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The possibility of seeing two crescent moons in one day and the interpretation of disappearance of the crescent by Sheikh Al-Islam

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Abstract The theory and observation of the crescent moon is an important and complex matter. This paper presents calculations indicating the possibility of two crescents in a single day; one is related to the previous month and the other pertains to the new month. The reason for the frequent denial of this possibility is also explained. Finally, the words of Sheikh Al-Islam Ahmad Ibn Taimiah about the crescent are explained. It became clear that what is meant by the disappearance of the crescent is the absence of a crescent at the horizon in the evening.

1. Introduction

Muslims are interested in observing lunar crescents because of their relation with Islamic rites. This explains the interest of both theorists and observers in this field. (Here, the word 'observers' refers to non-specialists in astronomy who are nevertheless interested in observation.) Over time, a gap arose between observers and theorists as a result of inadequate dialogue between the two. This resulted in errors and defects in observing the crescents, as well as the spread of inaccurate information such as the impossibility of there being two crescents in one day. This refers to the existence of the crescent above the sun when the sun is rising, and above the sun when the sun is setting on the same day. This does not refer to the possibility of observing the two crescents or either of them with the naked eye or astronomical devices. Some have attempted to interpret the statement by Sheikh Al-Islam Ahmad Ibn Taimiah – may Allah bless him – (Ibn Taimiah, 1412 H). His words were interpreted wrongly, however. He said (May Allah show mercy on him): "It approaches the sun and disappears for one or two nights as it became parallel to the sun". Sheikh Al-Islam here is speaking about the disappearance of the moon that he determined to occur at night for a period of time. This disappearance is asserted by Fatoohi et al. (1998), who stated that the moon should disappear for a period of time during its rotation around the earth. The meaning of 'disappearance' was defined as the absence of moonlight as seen by a terrestrial observer, who cannot therefore see the moon from the earth's surface. If, however, an observer has the opportunity to observe the moon

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from above the surface of the earth, he will be able to view it as a result of the different geometry.

This disappearance has been interpreted by some as follows. If the crescent was viewed in the morning before the sunrise, it could not be viewed after sunset on the same day. As a result, some have claimed the impossibility of observing two crescents in one day (Al Zoaq and Khaled Saleh, 1425a, b H). Al Lahib (1408 H) stated that "if the moon was viewed in the morning in the East, before the sunrise, then it will not be viewed on the same day after sunset but will certainly set before it. This is because the moon should disappear one or two nights unanimously. Disappearance refers to fading, so it is not to be viewed in the morning in the East and on the same day in the West. Disappearance is to be after the end of the 28th visible phases". Another author asserts that this phenomenon occurs once every 35 years (A'l Al Sheikh, 1425 H). Some prominent scientists have stated the same. Ibn Qutaybah Ad-Dinawaree (1375 H) stated that "the crescent cannot be viewed in the early morning in the East within the sun, and in the evening in the West behind the sun in a single day", while Al-Marrakushi (1422 H) stated that "it is well known that it cannot be viewed early in the morning in the East, then viewed in the evening in the West." He also said: "it became quite clear that the crescent vision in the morning and then in the evening on a single day is not possible; indeed it is absolutely impossible. Accordingly, a testimony of viewing it in the evening is to be declined with certainty if it was viewed in the East before sunrise, as this would be impossible".

Al Sheikh Ben Mahmoud, the Mufti of Qatar, has asserted this by saying: "whenever people viewed it in the morning, they knew with certainty that it would not appear in the evening and this custom, considered a rule, is not to be violated by the claim of a false vision," and has also stated: "As for the signs by which the impossibility of this vision is known, and the invalidity of testimony of having viewed it, the most important is that it can be viewed early in the morning between the dawn and the sunrise in the East, then, according to some, in the evening of the same day from in the West. This is impossible and cannot be achieved by sense, experience or present custom in the tradition of Allah even if a man's sight was stronger than that of Zarkaa Al Yamama. So viewing it in the morning then in the evening of the same day cannot be done. Whoever claims that must be giving the impression that he saw it when in fact he didn't. Thus, the testimony of viewing it twice in the same day is considered invalid".

In his justification of the impossibility of two crescents in one day, Al Lahib (1408 H) asserted that the scientific argument is clear, indicating that viewing the moon early in the morning until its conjugation with the sun requires 12 degrees i.e. 24 h according to the conjugation circle making viewing possible albeit with difficulty, there is at least 7 degrees i.e. 14 h. He stated that whoever testifies to viewing the crescent after 12 h is a claimer. Al Zoaq and Khaled Saleh, 1425a,b H explains that the astronomers consider this issue incontestable and a closed matter.

