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Suggestion of a conventional Islamic calendar

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ABSTRACT

There is a complexity of the problem concerning the first sighting of the new lunar crescent, which is attributed to various astronomical, astrophysical and geographical factors. Therefore, Astronomers adopted various criteria for the new crescent visibility. Muslims around the world differ in the beginning of the Hijric months. In fact the differences are not due to different methodology of astronomical calculations, which in turn the variations of the calendar at different countries gives. Farewell Hajj of Prophet Mohamed was on Friday, the ninth of Thul'hejja of the tenth year of immigration (Biography of the Prophet Mohamed). Therefor; the beginning of the month of Thul'hejja 10 A.H is on Thursday. Our suggested calendar takes Farewell Hajj of the Prophet Mohammad to be the base of this calendar. The advantage of our suggested calendar far away from any criteria; where the adoption of criteria for the new crescent visibility is often misleading.

1. Introduction

The Islamic year consists of 12 lunar months. Chronologists have made a rule that each of the odd months comprises of 30 days while each of the even months comprises of 29 days, starting at sunset. The average of the lunar year is 354.3670694 days (354 days; 8 h; 48 min.; 35 s) and therefore civil lunar years are divided into 355 day-leap year and 354 day- non-leap year.

Some scholars suggested alternate leap year schemes. The suggested schemes described in Table 1, (The Hijric calendar, Umesh Nair, April 6, 2009).

In the case of leap Hijri year, Chronologists added one day to the last month of the Hijri year, McPartlan (1996).

But Rashed suggested that the Leap years of the Arithmetical calendar may be the years 2, 5, 7, 10, 13, 15, 18, 21, 23, 26 and 29 in the 30-year cycle. This suggested Arithmetical calendar satisfies the mathematical patterns, while the old Arithmetical calendar does not satisfy a known fixed rule.

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2. Results and discussions

Farewell Hajj of Prophet Mohamed was on Friday, the ninth of Thul'hejja of the tenth year of immigration (Biography of the Prophet Mohamed). Therefor; the beginning of the month of Thul'hejja 10 A.H is on Thursday.

We have enumerated 10 major Hijric year cycles as in Table 1, where:

(1) Every major cycle containing 7 small cycles, every one of 30 years. The first small cycle of the year 1 to the year 30, and the 70 cycle of the year 2071 to the year 2100. It can increase the major cycles as well as the number of years that they contain as the same pattern.
(2) Every major cycle is a repetition of the previous one in days.
(3) Each column includes a beginning and an end of small cycles.

Enumeration of small Hijric year cycles of 30 years as in Tables 3–9, where:

(1) Each table contains the beginning and the end of a specified number of small cycles of the major cycles in Table 2.
(2) The Leap years of this small cycles according to the years suggested by Rashed et al.
(3) Each of the odd months comprises of 30 days while each of the even months comprises of 29 days. For leap Hijri year, added one day to Thul'hejja.

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Table 1
Leap years in each 30-year cycle and its usage.

Type	Leap years with 355 days in each 30-year cycle	Origin/Usage
I	2, 5, 7, 10, 13, 15, 18, 21, 24, 26 & 29	Kuwaiti algorithm
II	2, 5, 7, 10, 13, 16, 18, 21, 24, 26 & 29	al-Fazārī, al-Khwārizmī, al-Battānī (the most popular form)
III	2, 5, 8, 10, 13, 16, 19, 21, 24, 27 & 29	Fātimid calendar (also known as the Misri or Bohra calendar)
IV	2, 5, 8, 11, 13, 16, 19, 21, 24, 27 & 30	Habash al-Hāsib, al-Bīrūnī, Elias of Nisibis

Table 2
10 major Hijric year cycles.

No. of major Hijric year cycle	Beginning day of Hijric year in each 30 years (one cycle) and its end						
	Thursday Monday	Tuesday Saturday	Sunday Thursday	Friday Tuesday	Wednesday Sunday	Monday Friday	Saturday Wednesday
1	1–30	31–60	61–90	91–120	121–150	151–180	181–210
2	211–240	241–270	271–300	301–330	331–360	361–390	391–420
3	421–450	451–480	481–510	511–540	541–570	571–600	601–630
4	631–660	661–690	691–720	721–750	751–780	781–810	811–840
5	841–870	871–900	901–930	931–960	961–990	991–1020	1021–1050
6	1051–1080	1081–1110	1111–1140	1141–1170	1171–1200	1201–1230	1231–1260
7	1261–1290	1291–1320	1321–1350	1351–1380	1381–1410	1411–1440	1441–1470
8	1471–1500	1501–1530	1531–1560	1561–1590	1591–1620	1621–1650	1651–1680
9	1681–1710	1711–1740	1741–1770	1771–1800	1801–1830	1831–1860	1861–1890
10	1891–1920	1921–1950	1951–1980	1981–2010	2011–2040	2041–2070	2071–2100

Table 3
No. of small cycles in the major cycle: 1–8–15–22–29–36–43–50–57–64.

