarter רוח מערבא ... *because it is the chief (quarter).* Enastr^{c}1.ii.14 ('The east they call East) because it is the chief (quarter) (בדי הוא קדמיא). For the word-play on קדם, Dillmann, Henoch, p. 236: קדמיא can mean both 'first, chief' or 'in front' – The East is 'in front'. *the Most High descends.* Enastr^{b}23.2 בדיל לתמן דאר רבא 'because there the Great One dwells'. The Aram. assumes an etymology from Heb. דר רם; the translator reads the text as ירד רבא καταβαίνει ὁ ὕψιστος. Cf. Dillmann, Henoch, p. 236, Knibb, Enoch, p. 179.

77.2 *because all celestial luminaries decrease there* ... Enastr^{b}23.5 is defective in this clause: I suggest with Eth. בדי [לתמן חסרו נהור]י שמיא[39]. The reading מאין '(celestial) bodies' is corrected three times at Enastr^{c}1.ii.17,18: the first correction מאנין gives the true reading (the word occurs again at line 17 מאני שמיא [(written מאן נ)]: '(celestial) bodies setting and bodies entering'. (Milik reads interrogative מנ(א)ין 'whence' but translates 'there'.) The whole verse then reads: 'And the West is called the great quarter, because there the heavenly luminaries wane, (celestial) bodies setting and (celestial) bodies entering, and all the stars; and on this account it is called West (lit. 'setting').' Presumably 'great' because it has to accommodate all the heavenly host after they set.

77.3a Enastr^{c}1.ii.18–19, Enastr^{b}23.6–9 has a much longer text, relatively fully preserved; for the text see Milik, Enoch, pp. 288, 289. I read Enastr^{c}1.ii.18 בדי מאנין זרחין 'because (celestial) bodies arise' as above at Enastr^{b}23.7. 'And the north (they call) North because in it all the celestial bodies (lit. vessels)

39: Syr ܣܗܪ ܕܢܘܗܪ (P Sm col 1341) luna decrescens.

hide and assemble and revolve and proceed to the East of heaven. And the east (they call) East because from there the celestial bodies (מאני שמיא) arise; and also (they call it) *mizraḥ* because (there celestial) bodies arise זרחין, דרחין), moons . . . to appear . . .' (For Milik's conjectural supplement, see p. 288.)

77.3b For the second part of the verse, cf. Enastr^{c}1.ii.19, Enastr^{b}23.9; on the analogy of v.4 perhaps supplement [וחזית תלת פלגות] 'And I saw three divisions of the earth, one of them for the traffic of men, and one of them for [all seas and rivers], and one of them for the deserts [and the . . .] and the Paradise of Justice.' Milik supplies (after 'for the deserts') ולשבע 'and for the Seven (ultra-terrestrial regions)', a fascinating but unsupported guess (p. 291).

77.4 A few letters only are preserved in the first part of the verse (Milik, p. 289), but [ונ]חת עליהון תלגא is certain ·and snow comes down upon them'.

78.1 Milik's observation (Chronique d'Egypte, 46 (1971), p. 338) that the two names for the sun correspond to the two seasons of the year seems correct, but the order is not the 'dry' season followed by the 'wet' season, but probably the other way round (cf. Charles, Enoch, p. 167), winter and spring (early summer), the 'wet' season' Oryāres אורי חרס followed by summer, the 'dry' or 'hot' season (Tomās חמה?). 'Asonyā ('Asenyā) for the moon may be connected with Accadian sin, sen, 'moon' (cf. sivan, month of the moon-god, Sinai, etc.). 'Eblā can only be לבנה 'the white one', 'Ērā' ירח 'moon', and Benāsē is probably corrupt in the first syllable (Dillmann) unless it stands for בן ־ אנש, 'man' (cf. **78**.17).

