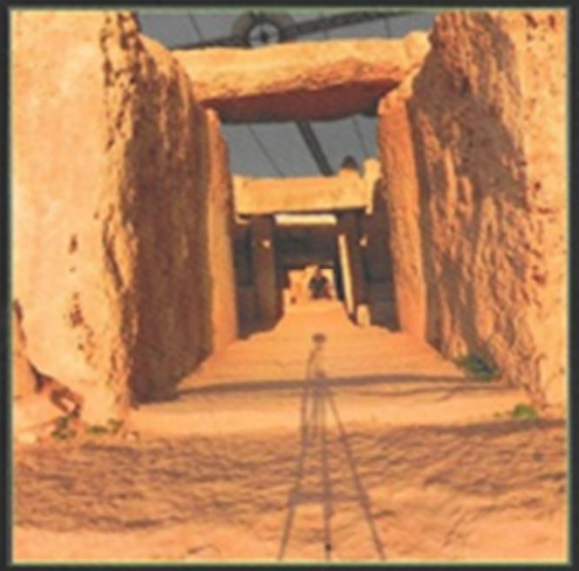
Sky and Purpose in Prehistoric Malta:

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 Wales Trinity Saint David

The Sophia Center for the Study of Culture in Cosmology

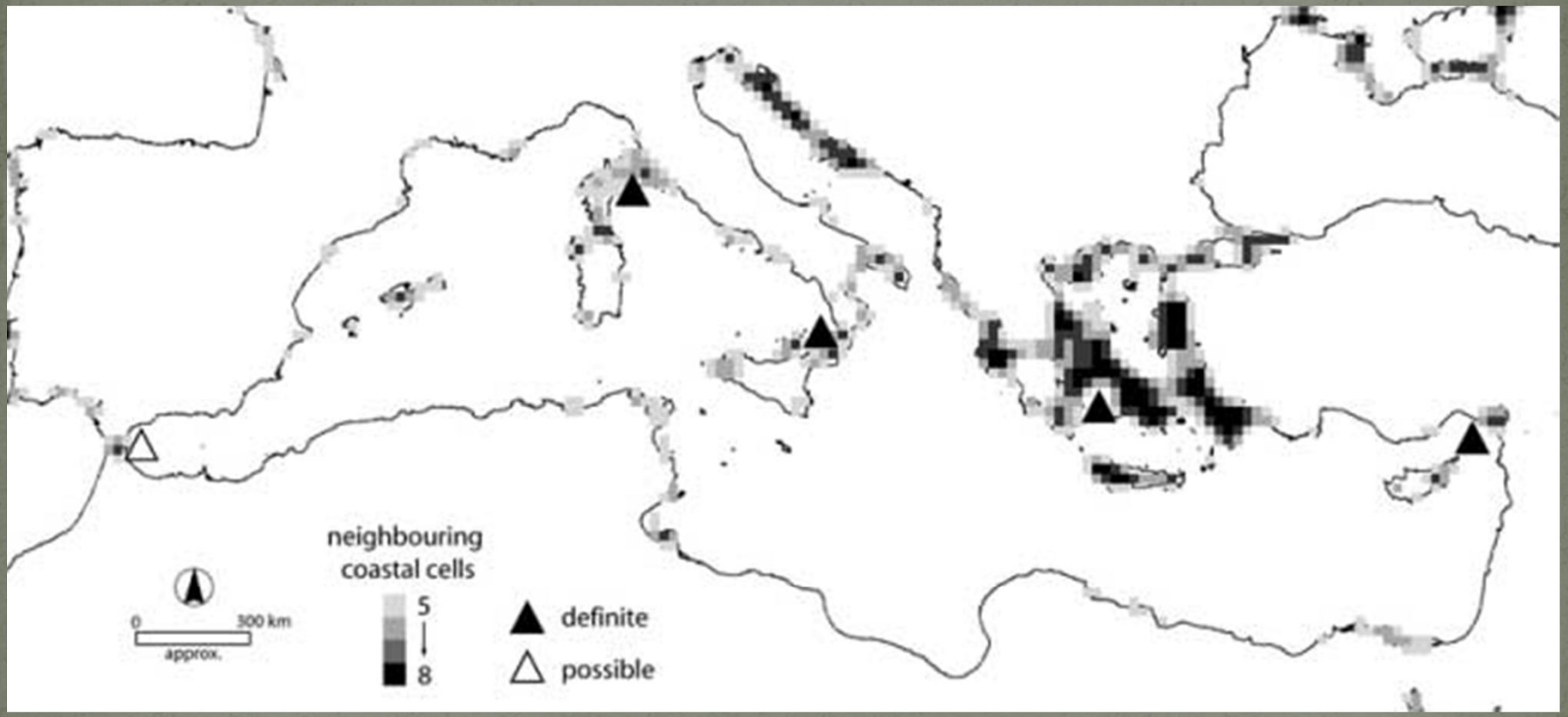
Astronomical Intentionality

- A crucial question in Archaeoastronomy!
- 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
- Clinometre
- Measuring tape
- Photographic camera
- Patience, luck and consistence

