Passover Days 28-35 CE

1. Introduction

There have been various attempts over the years at producing calendars in modern formats for the year of the Crucifixion of the Messaiah. The accuracy of these is open to question..

This report is based on the Internet document, “Spring Phenomena 25 BCE to 38 CE”, published by the Astronomical Applications Department, United States of America Naval Observatory, and available at http://aa.usno.navy.mil/data/docs/SpringPhenom.php as at August 2008. I expect that the accuracy of its information is as good as can be obtained at present. The navy authors claim an accuracy of two hours for the years examined here.

Assumptions used in this report:

1. Biblical days start and finish at sunset. Leviticus 23:32.
2. If the new moon conjunction alignment occurs at any time on a day, that day is taken as the first of the lunar month. New moon times have been predictable by civilizations worldwide for thousands of years. The Egyptians who built the pyramids would have had the knowledge, being very good astronomers, and the knowledge would have been known to Moses (who was raised in the Royal Court) and others of his time. David and Jonathan, long after Moses, knew in advance when a New Moon would occur (1 Samuel 20:5, 18).
3. The Wave Sheaf Offering should be on a Sunday, i.e. the day after the weekly Sabbath.
4. Abib 1 (or Nisan 1) is the earliest new moon such that the Wave Sheaf Offering is after the Equinox. (After the return from Exile in Babylon, “Abib” was known as “Nisan”.)

In the rest of this report, the calendars for the years 28 CE to 35 CE are drawn, firstly for the case of no time errors, then, in Appendix 1, for the case of the true times being two hours later, and finally for the case of the true times being two hours earlier than the Navy estimates.

In the tables, the first fourteen days of Abib (or Nisan) are shown in green , and the seven Days of Unleavened Bread are shown in turquoise .

Appendix 2 shows an extract from the Navy document, with the times relevant to the tables in this report.

A summary of the week days on which Abib 14 occurred during the years examined is given in the Summary.

2. The weekdays using times as supplied by the Naval Observatory

28 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14 March	15 New Moon 2 am Abib 1	16	17	18	19	20
21	22 Equinox	23	24	25	26	27
28 Abib 14	29 Full Moon	30	31	1 April	2	3
4 WSO	5	6	7	8	9	10
11	12	13	14	15	16	17

For the year 28 CE, the US Naval Observatory estimates there was a new moon at 2am Jerusalem time (0:00 am Greenwich Mean Time or Universal Time) on Monday 15 March. This is between sunset Sunday 14 March and sunset Monday 15 March, thus making Monday 15 March the date of the beginning of the lunar month, Abib 1 or Nisan 1. Hence the date of Abib 14 / Nisan 14 for that year would be 28 March, and it is a Sunday according to the US Navy data.

29 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 March	2	3	4 New Moon 2am	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22 Equinox	23	24	25	26
27	28	29	30	31	1 April	2 New Moon 7pm
3 Abib 1	4	5	6	7	8	9
10	11	12	13	14	15	16 Abib 14
17 WSO Full Moon	18	19	20	21	22	23
24	25	26	27	28	29	30

Here is how the above table was derived:

The US Navy has supplied on its web site:

1. the times and dates of the full moon, new moons and equinox; and
2. the week day of the equinox.

The New Moon in March, on Friday the fourth, was at 2am. The first of the corresponding lunar month is therefore from sunset Friday unil sunset Saturday. If this were Abib 1, then Abib 14 would be Thursday 17th March, and the Wave Sheaf Offering would be on Sunday 20th March, two days before the Equinox. This would contradict the assumption that the Wave Sheaf Offering should be after the Equinox. Therefore we have to reject the New Moon on 4th March as being Abib 1.

For the New Moon of the second of April, the time is 7pm, after sunset. The first of the lunar month is therefore from sunset Saturday 2nd April to sunset Sunday 3rd April 29 CE. The fourteenth of the lunar month is then Saturday 16th April, and the candidate day for the Wave Sheaf Offering is on Sunday 17 April 29 CE, after the Equinox. This is acceptable, and is the earliest date which is. Hence for the year 29 CE, the first month of the Biblical calendar, Abib, begins on Sunday 3 April.

The other years are considered similarly.

30 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
19 March	20	21	22 Equinox New Moon 8pm	23 Abib 1	24	25
26	27	28	29	30	31	1 April
2	3	4	5 Abib 14	6 Full Moon	7	8
9 WSO	10	11	12	13	14	15
16	17	18	19	20	21 New Moon 11am	22

Because the new moon is after sunset on Wednesday, Abib 1 runs from sunset Wednesday until sunset Thursday.

