THE SUMERIAN K8538 TABLET

THE GREAT METEOR IMPACT DEVASTATING MESOPOTAMIA

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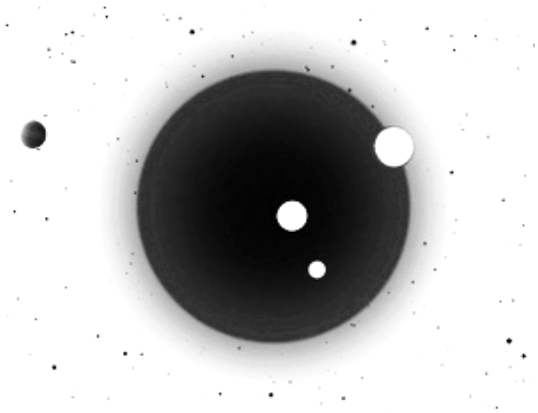

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Abstract. The K8538 is the world's first scientific documentation on approach and terrestrial impact of a large comet on Earth. Observations were made on top of an astronomical tower, located 100 km close to the impact site. The report is presented in form of a sequence of eight pictures, explaining the comet's first astronomical sighting, the appearance of comet tail and coma, the growing comet size, the comet flight across the sky and finally, its visible impact beyond the horizon, i.e. the impact flash lighting of the sky and the subsequent elevation of ash plumes, glowing beyond the horizon, spreading North and West. The impact itself is not described as a blast pressure wave but rather as an ash and dust tempest, rising out of mud sediments from the Tigris and Euphrates river delta, where the hot comet found its burial. The astronomical observer carried out trigonometrical measurements to record the flight path in the sky, flying distances and flying times. The observer started his measurements as soon as the comet showed its spectacular size, coma and tail, which convinced the observer, that an extraordinary celestial event was about to take place. The K8538 is a full comprehensive analysis of the comet event; its eight-picture sequence is cohesive. The tablet is a masterly work, explaining with as little text a maximum amount of impact event features. The tablet is a late Babylonian copy of the early old Sumerian original. Written cuneiform signs of two zodiacal constellations, Orion and Triangulum, are later Babylonian copy scribe additions and were not part of the Sumerian original. The K8538 tablet had high priority in Babylonian times, because it provided the documented evidence that the comet emerged out of the constellation Triangulum, Mul-Apin, onto which late Babylonian astronomy and religion rested. The tablet eyewitness account shows Mul-Apin as celestial seat of Gods and celestial source of destructive meteors on Earth. For this reason, the K8538 was guarded, copied and refreshed over more than 1,500 years, until the late Babylonian period, after the observed meteor impact in 2,193 BC. The tablet does not deal with any Babylonian zodiacal astrology. The described cosmic impact on Earth is the so-called 4.2 kyr event, shown in our other Holocene climate change studies. The comet impact is responsible for a 300 year long drop in global temperatures combined with lasting mega-droughts, which led to the collapse of various ancient civilisations around the world.

Citation. Seifert, J., Lemke, F.: The Sumerian K8538 tablet - The great meteor impact devastating Mesopotamia, 2014, http://www.knowledgeminer.eu/climate_papers.html

CONTENT

1. INTRODUCTION

The tablet K8538 is the singular, most difficult Babylonian tablet to decode. For this reason, only a few scientists tried this challenge over the past 150 years. According to the renowned assyriologist Ernst F. Weidner, it is "one of the most enigmatic Babylonian documents [with an] unique and enormously difficult text".

The tablet is on display in room 55 of the British Museum in London. [1, fig. A1 in annex]. It was recovered in archaeological excavations at the site of the ancient town of Nineveh. Sir Austen Henry Layard conducted the excavations during the years 1847 to 1852, after discovering the ruins of the Royal Library of King Ashurbanipal, which was burnt down in 612 BC, when the town of Nineveh was razed entirely by military force. The Nineveh site remained not occupied for centuries, which aided the preservation of the tablet collection. Layard's recovered clay tablets were sent to London, about 20,000 in number.

In 1880, Archibald Sayce and Robert Bosanquet discovered the tablet's astronomical relation and titled it "Astrolabe" [2]. The first step towards a content analysis, was done by Leonard William King, who produced a picture facsimile of the tablet [3, fig. A2 in annex]. His work was published in 1912 [4].

His transliteration of cuneiform writing signs in the picture facsimile is perfect, however, he did not translate facsimile signs into modern language. He hoped to receive more information from additional astronomical tablets by

joining an archaeological expedition to the same site at Nineveh, but nothing usable could be unearthed.

King presumed that K8538 was a "Planisphere", showing the night sky over Nineveh.

The next work on K8538, 3 years later, by Ernst F. Weidner [5] was published in 1915. On 6 pages of his book, he attempted to interpret all 8 individual tablet sections but the text remained to him mysterious, enigmatic, unidentifiable magic. He rejected King's term "Planisphere", because star distributions on the tablet do not coincide with the Nineveh sky. His major contribution was a valid numeration of a 1 to 8 sequence for reading tablet sections and, secondly, the observation, that the round tablet had to be turned for individual section reading.

Since Weidner`s work, for many decades, until the 1980's, nobody tried decoding of the tablet. Interest resumed in 1989, when the author Johannes Koch [6] published a Babylonian star constellation book, in which he included K8538. His approach, unfortunately, was not a translation and sign-by-sign interpretation of the tablet, but rather a picking of presumed Babylonian celestial constellations out of the tablet, to supplement his Babylonian celestial work. His astronomical analysis focusses on additional Babylonian literature, such as the Mul-Apin texts, the Astrolab B-I-18 and the K-11251 tablets. Over 110 pages, he calculates heliacal and acronychal star rises. He dedicated only one single page, number 113, to the wording of the K8538 text. His conclusion about the tablet was that it must have served as an unknown tool for assisting astronomical observations in Nineveh.

Twenty years later, two authors, Alan Bond and Mark Hempsell [7] finally made real progress. At the beginning of their book, they point out, that until 2008, quote: "there has never been a comprehensive and consistent translation of this unique tablet [which] might relate to an impact of a Near Earth Object". Bond and Hempsell, for the first time, offered a comprehensive transcript tablet, with sign numbers according to the Assyrian-Babylonian sign Index List [8]. The internet presentation of K8538 by the British Museum should also be mentioned as step forward.

Weidner recognised that the K8538 tablet is divided into a sequence of 8 images, from 1 to 8, and for image reading, one has to turn the tablet according to the sequence number. The tablet set-up, therefore, is a "8 picture cartoon", or a historical "8 picture sequence of power point presentation", which uses little written text, but which is composed of visible and easily memorable symbols for explaining the comet flight to an audience, which is less able in reading cuneiform, but which can recognise sequences, sizes, arrangements, placing and spacing of individual symbols. The full cometary event story is not those given in sparse cuneiform, but the overwhelming content is given in symbolic arrangement, such as in today's power point pictures, containing symbols, short notes, memory hints, arrows, bottom lines, etc. The symbols have to be explained by the show presenter. In our case of K8538, we had to assume the role of an historical show presenter and re-establish the lost sense of symbol arrangements. Every line, each sign placing, sign numbering, sign spacing and distribution on the tablet contains an inherit message. There is neither wasted space, unimportant space fill, duplicity, poetic and literary shallowness on the tablet. The tablet is a master's work of compressing an enormous amount of information onto one small tablet. For this reason, Assyriologists with esteemed cuneiform reading skills did not try to take up the challenge. E. Weidner freely admitted that he did not get far in his symbol interpretation, therefore he resigned to place K8538 into the corner of enigmatic witchcraft. One hundred years have passed since King and Weidner; we are certain that both would be pleased to hear that the enigmatic K8538 had finally been decoded.

For our explanations, we present the Rykle Borger Index numbers for each text sign, following the procedural steps of Bond and Hempsell.

2. FIRST IMAGE - THE COMET'S APPROACH DURING THE FIRST EIGHT NIGHTS

We start with the triangle at the right hand side in figure 1. Within, in its tip, there are seven dots closely marked, seven stars, unmistakably the "Seven Sisters", the Pleiades. The observer placed them into a triangle, retracted from the tip of the image, to be able to place more information around it, as compared to a position directly in the very tablet center.

As next feature, there is an important center line with writing above and below it. This is the true comet flight line, which continues from this image 1 in a straight line into the opposite image 4.

The comet flight line is described with B-129a-1-105, above: The line of "positions of the one and same" (of one same celestial flight object), and below this comet flight line: B-129a-56, which is identified as the constellation Triangulum, Mul-Apin, shown as a coarsely made triangular drawing, showing from where the flight line originates. Below this, an 8 dot line gives 8 positions of "the one and the same" object for 8 successive nights of observation, with each hole increasing in size and distance to the following night. The dotted line has its explanation below it for the first 7 night dots: B-99-313-579-575-449-129a, "the celestial object - with a

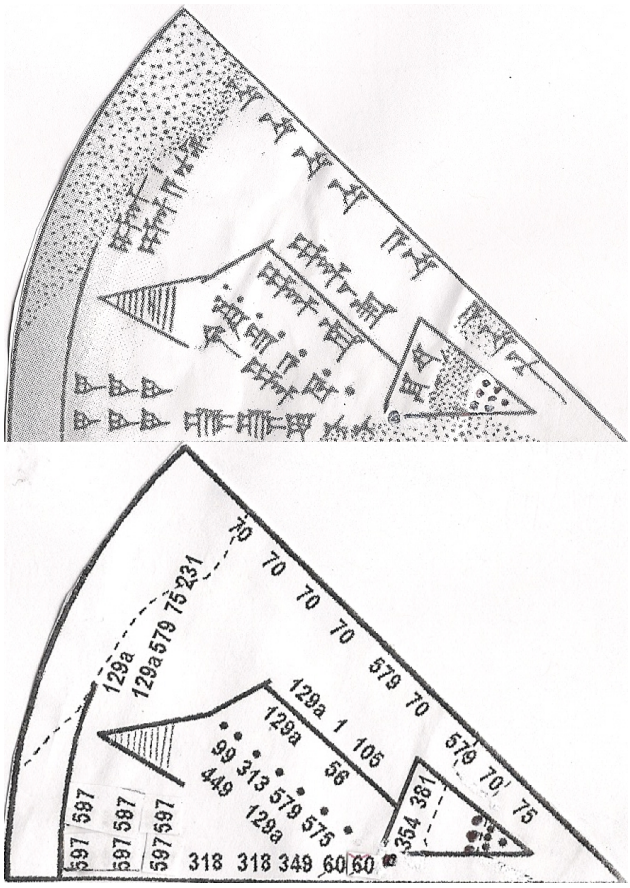

Figure 1. Sighting of the comet for the first 8 days.

white tail - is weakly - visible - as a star", thus not yet with a very strong shine. The last, the 8th nightly position, has a comment made above it, B-354-381: "repeating another day" of comet advance, thus, the comet advances on the line day by day.