Suleiman (2008) stated, in the context of the advent of the month at least, that "the crescent moves toward the sunrise after the dawn of the 29th, and before the sunset there is sufficient time. Thus, if the crescent is viewed before the sunrise, i.e. it rises before the sunrise, this will be evidence that it will set before the sunset. So the vision is not confirmed".

As a result of increased discussion, many people began to doubt the credibility of the astronomical calculations, leading to alienation of this important science from much of society. Accordingly, it is necessary to clarify this problem and remove ambiguity, and in particular not interpret the saying of Sheikh Al-Islam in any way different from what he meant in that "the crescent moon approaches the sun and disappears for one or two nights as it became parallel to the sun" (Ibn Taimiah, 1412 H).

The explanations of Sheikh Al-Islam (see Ibn Taimiah, 1412 H) are considered very important in astronomy. But because some of his work has been interpreted incorrectly, a gap has arisen between Sheikh Al-Islam and modern science. Some interpretations of his sayings about disappearance of the crescent relate to disappearance of the crescent in the sky.

The present work aims to interpret the disappearance phenomenon, and to refute some writers who have claimed the impossibility of viewing the crescent before sunrise and after sunset on the same day.

2. Methodology

Calculations were performed to determine the rising and setting of both the sun and moon over a 30-year period (1990–2020). The days were determined on which moonrise precedes sunrise, and the sunset precedes the setting of the moon; these are the days in which the moon or the crescent is above the sun in the case of setting and rising. The calculations were done for the latitude and longitude of the Holy Kabaa (Al-Mostafa, 1425).

After finding the days on which there are two crescents, we returned to the times of conjugation, to make comparison and seek the reasons for the occurrence of this phenomenon.

3. Results and analysis

Comparison of the results with the times of conjugation showed the possibility of viewing two crescents in one day due to the strong relation with conjugation; there were from three to five days per year in the period of study, with a total 91 days. This decisively demonstrates the falsity of the claim that viewing the crescent before sunrise implies it cannot be seen in the evening. Table 1 sets out the data for the study scope.

Analysis of these results found five cases in which two crescents occur before the occurrence of conjugation. The dates are October 27th, 2000, August 27th, 2003, October 30th, 2016, November 7th, 2018 and September 28th, 2019. An asterisk (*) has been was put next to these cases in the table.

Cases in which the difference between the two sunrises and sunsets are less than a threshold value of one minute are neglected.

The maximum time difference between the two sunrises was 37 ± 1 min; the same difference occurs between the two sunsets. This happened twice, on 25th June, 2006 and 15th June, 2007. Differences between the two sunrises and sunsets were equal on three dates during the study period: on August 29th, 2000, September 24th, 2014 and August 30th, 2019. These cases are denoted by a double asterisk (**) in the table.

Consequently, the words of Sheikh Al-Islam, about the disappearance – which can neither be seen at night, nor during the day – may be explained. The word "day" was not mentioned in the words of Sheikh Al-Islam; but he – May Allah rest his soul – used the word "night" in his explanation.

Table 1 Results. In columns 1–3 the date is given; column 4 shows the time of conjunctions, and in columns 5–10, the times of the two sunrises and sunsets of the Sun and the Moon and the differences between them are given. An asterisk (*) in the table refers to irregular cases; whereas the double asterisk (**) refers to cases in which the differences between the two sunrises and sunsets for both the sun and the moon are equal.

