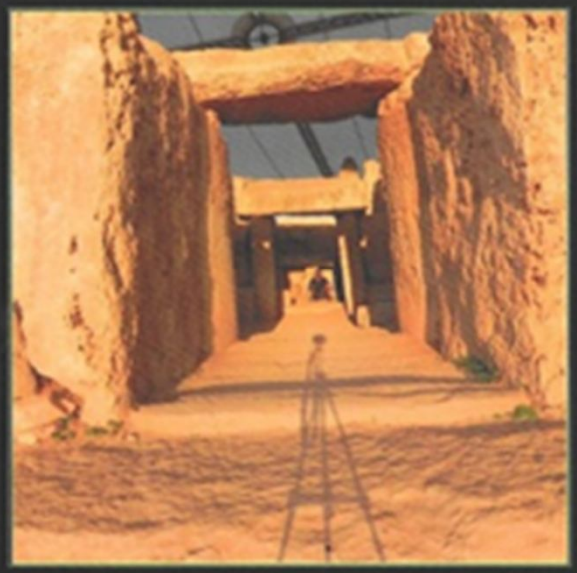
Sky and Purpose in Prehistoric Malta:

SUN, MOON, AND STARS AT THE TEMPLES OF MNAJDRA

by Tore Lomsdalen



[2] SCP SOPHIA CENTRE MASTER MONOGRAPHS

A possible Astronomical Intentionality for the Mnajdra Temple in Malta.

MA Dissertation

Tore Lomsdalen

University of Malta

Astronomical Intentionality

- A crucial question in Archaeoastronomy!
- The challenge is to see the sky through the eyes of an prehistoric person

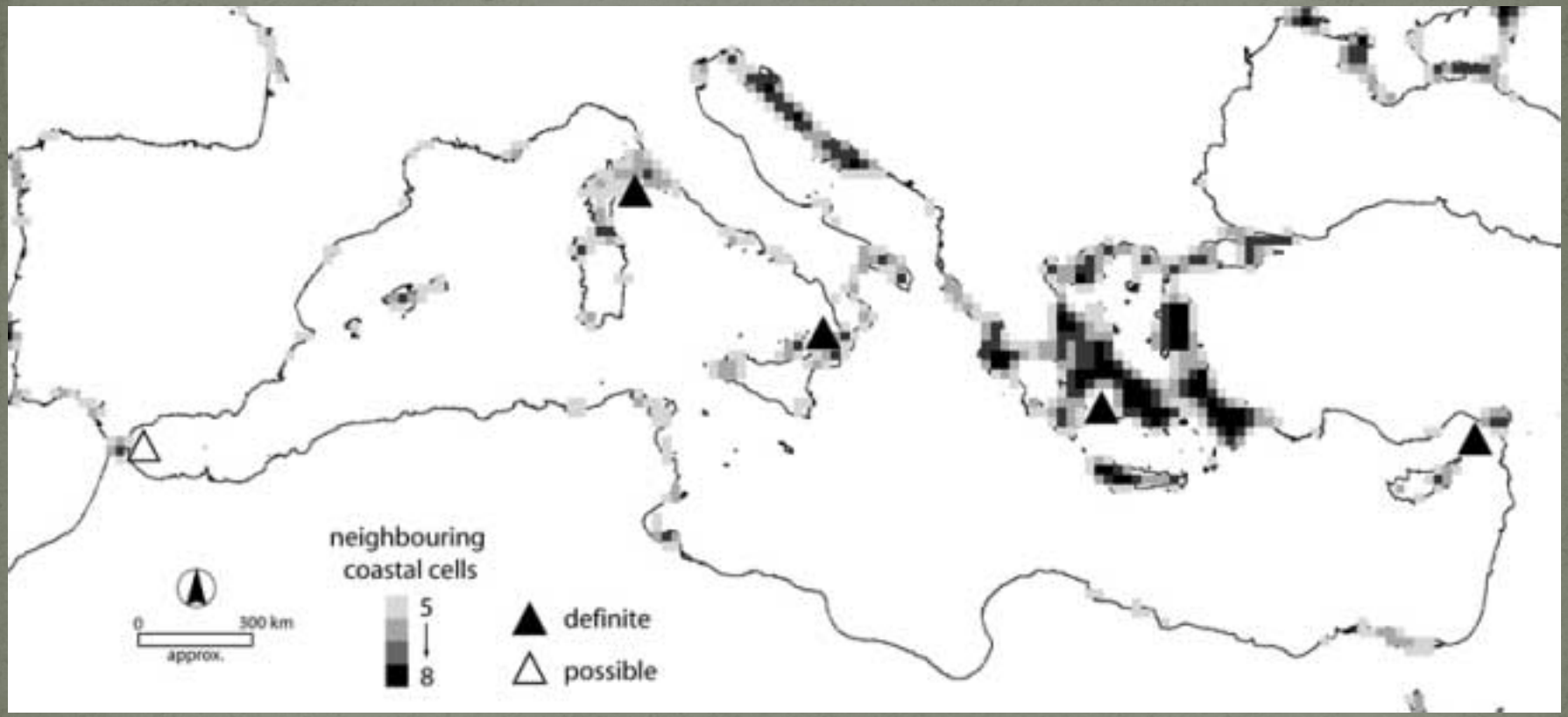
  Kim Malville, University of Colorado

- How do we know that an astronomical relationship was INTENDED by the builders?
- Nick Campion, Paper from Introduction to the Archaeoastronomy Module

Methodology

- Field study
- Naked Eye Astronomy
- Horizon Astronomy
- Conversion tables from lat. to dec.
- GPS
- Compass (Teodolite or Total Station)
- Clinometre
- Measuring tape
- Photographic camera
- Patience, luck and consistence
- Patterning and statistic

Maritime activity during Upper Palaeolithic to the end of Younger Dryas



Broodbank, Cyprian. 2006. The Origin and Early Development of Mediterranean Maritime Activity, Journal of Mediterranean Archaeology, 19.2, 199-230.

MALTA


35N49
14E26
Mag dec. +3°
Valletta
MALTA
Messina
Palermo
Sicily
Mediterranean Sea
Ionian Sea
Tyrrhenian Sea
Adriatic Sea
Aegean Sea
Black Sea
Red Sea
Sardinia
Corsica
Balearic Islands
Crete
Rhodes
ITALY
FRANCE
SPAIN
PORTUGAL
ALGERIA
TUNISIA
LIBYA
EGYPT
MOROCCO
GREECE
TURKEY
ALBANIA
YUGOSLAVIA
HUNGARY
AUSTRIA
ROMANIA
BULGARIA
SOVIET UNION
SYRIA
LEBANON
ISRAEL
JORDAN
SAUDI ARABIA
CYPRUS
Rome
Naples
Bari
Tirane
Skopje
Sofia
Belgrade
Sarajevo
Dubrovnik
Split
Trieste
Zagreb
Milan
Florence
Genoa
Marseille
Barcelona
Madrid
Lisbon
Valencia
Sevilla
Málaga
Gibraltar (U.K.)
Tangier
Rabat
Oujda
Oran
Algiers
Annaba
Bizerte
Tunis
Safaqis
Tripoli
Ouargla
Banghāzi
Alexandria
Cairo
Suez
Athens
Pátrai
Thessaloniki
Istanbul
Ankara
İzmir
Adana
Aleppo
Damascus
Beirut
Amman
Jerusalem
Tel Aviv-Yafo
Nicosia
Constanța
Varna
Bucharest
Ploiești
Odessa
Simferopol'
Kerch'
Budapest
Vienna
Bern
Geneva
Lyon
Bordeaux
Bilbao
Toulouse
Tours
Scale 1:19,450,000
0 200 400 Kilometers
0 200 400 Nautical Miles
Lambert Conformal Conic Projection, standard parallels 27°N and 47°N
Boundary representation is

Chronolegy Temple Period

- 4100-3800 ZEBBUGG
- 3800-3600 MGARR
- 3600-3000 GGANTIJA
- 3300-3000 SAFLIENI
- 3000-2500 TARXIEN

The Maltese stone-built temples can now be recognized as the earliest surviving free-standing stone structures in the world.

Renfrew, Colin, 2007. Prehistory: The Making of the Human Mind, London, Phoenix

Megalithic Sanctuaries

Zammit, Themistocles, 1929. Malta: The Islands and their History, Valletta, The Malta Herald

The temples are Malta's most important antiquities

Trump, David H., 1972. Malta: An Archaeological Guide, London, Faber and Faber

That these were temples, or ritual monuments, is beyond doubt

Tilly, Christopher, 2004. The Materiality of Stone: Explorations in Landscape Phenomenology:1, Oxford, Berg.

Celestial Orientation

- Vance (1842: 232) the first to associate the temples with a celestial relationship, to the worship of the heavenly bodies and for paying homage to the sun, moon and the stars
- Zammit (1929b: p. 13), slab at the entrance to the Tarxien Temple represented the image of the constellation of the Southern Cross.
- Ugolini (1934: 128) the Tal-Qadi Stone apparently indicates a crescent half-moon and stars, as a possible Neolithic 'la lastra astrologica'.

Caroline Malone

- The megalithic temples of prehistoric Malta present some of the most sophisticated, designed architeutural ritual spaces furnished with symbolic iconography and material culture in early Western Europe.

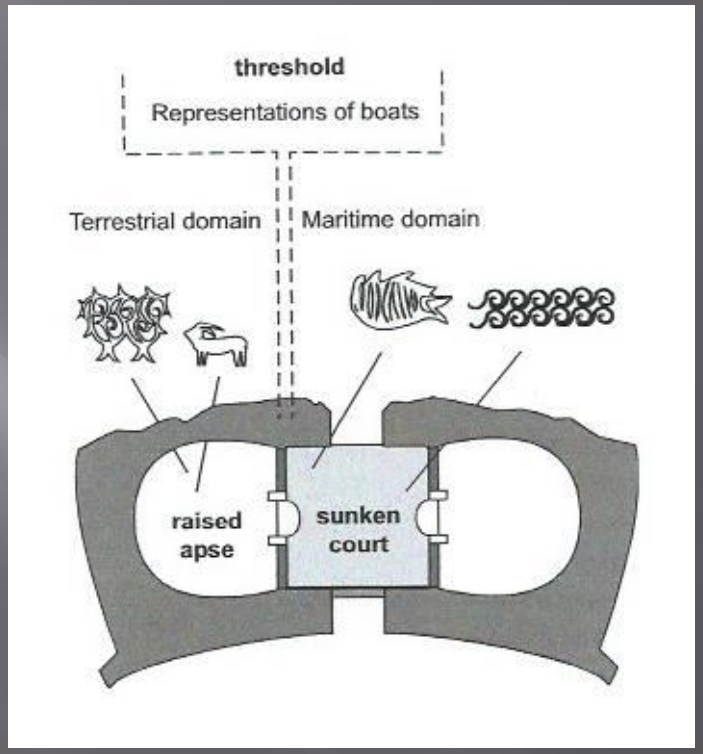
- They offer a hint of highly structured cermonial ritual practice and cosmology which perhaps reflected an equally complex social structure.