Looking to the bottom cuneiform: This line is longer, 6 times of B-597, followed by B-318-318-349-60-60. This bottom line explains the distances between those 8 daily comet advances.

At first, we translate B-318-318, which is the length measure "Kush", a traditional measure of 1 forearm length, called cubit.

We can see that the last 2 comet movements, day 7 and day 8, have a position advance of 1 cubit (about 50 cm) each. The script continues with B-349, of "the same and likewise" object, which is, B-60-60 (Dim-Dim) "advancing closer". "The same and likewise" signifies that there is only one object moves along and no other star is involved. The bottom line begins with 6 numbers B-597, which are the logical first 6 nights of comet detection. As the 8 lined dots above show, the first 6 dots have shorter distances between each other, which should therefore be entered as distances or fractions smaller than 1 Kush. All B-597s are written as a reclined block of 2 x 3 signs of the number B-597 (Limmu) "number 4", thus as reclined block of 2 x 3 x 4. This needs interpretation, which we find in [9, Brown, D, 2000], showing that 1 Kush was divided in 24 smaller units. Since no exact measurements for the first nights have been taken, the astronomical observer, therefore, left it just as general remark, that for the first 6 nights, only daily "fractions" of less than 1 Kush apply for the comet advance:

The first 6 days signify: "6 nights of a partial 1 Kush advance". The complete bottom line of 6 x B-597-B-318-318- 349-60-60 is therefore translated as:
With distances of "6 (days) of partial 1 cubits, and 2 (days) of 1 full cubit" each, the "same and likewise" (moving object) is "advancing closer". Important is that this Kush measurement is a linear measure, not given in arc degrees, because: [9, quote D. Brown, page 111]: "In the period before 750 BC, celestial distances were [...] never described as a fraction of a circle, as they were in the late period..."

The very top of the image is dedicated to the comet tail: Six times of B-70, of which the first 2 are missing, broken off, thus remaining are 4 times B-70-70-70-70: "smoke". And two more B-70 with distances between "smoke"- days getting wider in its written line, and made with additional explanation, B-579-70-579-70-75: "the light (steam)-smoke-picture" (of the flight line), documenting the growing white shining smoke tail (as compared to black smoke of fire).

The astronomer placed his most important celestial observation onto the periphery of the tablet, here, B-129a-579-75-231, "the object - with the steam - picture (tail) - is getting fatter" - thus larger and approaching.

As summary for image 1: Shown is the comet flight line, originating in Triangulum and moving directly into the Pleiades. Eight daily distances are given as a dotted line of distance estimates below the flight line. The linear distance for the 8 daily moves is calculated in Sumerian forearm lengths. The visible comet smoke tail line in the sky is indicated. Observations for those 8 days show that the flying celestial object itself is getting larger and shining stronger in its approach.

3. SECOND IMAGE - THE COMET'S CONTINUATION FROM THE 9TH DAY ON

Regrettably, not much is left of this image (fig. 2). Three remaining text signs say: B-537-68-457: "the along-moving, downwards-coming-punishment...", thus, the comet approaches, coming downwards and, as said in figure 1, getting faster and larger.

Four nightly observation entries are listed, each on a separate line, as repeating the same successive observation.

The major part is broken off, no doubt, this daily observation is repeated for more following days. We may

reconstruct the missing part in comparison with the next images 3 and 4 (fig. 3 and 4). Image 3 shows 2 days of comet flight, the image 4 summarises the total of 11 days comet flight since the Pleiades. Therefore, image 2 has 4 nightly observation entries; 5 more of the same entry make up the missing image part.

As summary, second image explains the continuing approach of the comet towards and down to Earth for the following 9 nights after the first 8 nights in image 1.

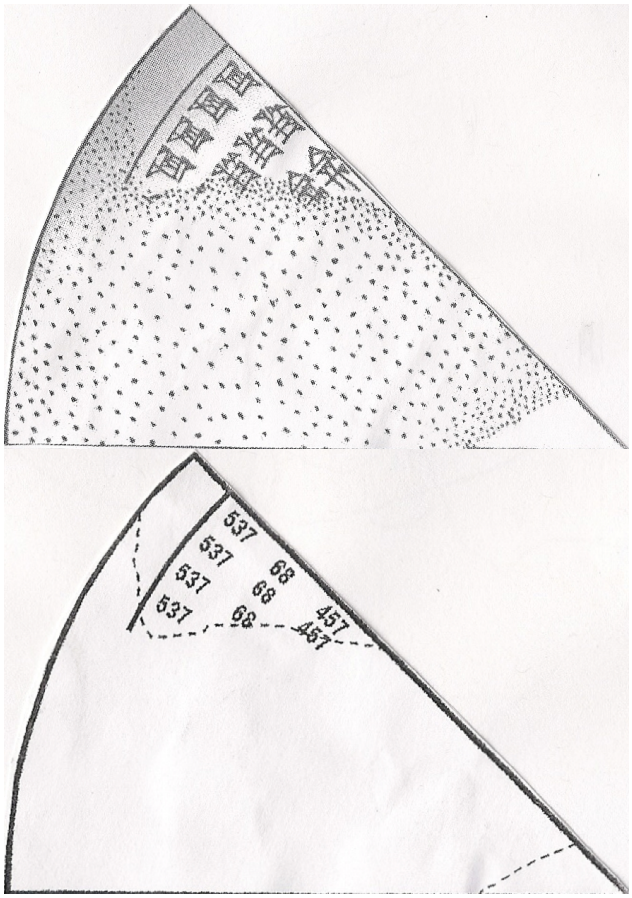

Figure 2. The continuing comet flight for 9 days.

4. THIRD IMAGE - THE COMET WITH A LARGE COMA REACHES ORION

In image 3 (fig. 3), the astronomer carried out triangulation measurements of approaching comet positions for 2 nights. The astronomer used a triangle as measurement symbol, such as done still today [10, fig. A3 annex], placing celestial and terrestrial triangulation marks for surveying. We can also imagine the motivation on why the tablet was produced: The astronomer on his observation tower was enormously impressed by the great comet, with its large coma and comet tail and therefore decided to document this unseen historical event, by placing his triangulation marks. He anticipated, by dividing the tablet into 8 successive images, that additional remarkable events were about to follow, and

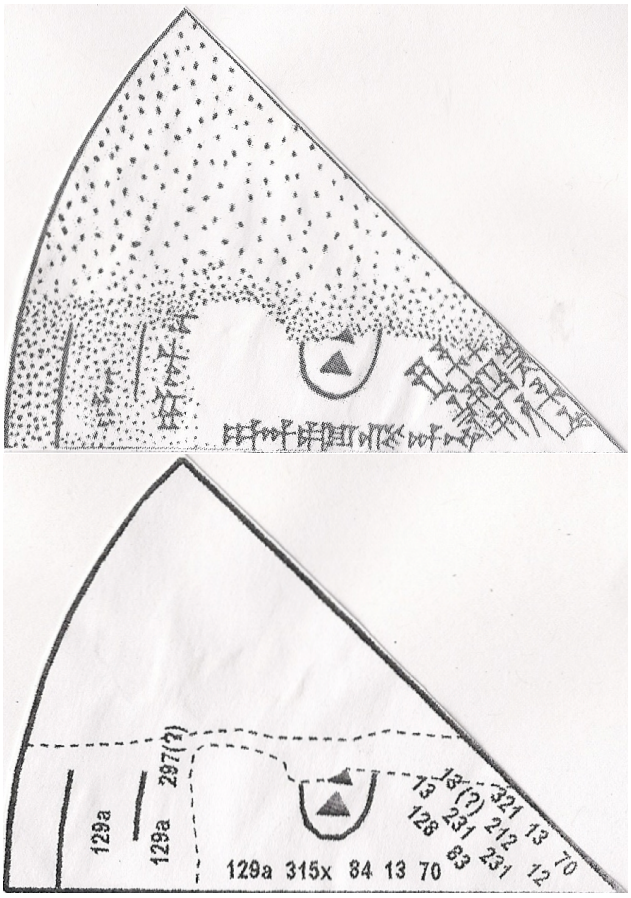

Figure 3. The comet grew with visible tail and coma.

that the Gods, as the top line proves, B-321-13-70, "have sent - the light object - with its smoke (tail)".

Image 3 demonstrates 2 triangulation marks above each other for the comet coming straight down within a large coma. The comet, as trigonometrical mark, always flies with the flat side in front, not with an angle point in front, as we might assume. A flight with the flat side in front is a standard feature on the tablet.