Year 1	Month 2	Day 3	Conjunction 4	Moonrise 5	Moonset 6	Sunrise 7	Sunset 8	Sunrise–Moonrise 9	Moonset–Sunset 10
1990	FEB	25	11:54	6:34	18:34	6:43	18:24	0:09	0:10
1990	APR	25	7:27	5:40	19:11	5:53	18:44	0:13	0:27
1990	MAY	24	14:47	5:08	19:07	5:38	18:57	0:30	0:10
1991	MAR	16	11:10	6:11	18:41	6:28	18:31	0:17	0:10
1991	MAY	14	10:36	5:30	19:20	5:42	18:52	0:12	0:28
1991	JUN	12	15:06	5:10	19:12	5:36	19:04	0:26	0:08
1992	APR	3	8:01	5:57	18:54	6:10	18:37	0:13	0:17
1992	JUN	1	6:57	5:34	19:26	5:37	19:00	0:03	0:26
1993	MAR	23	10:14	6:05	18:44	6:21	18:33	0:16	0:11
1993	DEC	13	12:27	6:37	17:51	6:48	17:41	0:11	0:10
1994	MAR	12	10:05	6:16	18:41	6:31	18:30	0:15	0:11
1994	JUN	9	11:26	5:34	19:09	5:36	19:03	0:02	0:06
1995	JAN	1	13:56	6:36	18:01	6:57	17:51	0:21	0:10
1995	MAR	1	13:48	6:18	18:28	6:40	18:25	0:22	0:03
1996	JAN	20	15:50	6:31	18:07	7:00	18:03	0:29	0:04
1996	MAR	19	13:45	6:10	18:37	6:24	18:32	0:14	0:05
1997	JAN	9	7:26	6:52	18:23	6:59	17:56	0:07	0:27
1997	APR	7	14:02	6:02	18:44	6:07	18:38	0:05	0:06
1997	OCT	31	13:01	6:11	17:59	6:22	17:46	0:11	0:13
1998	JAN	28	9:01	6:50	18:27	6:58	18:09	0:08	0:18
1998	OCT	20	13:09	6:07	18:08	6:17	17:53	0:10	0:15
1999	AUG	11	14:08	5:40	19:00	5:56	18:55	0:16	0:05
1999	OCT	9	14:34	5:59	18:16	6:13	18:03	0:14	0:13
2000**	AUG	29	13:19	5:47	18:55	6:02	18:40	0:15	0:15
2000*	OCT	27	22:53	6:13	18:08	6:20	17:48	0:07	0:20
2001	JUN	21	14:58	5:22	19:09	5:38	19:06	0:16	0:03
2001	SEP	17	13:27	5:53	18:41	6:07	18:22	0:14	0:19
2001	NOV	15	9:40	6:25	17:57	6:30	17:39	0:05	0:18
2002	JUL	10	13:26	5:26	19:21	5:43	19:07	0:17	0:14
2002	OCT	6	14:18	5:56	18:19	6:12	18:05	0:16	0:14
2002	DEC	4	10:34	6:37	17:47	6:42	17:39	0:05	0:08
2003	JUL	29	9:53	5:43	19:28	5:51	19:02	0:08	0:26
2003*	AUG	27	20:26	5:29	18:49	6:01	18:42	0:32	0:07
2003	OCT	25	15:50	5:58	17:52	6:19	17:50	0:21	0:02
2004	MAY	19	7:52	5:36	19:14	5:39	18:54	0:03	0:20
2004	JUL	17	14:24	5:26	19:22	5:46	19:06	0:20	0:16
2004	SEP	14	17:29	5:46	18:31	6:06	18:25	0:20	0:06
2005	MAY	8	11:45	5:32	19:01	5:44	18:49	0:12	0:12
2005	JUL	6	15:02	5:19	19:22	5:42	19:07	0:23	0:15
2005	OCT	3	13:28	6:00	18:09	6:11	18:07	0:11	0:02
2006	MAR	29	13:15	6:07	18:43	6:15	18:35	0:08	0:08
2006	MAY	27	8:26	5:24	19:24	5:37	18:58	0:13	0:26
2006	JUN	25	19:05	5:02	19:12	5:39	19:07	0:37	0:05
2006	JUL	25	7:31	5:47	19:30	5:49	19:04	0:02	0:26
2007	APR	17	14:36	5:38	18:46	5:59	18:41	0:21	0:05
2007	JUN	15	6:13	5:29	19:41	5:37	19:04	0:08	0:37
2007	JUL	14	15:04	5:21	19:19	5:45	19:07	0:24	0:12
2008	APR	6	6:55	5:59	19:02	6:07	18:38	0:08	0:24
2008	MAY	5	15:18	5:16	18:54	5:46	18:48	0:30	0:06
2008	AUG	1	13:13	5:37	19:07	5:52	19:00	0:15	0:07
2009	APR	25	6:23	5:41	19:12	5:52	18:44	0:11	0:28
2009	MAY	24	15:11	5:08	19:05	5:38	18:57	0:30	0:08
2010	JAN	15	10:11	6:58	18:11	7:00	18:00	0:02	0:11
2010	FEB	14	5:51	6:47	18:38	6:51	18:18	0:04	0:20
2010	APR	14	15:29	5:35	18:42	6:01	18:40	0:26	0:02
2010	MAY	14	4:04	5:38	19:25	5:42	18:52	0:04	0:33
2010	JUN	12	14:15	5:16	19:12	5:36	19:04	0:20	0:08
2011	JAN	4	12:03	6:50	18:01	6:58	17:52	0:08	0:09
2011	FEB	3	5:31	6:53	18:35	6:56	18:12	0:03	0:23
2011	MAY	3	9:51	5:35	19:02	5:48	18:47	0:13	0:15
2011	JUL	1	11:54	5:32	19:13	5:40	19:07	0:08	0:06

(*continued on next page*)

Table 1 (*continued*)

