Cosmology in 1 Enoch

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Whoever would like to treat scientifically the cosmological texts of 1 Enoch must be aware that Enoch's primary goal was in no way to supply his audience with a manual of physics. One of the principal subjects of his book was that of the fallen angels and the consequences of their disobedience. The primordial state of angels was a blessed life in heaven. By sharing in the heavenly nature they had access to the mysteries which were hidden to mere mortals. After having fallen and sinned with the daughters of man, evil spread rapidly throughout the earth. Their heavenly knowledge passed from the women to others and it was gradually misused. Questions arose: Who is stronger: evil or God? Who can stop the spread of evil? Did the watchers possess all the mysteries of heaven?

According to Newsom[1] these themes were the principal concerns of the book of Enoch. In spite of the numerous differences within the book, Newsom tries to discover the common denominator in the writing: Near Eastern diplomacy. In order to demonstrate the power of their kingdom, kings used to show their treasuries, army and fortresses of the kingdom to the messengers of the enemy kingdom. It served to frighten the enemies from entering into war with such a strong kingdom. Reading 1 Enoch we have a similar impression. Now there is nothing to fear because not all the mysteries were revealed to the watchers. Furthermore, it is enough to look at God's creation, to see its order, its majesty and greatness and thus spontaneously recognise God's supremacy. God's palace, its inhabitants and its throne, the marvellous divine projects of creation and its perfect administration was a sufficient reason to encounter God's way of ruling the world and to leave everybody spiritless. Our first step will be to attempt to search the depths of these mysteries by means of a reflection on the cosmological passages.

1. Events under the firmament

In reading 1 Enoch from a cosmological prospective, the first thing one notices the abundance of openings and gates in heaven (33,1; 34,2; 35,1; 36,1.2.3; 72-74; 75,4.7; 76). But not all of them were of equal importance nor did they have the same function in the heavenly cosmology. Some of them were used by the sun and moon, others by the stars, and the rest by meteorological elements such as wind, rain, heat, etc.

[1] Newsom, C. A., "The development of 1 Enoch 6-19: Cosmology and Judgement", *CBQ* 42 (1980), pp. 310-329.

1.1. Sun and moon gates (chaps. 72-74)

1.1.1. Sun

Enoch understood the world to be composed of a solid earth and a firmament above it. To the east and west there were two sets of six openings through which the sun rose and set. These astronomical chapters (72-82) represent the most scientific part of the book. An analysis of these chapters has provided the following cosmological information:

The sun belongs to one of the two largest luminaries. Every morning it rises at one of the gates at the eastern extremity of the earth. Its heavenly journey is accomplished by virtue of a blowing wind which drives the sun's chariot through the sky. The roundness of the sun is similar to the roundness of the sky. Its disc is totally filled with light. At the end of the day it enters into the corresponding gate on the west and thus completes its daily journey. During the night the luminary is transported to the north, to the corresponding eastern gate in order to be able to resume its next journey (72,3-4). The regular movement of the sun also offers the attentive observer the possibility of measuring days, months, and years, so as to follow the rhythm of nature and of religious life. The sun keeps "the principle of the gate" (72,19), whereby it rises at each gate 30 times, a yearly cycle of 360 days. The progress of Enoch's astronomers could be seen in introduction of four intercalary days at the extreme points of the cycle: one during the summer and the winter solstices, which occurs at the sixth and first gate. This happens between the third and forth month in summer and between the ninth and tenth month in winter. The next two intercalary days were added at the sixth and ninth month, exactly at the moment of the equinox, which is reached twice between the third and forth gate (vv.: 13, 19, 25 and 31). The yearly cycle thus numbered 364 days and was aligned more closely to the standard solar cycle.

A comparative analysis with MUL.APIN tablets has revealed Enoch's dependence on these Babylonian discoveries. By studing the MUL.APIN tablets,[2] we can distinguish two systems of astronomical time measuring:[3]

Set A corresponds to the minas, which determine the day-night ratio (table 1).

