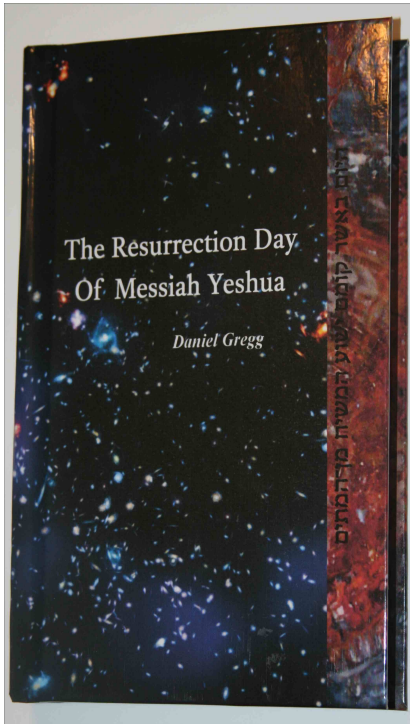


הַיּוֹם בַּאֲשֶׁר קוֹמַם יֵשׁוּעַ
הַמָּשִׁיחַ מִן־הַמָּוֶת



**The Resurrection Day
Of Messiah Yeshua**

When It Happened

According To The Original
Texts

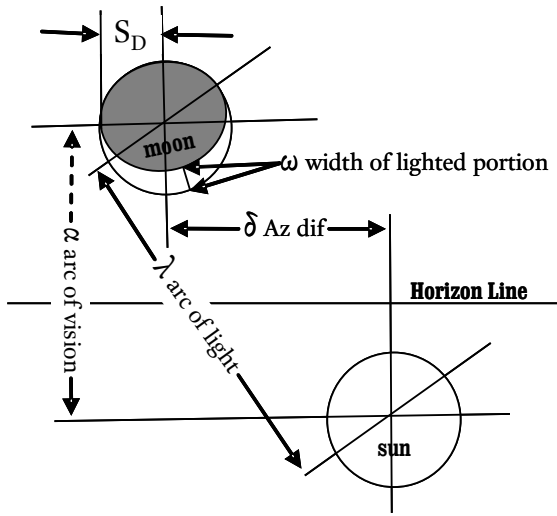
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(laid out in book order)

Azimuth Difference = $\delta = |AZ_s - AZ_m|$ // $0^\circ < \delta < 35^\circ$ ³⁹²
 Arc of Light = $\lambda = \cos^{-1}[\cos \alpha \cos \delta]$ // $3^\circ < \lambda < 35^\circ$
 If $\lambda \leq 22^\circ$, then solve the easier equation // $\lambda^2 = \alpha^2 + \delta^2$ ³⁹³
 Crescent width = $\omega = S_D (1 - \cos \lambda)$ // $0' < \omega < 32'$ ³⁹⁴

Figure 78: Geometry of New Moon



The best test is the Yallop “q” test. Calculate “q” as follows:

$$q = (\alpha - (11.8371 - 6.3226 \omega + 0.7319 \omega^2 - 0.1018 \omega^3))/10$$

- (A) $q > +0.216$ Easily Visible ($\lambda \geq 12^\circ$)
 (B) $+0.216 \geq q > -0.014$ Visible under perfect conditions

vision measures the sum of the height of the moon above the horizon and the depth of the sun below the horizon at the time of the observation.

³⁹² Typical values are between zero and twenty-degrees.

³⁹³ Normally calculations are done using spherical trigonometry. This equation is a plane geometry substitution that works when the portion of the sphere is small enough to approximate a plane. The value to be solved for is λ , the arc of light. This value measures the distance in degrees between the center of the sun and the center of the moon.

³⁹⁴ The crescent width measures the width of the lighted portion of the moon that can be visible from the center of the lighted edge toward the center of the moon. The width of a quarter moon crescent is 15 arc-minutes, and the width of a full moon lighted portion is 30 arc-minutes. Typical values for new crescent visibility tests are when: $0' < \omega < 3'$. Values of 0.2' to 0.7' are typical for very young crescents that may be visible. “The Calendar of Israel” Program uses a more complicated method of measuring crescent width based on Roy Hoffman’s Paper.

- | | |
|------------------------------|--|
| (C) $-0.014 \geq q > -0.160$ | May need optical aid to find moon |
| (D) $-0.160 \geq q > -0.232$ | Will need optical aid to find moon |
| (E) $-0.232 \geq q > -0.293$ | Not visible with a telescope ($\lambda \leq 8.5^\circ$) |
| (F) $-0.293 \geq q$ | Not visible, below Danjon limit ($\lambda \leq 8^\circ$) |

The next best test is the Indian test. The moon is visible if:

$$\alpha > 11.8371 - 6.3226 \omega + 0.7319 \omega^2 - 0.1018 \omega^3$$

You will see that the Yallop test is simply a way of evaluating the results of the Indian test by observing that the equation used in the Yallop test is exactly the same as the Indian test. The use of the width of the crescent was developed by Bruin. Here is his test:

$$\alpha > 12.4023 - 9.4878 \omega + 3.9512 \omega^2 - 0.5632 \omega^3$$

Here is the most primitive test by Maunder expressed in the form of the width of the lighted portion:

$$\alpha > 13.1783 - 9.0812 \omega + 2.0709 \omega^2 - 0.3360 \omega^3$$

Yallop's "q" test is based on fitting the Indian curve to 295 eyewitness observations of the moon such that the test gives a maximum of correct results according to whether the eyewitnesses saw the moon or did not see the moon.

SETTING LOCATION AND TIME

To properly calculate lunar visibility for ancient dates requires astronomical software that allows the user to set the value of ΔT . There is a program in the public domain called "Cartes du Ciel"³⁹⁵ which allows this to be done under menu item "Setup" → "Date/Time" → "More options" → "Use another DT-UT value". This parameter measures the deviation between the earth's longitude and uniformitarian ephemeris time (or dynamical time). There are several known factors that have caused calculated orbital time to deviate from the actual times kept by sunrise and sunset. The first is well known as due to tidal effects. The correction factor for this is derived from historical eclipse records. But these records have to be interpreted, and so there are several equations for ΔT to express various fits of the eclipse data with

³⁹⁵ <http://www.ap-i.net/skychart/en/download>.

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