31 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
11 March	12 Abib 1 New Moon 1am	13	14	15	16	17
18	19	20	21	22	23 Equinox	24
25 Abib 14	26	27 Full Moon	28	29	30	31
1 April WSO	2	3	4	5	6	7
8	9	10 New Moon 2pm	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1 May	2	3	4	5

For 31 CE, the new moon on Monday March 12 is at 1am, so Abib 1 runs from sunset Sunday 11 March until sunset Monday 12 March.

32 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
24 February	25	26	27	29 New Moon noon	1 March	2
3	4	5	6	7	7	8
10	11	12	13	14	14	15
16	17	18	19	20	21	22 Equinox
23	24	25	26	27	28	29 New Moon 10pm
30 Abib 1	31	1 April	2	3	4	5
6	7	8	9	10	11	12 Abib 14
13 WSO	14 Full Moon	15	16	17	18	19
20	21	22	23	24	25	26

For 32 CE, the new moon on Thursday 29 February is too early to be taken as Abib 1, as for 29 CE discussed above. The next new moon is suitable, with Abib 1 going from sunset Saturday 29 March to sunset Sunday 30 March.

33 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
15 March	16	17	18	19 New Moon noon	20 Abib 2	21
22 Equinox	23	24	25	26	27	28
29	30	31	1 April Abib 14	2	3 Full Moon	4
5 WSO	6	7	8	9	10	11

In 33 CE, the new moon on Thursday 19 March is at noon, so Abib 1 would extend from sunset Wednesday 18 March until sunset Thursday 19 March.

34 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7 March	8	9 New Moon 6am	10 Abib 2	11	12	13
14	15	16	17	18	19	20
21	22 Equinox Abib 14	23 Full Moon	24	25	26	27
28 WSO	29	30	31	1 April	2	3
4	5	6	7 New Moon 2pm	8	9	10

The year 34 CE is quite straightforward. The new moon is at 6am Tuesday 9 March, so Abib 1 is

from sunset Monday 8 March until sunset Tuesday 9 March.

35 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
20 March	21	22	23 Equinox	24	25	26
27	28 New Moon 6am	29 Abib 2	30	31	1 April	2
3	4	5	6	7	8	9
10 Abib 14	11 Full Moon	12	13	14	15	16
17 WSO	18	19	20	21	22	23

The 6am new moon in 35 CE is similar to the 6am new moon in 34 CE.

3. Conclusions

In summary, the week days for Abib 14 are as follows:
28 CE Sunday
29 CE Saturday
30 CE Wednesday
31 CE Sunday
32 CE Saturday
33 CE Wednesday
34 CE Monday
35 CE Sunday

Note there is no instance of a Friday.

We have three Sundays, one Monday, no Tuesdays, two Wednesdays, no Thursdays, no Fridays, and two Saturdays.

In the following Appendix, the effects of estimation errors are analysed. In summary, if the true times were at the maximum error later, there would be no changes from the above.
28 CE Sunday
29 CE Saturday
30 CE Wednesday
31 CE Sunday
32 CE Saturday
33 CE Wednesday
34 CE Monday
35 CE Sunday

For the case of the true times being at the maximum error earlier, there is an advance of one day for 29 CE to Friday but no changes for the other years.
28 CE Sunday
29 CE Friday
30 CE Wednesday
31 CE Sunday
32 CE Saturday
33 CE Wednesday
34 CE Monday
35 CE Sunday

Year	Using earliest time	Using likeliest time	Using latest time
28 CE	Sunday	Sunday	Sunday
29 CE	Friday	Saturday	Saturday
30 CE	Wednesday	Wednesday	Wednesday
31 CE	Sunday	Sunday	Sunday
32 CE	Saturday	Saturday	Saturday
33 CE	Wednesday	Wednesday	Wednesday
34 CE	Monday	Monday	Monday
35 CE	Sunday	Sunday	Sunday

Appendix 1. Are there Any Variations due to possible errors in time estimates?

The source document specifies that there are possible errors of "one or two hours for 4 BCE to 38 CE". In this appendix we consider the changes which would result from errors of two hours either way. The first consideration is if the true times were two hours later than considered above. In the next section, the effects of the true times being two hours earlier are shown.