The most important observation is stated on the peripheral side, identical to image 1,at which the flying object "is getting fatter". Here, the outer written sign of image 3 is B-129a, in tiny script, then below, a B-129a in large script, visibly showing, without being able to read cuneiform, that between the positions of the comet, the comet increased substantially in size, which is additionally shown by sign increase in between the two triangulation marks in the image center. The larger B-129a refers to the size increase with a distance measure, B-295 (Sutu) "doubled...", compared to the tiny script... most likely a size doubling of the comet.

The bottom line of the image 3 says: B-129a-315x-84-13-70, known as the constellation "Orion" and we can see that herewith the comet reached Orion.

The top line reads: B-321-13-70, the "envoyed light with its smoke (tail)", is, B-13-212-12, "an object - dividing

- the milky way", and is B-13-231-231, "an object - getting fatter - and fatter", and having a B-128: "window (coma)" plus a B-83: "steam channel", (i.e. white comet tail).

In summary: The comet, at this point, was now large in size, having a long tail and a wide coma. It reached the constellation of Orion. The astronomer observing this approaching comet set his first triangulation marks and started trigonometrical measurements of the flying object.

5. FOURTH IMAGE - THE COMET PATH FROM THE 9TH TO THE 19TH NIGHT

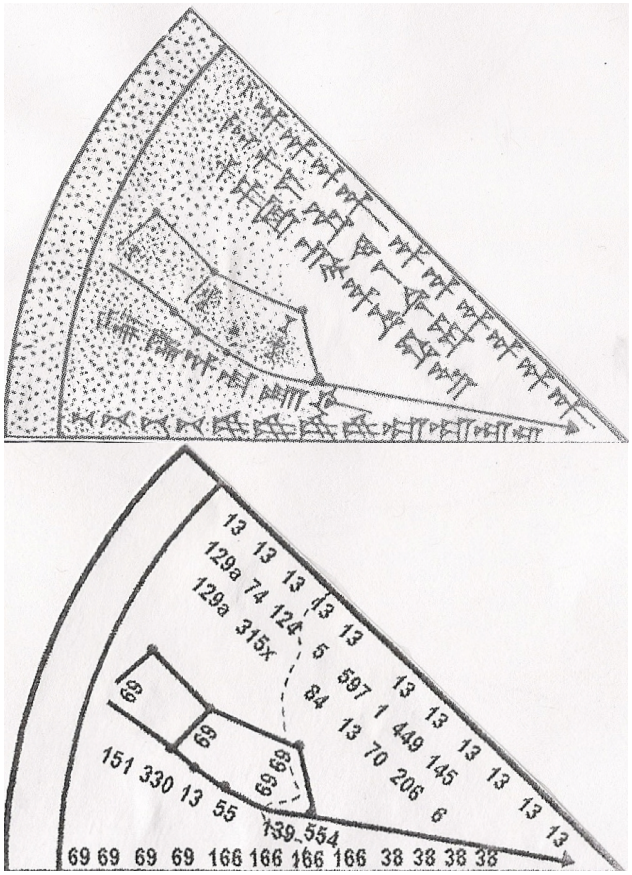

Figure 4. The comet reaches the visible horizon.

This image (fig. 4) shows 11 flight nights of the comet from the 9th night on. The trigonometrical mark at the right hand side shows the position of the Pleiades, from where a straight line of the comet's flight continues until reaching Orion.

Both images, 1 and 4, compose a joint image. The Orion constellation drawing is absolutely clear and unmistaken: Within it, four times the signs: B-69 "lights shining", are indicated, which are at left, the B-69 as the M42 great nebula in Orion, followed in the center, the B-69 as the Alnilam light and at the right, the two neighbouring B-69 form the large M43, the comma shaped nebula, in between Betelgeuse and Bellatrix. The Orion constellation is located just above the visible horizon. The visible horizon is explained as the image bottom line, as seen from an observation tower of the spectator: Into all four cardinal directions: Four times B-69-69-69-69... B-166-166-166-166… B-38-38-38-38: "Open cleared fields"… "Roads"... and "Towns". The comet's advance is the solid line between the two triangulation marks. The measured flight time between the two triangulation marks is 11 days, as indicated in the top line: B-13-13-13-13-13-13-13-13-13-13-13, one nightly position for each single number 13. A further feature is the entire flight distance for those 11 days: We are able to measure the full length of Orion, and the similar length, bridging the distance between Orion and the Pleiades. In order to place this Orion length distance onto the tablet, Orion was placed in a more horizontal, reclined position. In reality, Orion is positioned in a 90° turn compared to the tablet drawing. The Orion drawing and the 2 Orion length distances are outstanding examples for the observer's method for explaining this flight distance with a minimum of cuneiform writings, by preferring drawings instead. The Orion drawing is further significant as means for demonstrating the East-West direction axis: The comet went below the horizon in the East, until, it reappearance, later in image 5, in the West.

The flight of the comet is explained as: B-151-330-13-55-139-554: "God's powerful light object moves with persistence" (towards Orion). Additional information provides the second line from the top: B-129a-74-124-5-597-1-449-145: "The positions between the two triangulation marks - as "daily distance" B-597-1 in "the forward movement" B-449-145" and, as third line: B-129a-315x-84-13-70-206-6: towards "Orion, as demonstrated" ("made known" by this detailed drawing of image 4).

We can summarise: The comet moved into image 4 in the 9th night, out of image 1, from its last position a the Pleiades in the 8th night. From the image 4 position of the 9th night at the right, the comet moved 11 days in a straight line, reaching Orion in the 19th night, the left triangle. By this time, the comet has grown rapidly in size, having a large coma and a large tail. The 4. image shows the astronomical situation at the end of the 19th night, in other words, the early morning Orion rise on the 20th day. Orion elevates from behind the horizon and the comet is only hours away to reach the visible horizontal ground line in the East, and disappearing in the East below the horizon later in the day, while Orion continues its circumpolar path upwards.

6. FIFTH IMAGE - OBSERVATIONS FOR THE 20TH DAY AND THE 20TH NIGHT

The 5th image (fig. 5) reports all observations made

during daytime and nighttime of the 20th day. In daytime, the comet, just above the visible horizontal line in the morning in daylight, was now close enough to Earth to remain visible on the Eastern horizon in daytime. The comet went below the horizontal line in the evening about 8 pm.

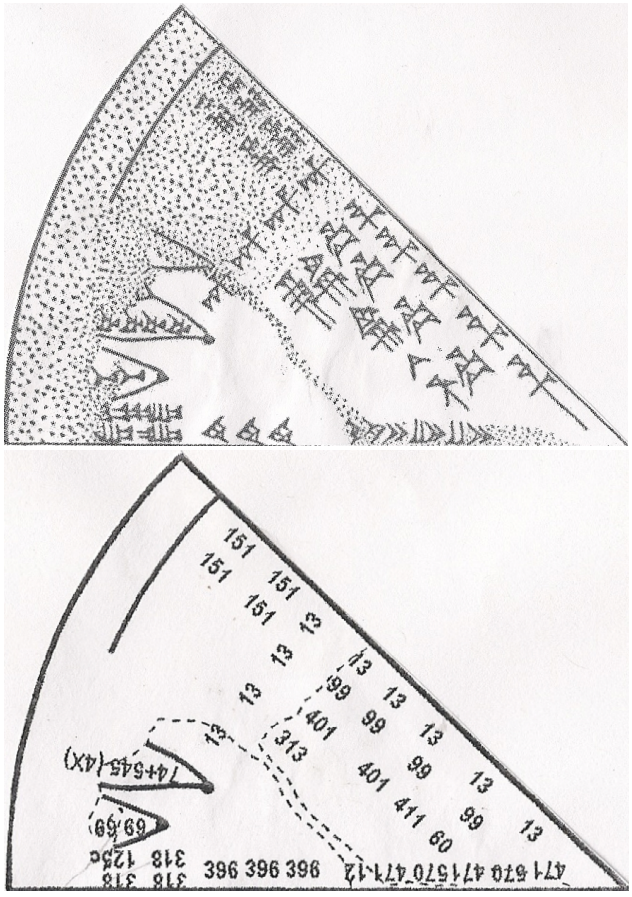

Figure 5. The comet disappears in the East and reappears in the West.

As the evening of the 20th day set in, the image 5 starts reporting. The observer was rewarded with a spectacular segregation of the comet tail into 4 comet sub-tails in the evening light. This feature is observed when a comet comes close to Earth, as witnessed, for example in the year 1744, when the Cheseaux comet spectacularly segregated into 6 sub-tails [11, fig. A4 in annex]. The physical cause for this phenomenon is the comet's spin around itself, spiralling with emission losses of gases and dust as it moves forward. From our comet, 4 sub-tails emerged, as explained in the top left corner: B-151-151-151-151, four phenomena of Gods, which, as the vertical line of B-13-13-13-13 signifies, "the object" vertically unfolds at the horizon, as shown in increasing distances between the 4 numbers. The horizontal widening or horizontal unfolding of the 4 tails in the sky is shown by increasing distances between the numbers in the top horizontal line: B-13-13-13-13-13.

There are 5 times the horizontal numbers B-13, which shows us the time for which the four tails were visible: 5 times number 13, thus visibility for 5 hours in the evening, until their final fading in the dark night.

Below this first line of 5 hours time, the entry is B-99-99-99-99, the four "objects", thus 4 tails of Gods, consisting of B-401-401: "fine milled nebula", and seen as B-411-60-313: "fine, mottled mat of streaks and lines" ("straw, cane mat and canals"). All those sky visions occurred just above the visible horizon, as given 3 times on the bottom line: B-396-396-396, "the visible horizon" into 3 directions from the observer.

In the evening of the 20th night, the four sub-tails were slowly fading in the dark beyond the horizon, while the comet disappeared about 8 pm below the horizontal line in the East. All night, the comet and its tail stayed invisible until the break of the 21st day.

