

THE 1ST OF APRIL 2470 B.C. TOTAL SOLAR ECLIPSE SEEN BY THE PROPHET IBRAHEEM

S. M. YOUSEF

*Astronomy & Meteorology Dept., Faculty of Science
Cairo University, Cairo 12613, Egypt
E-mail: shahinaz@sci-astro.cairo.eun.eg*

Abstract. The Holy Quran describes a phenomenon seen by young Abraham that can only fit a solar eclipse. Two criteria were given for this particular eclipse; first only one planet was seen as soon as it got dark and second no corona was seen. In order to justify the first selection rule, examinations of solar and planetary longitudes for total solar eclipses passing over Babel were carried out. Only the eclipse of the 1st of April 2470 BC meets this condition, as it was only Venus that was seen at that eclipse. The second selection rule was also naturally fulfilled, as Babel happened to be on the border of the totality zone hence no corona was seen, however all the time the moon glistened as Baily's beads. There is no doubt that the prophet Abraham witnessed the 1st of April total solar eclipse that passed over Babel. This will put him about 470 years backward than it was previously anticipated.

Key words: solar eclipse – Quran – Abraham or Ibraheem – Babel – Baily's beads – border – totality zone

1. INTRODUCTION

Dating by solar eclipses is the most accurate method. Several attempts were made for using historical solar eclipses for such a purpose (Mitchell 1951).

2. IN THE NAME OF GOD, THE COMPASSIONATE, THE MERCIFUL

Lo! Ibraheem said to his father Azar: "Takest thou idols for gods! For I see thee and thy people in manifest error" (74). So did We show Ibraheem (malakoot)* the kingdom of the heavens and earth that he would become one of those who are certain (75). When the night (ganna)* very quickly covered him over, he saw a planet, he said: "this is my lord", however it (afala)* disappeared, he said, "I love not those that disappear" (76). When he saw the moon (bazighan)* emerging, he said, "this is my lord" however it disappeared, he said "unless my Lord guides me,

I shall surely be among those who go astray" (77). When he saw the sun (bazighatan)* emerging, he said "this is my lord, this is greater", however it disappeared, he said "Oh, my people, I am free from guilt of giving partners to God (78). For me I have directed my face, firmly and truly, towards Him who created the heavens and the earth, and I am not of those who take partners to God" (79).

Surat (i.e. chapter) Al Anaam (74-79)

3. IT WAS AN ECLIPSE

It is important to point out that very specific Arabic words¹ are used to describe this unique phenomenon. They are not used in the Quran otherwise. Nevertheless, the word malakoot is repeated in the Quran four times. In Babylonian theology, they used to worship the Sun, the Moon and some planets, especially Venus. They used to make idols to represent such gods. Young Abraham (Ibraheem in Arabic) questioned such theology of worshiping idols. Witnessing the solar eclipse provided him with a unique opportunity for examining each assumed god in turn. He looked for ONE God who is everlasting and who is the greatest.

The steps of the eclipse described in the above text are given below:

1. The night covered him very quickly i.e. the Moon's shadow covered him with enormous speed.

2. He thus saw only one planet in the sky, but this planet vanished, as it became invisible. He thus excluded the planet from the list of gods.

3. Following this, he saw the Moon (Basighan) emerging like a new baby's tooth starting to emerge from the gum. He thus actually saw the Baily's beads as the solar photospheric light passed through the valleys on the edge of the Moon and reflected by the Moon's mountains, so part of the Moon's surface could be seen. However those beads disappeared and thus the Moon became invisible. As a consequence, the Moon was also wiped out from the Babylonian list of gods.

4. Then he saw the Sun emerging and getting bigger and bigger as the eclipse was over, He thought that the Sun was his lord. However the Sun disappeared, so finally the third assumed lord of the Babylonians fell.

As a result young Abraham directed his face to the Creator of the heavens and Earth.

It is very important to note two conditions, which were satisfied in that eclipse seen by the Prophet Abraham, namely:

1. Only one planet was seen.

2. No corona was visible to the Prophet Ibraheem. The corona gives glory to the Sun, which can be confusing to one who is looking for the truth. Thus the lack of corona was an advantage in this case.

¹ Those words are denoted by asterisk in the text.

4. WHEN WAS THIS ECLIPSE?

Solar and lunar eclipses of the ancient near east were calculated from 3000 BC to 0 BC with maps by Kudlek and Mickler (1971). It was thus possible to go through the maps and determine the eclipses that passed over Babel.

In order to determine the planets seen at eclipses, Stahlman and Gingerich (1963) tables of solar and planetary longitudes between -2500 and +2000 were used.

A list of solar eclipses that passed over Babel is given in Table 1, together with solar and planetary longitudes. The Julian date and local time at the middle of eclipse are given. Seven eclipses passed over Babel during a period of 1455 years; planetary longitudes are known for only six of them. But which one did the Prophet Ibraheem see?

Table 1

Solar eclipses that passed over Babel, and solar and planetary longitudes at the time

JD	676525	818980	908753	933028	1042557	1208076
Year	-2860	-2470	-2224	-2158	-1858	-1405
Month	3	4	1	6	5	7
Day	23	1	13	29	14	14
Time	16.65	8.97	10.88	11.2	17.35	15.42
Sun		351	276	78	36	97.6
Mercury		11.3	263.8	101	18.7	102
Venus		329.3	229.9	105.6	358.4	130
Mars		90.4	355	114.6	346.6	326
Jupiter		37.2	298.8	148.8	273	360
Saturn		87.1	212.4	300	13.7	158

Note: Bold planetary longitudes distinguish planets seen at each eclipse.