- The solar alignment would have been aexceptional spectacle, with light slowly entering the temple by illuminating the central corridor in stages, finally reaching the far apse

- Malone, Caroline. "Ritual, Space and Struture - the Context of Cult in Malta and Gozo." In Cult in Context: Reconsidering Ritual in Archaeology, edited by David A. Barrowclough and Malone Caroline. Oxford: Oxbow Books, 2007.

Spatially ordered cosmological references

The relationship prompts the suggestion that the cosmological domains that are being represented here are land and sea, perhaps the two most inevitable components of an islander's cosmology

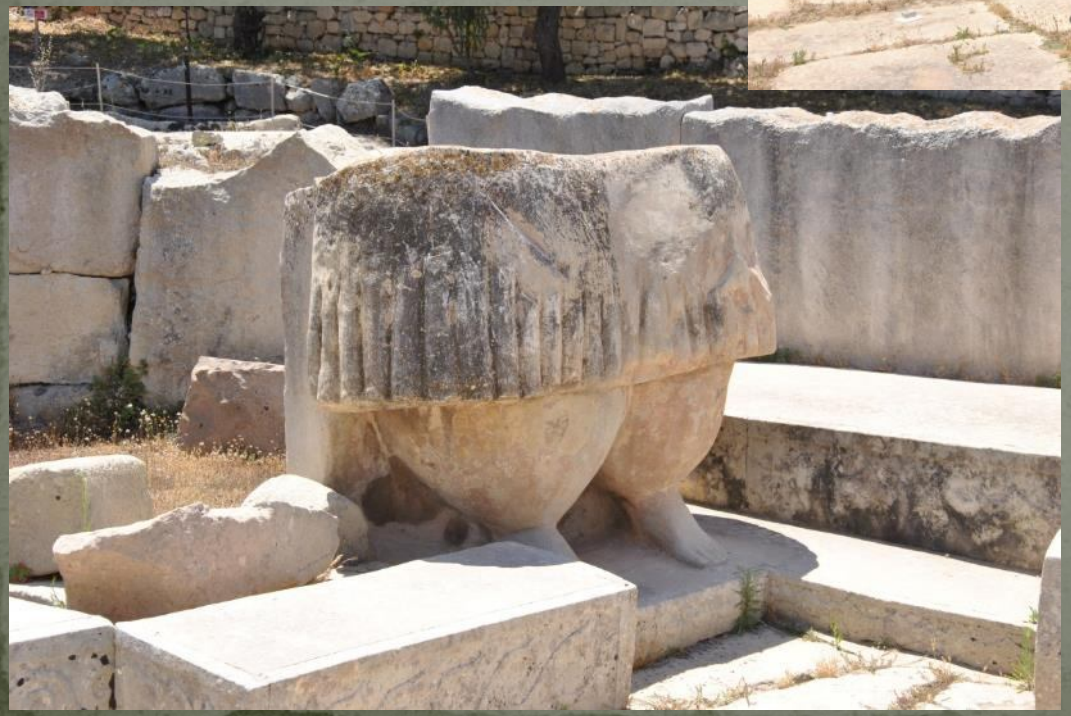


Grima, Reuben. 2001. An Iconography of Insularity: A Cosmological Interpretation of some Images and Spaces in the Late Neolithic Temples of Malta., Institute of Archeology, vol 12, 48-65.

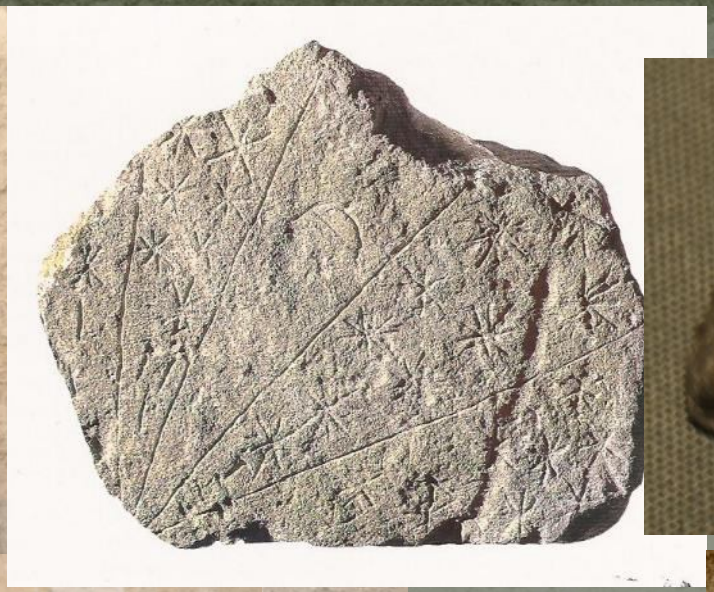










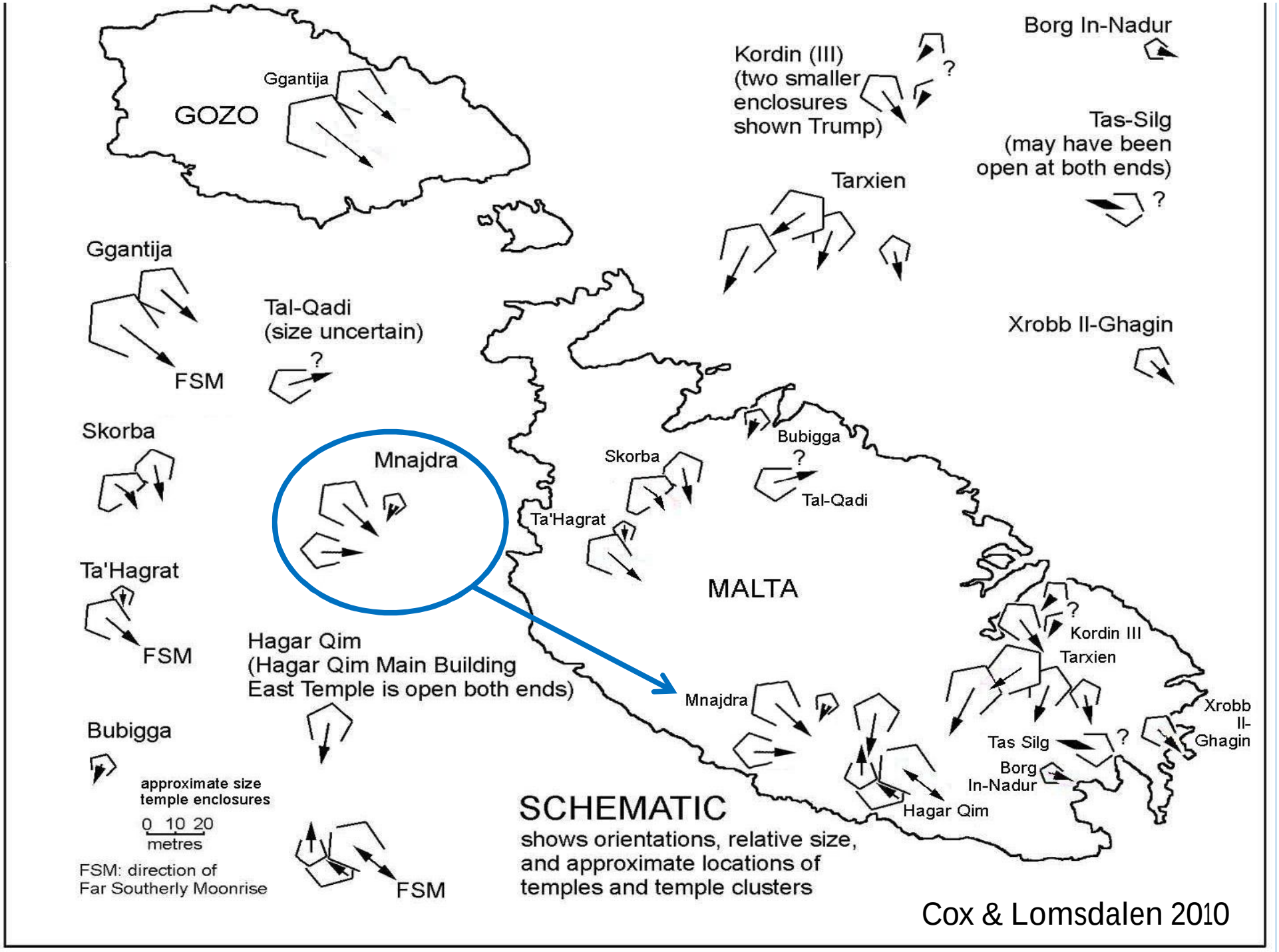











GOZO
Ggantija
Ggantija
FSM
Tal-Qadi
(size uncertain)
?
Skorba
Mnajdra
Ta'Hagrat
FSM
Hagar Qim
(Hagar Qim Main Building
East Temple is open both ends)
Bubigga
approximate size
temple enclosures
0 10 20
metres
FSM: direction of
Far Southerly Moonrise
FSM
Kordin (III)
(two smaller
enclosures
shown Trump)
?
Borg In-Nadur
Tas-Silg
(may have been
open at both ends)
?
Tarxien
Xrobb Il-Ghagin
Skorba
Bubigga
?
Tal-Qadi
Ta'Hagrat
MALTA
?
Kordin III
Tarxien
Mnajdra
Xrobb
Il-
Ghagin
Tas Silg
?
Borg
In-Nadur
Hagar Qim
SCHEMATIC
shows orientations, relative size,
and approximate locations of
temples and temple clusters
Cox & Lomsdalen 2010

Azimuth orientation

Chi square test shows, assuming that the temple builders had any other preference, the probability that this distribution occurs by chance, is less than 1 in a 1000.

That implies that some factor has influenced the choice of orientation of the temples.

14 axes are clearly non-random and measures just 78.5°, which is much less than a quadrant of a circle.