This image 5 presents more astronometrical data to the ensuing development of the comet's flight. This measurement data is placed upside down, because it was determined in connection with drawing of image 8, after the round tablet was turned by 180°, having a matching flat position in both the 5th and the 8th image. In this 20th night, the comet and its tail remained invisible and reappeared suddenly early in the 21st morning. This disappearance in the East and reappearance in the West is described as "flying backwards" toward the West, as shown at the bottom left side: An enlarged V-angle with B-69-69 in it, "the large light" (of two B-69s for one object), which is the comet, with the flight direction triangle now turned backwards in flight.

The triangle arranged in flat side backwards signifies an invisible backward flight from East to West, for which we quote [9, p 110]: "This… lies at the very heart of cuneiform astronomy, and is explicitly referred to in the text Mul-Apin I iii 49-50: The stars move backward into the night in the morning… each day, the stars move forward into the day in the evening… each day…"

Above this left V-angle is a second V-angle, molten and larger, containing 4 signs in a line: B-74-545, 74-545, 74-545, 74-545, "thinning - overcast", thus the 4 sub-tails, which fade, disappear and start to fly invisible "backward" behind Earth toward the West. The V-angle with its flight triangle is damaged from tablet melting.

The entire 20th night, the comet remained invisible, until, again in reverse script, and translated by Bond&Hempsell, p.19 [7]: B-471-570-471-570-471-12, as " 9 ½ hours - the 20th day". Thus, until the end of the 20th night, and for 9 ½ hours, the comet with its four tails remained invisible. The 9 ½ hours disappearance of the comet ended with the signs B-318-318-318-125c, the

"comet rise" (in the following image 8 explained in detail), which rose at "24 minutes - before sunrise" [7, p.19].

As summary for the 20th day and night: The comet moved from its position at Orion in the morning closer to Earth, increasing in size and gradually lowering its position from above the horizon to disappear below the horizon in the East at about 8 pm. The spectacular evening sky vision of 4 sub-tails above the horizon could be seen for 5 hours. In the next morning of the 21st day, the comet re-appeared in the West 24 minutes before sunrise.

7. SIX IMAGE - THE 21ST DAY AND THE COMET IMPACT AT 12 NOON

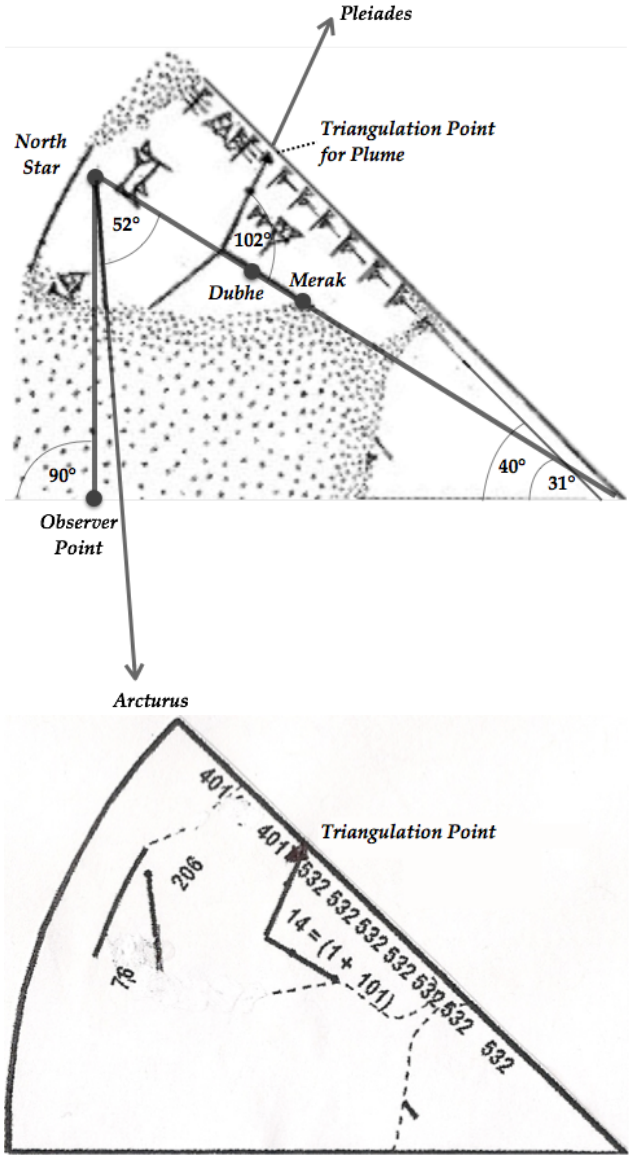

Figure 6. Daytime observations of the comet crash.

On the first glance, the 6th image (fig. 6) seems strange, because many written signs are crammed into a narrow top section, and secondly, we notice a carefully produced angle line with dots. One would ask of why would this careful drawing not be conveniently placed in a lower position in the picture's center. The answer is that the taken measurements do not allow the drawing be placed in a better position. In order to understand the set-up and arrive at astronometrical values, we must prolong given angle lines and must remember that the bottom line is the visible horizontal ground line.

The major line with two star dots is the right part of Ursa Major, Dubhe and Merak, with its line leading to the North Star. Still today, the conventional North Star search is done this way.

We are able to detect following angles:

- of 90° from the observers position vertically up to the North star, as identified as: B-206: "Standing fixed", star not moving, the North star.
- of 31°. The North star is found in the correct declination angle of 31° from the base line, which is the latitude of Sumer. The Dubhe-Merak line (in today's Ursa Major) indicates the straight direction toward the North star.
- of 52° between the Dubhe-Merak line starting at the North star and going down. This line leads to the brightest star of the Northern Hemisphere, the Arcturus, in Babylonian times known as Star of the God Enlil, or Shu-Pa, located in Bootes.
- of 102°, starting at the Dubhe-Merak line and going up to the Pleiades.
- of 40° declination, starting from the ground horizontal line, going up to the measurement triangle, placed close to the top picture line. This triangulation mark is placed there, with its flat side towards the left, indicating that there is movement from right to the left. On the left of the triangulation mark, it says B-401-401 (Har-Har) "fine milled", dust and ash. The B-401 is placed twice. This double entry signifies a reinforcement of the dust sign, therefore the dust being of a heavy, large grain type. At the right hand of the trigonometrical mark, the line continues with: B-532-532-532-532-532-532-532: "a lot".

Altogether, the top line reads "a lot of -- into the left direction moving -- heavy dust and ash". The velocity of dust plume is shown by a wider spacing of B-532s, which signifies a faster elevation at the right hand side, East, slowing toward the North on the left. The measurement for the height of the dust plume has a 40° declination angle, thus 9° above the 31° North star declination.

We can see that the dust plume propagates from the East to the North. The most important observation was placed on the peripheral side, the sign B-81 (Mud): The sky is getting "dark", i.e., the visible sky darkens in daytime by the dust plume. More information about this sky darkening can be taken from other Sumerian city lament literature from the impact time [12]: line 79-92:

"...the daytime was wiped out... heaven was darkened, it was covered by a shadow… the mountains roared... dust passed over the mountains..." or in [13]: line 19-26: "In Eridug, where bright daylight used to shine, the day darkened […], as if the Sun had set below the horizon, it turned into twilight...

The next important sign in this image is a combined ligature sign of B-1 and B-110, right in the tablet center, the sign B-1 "one single", connected in ligature with B-110 "flash lightening" in the sky. This sign documents the impact blaze light in the sky. Additionally, a comet crash produces a strong impact sound coming from a lower sky altitudes, such as in the above lament observation: "the mountains roared". At K8538, the sound description is broken off the tablet.

A further measurement result is given in the line of seven times B-532: "a lot". These seven horizontal signs in a line signify that the total visibility time of the dust was seven hours until night darkness obscured the view. The ash and dust movement towards North and West are archaeologically proven as thick clay sediments, measured in North and West Sumer [14] and [15], whereas none were deposited in the East [16]. Concerning Sumerian astronomy, we see that the 6th image shows the ancient astronomical method for determining the North star, Kak-Si-Di, in early Sumerian times.

We can also draw conclusions about the hour of the day, at which the cosmic impact occurred.

We present 3 historical measurements:

- from image 5: the comet rose in the early morning, half an hour before sunrise.
- from image 8, still open to discuss, the comet flight time on impact day was 6 ½ hours.
- from image 6, the dust plume was visible 7 hours until the dark of the night.

By drawing all 3 values together, and assuming a sunrise at 6 am, then the comet rise occurred at 5:30 am, the impact time was about 12 noon. From this hour, the ash plume elevated and the plume was visible until 7 pm in the darkening sky.

As summary of the 6th image: The tablet documents the comet impact during daytime noon of the 21st day. The impact flashlight is placed as major event into the center. After the impact, the sky darkened, ash and dust plumes elevated over the impact site and the plume propagated in the sky toward North in an declination angle of 40° to the visible horizontal line. The dust clouds were visibly for 7 hours until the night set in. As celestial background for the impact dust plume propagation, the Sumerian trigonometrical method for determining the North star Kak-Si-Di and 2 cardinal directions, North and East, are explained. This image is a valuable example for the state of astronomical and mathematical science at 2000 BC.