The answer to this question can be determined by applying the first selection rule for this very special eclipse, namely only one planet was seen. Examination of Table 1 indicates that the eclipse of the 1st of April 2470 BC is the only eclipse that satisfies this selection rule. It was only Venus that was seen at that eclipse.

5. WHY NO CORONA WAS SEEN BY YOUNG ABRAHAM AT THIS ECLIPSE?

The path of the 1st of April 2470 BC is reproduced in Fig. 1 after Kudlek and Mickler (1971). Note that Babel lies at the border of the totality zone of that eclipse. Generally speaking, this position makes the observer of the eclipse see the

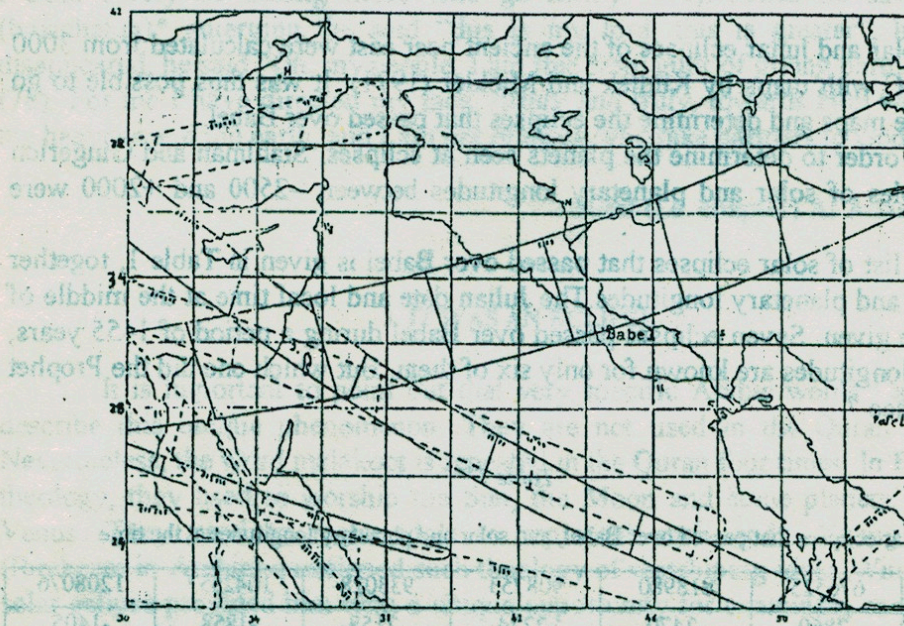


Fig. 1 - Paths of the eclipses that passed the Near East between -2501 and -2459. Notice that Babel was on the border of the zone of totality of the 1st of April 2470 BC total solar eclipse.

Baily's beads all the time but doesn't see the solar corona (Pasachoff 1999). It is thus clear that the second selection rule put earlier for this eclipse, namely the absence of corona is automatically satisfied in this eclipse.

6. CONCLUSION

It is of special interest to determine the life period of Prophet Abraham. The Holy Quran mentions the circumstances that lead young Abraham to firmly believe in God as the only creator. Like a scientific experiment in which each factor is tested independently, the solar eclipse seen by Prophet Abraham provided him with a unique and quick opportunity to examine the basis of Babylonian theology in which Venus, the Moon and the Sun were taken as gods. As the shadow quickly covered him, he saw Venus alone but shortly it disappeared. He then saw the Moon enlightened by the Baily's beads but again it disappeared. Lastly he saw the Sun as a crescent getting bigger and bigger before disappearing. He looked for one god who is ever lasting, thus on these bases, he disregarded those false gods one at a time. The final result of witnessing this particular eclipse was his firm belief in God.

A list was prepared for eclipses that passed over Babel for a long period of time, and one selection rule was applied namely only one planet was visible during that particular eclipse. Only the eclipse of the 1st of April 2470 stands for this selection rule. The second selection rule of that eclipse was the absence of corona. Being on the border of the totality zone, it was not possible for observers in Babel then to observe the corona. Having fulfilled the two selection rules, then the prophet Abraham must have witnessed the 1st of April 2470 BC solar eclipse.

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REFERENCES

- Kudlek, M., Mickler, E.: 1971, *Solar and Lunar Eclipses of the Ancient Near East from 3000 BC to 0 with maps*, Verlag Butzon & Bercker Kevelaer, Neukirchener Verlag des Erziehungsvereins Neukirchen-Vluyn.
- Mitchell, S.A.: 1951, *Eclipses of the Sun*, 5th ed., Columbia University Press, New York.
- Ranyard, A.C.: 1879, *Mem. Roy. Astron. Soc.*, **40**, 1.
- Stahlman, W.D. and Gingerich, O.: 1963, *Solar and Planetary Longitudes for Years -2500 to +2000 by 10-Day Intervals*, The University of Wisconsin Press, Madison.
- Pasachoff, J.M.: 1999, Lecture given at NATO ASI "Advances in Solar Research at Eclipses, from the Ground and from Space", Bucharest, August 9-20, 1999.