Table 1: Set A: MUL.APIN tablet II i 9-21.[4]

	Date	Day	Night
Summer solstice	15. Du'uzu	4 minas	2 minas
Autem equinox	15. Tešritu	3 minas	3 minas
Winter solstice	15. Tebetu	2 minas	4 minas
Spring equinox	15. Nisanu	3 minas	3 minas

[2] Hunger H. – D. Pingree, *MUL.APIN: An Astronomical Compendium in Cuneiform*, (AFOF 24; Horn 1989).

[3] Glessmer U., "Horizontal Measuring in the Babylonian Astronomical Compendium MUL.APIN and in the Astronomical Book of 1En", *Henoch* 18 (1996), pp. 259-282.

[4] Glessmer, "Horizontal Measuring", p. 261.

The ratio of the summer to the winter solstice is 4 : 2 and 2 : 4 and for equinoxes the ratio is 3 : 3. This division of a day conformed to the watch system (three watches for a day and three for a night) and it depended on the season. A watch during the summer was longer than one during the winter (see table 2).

Table 2: Table of minas as fixed time-units used in the 3 day- and the 3 night-watches.[5]

	Date	Day Watches * minas	Night Watches * minas	Ratio Day : night
Summer solstice	15. Du'uzu	3*4 minas	3*2 minas	12 : 6
Autem equinox	15. Tešritu	3*3 minas	3*3 minas	9 : 9
Winter solstice	15. Tebetu	3*2 minas	3*4 minas	6 : 12
Spring equinox	15. Nisanu	3*3 minas	3*3 minas	9 : 9

Set B had a ratio of 3 : 2 and was based on the observation of a shadow-length on the 10 concentric circles with an increasing radius of 1 cubit. When the shadow-length reached one of the circles, the number of *beru* and *uš* was read off (see table 3). The observers thus received the equations or tables for determining the change of watches and time orientation for every moment of the day. Each season had its own seasonal constant (c). For winter its value was 90, for summer 60 and for autumn and spring 75. The ratio was 90 : 60. From the equation c = t x l (constant = season time-angle x shadow-length) it was possible to obtain more or less precise information about the time at a certain moment of the day. The fact that in Babylon, and likewise in Palestine, "the difference between the most northern and the most southern rising point of the sun is nearly 60°,"[6] one can exchange the day-night ratio with the angular system: for the summer and the winter solstice the ratio of day to night was 240° : 120° and 120° : 240° and for equinoxes 180° : 180°. If we divide the daylight into three watches and each watch into four parts, we can obtain the principal time-unit. They are, however, not constants. The objective length of the time-unit depended on the season. For summer, the measure unit is 20 (240 : 12), for winter 10 (120 : 12), and for spring and autumn it is 15 (180 : 12). This seasonal time-unit should correspond also to a certain shadow-length which could be derived from the equation: c = t x l.[7] (See table 3, p. 208.)

The similar system described in 1 Enoch 72 and the existance of "an instrument for astronomic measurements"[8] at Qumran confirms our view that

[5] Glessmer, "Horizontal Measuring", p. 262.

[6] Glessmer, "Horizontal Measuring", p. 274.

[7] So for eg.: the end of the first watch in the summer solstice could be calculated: constant = 60, season time unit is 20 (240 : 12) and the end of the first watch represents 4 units of the 12 (each of three watches is divided in 4 parts). The calculation is as follows: c = t x l; then l = c / t = 60 / (20 x 4) = 60 / 80 = 3 / 4 cubit. The shadow-length can be properly measured in a system of a concentric circle with a gnomon placed in the centre, whose height was one cubit.

[8] Albani M. – U. Glessmer, "Un Instrument de Mesures Astronomiques ŕ Qumran", *RB* 104 (1997), pp. 88-115.

chapter 72 was not only an astrological description of the heavenly elements, but that it served also as a practical aid for measuring time.