78.6–8 cf. Enastr^{c}1.iii.3–9 (Milik, Enoch, p. 292). In line 1 בשמיא (corresponding to basamāy) is barely identifiable in the photograph and nothing else is now recoverable from the traces of other letters visible. At line 2 מין[משל . . .] בכול יום ויום ? עד יום ארבעת עשר ומש[למין בה כול נהורה] is all that can be recovered with certainty, but the Aram. text is evidently fuller than Eth.: the meaning seems to be that 'they (the added fractions) fill up (the light) each day and complete in it (the 14th day) all its light'. The last few words can be confidently restored from verse 7 where Enastr^{c}1.iii.5 has preserved a text: עד יום חמשת עשר ומשלמין בה נהורה 'Until the 15th day and they (the fractions) complete in it its light.'

78.7 cf. Enastr^{c}1.iii.6, read and translated by Milik: ודבר ירחיא בפלגי שבעין 'And it (the moon) accomplishes (lit. guides) (its) phases by halves of sevenths.' The reading דבר is certain (cf. Knibb): the word occurs again at **78**.5 as a noun (Enastr^{b}26.3, Milik, p. 294); cf. Tg דברא Jud. 5.21. If we assume that ירח 'month' can mean 'phase of the moon' (Milik), an alternative construction would be to take דבר as a noun and render 'and the course of the moon's phases is by halves of sevenths'.

78.8 Enastr^{c}1.iii.8 reads [ובי]ומא רב[יעי חד מן חד עש[ריא] 'and on the fourth day (the moon decreases) by one part from eleven parts', i.e. to ten parts (not as Milik 'eleven parts'). This firm text enables us to restore the earlier sequence which should be correctly rendered: 'And on the first day (the moon decreases) by one part from fourteen parts', i.e. to thirteen parts (not as Milik fourteen parts).

78.10 *Then Uriel showed me another rule.* Milik equates the fragment Enastr^{b}25.1–4 with this verse but the identification is doubtful. All that is now visible in the photograph are the words: [..]שבון אחרן אחזית לה די אזל [..]. 'Another calculation I was shown with regard to it (the moon?).' חשבון 'calculation' is certainly right (cf. **79**.1 Enastr^{b}26.7) and אחזית is to be construed as an inner passive of the Ophal (cf. Milik, Enoch, p. 202). (Milik supplements ['And Uriel demonstrated to me] a further calculation by having shown it unto me that ...', but this is forcing the syntax to support the identification.) In line 1 שניא 'years' is visible but there is nothing corresponding in Eth. There are several other passages where similar words are found, e.g. **73**.1 '... I saw another law', **74**.1 'I saw another course, a law ...'. (The verb אזל is probably auxiliary, but the main verb is lost.)

78.17 *At night it is visible ... nothing else in it.* This verse is fragmentarily preserved at Enastr^{b}26.4–6 but in a longer form of text. (Enastr^{b}26.3 is reproduced in Eth. at **79**.3, but Enastr^{b}26.4–6 go together and belong to the text behind **78**.17 Eth.) Enastr^{c}26.4–5 reads: [. . .] בה כדמות חזי דמי כדי נהורה בה ... האי[ר בלילא מן קצ]ת דמי חזוא דן כדמות אנש ... in it (?) it resembles the likeness of a mirror when the light shines on it. On some nights (מן קצת) this appearance resembles the image of a man'. There is a play on the noun חזי, חזיא 'mirror' (Heb. חזיא מראה Tg. Ex. 38.8) and חזוא 'vision, appearance, (Milik's 'like an image of vision' makes little sense). I take האיר as a Haphel of אור (cf. the use of אורתא for 'moon-light'; אר Hoftijzer, p. 23). Has this line 4 fallen out of the original behind Eth. by h m t or a similar form of scribal error (note the common phraseology of lines 4 and 5). מן קצת = *partim* (Dan 2.42) must refer in this context to the appearance of 'the man in the moon' for only a part of the full times of the moon's waxing or waning. There is nothing in the Aram. text about 'twenty (nine) days', which could have arisen in the Eth. text from the Greek κατεικάζει = דמי read as κατ' εἴκοσι, baba'ešrā. All that remains of the rest of the verse in Aram. is ובימא מן ה בלחודהי[. . .]. The second phrase is read as a repeated מן קצת by Milik. The last phrase looks like נהורה בלחודוהי 'light by itself'; perhaps the original read 'and in the day-time, for part (of the time), it resembles the sky for there is no light in it by itself: ובימא מן[קצת דמי כדמות שמיא די לית בה נהור]ה בלחודוהי. The meaning would be that

the moon 'resembles the sky' in the sense that its now invisible disc is blue 'like the sky'. (There is no evidence to support Milik's 'like the sun in the sky'.)