8. SEVENTH IMAGE - EVENT OBSERVATIONS IN THE 21ST NIGHT AFTER THE IMPACT CRASH

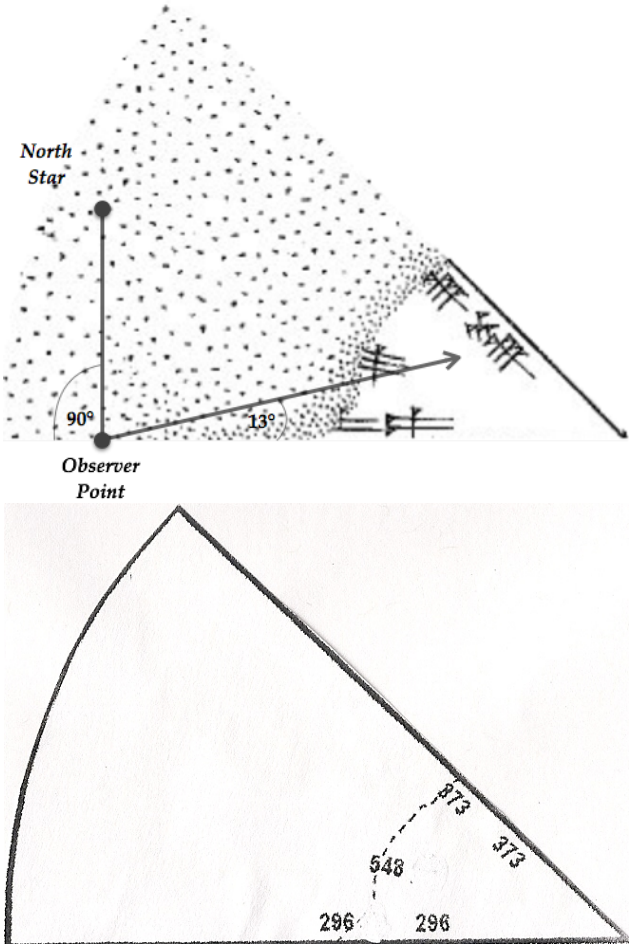

Figure 7. Nighttime observations after the comet crash.

Darkness of the 21st night set in. The 7th image (fig. 7), as in all others, has the visible ground horizon as the bottom line. All visible events from the observation tower are reported. At the top, the line reads: B-373-373, "very distant", which signify the occurrences take place behind the visible horizon at night. The signs B-373-373 are placed onto the identical position as the emission source of dust and ash plumes in the previous image 6 (fig. 6). The angle from the East position at the right side towards North is 13°.

The major observation is placed into the picture center, on what happens in the "very distant" location, is reported in the center: B-548: " burning", a fiercely red hot fire glowing in the night, in a recognisable shape of, as reported on the bottom horizontal line: B-296-296, several "branching tree-type patterns", glowing in the distant dark. Those patterns obviously show red glowing dust

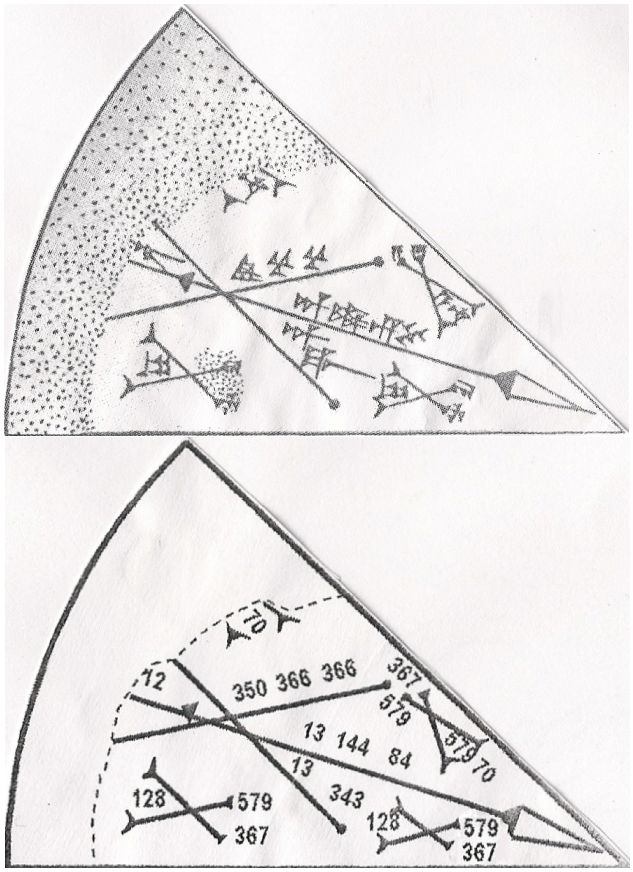

Figure 8. The comet flight on impact crash day.

and ash columns from the meteor impact, rising from the horizontal line and being visible by its fierce glow in the dark, over a large distance. The down-coming of the tempest with ash and dust, is described in [12]: line 79-92: "The dark time [night] was roasted by down-coming ash and dust (Su-Bir: "scattered and sinking material") and flames...", which still had not yet begun at the observer's tower location. This part, the tempest finally reaching the observation tower, is the broken-off part. We know that the tempest rage reached all Sumerian towns this night, therefore, the ziggurat tower of our observer was later in the night devastated. The large broken-off section provides ample space for reporting the ensuing tempest. On the peripheral side on the previous image 6, darkening of the sky is reported with one sign B-81, for image 7, we can assume that the observer placed several B-81 on the peripheral side. Our observer survived this tempest night and managed to rescue and preserve the tablet.

As summary, this image 7 documents all events in the night after the meteor crash.

Beyond the horizon, red hot-glowing ash and dust plume columns elevate visibly in the night.

As we know the coordinates of the Umm-al-Binni impact site, we may extend a line of 13° towards the South-West and arrive at an observer's location of less than 100 miles distance, most likely at one of the two historical cities, Eridu or Uruk. Behind those two cities, the Arabian desert commences without further human settlements. Unfortunately, most information is broken off, but we may reconstruct those from other city lament tablets. The hot deadly plume reached Eridu and Uruk in the late night, an devastated both towns.

Both images 6 and 7 explain the day and the night of the impact. Those explanations are highly important because they specify details of the actual impact process. Meteor impact process calculations exist today, for example those of D. W. Hamacher [17] by "use of numerical models and scaling equations", evaluating satellite images, but without considering real impact conditions on Earth, as described on K8538. The fundamental question is: How does the released cosmic energy at the impact site manifests itself? If an impact ends in the ocean, a lot of energy will be converted into a huge tsunami wave. If the impact hits solid land mass bedrock, the impact energy will be converted into an enormous air pressure and heat wave. If, as in our observed case, the impact bolide disappears deep in soft and shallow estuary sedimentary mud of the Tigris and Euphrates river delta without reaching bedrock, the impact energy will be released from its deep final comet location in the ground via dust, ash and steam plumes, elevating in a tempest over the impact site and propagating for hundreds of miles. The river sediment estuary at the Sumerian Umm-al-Binni location is of abyssal depth, filling the gap between two continental plates, the Eurasian and the Arabian plates. The K8538 observations describe impact conditions of the bolide into abyssal sedimentary mud, releasing the impact energy via dust, ash and vapour plumes, rising from deep out of the shallow Persian Gulf estuary, constantly being fed by renewed inflowing salty Gulf waters, producing vapour columns, elevating sedimentation mud for more than 24 hours into the air [18]. For this reason, mud plumes with high tempest velocities devastated all of Sumeria, by depositing salty Gulf mud over hundreds of kilometres land distance, in the prevailing wind direction West. This event was called the "tempest" [12] in hundreds of cuneiform tablets. All model calculations of today, assuming a hard bedrock surface, a propagation wave of air blast pressure and high air temperatures above a rock surface are meritless exercises, as proven by our Sumerian observer on his observation platform.

9. EIGHTH IMAGE - THE COMET'S PATH MEASURED IN DAYLIGHT OF THE 21ST DAY

The eighth image (fig. 8) presents four measurements of the comet's flight during daylight of the impact crash.

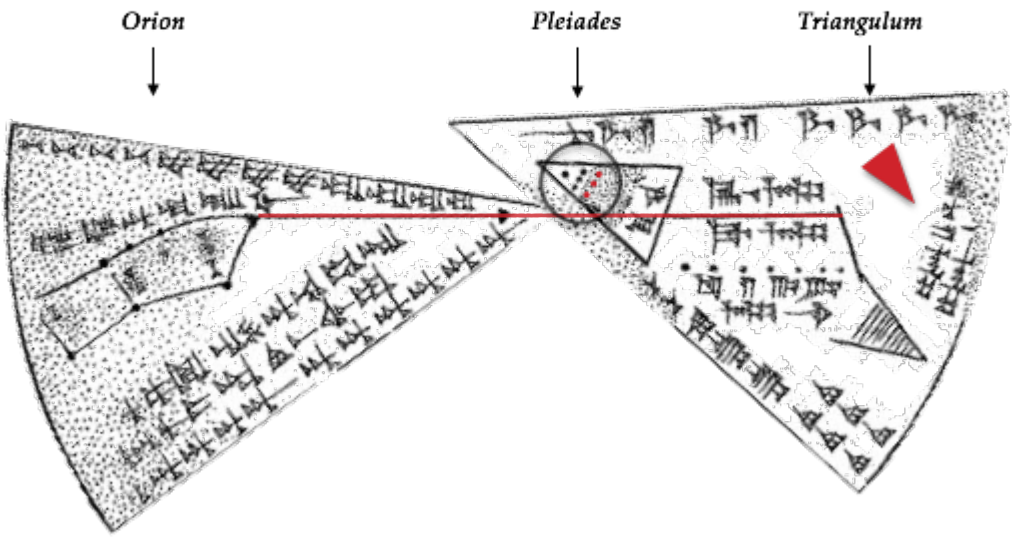

Figure 9. The true comet flight line for 20 days.