Table 3: Set B: MUL.APIN tablet II ii 21-42.[9]

Shadow -length	Summer solstice 15. Du'uzu	Equinoxes 15. Nisan = 15. Tešritu	Winter solstice 15. Tebetu
s	t^1 (° beru; uš; ninda)	t^2 (° beru; uš; ninda)	t^3 (° beru; uš; ninda)
1	60 (2b)	75 (2 1/2b)	90 (3b)
2	30 (1b)	37.5 (1b; 7u; 30n)	45 (1 1/2b)
3	20 (2/3b)	25 (2/3b; 5u)	30 (1b)
4	15 (1/2b)		22.5 (2/3b; 2u; 30n)
5	12 (12u)		18 (18u)
length	15. Du'uzu	15. Nisan = 15. Tešritu	15. Tebetu
6	10 (10u)		15 (1/2b)
8	7.5 (7u; 30n)		11.25 (11u; 15n)
9	6.67 (6u; 40n)		10 (10u)
10	6 (6u)		9 (9u)

1.1.2. Moon

We can find a more or less precise description of the moon in 1 Enoch 73-74. The information offered there can be summarized in the following way:

The moon is the second greatest luminary of the heavenly world; its roundness is similar to the roundness of the sky and for its daily journey it uses the same gates at the east and west as does the sun. Its light comes from the sun and when there is a full moon it reaches 1/7 of the sun's light. In its waxing the moon becomes 1/14 lighter and in its waning it becomes 1/14 darker each day. In terms of sun light the daily increase is 1/7 x 1/14, that is 1/98 of the sun's intensity. Therefore, the full moon is completed in fourteen steps and the new moon is reached in fourteen steps as well. The astronomers of the period of 1 Enoch left us a description of the moon's waxing and waning for one day only. Neugebauer, comparing Enoch's dates with similar tables of the Ethiopian Computus, concluded that we are dealling with a corrupt text or an incomplete list of dates.[10]

The fact that the moon uses the same gates as the sun does not mean that it moves by itself in them in the same way as the sun. From the dates given in verses 74, 6-7, we can reconstruct a table of the moon's journeys for the first

[9] Glessmer, "Horizontal Measuring", pp. 263-264.
[10] Neugebauer O., "The Astronomical Chapters", p. 397.

Table 4: Ethiopic computus.[11]

Month /Gate	1	2	3	4	5	6	7	8	9	10	11	12	1
4	2												
5	2	2											
6	8	8	4	4									
5	2	2	2	2	2								
4	1	1	2	2	1	2							
3	1	1	1	1	1	1	2						
2	2	2	2	2	2	2	2	2					
1	8	7	8	7	8	7	8	7	4	4			
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	
4	1	1	2	2	1	1	1	1	1	1	1	1	2
5		2	2	2	2	2	2	2	2	2	2	2	2
6			4	4	8	8	8	8	8	7	8	7	8
5					2	2	2	2	2	2	2	2	2
4						1	1	1	1	1	1	1	1
3							1	2	2	2	1	1	1
2								1	2	2	2	2	2
1									4	4	8	8	8
2											2	2	2
3												1	1
4													1
Dates	30	29	30	29	30	29	30	29	30	29	30	30	30

month, i.e. the month in which the sun comes out of the fourth gate in the east and sets in the fourth gate in the west (see table 5). But all of this does not correspond to Neugebauer's suggestion who to support his idea had to alter a test.[12] Taking into consideration the entire list of the dates constructed on the basis of the ancient scrolls of Ethiopia, we can conclude that the list which appears in Enoch 74, 6-7 is a simplified exemplar, whereby gates numbers 5, 3,

[11] Neugebauer O., "The Astronomical Chapters of the Ethiopic Book of Enoch (72 to 82)", *The Book of Enoch or 1 Enoch* (Black M. Leiden1985), p. 400.
[12] Neugebauer O., "The Astronomical Chapters", p. 400.

and 2 are not taken into consideration and all increasing steps are summarized in gate number 4 (see table 4). But comparing its numbers with that of table 5,[13] we can assume that the differences of waxing attributed to gate number 4 was a simple arithmetical sum of the increasing differences of the gates not mentioned (see table 6).

In the waxing phase – from gate number 4 up to gate 6 until the return to gate number 4 – according to the computus we have: 2 + 2 + 2 + 1 = 7 days during which the moon remains in the corresponding gate. In the waning phase – from gate number 4 through gate number 1 until the return to gate number 4 – the number of days is: 1 + 2 + 2 + 1 + 1 = 7. From this simple addition we can conclude that the number of days during which the moon comes out of gate number 4 is a sum of days during which the moon rises from the gates that were not mentioned.