Year 1	Month 2	Day 3	Conjunction 4	Moonrise 5	Moonset 6	Sunrise 7	Sunset 8	Sunrise–Moonrise 9	Moonset–Sunset 10
2012	JAN	23	10:39	6:46	18:19	6:59	18:05	0:13	0:14
2012	FEB	22	1:35	6:43	18:53	6:46	18:22	0:03	0:31
2012	APR	21	10:18	5:44	18:55	5:55	18:43	0:11	0:12
2012	DEC	13	11:42	6:37	17:55	6:48	17:41	0:11	0:14
2013	FEB	10	10:20	6:36	18:31	6:52	18:16	0:16	0:15
2013	APR	10	12:35	5:50	18:46	6:04	18:39	0:14	0:07
2014	JAN	1	14:14	6:34	18:01	6:57	17:51	0:23	0:10
2014	MAR	1	11:00	6:25	18:38	6:40	18:25	0:15	0:13
2014**	SEP	24	9:14	6:06	18:19	6:09	18:16	0:03	0:03
2014	NOV	22	15:32	6:15	17:45	6:34	17:38	0:19	0:07
2015	JAN	20	16:14	6:31	18:05	7:00	18:03	0:29	0:02
2015	MAR	20	12:36	6:13	18:41	6:24	18:32	0:11	0:09
2015	SEP	13	9:41	6:02	18:31	6:06	18:27	0:04	0:04
2015	DEC	11	13:29	6:29	17:53	6:46	17:40	0:17	0:13
2016	APR	7	14:24	6:02	18:43	6:07	18:38	0:05	0:05
2016	SEP	1	12:03	5:54	18:42	6:03	18:37	0:09	0:05
2016*	OCT	30	20:38	5:56	17:48	6:21	17:46	0:25	0:02
2016	NOV	29	15:18	6:20	17:48	6:39	17:38	0:19	0:10
2016	DEC	29	9:53	6:46	18:06	6:56	17:49	0:10	0:17
2017	JUL	23	12:45	5:38	19:07	5:49	19:04	0:11	0:03
2017	NOV	18	14:42	6:16	17:51	6:32	17:39	0:16	0:12
2017	DEC	18	9:30	6:43	18:00	6:51	17:43	0:08	0:17
2018	AUG	11	12:58	5:41	19:05	5:56	18:54	0:15	0:11
2018*	NOV	7	19:02	5:58	17:48	6:25	17:42	0:27	0:06
2018	DEC	7	10:20	6:36	17:55	6:44	17:39	0:08	0:16
2019	JUN	3	13:02	5:34	19:05	5:36	19:00	0:02	0:05
2019**	AUG	30	13:37	5:46	18:56	6:02	18:40	0:16	0:16
2019*	SEP	28	21:26	5:34	18:15	6:09	18:12	0:35	0:03
2020	JUN	21	9:41	5:34	19:22	5:38	19:06	0:04	0:16
2020	SEP	17	14:00	5:52	18:39	6:07	18:22	0:15	0:17

In the Arabic language the word ''night'' indicates the period from sunset to dawn. In Lesasan El Arab the word ''night'' denotes what follows the day, and it starts at sunset. In Al Tahtheeb, in contrast, the night refers to darkness and the day to light; but day also means 24 h, as in the phrase ''the night of a day'', and the reduction of the word ''Laila (night)'' is ''Loiailia''; where we put the ''last Ya'a'' onto the end of the word ''Al Laialy'' (nights).

Some say: the origin of the structure ''lail'' (night) is minor; Al Farra'a said: the word ''Laila'' (the night) was ''Lailia'' in its origin; therefore it is reduced to the form ''Loiailia''. It is like the phrase for the white cake, ''Al Kaika Al Baidaa'', which was originally ''Kaikia'', and its plural form was ''Kiaky''.

Abo El Haitham stated that: the day is a name, and it is against the night (Al Nahar); the day is a name for every day, and Al Lail ''Night'' is a name for every night, and it can neither be said: Nahar- Naharan, nor Lail, Lailan; but the singular form of the word ''Al Nahar'' is Yawm (day), and its plural form is (Ayam), Days; the oppositee of ''Yawm'' (day) is ''Laila'' (Night), and its plural form is (Laial) ''nights'' (Lessan Al Arab).

4. Conclusion

This work proves by mathematics the possibility of sighting two crescents on the same day, in addition to explaining the speech of Sheikh Al-Islam ''Ibn Taimiah'' about the problem of the disappearance of the moon for one or two nights. The sighting of the crescent in the morning – before sunrise – cannot be considered a proof that the crescent will not be seen above the west horizon after the sun sets.

5. Recommendations

The intrusion of non-experts in this field, as well as the reluctance of some specialists to engage the wider community and communicate in elementary words, led to the spread of incorrect astronomical information. It is therefore necessary for people who speak out in this field to be careful in tracking information from its accredited and trustful sources.

It is necessary for a researcher to make clear what he has used from other scientists, even if it was explained fully in the past, in order not to be trapped by wrong explanations or erroneous subsequent interpretations. It is also vital for scientific organizations to oversee the teaching of astronomy, so as to popularize it. The difficulty in this field lies in the lack of published scientific research, and the present researcher has gathered related material from diverse sources.

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