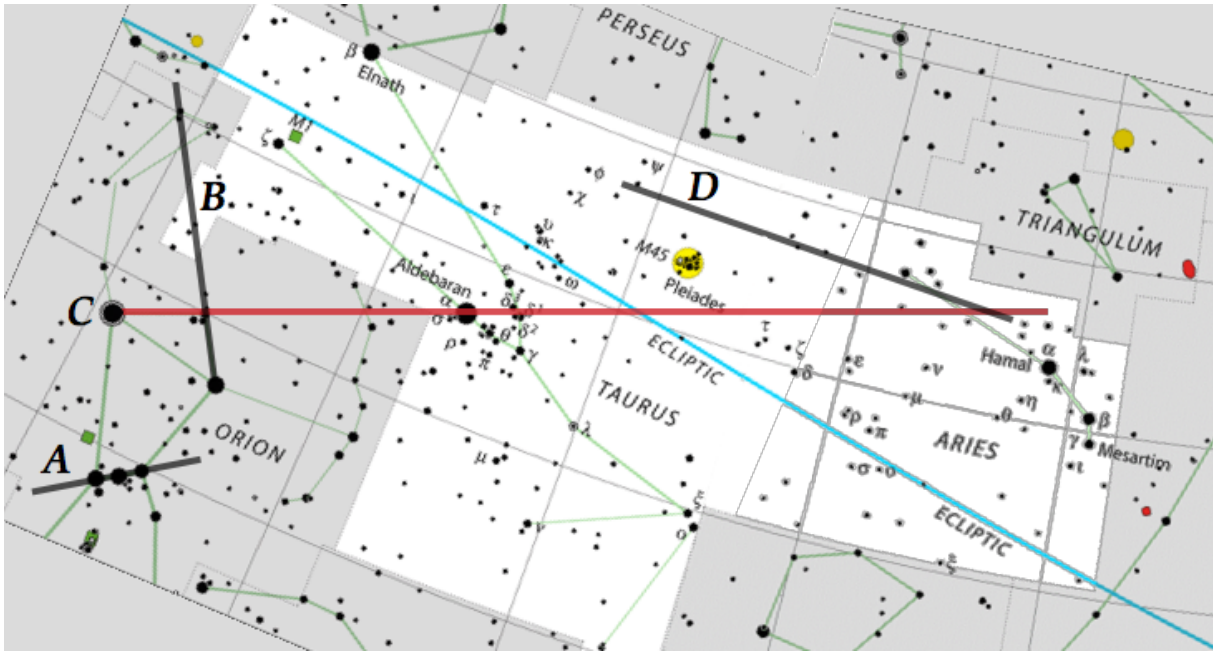

Figure 10. The true comet flight line on the IAU Taurus chart.

Results are shown in angular result crosses, two crosses above and two crosses below the comet's flight line, which is pictured as a spear line. The comets flight line commences with the comet rise in the West, this part, unfortunately, is broken off, but is explained in reverse on image 5, horizontally aligned with this image 8.

On the left hand side, after the comet rise, the sign signifies: 12: "divides", the flight path cuts and divides the sky. The flight reaches the first trigonometrical mark, center left on the spear. After this, the comet flight crosses the West position and continues toward the right, to the East. The second trigonometrical mark at the right hand reached an enormous size, with a spear blade drawing, indicating a fast movement in the sky and being a large sized object. The description on the spear reads: B-13-144-84: the "light object flying vigorously" and below the line: B-13-343: "object, very large". The flight passes "the West"-cross: B-350-366-366. The left triangulation mark was set in daytime, and had to be verified in the following night with a star background. We see that the observer was astonishingly exact in setting his triangulation mark, estimating as close as possible the exact West point. Because of this ultimate West direction verification, the last hours of the comet's flight are documented as the last image 8 instead of being the earlier image 6 for the correct successive order.

The left triangulation mark on the spear has its measurement results given in the top left cross for the angle of the smoke tail line, compared to the ground level: B-579-70 compared to B-579, an about 60° declination angle. The left triangulation mark gives more results in the left bottom cross below the flight line, a cross with the horizontal line, B-579, "sea, water level", and the angle for the solar time of about 55°, for the time passed, since the comet rose from beyond the horizon in the morning.

The second trigonometrical mark on the spear is the large triangle on the right hand side. It presents results as top right cross of 63°, the declination angle for the smoke line in the sky, B-579-70 compared to B-579, the horizon. At the bottom right, the cross of 60° is the sun time measured for the flight distance between both measurement triangle marks. The two bottom crosses, signify the flying time; we may quote [6, Koch, J., p.19, "The Babylonians divided [...] the entire daylight in 12 equal parts, as well as the night, which was also divided in 12 equal time parts."

One can argue of whether the right hand trigonometrical point is placed directly onto the location of the impact at the horizon or whether a certain comet flight distance still remained open. In any case, the large sized spear blade signifies a high meteor velocity; and if there were 2 possibilities, they should be within little time difference, thus not being important.

The summary of this image 8: The comet rose before dawn of the 21st day, continued towards the celestial point of the cardinal West direction and flew further towards East to its final impact site. To the reporting observer, the comet's smoke tail was in a 60-degree declination angle to the ground level. Adding two sun time measurements together, both result in a 115° degree angle for the observed flying time in the sky. A 180° degree angle signifies 12 hours daylight, therefore, a combined 115 degree angle signifies a comet flight of 6 ½ hours until its final impact on the ground.

10. THE MIRROR IMAGE OF THE COMET'S PATH

The comet path in the sky is demonstrated in a joint image 1 (fig. 1) and 4 (fig. 4), in mirror image (fig. 9).

The actual K8538 tablet image is the result of copy work, in which the original Sumerian tablet was placed onto a flat surface. Fresh clay was pressed on top over the tablet surface. The resulting negative is the mirrored image of the real comet's flight path on the new Babylonian copy. We will present additional prove that this type of clay copying was done by the Babylonian copy scribe. At first, we dedicate us to image 1 and as start, temporarily remove Mul-Apin from this image, because Mul-Apin will be discussed in the following chapter. For comparing celestial features, we present the mirrored negative of image 1 and 4 together and add the corresponding IAU sky map directly below it (fig. 10) [19, Aries and Taurus].

We compare both maps, augmented with 4 line extensions, A, B, C, D, onto the IAU sky map. The real Orion's position is vertical on the IAU sky map, whereas on the Sumerian tablet, Orion is pictured in reclining position. This feature has a purpose: A reclined position of Orion allows to demonstrate the full length of Orion, which in vertical position, would partially disappear below the image 4 bottom line. The observing astronomer intended to demonstrate that the flight distance of 11 days from the Pleiades to Orion is about as long as the entire reclining Orion length.

We will start with the line A, which crosses Orion in the star line Alnitak-Alnilam-Mintaka.

We focus on the angle of this line A in the Orion scheme. The angle proves clearly that the Babylonian copy is a mirror image of Orion.

To the line B: This line is the Babylonian copy line of the comet's flight, from Bellatrix to Meissa, and supposed to connect with the Pleiades. Here lies another prove that the Babylonian tablet is a mirrored copy, because line B does not proceed into the direction of the Pleiades, clearly self- evident.

The true comet's flight is the line C: Betelgeuse-Meissa-Aldebaran-Pleiades-Triangulum, which exactly matches the above mirrored tablet image 1, connected with image 4. Another feature is that the comet's flight moves right through Aldebaran (Taurus eye), which was important in Babylonian times, but not in old Sumerian times, therefore, there is no Aldebaran on the tablet.

At last, there is line D, which shows the wrong mirrored comet flight line on K8538, as result of late Babylonian copying. This line follows its course in between the space between the Pleiades and Triangulum, and leads to nowhere in the sky, in any case, definitely not leading towards Orion.

As summary, we conclude that the early Sumerian tablet original was copied by a late Babylonian copy scribe, who did not want to or was not allowed to produce a completely new tablet. He placed copy clay onto the original tablet and modified or actualised its pictured and written content on the new tablet mirror negative afterwards. Nobody at the copy time seems to have noticed the mirror image inconsistencies. There even could be the possibility that the tablet was the copy of an copy, after a millennium time lapse. Today, mirror inconsistencies were helpful for the final prove of the old Sumerian original.

11. THE MUL-APIN CULT AND THE ORIGIN OF CONSTELLATIONS

We will focus onto Mul-Apin, the constellation Triangulum, by presenting image 1 in positive and in mirrored position in one combined graph (fig. 11).

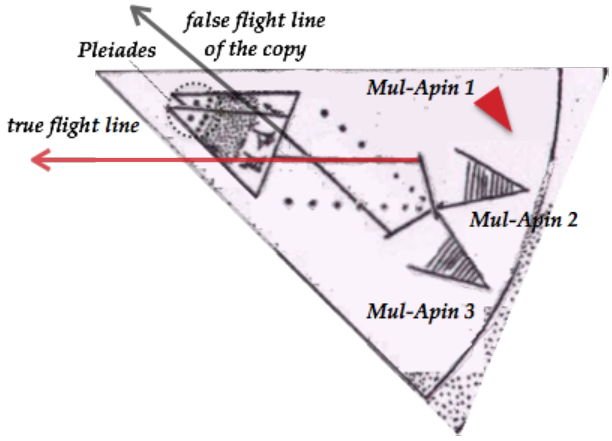

Figure 11. Three positions of Mul-Apin in relation to the Pleiades .

The angular drawing is Mul-Apin, as confirmed by the cuneiform signs B-129a-56.

Our diagram presents 3 variants of Mul-Apin:

- The first variant, Mul-Apin 1, is located following the real IAU constellation map. We can see that both, Pleiades and Triangulum, are positioned on the same right hand side of the comet's path line.
- The second variant, Mul-Apin 2, is the variant entered by the late Babylonian copy scribe. In here, he added Mul-Apin correctly to the right hand side of the comet's path line, but uses the incorrect flight line, which passes mistakenly through the space in between the Pleiades and Triangulum. A comparison with the IAU chart (fig. 10) proves that this flight line would end without reaching Orion.
- The third variant, the mirrored Mul-Apin 3, would show if Mul-Apin were clay-copied from a Sumerian original onto the Babylonian copy. As we can see, this position is not given on the tablet, and therefore, Mul-Apin was not on the Sumerian original.