Investigating the waxing moon's light (see table 7) and analysing the whole computus we can make some interesting conclusions regarding the gates:

1) In gates numbers 1 and 6 the moon rises and sets seven or eight days a month.
2) In gates 5 and 2 the moon rises and sets four times, except for the month in which the sun rises from the same gate (2nd and 8th months).
3) In gates 3 and 4 the number of days in which the moon rises and sets alters from two to four.
4) The full moon is reached in the corresponding gates 6–1, 5–2, 4–3 except for the first and twelfth months. In the first month it is reached in gate 4 and in the twelfth month in gate 5.

The change of gates and the numbers of days during which the moon remains in a gate is not accidental. According to Neugebauer,[14]

"these intervals are of the right order of magnitude as can be seen by computing the time intervals for which the ecliptic intersects the horizon within the same gate."[15]

Considering the macrostructure of the moon cycle, we can delineate some laws of the moon year:

"Die Dauer und Monatsstruktur des Lunarjahres erfährt man aus 74,14 und 78,15 sowie 79,4: in 74,14 heisst es, dass dem Monat in 3 Jahren 1062 Tage zukommen. Das ergibt für ein Jahr 354 Tage. In 1 Hen 78,15 und 79,4 wird die Dauer eines halben Mondjahres dementsprechend mit 177 Tagen angegeben. Des weiteren bestehe dieses Halbjahr aus drei 30tägigen Monaten und drei 29tägigen Monaten, die sich vermutlich abwechseln, so dass man in einem Mondjahr von 354 Tagen auf 12 zwischen 30 und 29 Tagen alterierende Mondmonate kommt."[16]

The difference between the length of the moon year (354 days) and the sun year leads to inevitable corrections. The deviation in this calculation system is ten

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[13] Neugebauer O., *Ethiopic Astronomy and Computus* (Wien 1979), p. 160.
[14] Neugebauer O., *Ethiopic Astronomy*, p. 161.
[15] A mathematical explanation of the thesis can be done on the basis of Neugebauer's *A History of Ancient Mathematical Astronomy* (Berlin – New York 1975), pp. 68-144.
[16] Albani M., *Astronomie und Schöpfungsglaube* (Leipzig 1994), p. 69.

Table 5: Comparison of computus with 1 Enoch.

The number of days during which the sun comes out from the same gate			
gate number 6		8	
gate number 4	7		7
gate number 1		8	

Table 6: Comparison of computus with 1 Enoch.

Number of gate	1	2	3	4	5	6
computus	8	2 + 2	1 + 1	2 + 1 + 1	2 + 2	8
1 Enoch	8			7 + 7		8

Table 7: Waxing and waning of the moon light.

Number of gate	1	2	3	4	5	6
moon light		⇒ 1/14	⇒new moon	2/14 ⇒	4/14 ⇒	12/14 ⇒
	3/14	11/14	13/14	full moon	14/14	

days, which amount to thirty days in three sun years, that is exactly one moon month. But the fact that the real difference between these two systems was 365.25–354.375=10.875 rendered either this calculation inadequate and thus in ancient cosmologies one can encounter a labyrinth of correcting systems. The best known of them are the corrections at the end of every five or eight year period. This type of correction is present also in 1 Enoch 74 and according to Neugebauer, it was an "abortive attempt"[17] to have introduced this concept. The correction was introduced not only to balance the arithmetical disproportions but it was also included for apologetic reasons.[18] It was necessary to have an precise calendar for celebration of feasts.

Beckwith, on the other hand, summarizes the principal motivations of Enoch's calendar as follows:

- the Jubilee year,
- the Sabbath,
- and the belief in predestination and in angels.[19]

[17] Neugebauer O., *Ethiopic Astronomy*, p. 232.
[18] Albani M., *Astronomie*, 69, pp. 99-153.
[19] Beckwith R. T., "The Earliest Enoch Literature and its Calendar: Marks of their Origin, Date and Motivation," *RQ* 39 (1981), pp. 365-404.