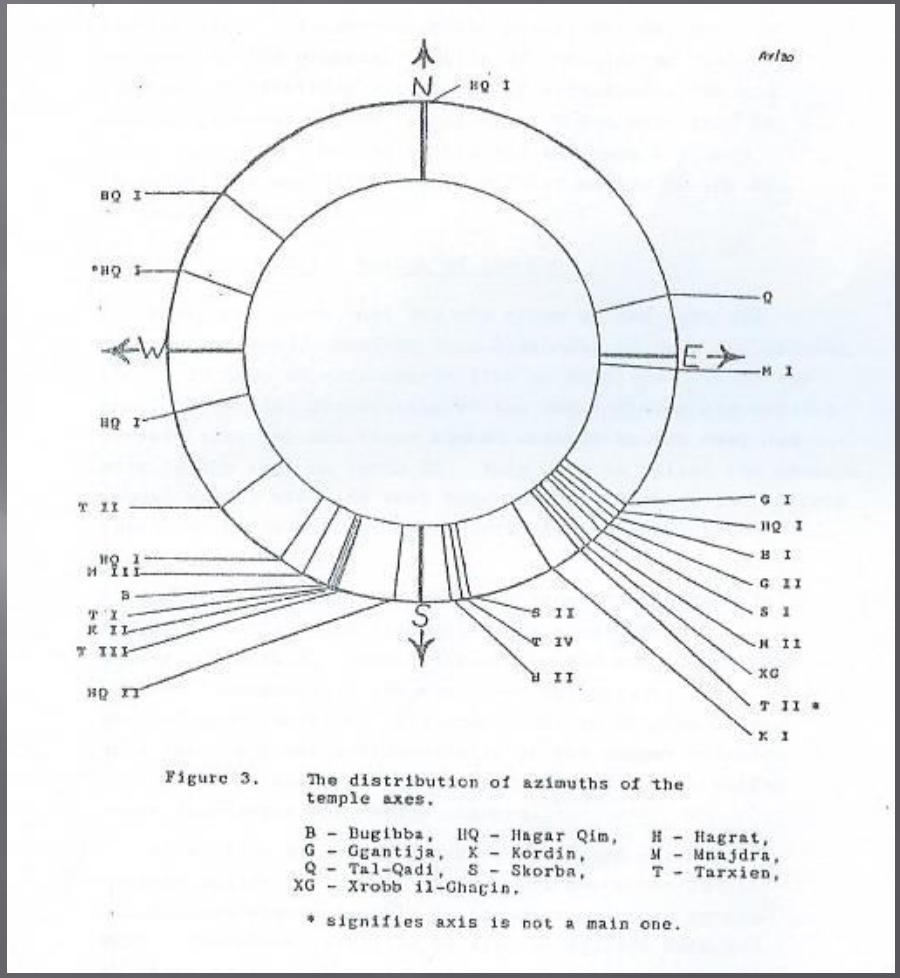


Figure 3. The distribution of azimuths of the temple axes.

B - Bugibba, HQ - Hagar Qim, H - Hagrat,
G - Ggantija, K - Kordin, M - Mnajdra,
Q - Tal-Qadi, S - Skorba, T - Tarxien,
XG - Xrobb il-Ghagin.

* signifies axis is not a main one.

Agius, George & Ventura, Frank. 1981. Investigation into the Possible Astronomical Alignments of the Copper Age Temples in Malta, Archaeoastronomy, Vol. IV, No. 1, 10-21.

Pleiades

The heliacal rising of Pleiades has ben used by peoples all over the world to mark the passage of time and season of the year.



Dicks, D. R., 1970. Early Greek Astronomy t o Aristotle, Ithaca, NY, Cornell University Press, p. 36.



Photo: John Cox

Mnajdra



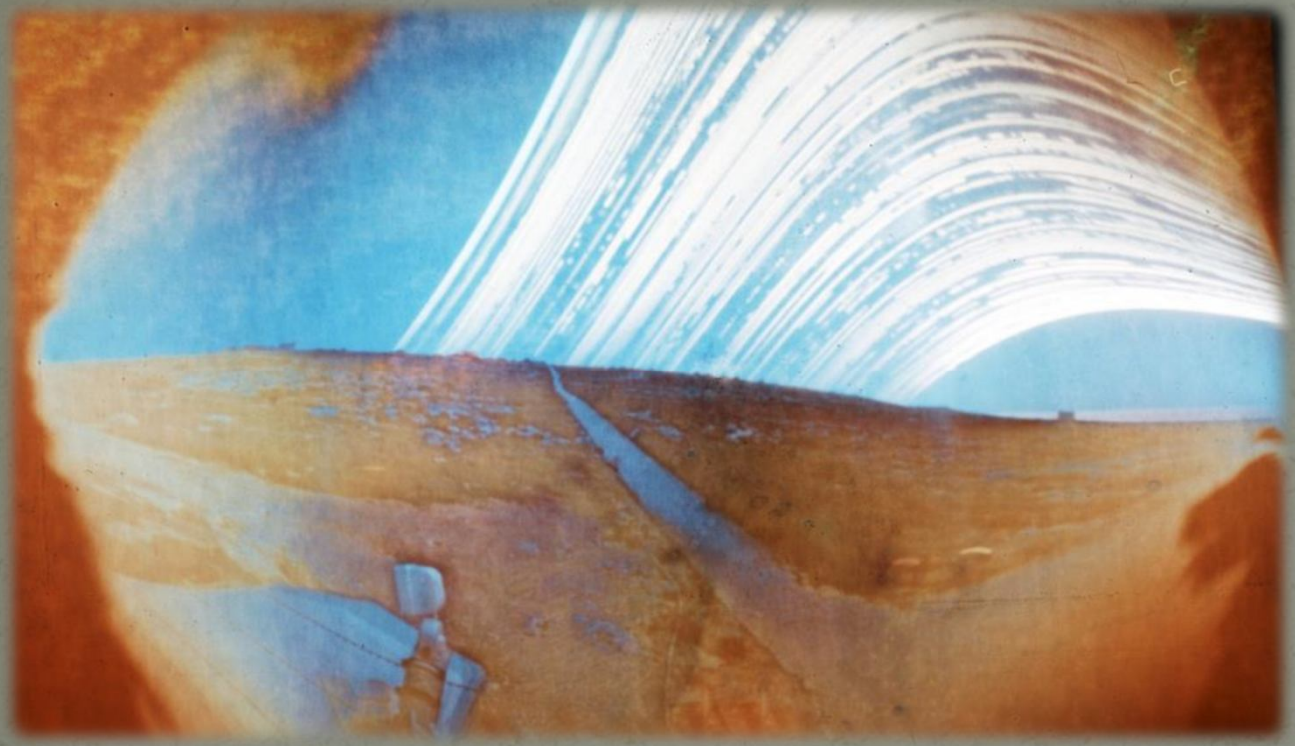
Photo: Daniel Cilila

Mnajdra Facade



Photo: TL

Solargraphy of Mnajdra Eastern Horizon



December 22, 2010

until

June 22, 2011

Project: Tarja Trygg

Solargraphy assistant:
T. Lomsdalen

Horizon Astronomy



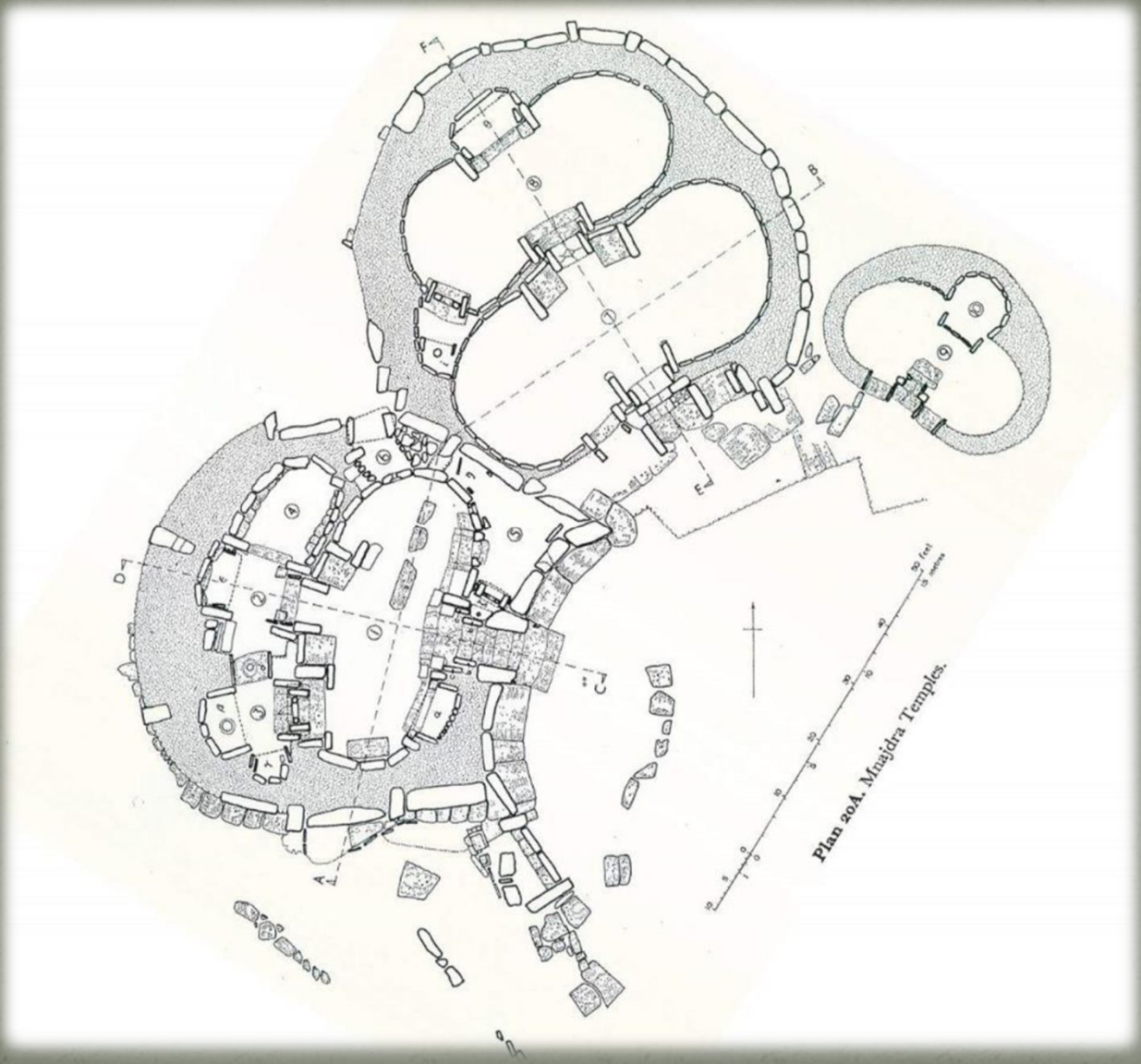
Summer Solstice

Equinox

Winter Solstice

Photo: TL


Seen from horizon
point of 90° East



Mnajdra

Eastern orientation

Evans, J. D., 1971. The Prehistoric Antiquities of the Maltese Islands: A Survey, London, The Athlone Press University of London.