A1.1 If the true times were two hours later than the Navy estimate

28 CE

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14 March	15 New Moon 4 am Abib 1	16	17	18	19	20
21	22 Equinox	23	24	25	26	27
28 Abib 14	29 Full Moon	30	31	1 April	2	3
4 WSO	5	6	7	8	9	10
11	12	13	14	15	16	17

If the true time of the new moon estimated to be at 2am Monday 15 March were actually two hours later, i.e. at 4am Monday 15 March, it would still be after sunset Sunday 14 March and before sunset Monday 15 March. Hence there is no change to the date of Abib 1, and consequently no change to the date of Abib 1n / Nisan 14. It is still on Sunday 28 March.

29 CE no change to the days

The New Moon of 2nd April would be 9 pm rather than 7pm. This would not change the date of the first of Abib.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 March	2	3	4 New Moon 4am	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22 Equinox	23	24	25	26
27	28	29	30	31	1 April	2 New Moon 9 pm
3	4	5	6	7	8	9
10	11	12	13	14	15	16 Abib 14
17 WSO Full Moon	18	19	20	21	22	23
24	25	26	27	28	29	30

30 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
19 March	20	21	22 Equinox New Moon 10pm	23 Abib 1	24	25
26	27	28	29	30	31	1 April
2	3	4	5 Abib 14	6 Full Moon	7	8
9 WSO	10	11	12	13	14	15
16	17	18	19	20	21 New Moon 1pm	22

31 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
11 March	12 New Moon 3am	13	14	15	16	17
18	19	20	21	22	23 Equinox	24
25 Abib 14	26	27 Full Moon	28	29	30	31
1 April WSO	2	3	4	5	6	7
8	9	10 New Moon 2pm	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1 May	2	3	4	5

32 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
24 February	25	26	27	29 New Moon 2 pm	1 March	2
3	4	5	6	7	7	8
10	11	12	13	14	14	15
16	17	18	19	20	21	22 Equinox
23	24	25	26	27	28	29 New Moon midnight
30 Abib 1	31	1 April	2	3	4	5
6	7	8	9	10	11	12 Abib 14
13 WSO	14 Full Moon	15	16	17	18	19
20	21	22	23	24	25	26

33 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
15 March	16	17	18	19 New Moon 2pm	20 Abib 2	21
22 Equinox	23	24	25	26	27	28
29	30	31	1 April Abib 14	2	3 Full Moon	4
5 WSO	6	7	8	9	10	11

34 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7 March	8	9 New Moon 8am	10 Abib 2	11	12	13
14	15	16	17	18	19	20
21	22 Equinox Abib 14	23 Full Moon	24	25	26	27
28 WSO	29	30	31	1 April	2	3
4	5	6	7 New Moon 2pm	8	9	10

35 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
20 March	21	22	23 Equinox	24	25	26
27	28 New Moon 8am	29	30	31	1 April	2
3	4	5	6	7	8	9
10 Abib 14	11 Full Moon	12	13	14	15	16
17 WSO	18	19	20	21	22	23

In summary, there are no changes in the days even if the times were two hours later than estimated by the US Naval Observatory:
28 CE Sunday
29 CE Saturday
30 CE Wednesday
31 CE Sunday
32 CE Saturday
33 CE Wednesday
34 CE Monday
35 CE Sunday

A1.2. If true times were two hours earlier than the best estimate of the Navy

28 CE no changes

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14 March	15 New Moon 0:00 am Abib 1	16	17	18	19	20
21	22 Equinox	23	24	25	26	27
28 Abib 14	29 Full Moon	30	31	1 April	2	3
4 WSO	5	6	7	8	9	10
11	12	13	14	15	16	17

If the true time of the estimated new moon on Monday 15 March were actually two hours earlier, it would be at midnight between 14 March and 15 March, i.e. 0:00 am Monday 15 March. This time is still between sunset Sunday 14 March and sunset Monday 15 March, so there is no change to the Abib / Nisan dates. Abib 1 is still on Monday 15 March and Abib 14 / Nisan 14 is still on Sunday 28 March.