1.2. Star's gates

In comparison with the sun and the moon, the stars occupied much less space in Enoch's astronomy. Enoch's astronomers did not employ the concept of a zodiac system, which in 2 Enoch 21 is located in the ninth heaven. Also, stellar movements are not described with precision. From the information found in 1 Enoch we can draw several conclusions:

It was again the wind which caused the stars to move in their chariots across the firmament (18,4; 75,8). Due to different stellar magnitudes, other types of gates were appointed for the stars. They are actually sets of small gates which were shown to Enoch during his journey to the south and to the east (36,3; 33,2). This innumerable amount of gates was scattered to the left and to the right of the sun-moon openings (72,3). The role of the stars in Enoch's cosmology is difficult to comprehend immediately. The point of departure for Albani's comparative analysis[20] – an attempt to clarify the statement that the sun-moon movements are "guided by the stars" (72,3) – was an obscure list of angels' names that appears in ch. 82 and their possible connection with chaps. 72-76 (see table 8).

Table number 8: Points of comparison.

Point of comparison	Sun-moon system	Stellar system
Division of the year into 12 months	The rising and setting of the sun at 6 gates (ch. 72)	12 leaders of the orders which distinguish the months (82, 11)
Thirty-day months	Gates numbers 2, 3, and 5	360 captains (82, 11)
- 4 intercalary days - 4 seasons	Adding of intercalary days (72,13.19.25.31) at the extreme parts of the cycle – division of the year into 4 seasons	- intercalary days (82, 11) - 4 leaders (82, 11)

From this comparison we can conclude that there perhaps is some kind of connection between the stars and sun-moon movements. The results of Albani's research can be summarized: Each month had its own star or stars which appear only during this month. At the beginning of the month the sign-star rises together with the sun and therefore it is not possible to observe it in the morning sky. But each day this star rises earlier for a couple of minutes and therefore after several days it becomes visible in the morning sky. After fifteen days its rising can be observed only in the middle of the night. The fact that the star rises every day a bit earlier than the sun means that at the end of month it sets when the sun rises.

[20] Albani M., *Astronomie*, pp. 55-68.

Thus, through the observation of the dawn and aurora stars, Enoch's astronomers could receive precise information about various periods, cycles and feasts.

Another problem is caused by the alternation of the length of the night during different seasons and the time in which the star should rise earlier. During the time of the equinoxes, the night lasts nine parts of eighteen day-night parts. The division 9/30 (30 = number of days in one month) described the time difference in which the star must cross the sun each day. In addition, similar calculations can be made for the summer (6/30) and winter (12/30) solstices. As was shown above, this time difference corresponds to the angle measurements: the equinox night period is 180°, difference angle 180/30=6°; for the summer solstice 120/30=4°; for the winter solstice 240/30=8°. The appearance of the new star at the fourth day and not on the first of the month corresponds to the geographical position of Palestine.

1.3. Gates for meteorological phenomena

In 1 Enoch we can also find vivid descriptions of various natural phenomena and their origin. The principal sources for this information are found in chaps. 32-36 – the revelation given to Enoch during his journeys to the four corners of the world – and the astronomical book (72-82). Chap. 34 describes three gates at the extreme northern ends of the earth, through which the wind blows; good things come to the earth from the middle, and through the two lateral gates bad things fall upon the earth. Amplifying this information with the dates which are listed in chap. 76, we can reconstruct a rather comprehensive image of the gates and their connection with the winds. In the four principal directions the four good winds were collocated and around them the gates for the eight bad winds were situated (see picture 1 on p. 214).