79.1 Enastr[b] 26.6 וכען מחזא אנה לך ברי 'And now I am showing to you, my son ...'

79.3–4 Fragments of the original of these verses have been preserved at Enastr[b] 26.2–4: בתרעא שתיתיא בה 'in the sixth gate ...' ומין [. . . ו] תרין ומחסר מן דבר שמשא [4] (twenty five weeks) and two days. [5]And it (the moon) falls behind the course of the sun ...' (For the rest of this fragment see on **78**.17.)

82.9 Fragments of verses 9–13 are preserved at Enastr[b] 28.1–5 (Milik, Enoch, p. 295). It is pointless to try to reconstruct an original text on the basis of the few words and phrases preserved: the most we can do is to identify the terminology and its Eth. equivalent. Thus lines 1 and 2 preserve five nouns two of which occur in Eth. verse 9, two in verse 10: למעדיהון לחדשיהון לדגליהון . . . [ו]בש]לטנהון לכל מסרתהון. The first two words correspond to Eth's 'their festivals and at their months'. (There is no astronomical justification for taking מעדין as 'signs of the Zodiac', Milik, p. 295,187 f.) Eth.'s 'months' should be understood, in the light of Aram. חדשיהון as 'their new moons', closely associated with 'festivals'. The last term דגליהון probably corresponds to šer'atātihomu of verses 10, 11 in the sense of τάγματα 'order, classes', especially in a military sense 'battalions'. See Milik, Enoch, p. 147, Knibb, Enoch, p. 188 f. The two terms in line 10 correspond to šelṭānātihomu 'their powers' and either to meqwāmātihomu or makānātihomu, 'their positions' or 'their places'. See Milik, p. 187 for מסרת. At lines 3 and 4 the fragment has ן ראשין ד [. . . and [. . . רשין בי[מפ] corresponding to Eth. marāḥyan zašer'atāt 'leaders of the orders' (ראשין ד[דגלין] probably translated first as ταξιάρχαι); the remaining fragment corresponds to 'ella yelēleyewomu la'awerah, 'who separate the months' ([די מפ]רשין בין ירחיא). Line 5 corresponds to verse 13 [וא]לין שמהת 'and these are the names ...'

82.16 ff. A description of spring, summer and winter occurs at Enastr[d] 1.1 (Milik, Enoch, p. 296) with expressions recalling En 2.1–5 and En 3 (En[a] 1.ii.3 ff.) and En **82**.16 ff. Milik detects in this piece the missing original of the description of autumn and winter which should have followed **82**.20. Certainly some original Aramaic description of the seasons, preserved more fully at En[a] 1.ii.3 ff., has served to provide the foundation of the poetic account of the seasons at En 2 and 3. En[d] i [. . . ומטר מחתין על ארעא וזרע[ונין . . .] line 2 '... and rain descend upon the earth, and plants (?) ...' Cf. Eth. En 2.3 '... and clouds and dew and rain rest upon it (the earth)'. (Has מחתין, Aph. ptc. נחת been read as מניחין Aph. ptc. נוח = 'a'raf?)

[. . .]עשב ארעא יעא ונפק ויעל[י . . .] line 3
'... the herbage of the earth sprouts, comes forth and blossoms.' Cf. 82.16.

ושתוא הוה ועלי כל אילנוא [מתבישין ונפלין lines 4–6[40]
ברא מן ארבעה] עשר אילנין די לא חזה להון [לאתעריא
לאתערטלה . . .]על[יהו]ן מתקימין

'But winter comes and the leaves of all the trees [wither and fall except for four]teen trees from whom it is unseemly [to be stripped bare ...] their leaves abide ... Cf. Eth. En 3 '... the trees appear withered ... with the exception of fourteen trees which are not stripped bare (but) which abide with the old (foliage) till the new appears after two or three years.' (cf. En[a]1.ii. 5–6)

40: Restored from En 2.2, En 3.

Subject Index

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