210°
93°
140°
But is this the whole story of orientations?
Photo: Daniel Cilil

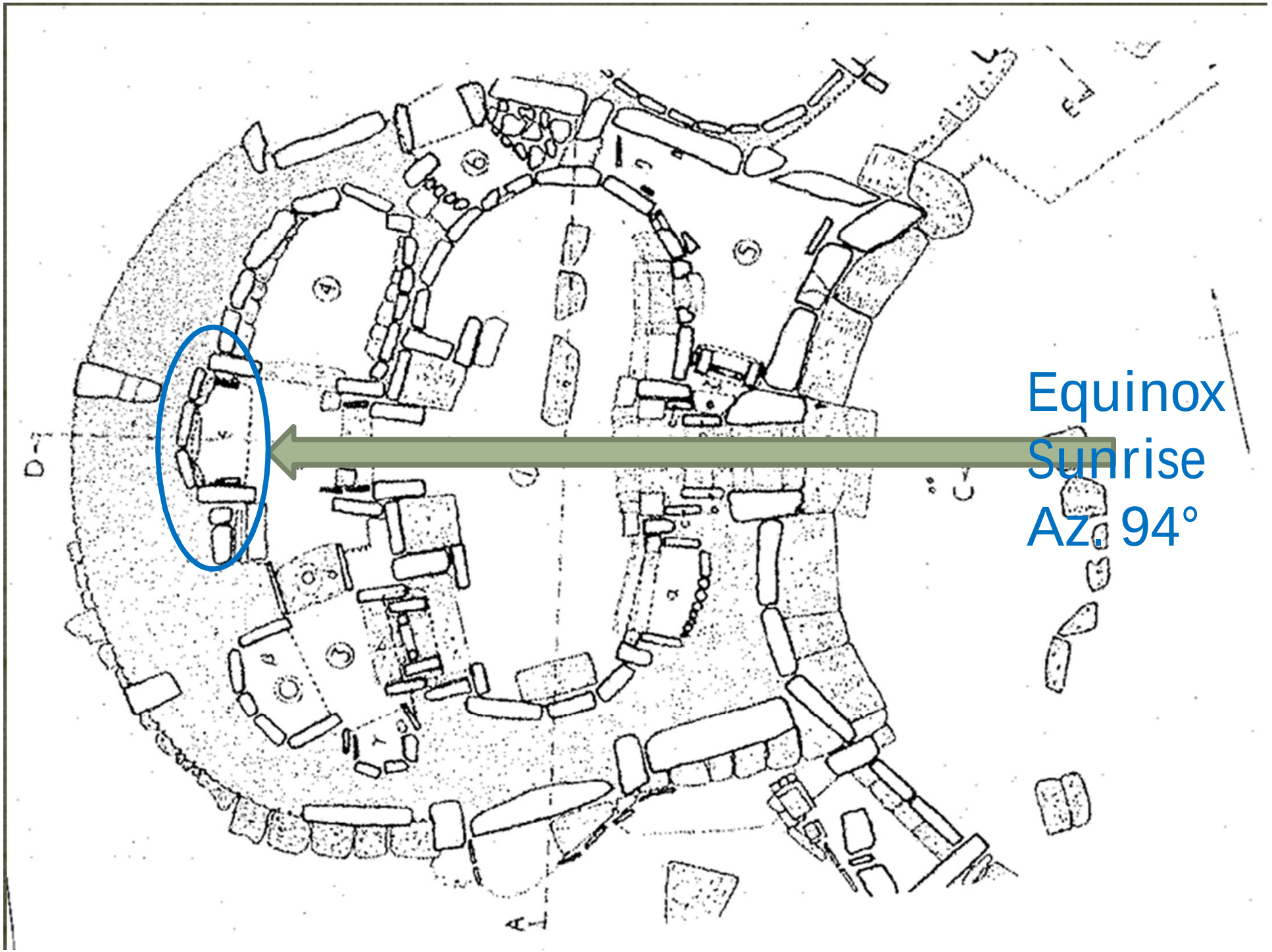

Equinox
Sunrise
Az. 94°


Photo: TL



Equinox
230311 at 05:26 -
,Sunrise 05:08 UT

Sunrise seen
from

the back altar

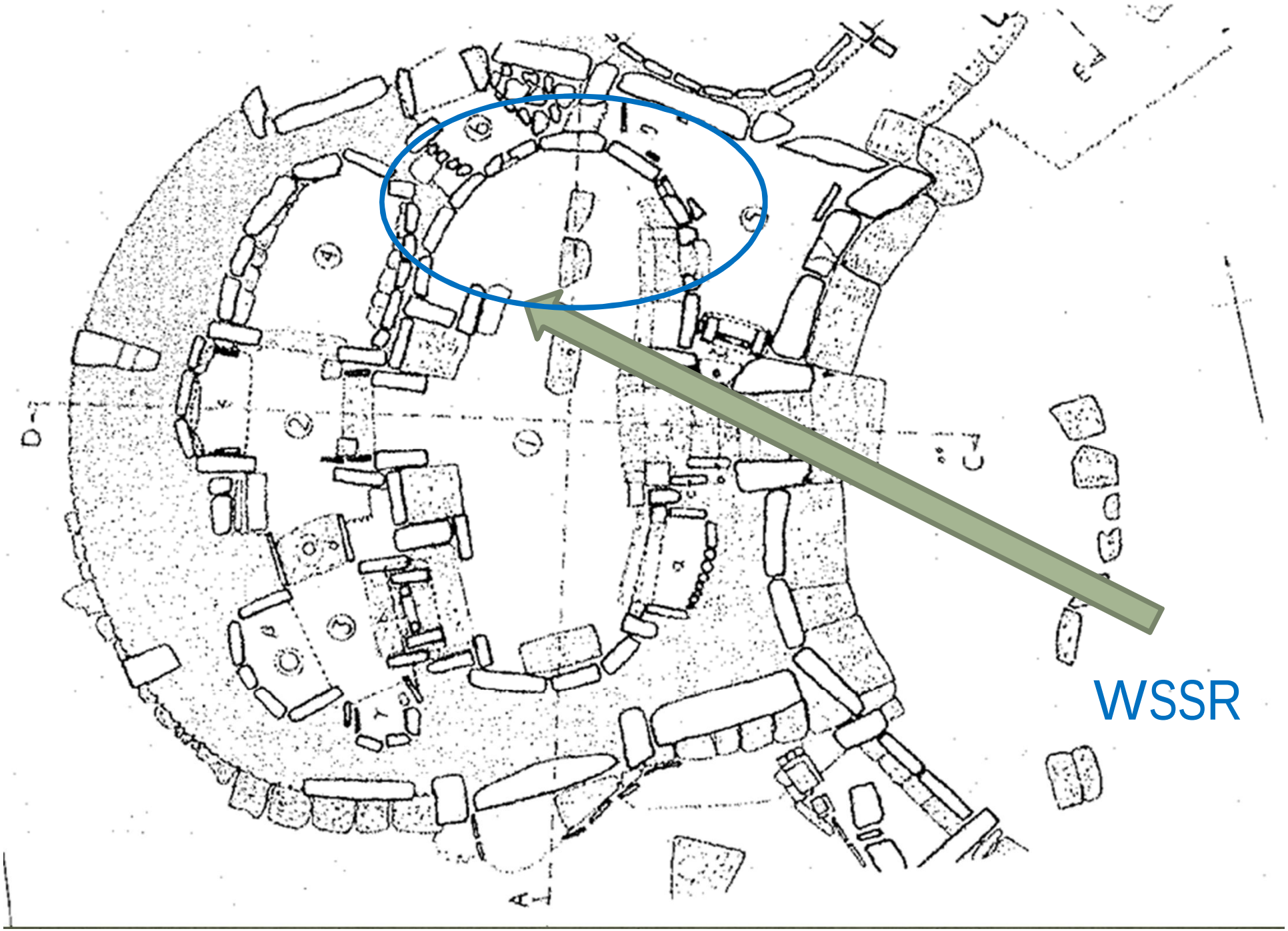


Photo: TL

Equinox
190310 at 05:34 UT

Sunrise
illumination

of back alter


WSSR


SSSR
WSSR
WSSR



WSSR

20DEC10,
06:15UT

Illumination of orthostat



Photo: T.L.