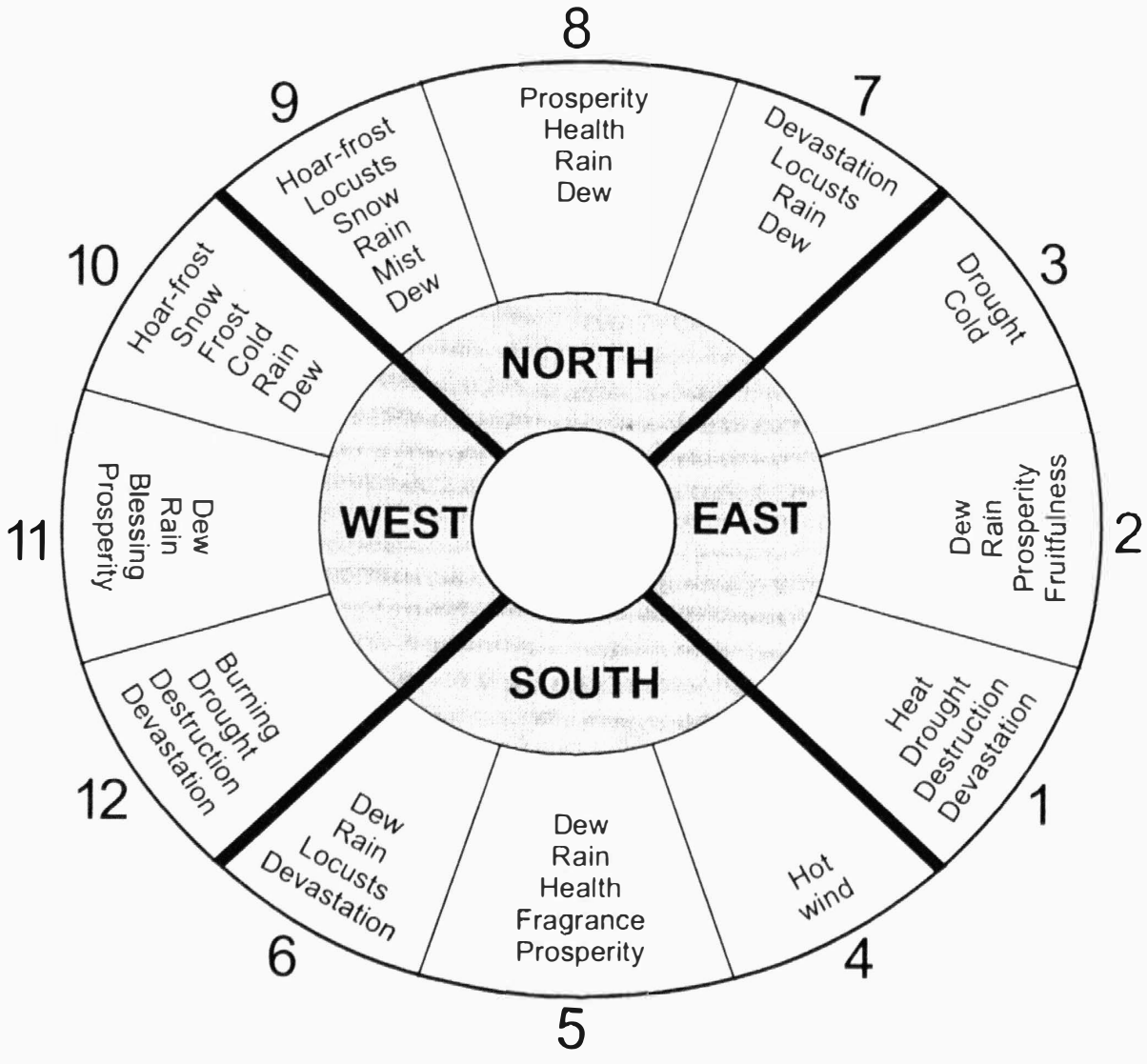
From these divisions we can deduce with Albani as follows:

"Das bedeutet jedoch, dass nach Ansicht der henochitischen Astronomen die Strukturen des Kosmos und die darin wirkenden Naturkräfte nichts Neutrales sind, sondern wie im Bereich der Menschen auch dort zwischen <gut> und <böse> unterschieden werden muss."[21]

The division probably originates from the experience of nomadic people whose lives were connected with meteorological events. Albani tries to uncover some possible roots for this tradition.[22] His analysis includes an analysis of chap. 75, vv. 4-5 where the twelve gates for heat are placed along the course of the sun chariots. He noticed the close connection between the twelve gates for heat (75,4) and the four winds (75,5) and their connection with the sun, the moon and the stars (75,2.6; 8,9). The division of the cosmos into four directions seems to be natural in these passages. There are four principal directions (76,1) and four great luminaries which divide a year into four seasons. On the basis of