Beginning End	Thursday Sunday	Monday Friday	Saturday Tuesday	Wednesday Saturday	Sunday Thursday	Friday Monday	Tuesday Saturday	Sunday Wednesday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 4
No. of small cycles in the major cycle: 2–9–16–30–37–44–51–58–65.

Beginning End	Tuesday Friday	Saturday Wednesday	Thursday Sunday	Monday Thursday	Friday Tuesday	Wednesday Saturday	Sunday Thursday	Friday Monday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 5
No. of small cycles in the major cycle: 3–10–17–24–31–38–45–52–59–66.

Beginning End	Sunday Wednesday	Thursday Monday	Tuesday Friday	Saturday Tuesday	Wednesday Sunday	Monday Thursday	Friday Tuesday	Wednesday Saturday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 6
No. of small cycles in the major cycle: 4–11–18–25–32–39–46–53–60–67.

Beginning End	Friday Monday	Tuesday Saturday	Sunday Wednesday	Thursday Sunday	Monday Friday	Saturday Tuesday	Wednesday Sunday	Monday Thursday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 7
No. of small cycles in the major cycle: 5–12–19–26–33–40–47–54–61–68.

Beginning End	Wednesday Saturday	Sunday Thursday	Friday Monday	Tuesday Friday	Saturday Wednesday	Thursday Sunday	Monday Friday	Saturday Tuesday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 8
No. of small cycles in the major cycle: 6–13–20–27–34–41–48–55–62–69.

Beginning End	Monday Thursday	Friday Tuesday	Wednesday Saturday	Sunday Wednesday	Thursday Monday	Tuesday Friday	Saturday Wednesday	Thursday Sunday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 9
No. of small cycles in the major cycle: 7–14–21–28–35–42–49–56–63–70.

Beginning End	Saturday Tuesday	Wednesday Sunday	Monday Thursday	Friday Monday	Tuesday Saturday	Sunday Wednesday	Thursday Monday	Tuesday Friday
No. of Hijric year in a small cycle	1–9–17–25	2–10–18–26	3–11–19–27	4–12–20–28	5–13–21–29	6–14–22–30	7–15–23	8–16–24

Table 10
The beginning of the Hijri months of any small cycle.

The month	The beginning of the Hijri months
Mohar'rum – Shawal	Same day as the beginning of the year
Safar – Rajab	Excess two days on the beginning of the year
Rabee 1 – Thul'hejja	Excess three days on the beginning of the year
Rabee 2 – Ramadan	Excess five days on the beginning of the year
Jumade 2 – Thul'kada	Excess one day on the beginning of the year
Jumade 1	Excess six days on the beginning of the year
Sha'aban	Excess four days on the beginning of the year

Also we have created Table 10 to know the beginning of the Hijri months of any small cycle.

To know the beginning of any Hijri months, for example – Shawal, 1437 H.A.

(i) To know the beginning of the year 1437 H.A as follows:
  (1) 1437–30 = 47.9, its ceiling is 48 and its ground (floor) is 47. The Ceiling number is the number of the small cycle in the major cycle.
  (2) $47 \times 30 = 1410$, Then;
  (3) $1410 - 1437 = 27$, where 27 is the number of Hijric year 1437 in the small Cycle number 48.
  (4) From Table 8, the beginning of 1437 H.A is Wednesday and its end is Saturday.

(ii) To know the beginning of Shawal, from Table 10 we find that it's beginning is the Same day as the beginning of the year 1437 H.A. i.e. Wednesday.

3. Conclusions

Our suggested calendar takes Farewell Hajj of the Prophet Mohammad to be the base of this calendar. The advantage of our suggested calendar is far away from dependency on any criteria; where the adoption of criteria for the new crescent visibility is often misleading.

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