WSSR

28DEC2010 ,
06:18UT

Az: 119°

Dec. -23.17

Sunrise : 06:11UT

Source: Naval Oceanographic Portal



Moon rise on post hole

26 June 2010,

18:38 UT

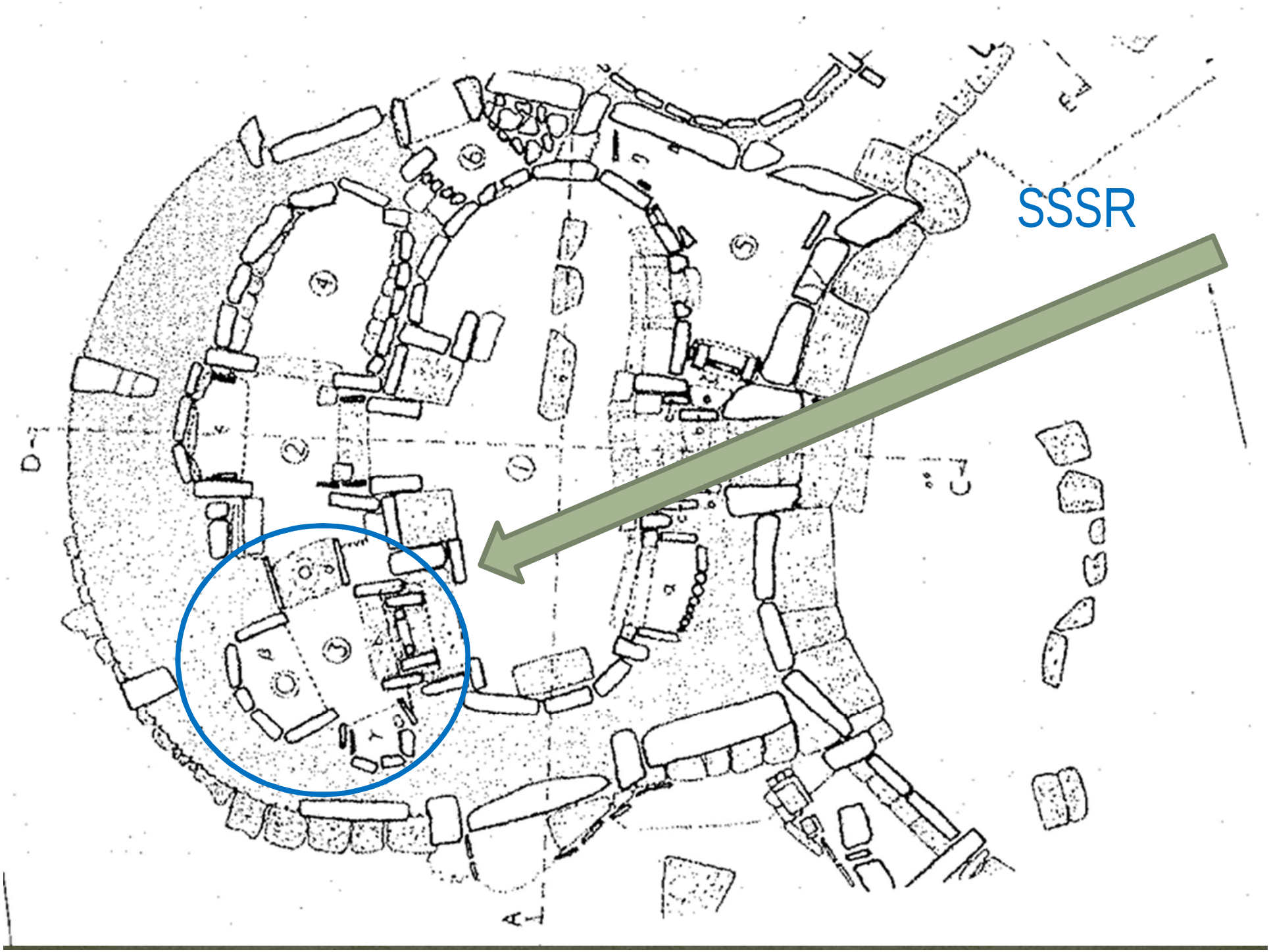
Az. 120°

Dec. -24.05

Source: Naval Oceanographic Portal

Sunrise dec. 3.000 BC: - 24.0

Source: F. Ventura


SSSR

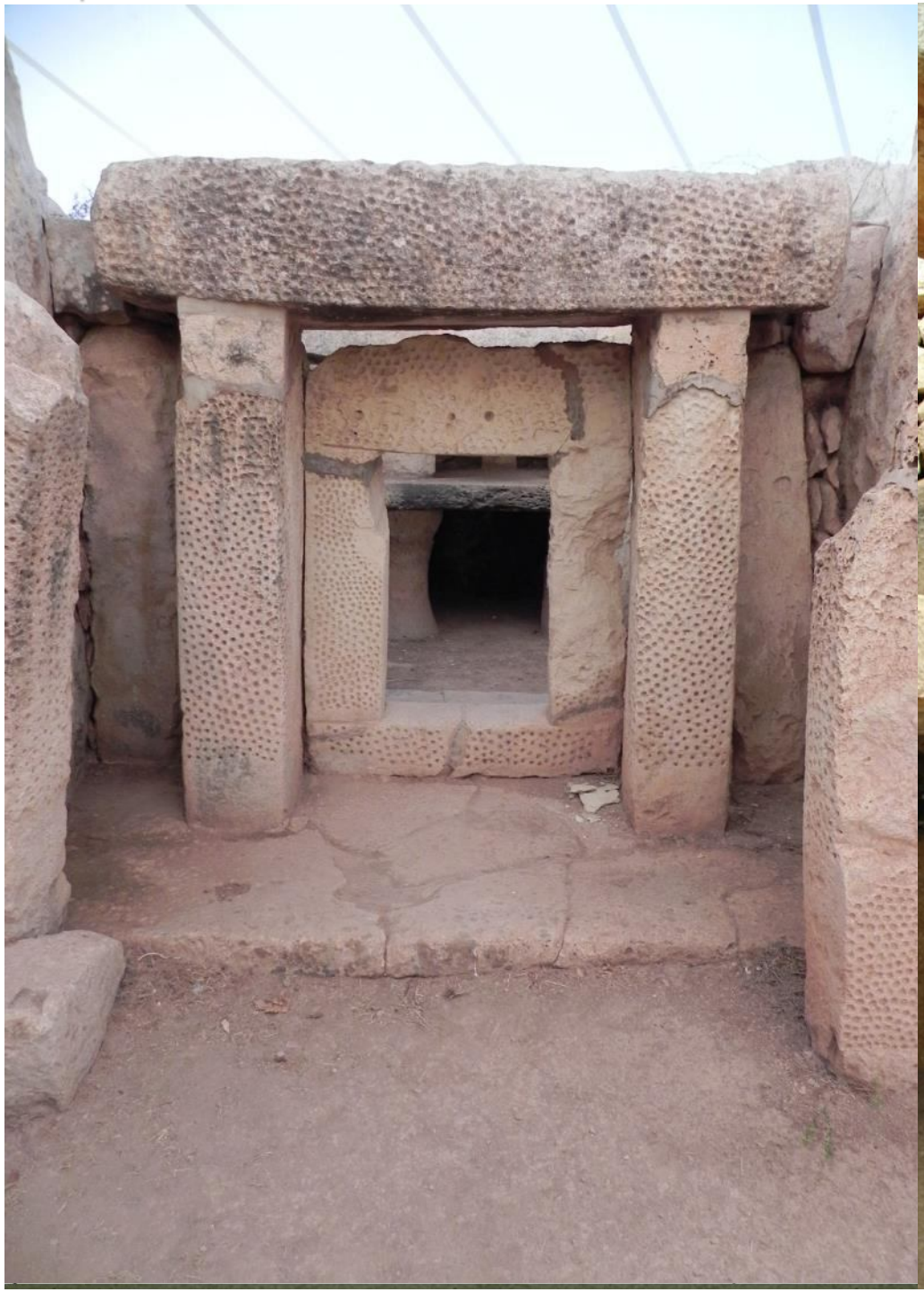






Photo: TL

SSSR
220711 at 04:25 –
Sunrise 03:46 UT

Cross-jamb

illumination of left

hand orthostat



SSRS
240711, 04:23 UT

Camera placement

for cross-jamb

photos of sunrise

Photo: Fabio Silva



Photo: T.L.