As our conclusion, the Babylonian copy scribe added Mul-Apin as a coarse scratch to the right hand side of his mistaken mirrored flight line, intending to make image 1 appear as being correct.

The most interesting question is why did the Babylonian copy scribe add this small sized Triangulum constellation, which consists of 3 lesser stars? Why did this constellation Mul-Apin acquire major prominence? The answer is not difficult: There was only one celestial triangle, from where the destructive Sumerian comet emerged. A small three-star constellation is the smallest celestial surface possible. This shows that Sumerian astronomers were not satisfied by a general opinion that God's celestial seat was located somewhere up in the sky, but they tried to pinpoint as exactly as possible God's seat in the sky, from where comets, messengers and envoys emanate. Comets were the punishing envoys of God, his almightyness manifests itself in that nobody on Earth is capable to withhold God's envoyed comets and escape God's punishment.

Triangulum was the seat of God; the question remains, from which century on? Bradley E. Schaefer determined that all 600 BC Mul-Apin tablets were already transcripts. He traced the Mul-Apin cult back to 1370 BC [20]:

"The much-copied clay tablet called Mul-Apin... [with] the earliest dated sample from 687 BC... [shows] observations at 1370 +/-100 BC...". This signifies that the Triangulum cult as being God's seat, developed 800 years after the actual cosmic impact. If we endorse this time assessment, then the "Mul-Apin" term or expression must have been not in use before Schaefer's proposed 1370 BC date. This would mean, for example, that the term "Mul-Apin" should not be mentioned on tablets of the early Ur III dynasty, in 2000 BC.

Three more interesting aspects remain in regard to the late Babylonian zodiac:

- The first is that all trigonometric measurements on the tablet do not deal with the late Babylonian zodiac. All Sumerian trigonometric measurements only concern the comet's flight path, the plume path in the sky and the determination of 3 cardinal directions, East, North and West.
- The second aspect is the shape and location of Triangulum in the sky. On the tablet, the triangle is more or less even sided, whereas on the real sky map, Triangulum only is a narrow slice. Even narrower, if the star Alamak (Almach) in Andromeda were one original corner star of the Babylonian Triangulum, as described in some literature. Thus, the tablet copy scribe improved the Triangulum image, by fatten it to produce a recognisable triangle or plough "Apin" impression for his audience.
- The third aspect concerns the trigonometrical base line for declination angle measurements. In image 3, the image bottom line is the visible horizon line required for triangulations. Therefore, this bottom line cannot be Orion, B-129a-315x-84-13-70, or, in translation, the "Faithful Shepherd in the Sky" as the copy scribe called this bottom line. Further, in image 4, five cuneiform script signs "Orion" do not add new information to the image, and repeat only with B-206-6: "as already shown in the picture" the Orion name in writing for the

drawing. Here we have a superfluous duplicate entry made by the copy scribe, which does not fit the word saving writing style of the original astronomer.

12. DATING THE K8538 ASTRONOMETRICAL TABLET

Leonard King [3], in his 1912 publication of 50 transcribed tablets, regarded the first 8 tablets as 5th century BC, late Babylonian, but called the 10th tablet, which is the K8538, as only being "Assyrian", without proposing a century date.

The first author, who quotes an age for K8538, was Ernst Weidner in 1915. He commented, that "the text belongs to the time around 700 BC...", only assuming a late Babylonian date. He rejected King's idea that the tablet represents the sky over Nineveh as planisphere. Many decades later, in the 1980s, the author Johannes Koch, specialist for Babylonian celestial constellations, dated the tablet as being the sky over Nineveh at Jan, 4, 650 BC, not agreeing with Weidner. His age dating, however, was based on incorrect celestial constellations. His celestial constellation book does not translate or include cuneiform signs from K8538. The next dating attempt was made by Bond and Hempsell in 2008, this time applying three computer ephemerides programs "Redshift", "Starry Night" and "VSOP87", analysing the Babylonian night sky. The date of June, 29, 3123 BC is proposed. The problem with those calculations was that planetary positions and celestial constellations were solely assumed and there are no planets for computer calculations mentioned on the tablet. But, as their achievement, they advanced science by recognising that K8538 was originally an old Sumerian tablet, which was, later on, in Babylonian times, copied, freshened up and reinforced.

The general concept of K8538 as being a planisphere depicting the entire Babylonian sky is most questionable from the very beginning. Weidner rejected it. The tablet has to be turned for its reading and almost all 8 tablet sections show the ground horizon as recurrent feature from the astronomers observation tower. Therefore, only the near horizontal sky is shown; picturing of an entire celestial sky is impossible. A good prove is image 6, where Arcturus and the Pleiades already exceed the image 6 space frame. The separation lines between the 8 images as being ground horizons, are explained by Johannes Koch [6, page 19, footnote 105]: "the numbers on [other] Astrolabes K and P, s and EW2 [...] prove that diameter [lines] of Astrolabes were understood as East-West [visible ground] horizons... and Astrolabes describe astronomical phenomena close to the horizon".

To some extent, we may excuse assumptions of authors, who tried to decode the tablet: Leonard King omitted 4 important star dots on his tablet facsimile, which impaired the Pleiades identification. The internet K8538 clearly shows the 7 star Pleiades group. We therefore decided to do all cuneiform tablet readings from the very beginning. Reliable information about K8538 is the following: The tablet was written in typical late Babylonian cuneiform of 600 BC. Additionally, the tablet shows two late Babylonian celestial constellations, Triangulum and Orion, both additionally mentioned in cuneiform script. Historians determined that the Nineveh library, where the tablet was stored, was destroyed in 612 BC and left as ruin for centuries. These 3 aspects point to a late Babylonian age, if the tablet were not the copy of an earlier Sumerian document.

As next, we will take a look onto the physical appearance of the clay tablet. Tablets in general, were written by cuneiform up to the very outside borders. Here, this is different: The K8538 shows that soft copy clay was put above the original tablet, forming an additional raised rim. For further copy reinforcement, a convex bulge was formed in the center of the tablet reverse, during tablet copying, a bulge on top of the copy form. The original rim can be seen best in section 1 and section 6. The copy clay produced an additional outside rim and the tablet is not written to its full outside. This copying produced reverse mirror type drawings in images 1 and 4, which were later modified to make the tablet seem correct. The linear Kush measure used in image 1 also proves a Babylonian copying of a pre-750 BC tablet, because old Sumerian tablets used linear sky distance measures, as compared to late Babylonian radial arc measurements. Each experienced assyriologist would recognise immediately the old Sumerian original, because in image 1, the Kush forearm length is divided into 24 parts as in Sumerian times, whereas in late Babylonian times the Kush was divided into 30 smaller measuring units. Further, the coarse drawing of Triangulum, without correct celestial shape, correct celestial location on the tablet and mistaken position angles clearly shows a coarse alteration of the tablet. If tablet pictures were pure late Babylonian, the Orion constellation would have been drawn as an non-mirrored image. Furthermore, the Aldebaran, through which the comet exactly crosses, would have been mentioned on a Babylonian tablet. But there is no mention of it, because in old Sumerian times, Aldebaran, the Taurus eye, was insignificant in celestial observations, thus another point against a putative late Babylonian tablet origin.

We know that the destructive cosmic comet impact in Mesopotamia occurred in 2193 BC, which is confirmed in

cuneiform historical witness accounts, as well as in geological exploration results [in:18] and in detailed cosmic impact climate change analyses, which span 10,000 years of the Holocene, and another 10,000 years, the 27-37 ka BP, in total covering over 20,000 years of paleoclimate history [21]

13. SUMERIAN HISTORY AFTER THE COMET IMPACT

The actual meteor impact on the ground from the astronomer's tower is witnessed as event sequence in images 6 and 7: At first, a strong impact flash lightening of the whole sky in full daylight noon, followed by ash plume elevation, which darkened the day. Hot burning ash columns lit the sky at night. The comet crashed in a densely populated area, producing an impact crater of 3.4 km in diameter, which destroyed the first empire of the word, the Akkadian empire, and buried two large cities, Agade and Lagash entirely with "Su-Bir" fly ash and dust ("Bir": scattered material, "Su": sinking, submerging) described in detail in [18], our paper of "The destruction of the city of Akkad by a cosmic asteroid impact and the link to global climate change". Geological evidence from the impact site is presented. Historical impact evidence is given in many eyewitness accounts, known as "Mesopotamian city laments".

The impact site is called Umm-al-Binni, with the location at 31°, 14-15'N and 47°, 06'E, while the buried Akkadian capital, Agade, is located in short distance next to the impact site at 31°,15 - 16'N and 47°, 09'E.

The multitude of Mesopotamian city lament tablets of eyewitness accounts report the impact, with grief and prayers in highly dramatic and poetic expression. The impact terminated the Sumerian society for an entire generation; no historical activity records on commerce, trade, building, agriculture, government or military activities etc. exist for the period 2193-2157 BC, not because non are preserved but because none were made by scribes. Only city destruction laments are preserved. From 2157 BC on, Sumerian society resumed on a small scale on the Euphrates river, in the town of Girsu under Ur-Baba and Gudea of Lagash, followed by the Ur III dynasty in 2112 BC. The fact, that there are no tablet records for Sumerian society of this devastation period, 2193-2157, is to be seen in comparative relation to extensive tablet collections made and preserved before and after this devastation time span.