[21] Albani M., *Astronomie*, p. 54.
[22] Albani M., *Astronomie*, pp. 51-55.

these dates, he tries to reconstruct the development of the gate tradition: we basically have a "Grundstruktur von der vier Himmelsrichtungen bzw. Winden"[23] which represents the good winds. Analogous to the twelve Sun gates the four "Himmelsrichtungen" were extended along with the bad winds into the twelve gates. A comment on the hot wind in the lateral gate in the south suggests that the idea of separated gates for heat was perhaps an imitation of the sun gates system.[24]



Picture 1: The division of winds.[25]

[23] Albani M., *Astronomie*, p. 53.

[24] But it can also well represent an independent system of gates for the rest of the meteorological events.

[25] Neugebauer ●., "The Astronomical Chapters", p. 404.

2. Events above the firmament

The idea of heaven as a solid firmament with a large number of gates from which the sun, moon, stars and other meteorological phenomena exit necessarily led the learned of that time to offer another reflection: the question is not only from what gate the phenomena exit, but also one must ask from where do these phenomena come. This reflection can be identified as a common denominator of the "storehouses, chambers and reservoirs" of the sun, the wind, etc. Reflecting on this, the Enoch's cosmologists developed the image of an entire system of reservoirs filled with various elements. These reservoirs were able to empty themselves at the opportune moment. Summing up the information which appears in 1 Enoch, we can establish four principal types of storehouses:

A) for winds (18,1; 41,3-9; 60,12),
B) for thunder and lightning (17,3; 60,15),
C) for water and rain (54,7) and
D) for luminaries (41,5; 71,4).

Most of the information is given for the reservoirs of winds: they are huge sealed tanks (41,4) equipped with a certain kind of opening which enables them to empty their contents (60,12). The openings are under the control of an angel (60,19.21). The functioning of this entire complex is controlled by God's secrets (41,3.6; 60,11; 59,11). All of these terms, such as hidden things, secrets, mysteries and commandments represent "lois fixes"[26] which control and maintain order in nature.

A more difficult question concerns the localisation of these reservoirs. The question had probably been reflected on because in 2 Enoch 3-6 a precise localisation for these elements is in the first heaven. Chap. 17,2.7 suggests their possible position on the top of the mountain whose peak reaches heaven. Chaps. 41,4 and 60,20 suggest an eventual connection between the clouds and the reservoirs and thus the images could localise the chambers of wind at the extremities of the earth or heaven. A possible confusion as to the exact position of the winds' reservoirs is due to the great variety of the winds and their different roles in the cosmology. Some of their functions are as follows: 1) as engines or as a kinetic mechanism for the journey of the sun, moon and stars; 2) the four winds are responsible for sustaining the earth and the firmament (18,2) and "turning the heaven" (18,4) – so that they can be considered as the very pillars of heaven (18,3); and finally 3) the winds are identified as meteorological elements like frost, hail, snow, mist, dew, rain, and sea breeze (60,16-21, cf. with the fourfold division of the world in chaps. 33-36 and 76-77), and the winds acting as the controlling mechanism of thunder (60,15).

There were whole divisions of winds in various scales and grades[27] according to their strength: the strong sea breeze (60,16), the kind messenger which

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[26] Martin F., *Livre D'Hénoch* (Paris 1906), p. 24.

[27] The idea of different sorts of winds is also implicitly contained in the image of "balancing" (41,2; 43,2).

is the hail wind, and the snow-wind which "doesn't exist because of its strength" (60,18). The rain-wind's mechanism of triggering and emptying the reservoirs is described as follows: "when the rain-wind becomes activated in its reservoir, the angels come and open the reservoir and let it out" (60,21). Comparing the third group of winds with the descriptions given in chaps. 33-36 and 76-77 we can assume that the same atmospheric elements are at hand. Having the complete descriptions of the twelve wind-gates in the four directions, we can assume that according to Enoch's cosmologists behind the twelve wind-gates existed huge reservoirs of snow, rain, dew, hail, frost, etc. Agitation of the elements inside the reservoirs was the sign for a designated angel to open the gate and to remove their contents over the face of the earth. This process could be carried out directly in the form of precipitation or snow or indirectly by the formation of clouds.