SSRS
240711, 04:23 UT

Cross-jamb

view of

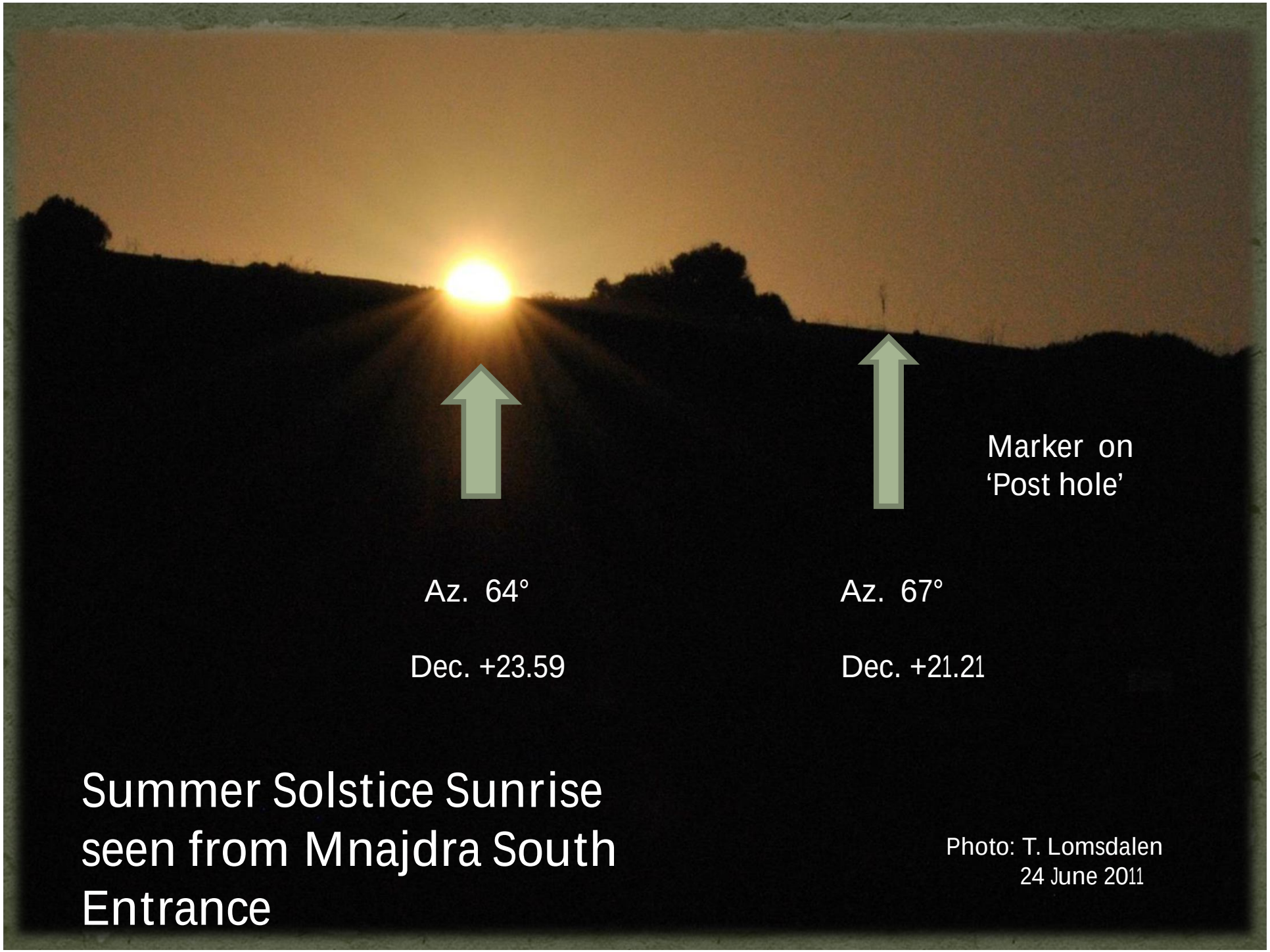
sunrise from left

hand orthostat



Photo: TL

Rediscovering the SSSR posthole, June 2011

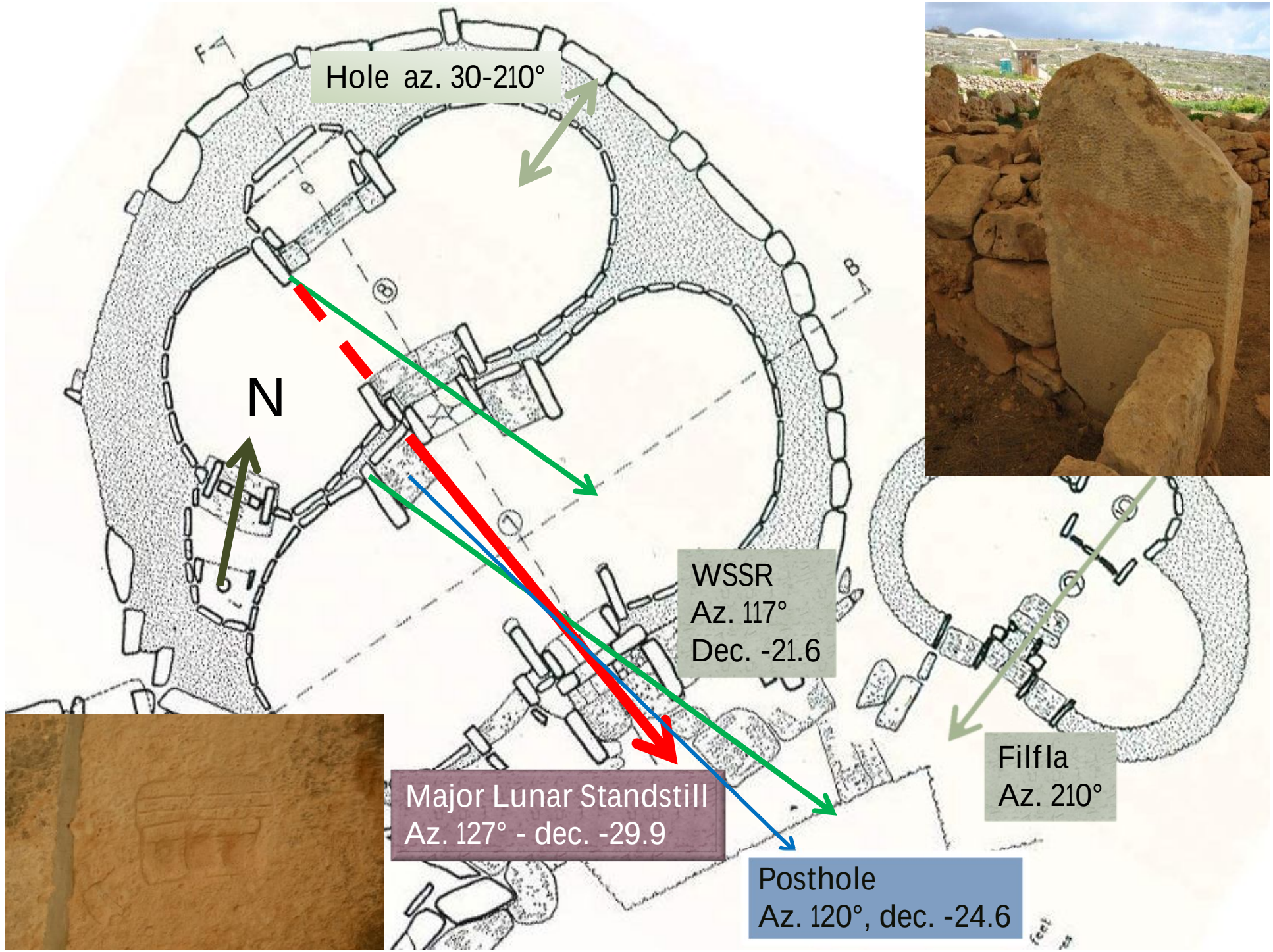


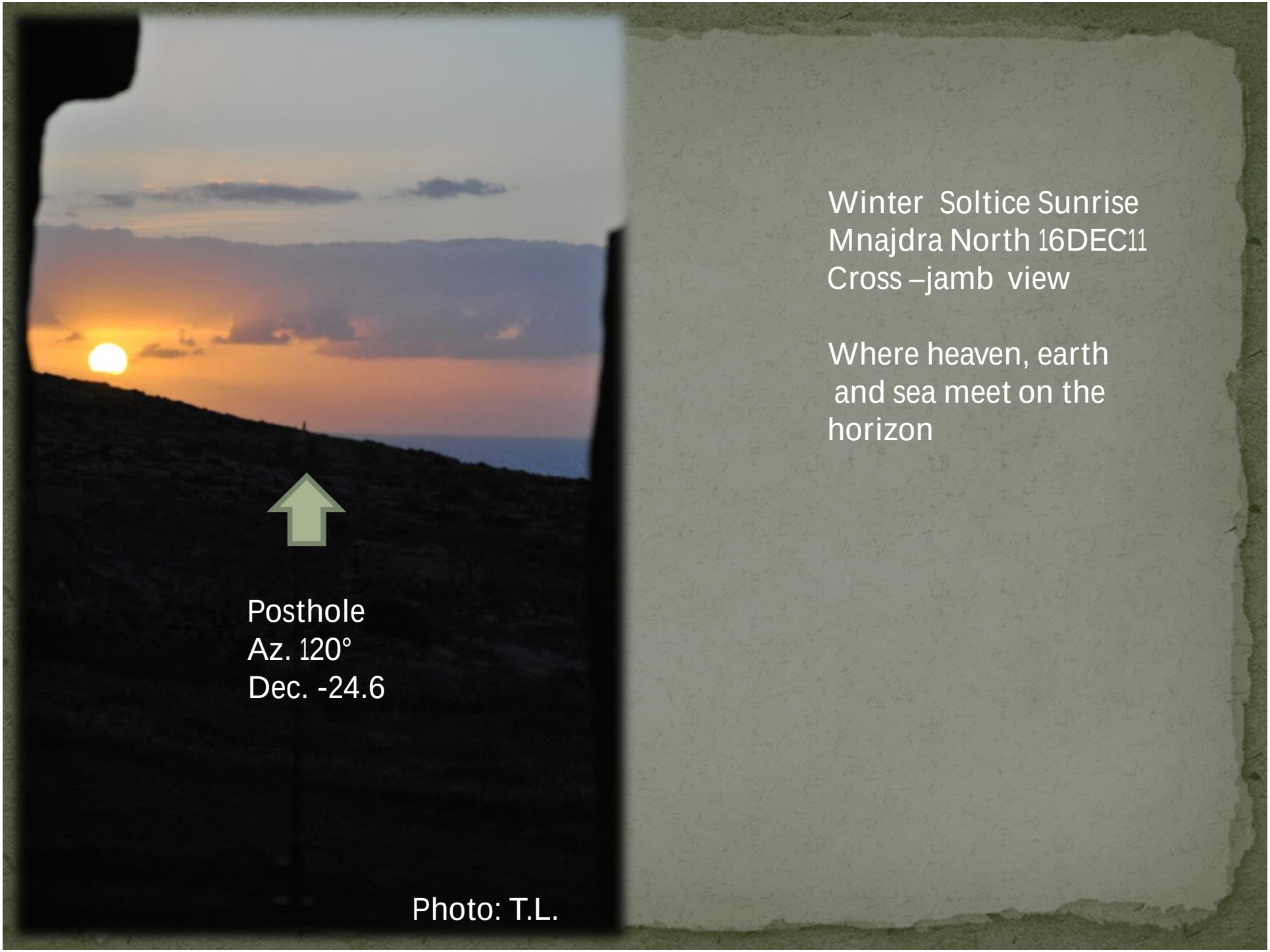
Summer Solstice Sunrise seen from Mnajdra South Entrance

Photo: T. Lomsdalen
24 June 2011



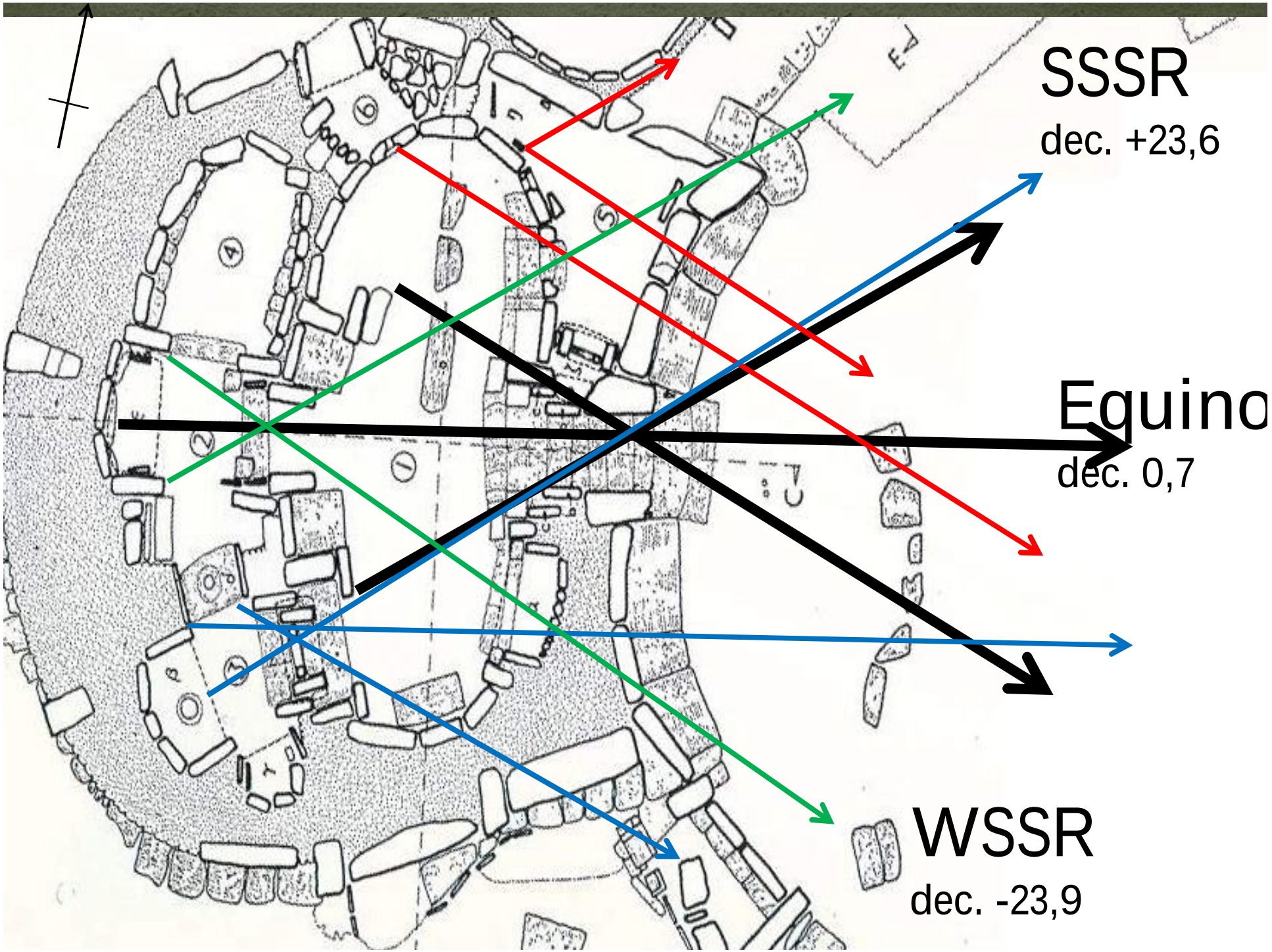



Hole az. 30-210°
N
WSSR
Az. 117°
Dec. -21.6
Filfla
Az. 210°
Major Lunar Standstill
Az. 127° - dec. -29.9
Posthole
Az. 120°, dec. -24.6



Winter Soltice Sunrise
Mnajdra North 16DEC11
Cross –jamb view

Where heaven, earth
and sea meet on the
horizon

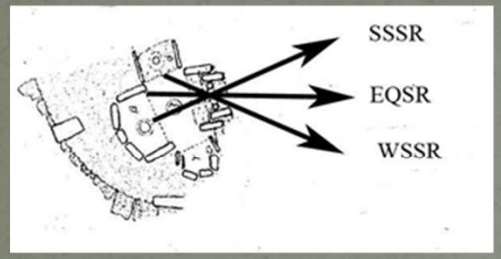

SSSR
dec. +23,6
Equino
dec. 0,7
WSSR
dec. -23,9

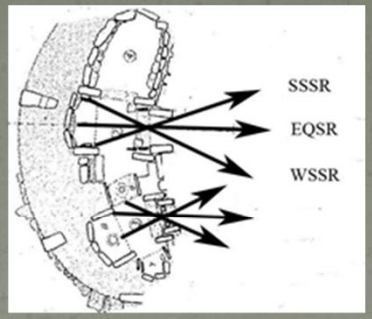
Reuben Grima

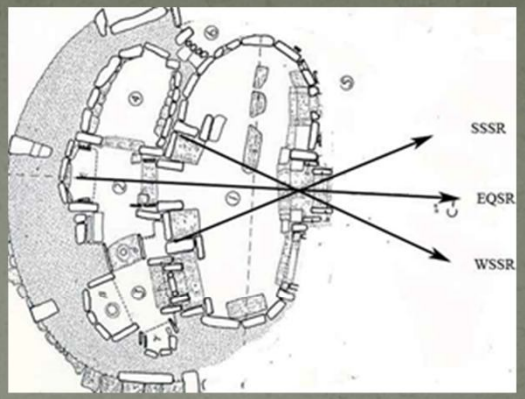
- The precise dating of Mnajdra is not free of difficulty as chronology is based on limited stratigraphic evidence and more on typology;