The cosmic devastation destroyed the irrigation agriculture in Sumer, which was built up over many centuries, to such an extent, that Sumer never again recovered its previous level of the Akkadian Sargon the Great. The Sumerian III dynasty of Ur was smaller and weaker, short-lived, and soon overrun by foreign invaders. This weak recovery was caused by another profound cometary impact effect: Abrupt climate change. The physical and astronomical background for this effect is EOOs (Earth Orbital Oscillations), which always and inevitably follow strong cosmic impacts, as explained in [21]. Global temperature drops and mega-droughts on Earth follow as standard consequences, being abrupt, high magnitude and century long events. A 300-year mega-drought and a sharp drop in temperatures from 2193 BC after the Sumerian impact is well documented for the belt Spain-Mediterranean-Egypt-West Asia [22]. His field studies at Tell Leilan show the 4.2 - 3.9 ka BP aridification period, in which reduced agro-cultural production, region-wide social collapse and regional abandonment, especially from dry farming areas occurred. The North Sumerian region, for example, remained for over 300 years unoccupied. The irrigation-based South-Sumer suffered by continuous decreases of the Euphrates river water level, a 1.5 m lowering, a considerable water table drop in a totally flat region. The megadrought and the cold ended abruptly after 300 years in 1900 BC, too late for a Sumerian recovery. In the meantime, Amorite invaders terminated Ur III before Ur III could strengthen again in benign climate conditions. H. Weiss' paper has the title: "Seven generations after the fall of Akkad", in which a country ruler laments that religious temples were neglected and not repaired over seven generations, since 2193 BC. The disastrous comet left its footprint on human history for centuries.

Harvey Weiss put the question: How would the course of history have turned if this cosmic event had not happened and the Akkadian empire had continued strong and further expanding? This question has its merit, because Akkad was the most advanced center of science on Earth, with high-level innovations in mathematics, astronomy, military, commerce, government, law, administration and irrigation agriculture. The comet wiped this advanced civilisation in an instant from the world map, as witnessed on tablet K8538.

14. SUMMARY

The K8535 tablet is a late Babylonian copy of an early Sumerian astronomical tablet.

The original document, regarded of maximum importance, was copied over more than 1,500 years, because it was the astronomical witness for the exact seat of the Gods in the celestial realm. The Gods sent their envoy messengers as comets out of the constellation Triangulum. The observed comet passed the Pleiades, Aldebaran, moved further towards Orion and finally crashed into the highly advanced, irrigation based

agricultural civilisation of Akkad and Sumer, in 2193 BC, destroying the entire Akkadian empire and its capital city of Agade.

The comet flight line can be seen by connecting image 1 and image 4 into a combined image. This combination places the Pleiades in the tablet center.

A comparison with IAU sky maps reveals a straight comet flight line, for which the ancient astronomer did regular nightly observation entries for over 3 weeks, in order to document the comet's advance.

About 40% of the tablet is missing. Fortunately, the entire flight path of the comet is preserved. Broken-off sections mostly deal with observations concerning the impact itself and with the immediate impact aftermath, recording what could be seen from the observation tower, looking towards the crash site. The information is adequate to reconstruct the detailed comet advance and the impact process sequence. The position of the astronomical tower was at a 31° latitude and at a distance of about 60 miles from the cosmic impact site, witnessing the impact flashing light in the sky followed by elevation of fiercely glowing ash plumes.

The K8538 witness account must be considered as part of a great number of preserved "Mesopotamian city laments", which report the end of Akkad and Sumer by an enormous atmospherical tempest. These laments were rehearsed on stage in public over millennia, accompanied with drummer background. Their poetical lamentation style misled various contemporary assyriologists to opine that those documents are nothing but entertaining poetical and mystical fiction, and that there had never been a destructive tempest in Sumer, disregarding observations of hundreds of historical witnesses.

The K8538 observation tablet was made by an unknown alert Sumerian astronomer, who sensed the historical significance of the event on his astronomical lookout tower and decided to document it. The authors Bond and Hempsell gave him the name "Lugalansheigibar - the great man who observed the sky". His trigonometrical observations witness the comet approach and its terrestrial impact. For this reason, K8538 was guarded, restored and copied over the millennia. The tablet demonstrates the high level of science and astronomy reached four thousand years ago.

Today, the real value of K8538 is not only confined to history. It is of immense value for today and for the future, because it contains an unique and accurate precedence observation of a disastrous cosmic asteroid, impacting Earth.

We know that more asteroid impacts will strike in the future. Various disastrous impacts on Earth occurred, since the time of the Sumerian impact. This can be proven by analysing GISP2 Holocene temperature drop records. One can easily pinpoint cosmic asteroid impacts on Earth with an accuracy of one decade. Their typical, characteristic Z-type climate change patterns in the GISP2 temperature record reveal corresponding cosmic impact dates. The next major cosmic impact is long overdue. Today's climate interpretations call abrupt cooling and ensuing megadroughts "Bond-events", and, our Sumerian impact, as the "4.2 kiloyear event". Comet or asteroid impact events occur regularly on a millennium timescale. We need comparative studies to determine the relation of asteroid impact crater size, regional impact devastations, the abrupt ensuing global climate cooling, which always follows after an about one month lasting fallout of global atmospheric moisture as catastrophic flooding, and thereafter followed by an abrupt megadrought on Earth. It is important to know for the future, how many decades or centuries those megadroughts will persist. The statistical relation of impact crater diameter, global cooling and the length of the ensuing drought period needs exact calculation. The tools for carrying out those calculations are explained in [21]. The K8538, as a very rare scientific observation tablet, provides comparative facts, helpful for realistic forecasts of asteroid devastations and resulting megadroughts on Earth. The British Museum is in charge now to keep and protect this valuable document, made by the Sumerian astronomer Lugalansheigibar. We hope that the Museum is able to accomplish this for many millennia and more successful than the former Nineveh library in Babylonia.

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ANNEX

Figure A1. K.8538, part of a circular clay tablet with depictions of constellations (planisphere) [1].

PLATE 10.

ASSYRIAN PLANISPHERES.

K. 8538,

[THE REVERSE OF THE PLANISPHERE
IS UNINSCRIBED.]

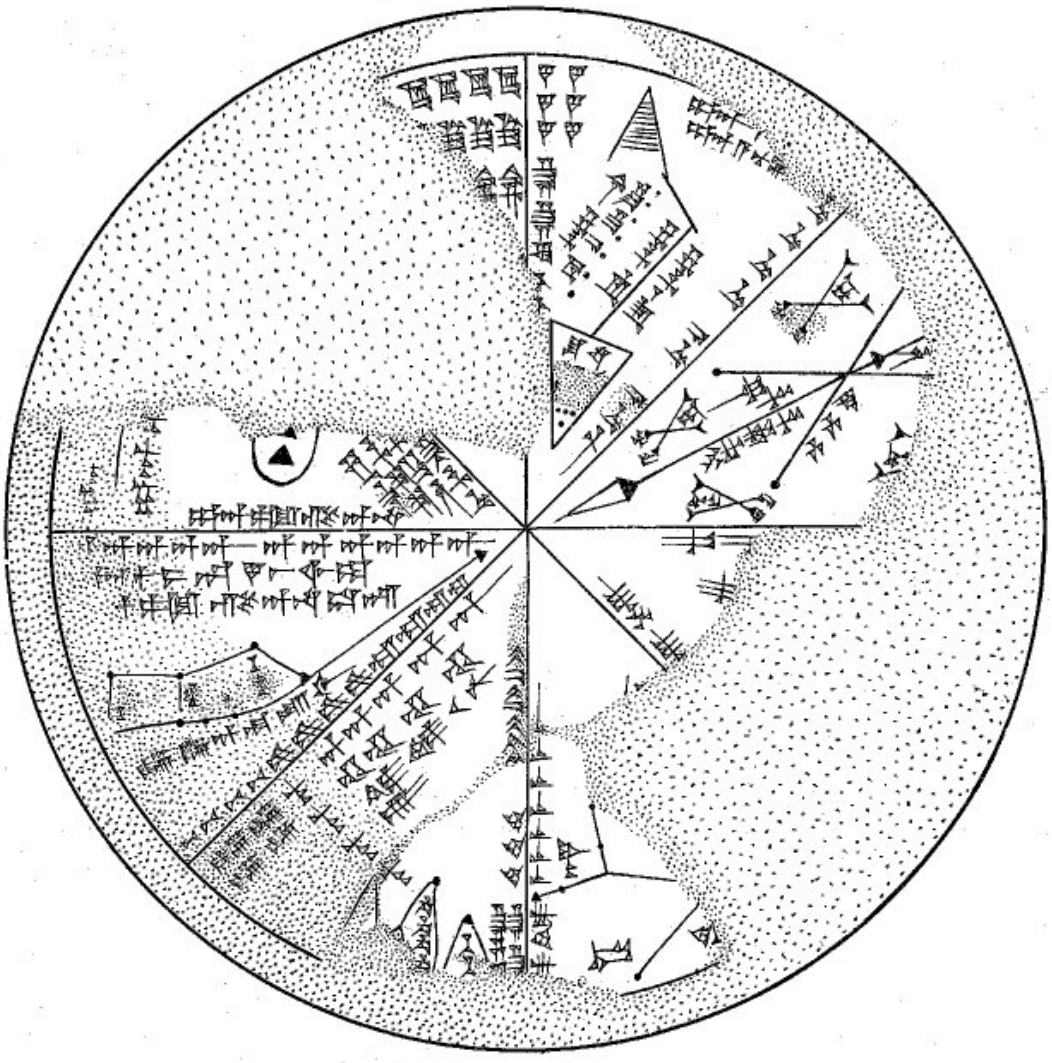

Figure A2. K.8538, part of a circular clay tablet with depictions of constellations (planisphere) [3].

Figure A3. Triangulation point symbol [10].

Figure A4. Comet C/1743 X1, The Great Comet of 1744, or "Comet de Cheseaux-Klinkenberg", at 4am on March 9, 1744, showing six tails rising above the horizon [11].