A similar description can be also found for lightning and thunder. They are likewise stored in the huge reservoirs which contain an enormous number of thunderbolts (60,15)[28] varying according to their velocity, the places where they fall (60,13), their force, their sound (59,2; 60,1), and their lights (43,2). The action of thunder and lightning is reciprocally connected (60,14). The mechanism of the action is the "revolution" (43,3) inside the reservoirs after which the lightning's "bridle" are released and the lightning bolts strike the earth. Thunder follows the lightning: "when the lightning flashes light, the thunder utters its sound" (60,15). But it is again the wind which serves as a "bridle" restraining unleashed natural elements (60,15).[29]

3. Attempt at a synthesis

On the basis of the analysis of 1 Enoch we can conclude that his vision of the world is strongly geocentric. The possibility of travelling through the earth and reaching the extremities of the world presupposes an image of the earth as a disc in either an elliptical, circular, or rectangular form. Its corners served as the points of support for the pilasters, which served the earth as well as the heaven. The pilasters were probably located in the four directions of the world and there are some indications by which we can identify them with the four winds.[30]

One of the most important elements of the cosmos was water (54,7-10). It surrounded the entire earth. Above the earth as well as above the heavens was the heavenly ocean (masculine water) and a smaller one under the earth (feminine

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[28] Black's interpretation of chap. 60,15 is " The storehouses are so full of thunders as the sea-shore is of sand", Black M., *The Book of Enoch or 1 Enoch* (Leiden1985), p. 229.

[29] The information about the lumiary reservoirs is very concise (41,5; 71,4) and does not add anything new to the ideas already expressed.

[30] Sachhi sees an egyptian matrix behind it; Sacchi P., *Apocrifi dell'Antico Testamento* (Torino 1981), I, p. 494.

water).[31] The heavenly ocean fed clouds and other reservoirs with water so that rain could fall on the earth. These two types of water were separated by the firmament which was a solid arch spread over the earth. This solid and impermeable firmament represented a new question to be resolved: namely the communication of the heavenly world with the earthly world. The solution was found by introducing different sets of gates which could be opened at opportune moments, and thus the elements behind the firmament could appear in the intermediate space between the earth and the firmament. For this reason twelve sun-moon gates were introduced which allowed the sun and the moon to perform their daily journey through the sky. The stars used the smaller gates for their rising and their setting. "Leur éclat et leur chaleur sont alimentés par une masse ignée qui court sans cesse."[32] The same system of gates was also described for the reservoirs of rains, winds, thunder and lightning. They represent a kind of storehouse in which the meteorological elements were deposited. Because of the "revolution" inside the reservoirs, the gates were opened by their angel (a kind of watcher) and their content was let out over the earth. The controlling mechanism as well as the reciprocal communication of the natural elements were brought about by the controlling winds and the whole hierarchy of angels.

Earth was appointed as the principal abode for human beings and heaven was designated as the residence for divine beings, and in the highest heaven was the throne of God.

The whole heavenly cosmos was governed by a complex systems of laws. Natural forces observed them by means of an the oath (69,16-24). Every kind of disobedience was severely punished. None of the physical elements was considered neutral. They were etheir for blessing or for cursing. The Israelites did not develop any special cosmology. They simply took the cosmological conceptions which had already existed for thousands of years[33] and adapted them for their religious purposes. The principal goal of Enoch's cosmology was thus to uncover the greatness of creation, to understand its laws and to observe them. On this basis one could sing a song of praise to the Lord (69,25).

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[31] The idea derives from a Mesopotamian conception of the world, see Lambert W. G., "The Cosmology of Sumer and Babylon", *Ancient Cosmologies* (ed. C. Blacker – M. Loewe) (London 1975), pp. 42-62.

[32] Martin F., *Livre D'Hénoch*, p. 23.

[33] Jacobs L., "Jewish Cosmology", *Ancient Cosmologies* (ed. C. Blacker – M. Loewe) (London 1975), p. 66.

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