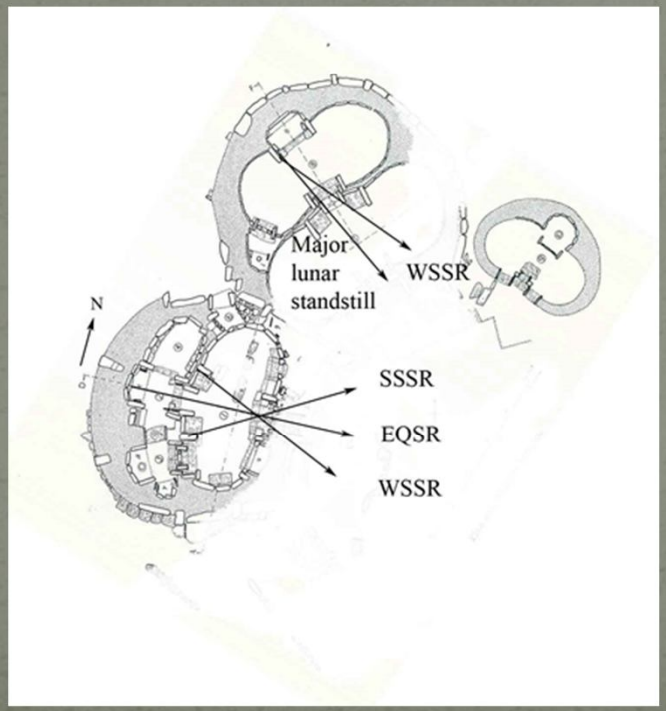
  'we are on shaky gound'.

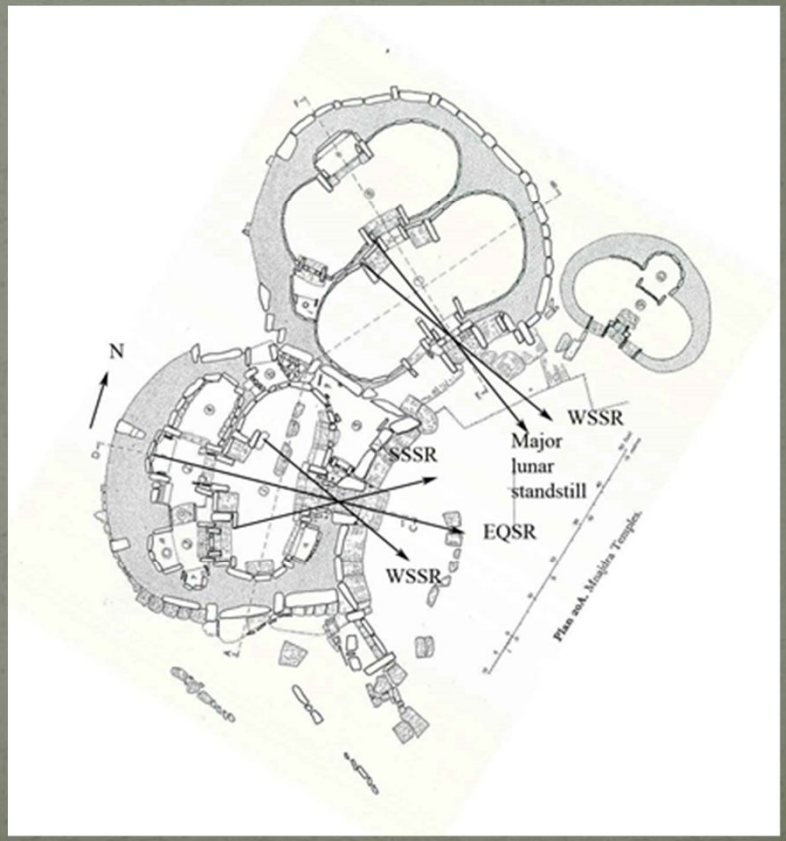
- Lomsdalen, Tore, 2014a. Sky and Purpose in Prehistoric Malta; Sun, Moon and the Stars of the Temples of Mnajdra, Ceredigion, Wales, UK, Sophia Centre Press.,Appendix II, pp. 186-207