29 CE advances one day

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 March	2	3 New Moon midnight	4 Abib 1	5 Abib 2
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22 Equinox	23	24	25	26
27	28	29	30	31	1 April	2 New Moon 5pm Abib 1
3	4	5	6	7	8	9
10	11	12	13	14	15 Abib 14	16
17 WSO Full Moon	18	19	20	21	22	23
24	25	26	27	28	29	30

In this case, the new moon time is advanced to 5pm on Saturday 2 April. An estimate of sunset time using a program at http://www.ga.gov.au/geodesy/astro/sunrise.jsp using coordinates of 35 degrees 15 minutes east, 31 degrees 45 minutes north, is 5:59pm. This condition makes Abib 1 run from sunset Friday 1 April to sunset Saturday 2 April. Abib 14 in this case advances to Friday 15 April.

30 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
19 March	20	21	22 Equinox New Moon 6pm	23 Abib 1	24	25
26	27	28	29	30	31	1 April
2	3	4	5 Abib 14	6 Full Moon	7	8
9 WSO	10	11	12	13	14	15
16	17	18	19	20	21 New Moon 11am	22

Using the same program as for 29 CE, the estimate of sunset on 22 March is 5:52 pm. In this case, Abib 1 remains from sunset Wednesday 22 March to sunset Thursday 23 March.

31 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
11 March New Moon 11pm	12 Abib 1	13	14	15	16	17
18	19	20	21	22	23 Equinox	24
25 Abib 14	26	27 Full Moon	28	29	30	31
1 April WSO	2	3	4	5	6	7
8	9	10 New Moon noon	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	1 May	2	3	4	5

32 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
24 February	25	26	27	29 New Moon 10am	1 March	2
3	4	5	6	7	7	8
10	11	12	13	14	14	15
16	17	18	19	20	21	22 Equinox
23	24	25	26	27	28	29 New Moon 8pm
30	31	1 April	2	3	4	5
6	7	8	9	10	11	12 Abib 14
13 WSO	14 Full Moon	15	16	17	18	19
20	21	22	23	24	25	26

33 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
15 March	16	17	18	19 New Moon 10am	20	21
22 Equinox	23	24	25	26	27	28
29	30	31	1 April Abib 14	2	3 Full Moon	4
5 WSO	6	7	8	9	10	11

34 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
7 March	8	9 New Moon 4am	10	11	12	13
14	15	16	17	18	19	20
21	22 Equinox Abib 14	23 Full Moon	24	25	26	27
28 WSO	29	30	31	1 April	2	3
4	5	6	7 New Moon 2pm	8	9	10

35 CE no change to the days

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
20 March	21	22	23 Equinox	24	25	26
27	28 New Moon 4am	29 Abib 2	30	31	1 April	2
3	4	5	6	7	8	9
10 Abib 14	11 Full Moon	12	13	14	15	16
17 WSO	18	19	20	21	22	23

In summary, if the maximum errors are in the opposite directions, 29 CE is advanced one day, but there are no changes to the other years:
29 CE advances to Friday but no changes for the other years.
28 CE Sunday
29 CE Friday
30 CE Wednesday
31 CE Sunday
32 CE Saturday
33 CE Wednesday
34 CE Monday
35 CE Sunday

APPENDIX 2. Extracts from the Navy source document

VERNAL EQUINOX

Julian Calendar CE	Greenwich Date March	Time	Day of Week
...			
28	22	10 a.m.	Monday
29	22	4 p.m.	Tuesday
30	22	10 p.m.	Wednesday
31	23	3 a.m.	Friday
32	22	9 a.m.	Saturday
33	22	3 p.m.	Sunday
34	22	9 p.m.	Monday
35	23	3 a.m.	Wednesday
...			

FULL MOON				NEW MOON			
On or next after date of equinox				On or preceding date of equinox		Following equinox	
Julian Cal. Date	Greenwich Time	Week Day		Julian Cal. Date	Greenwich Time	Julian Cal. Date	Greenwich Time
28 March 29	3 a.m.	Mon.		March 15	0*	April 13	2 p.m.
29 April 17	3 a.m.	Sun.		March 4	0*	April 2	5 p.m.
30 April 6	8 p.m.	Thu.		March 22	6 p.m.	April 21	9 a.m.
31 March 27	11 a.m.	Tue.		March 11	11 p.m.	April 10	Noon
32 April 14	9 a.m.	Mon.		Feb. 29	10 a.m.	March 29	8 p.m.
33 April 3	3 p.m.	Fri.		March 19	10 a.m.	April 17	7 p.m.
34 March 23	3 p.m.	Tue.		March 9	4 a.m.	April 7	Noon
35 April 11	8 a.m.	Mon.		Feb. 26	6 p.m.	March 28	4 a.m.

* Midnight at the beginning of the given date.

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