SSSR
EQSR
WSSR

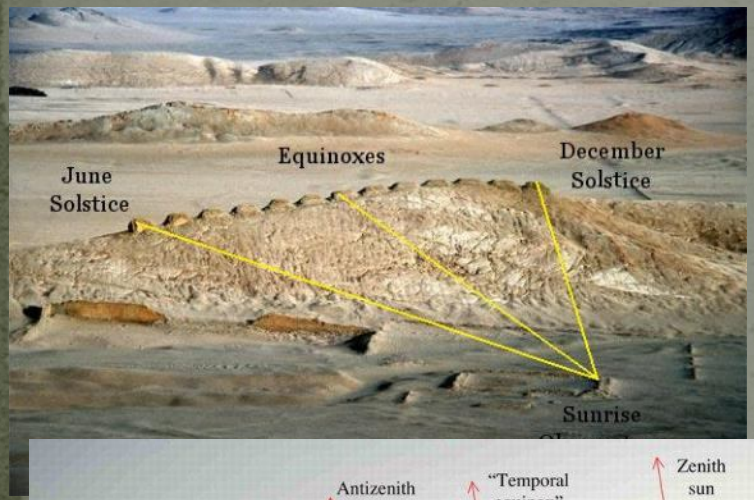

SSSR
EQSR
WSSR

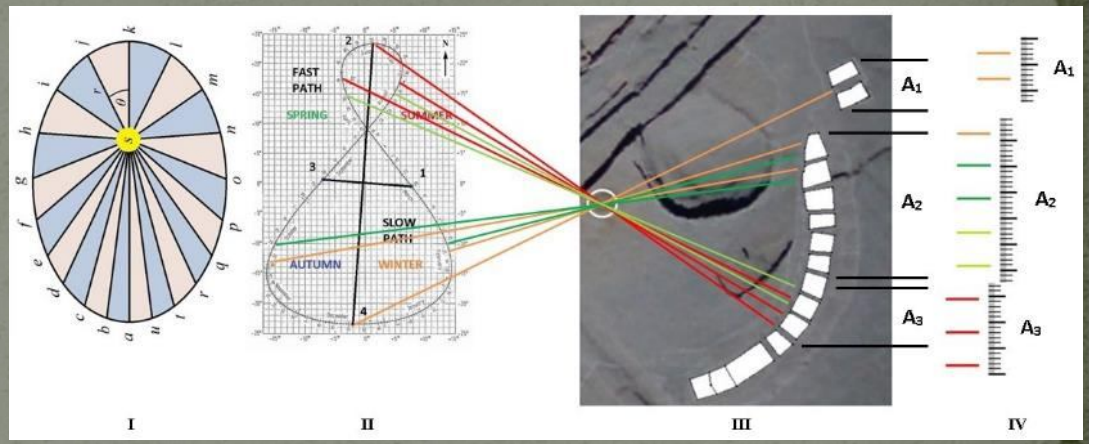

SSSR
EQSR
WSSR

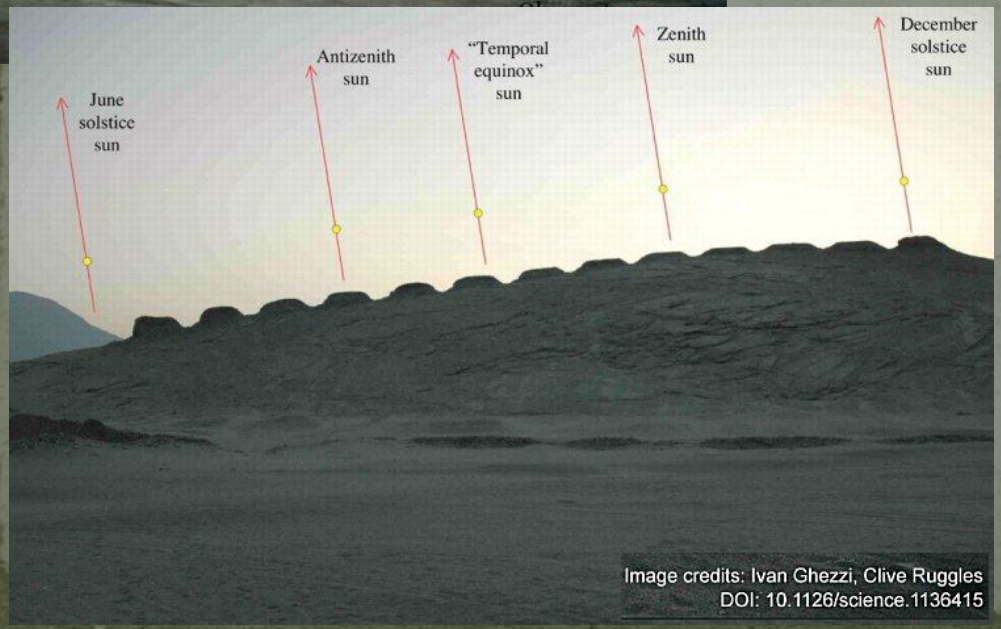

Major
lunar
standstill
WSSR
N
SSSR
EQSR
WSSR


N
WSSR
Major
lunar
standstill
SSSR
EQSR
WSSR

Chankillo & Taosi solar observatories









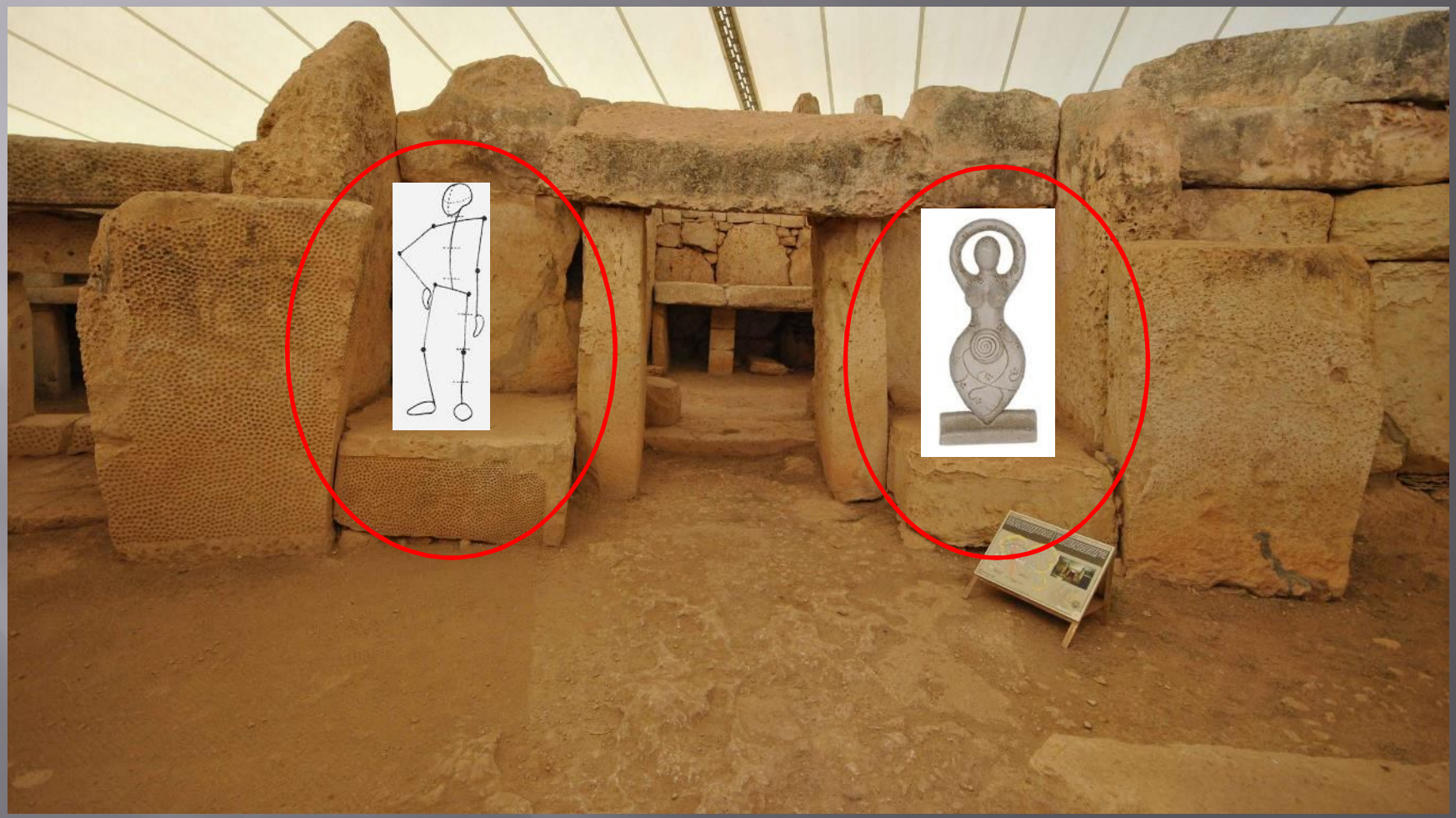
A Calendar in Stone?

- It can be argued that Mnajdra South Temple is the oldest extant temple in the world qualified as a device that seems to cover the path of the rising sun throughout the year.

- Was it intentionally built as a solar calendar for keeping track of time and framing the seasons?

- Lomsdalen, Tore. 2012. Astronomy and Intentionality at the Neolithic Temple of Mnajdra in Malta. Master MA Dissertation, work in prossess, University of Wales Trinity Saint David.

A chiefdom society



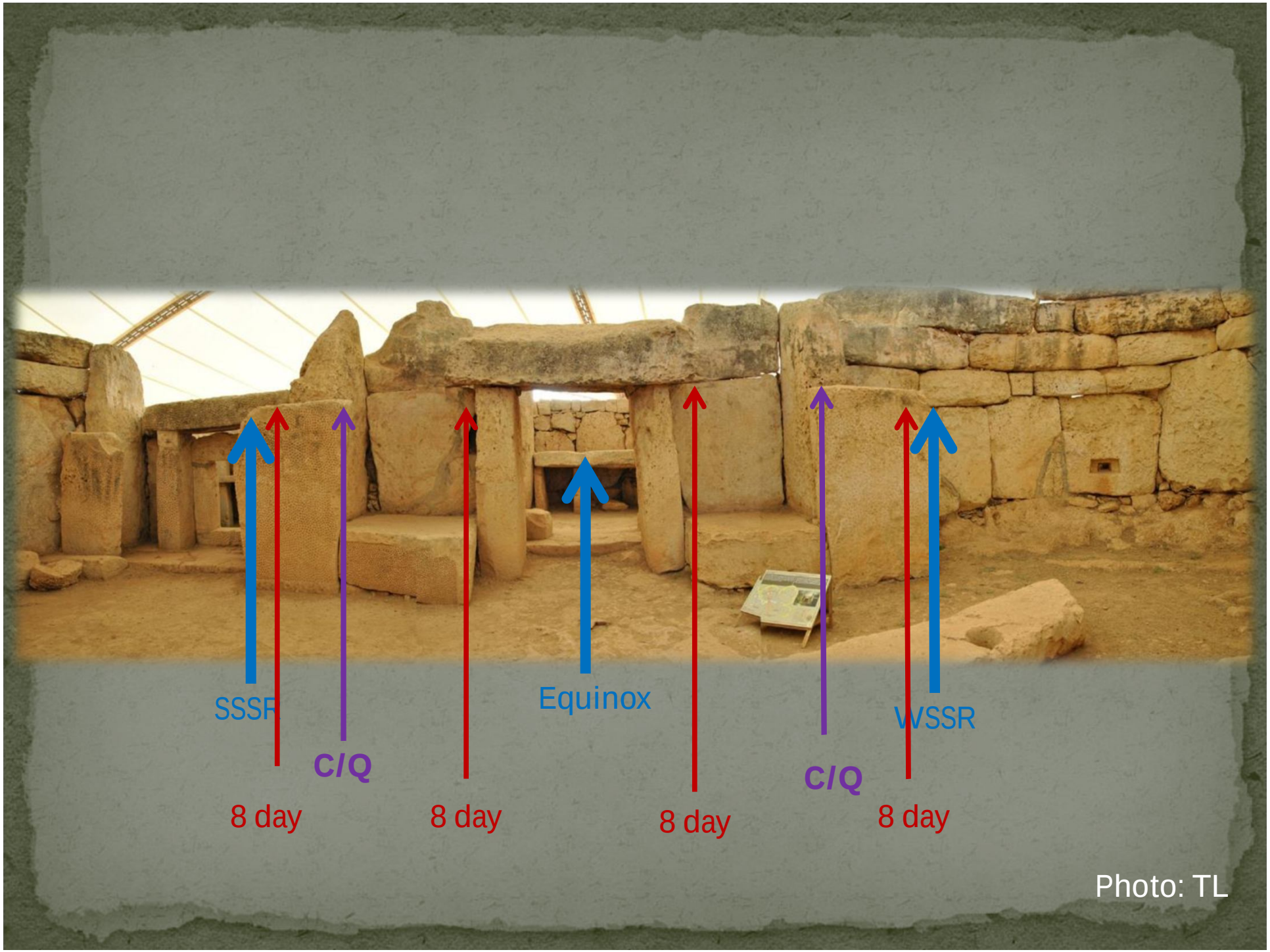

SSSR
C/Q
8 day
8 day
Equinox
8 day
C/Q
WSSR
8 day
Photo: TL



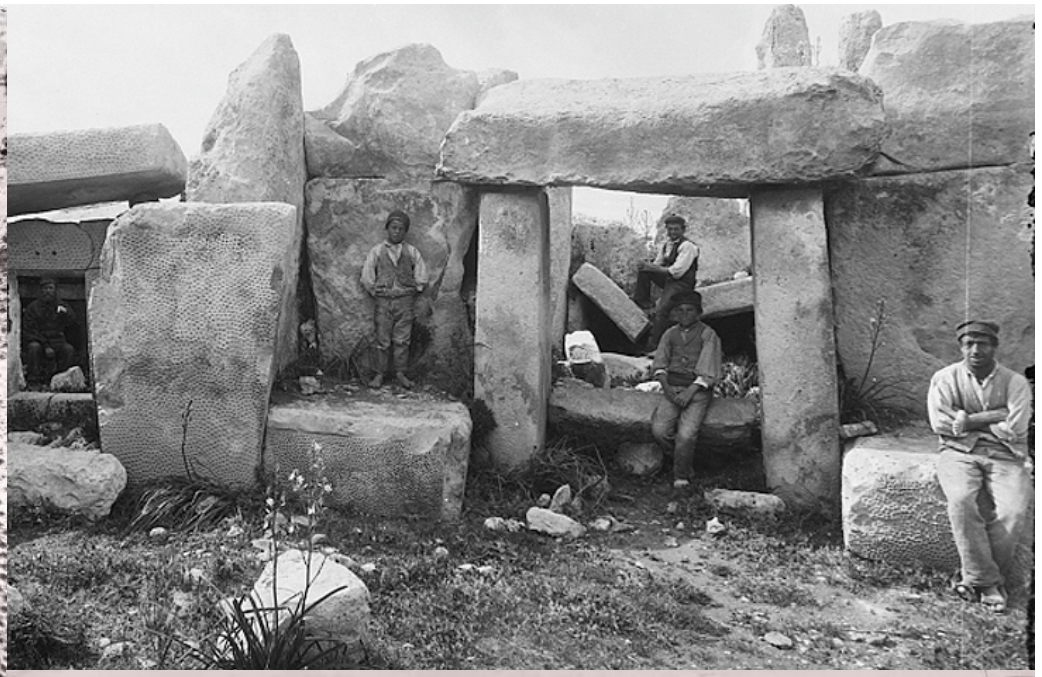
Photo: D. Cilia

Intentionality

Was there a deliberate purpose behind the construction?

To what extent is the original architecture intact ?









- Astronomical pehenomena
- Cosmological perception and actions
- Ingress to yearly seasons
- Solar calendar, a device to keep track of time
- Celestial pantheon
- Sacred place of sun worship
- Obeisance to the power of cosmos
- Manifestation of power
- Elite priesthood or chiefdom society
- Sacrifices, offerings and cult cermonies
- Oracle rituals
- Religious festivals
- A multi purpose megalithic compound

1000 years in 2 minutes

On YouTube

https://www.youtube.com/watch?v=RI3azd8e0dE

Abela, Franscesco, 1647. Malta Illustrata: Della Descrittione di Malta, Malta, Paolo Bonacota, Facsimile Edition 1984 by Midsea Books Ltd.
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John Cox, Tore Lomsdalen. 2010. Prehistoric Cosmology: Observations of Moonrise and Sunrise from Ancient Temples in Malta and Gozo Journal of Cosmology, Vol. 9.
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Zammit, Themistocles, 1929. Malta: The Islands and their History, Valletta, The Malta Herald