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. +2°
Valletta
MALTA
Mediterranean Sea
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
North Atlantic Ocean
FRANCE
SPAIN
PORTUGAL
ITALY
SWITZ.
AUSTRIA
HUNGARY
ROMANIA
YUGOSLAVIA
BULGARIA
ALBANIA
GREECE
TURKEY
SOVIET UNION
Black Sea
Adriatic Sea
Tyrrhenian Sea
Aegean Sea
Ionian Sea
Sardinia
Corsica
Sicily
Balearic Islands
Crete
Rhodes
MOROCCO
ALGERIA
TUNISIA
LIBYA
EGYPT
SYRIA
LEBANON
ISRAEL
JORDAN
SAUDI ARABIA
CYPRUS
Red Sea
Nile
Suez
Cairo
Alexandria
Banghāzi
Tripoli
Tunis
Algiers
Oran
Rabat
Tangier
Gibraltar (U.K.)
Lisbon
Madrid
Barcelona
Valencia
Sevilla
Málaga
Marseille
Toulouse
Bordeaux
Bilbao
Lyon
Geneva
Bern
Milan
Trieste
Zagreb
Genoa
Florence
Rome
Naples
Bari
Palermo
Messina
Athens
Pátrai
Thessaloniki
Tirane
Skopje
Sofia
Dobrovnik
Split
Belgrade
Sarajevo
Bucharest
Ploieşti
Constanţa
Varna
Istanbul
Ankara
İzmir
Adana
Aleppo
Damascus
Beirut
Amman
Jerusalem
Tel Aviv-Yafo
Nicosia
Odessa
Kerch'
Simferopol'
Budapest
Vienna
Danube
Rhône
Po
Ebro
Tagus
Guadalquivir
Loire
Garonne
Tours
Oujda
Annaba
Bizerte
Safaqis
Ouargla
Valletta
Vienna

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.

Chronolegy Temple Period

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

Caroline Malone

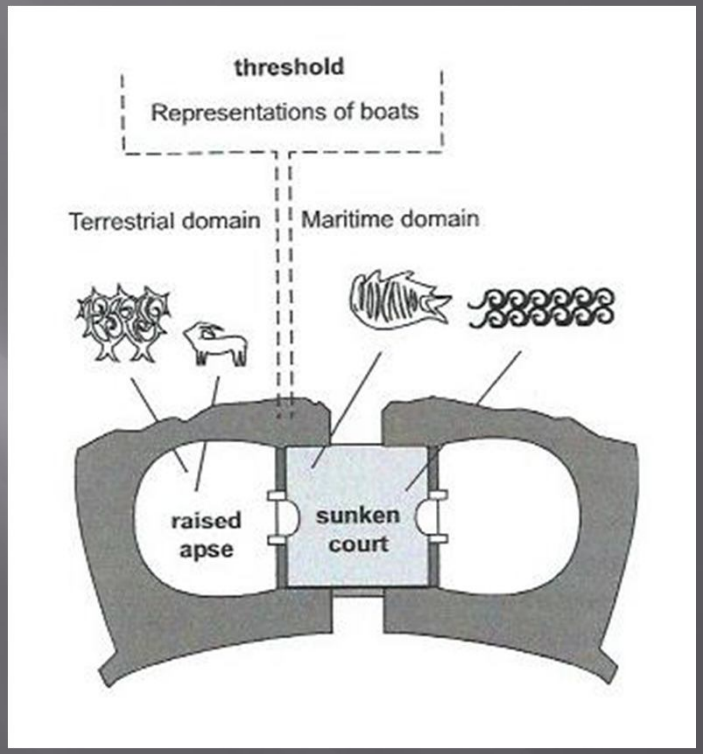
- The megalithic temples of prehistoric Malta present some of the most sophisticated, designed architeutural ritual spaces furnished with symbolic iconography and material culture in early Western Europe.

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

- 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

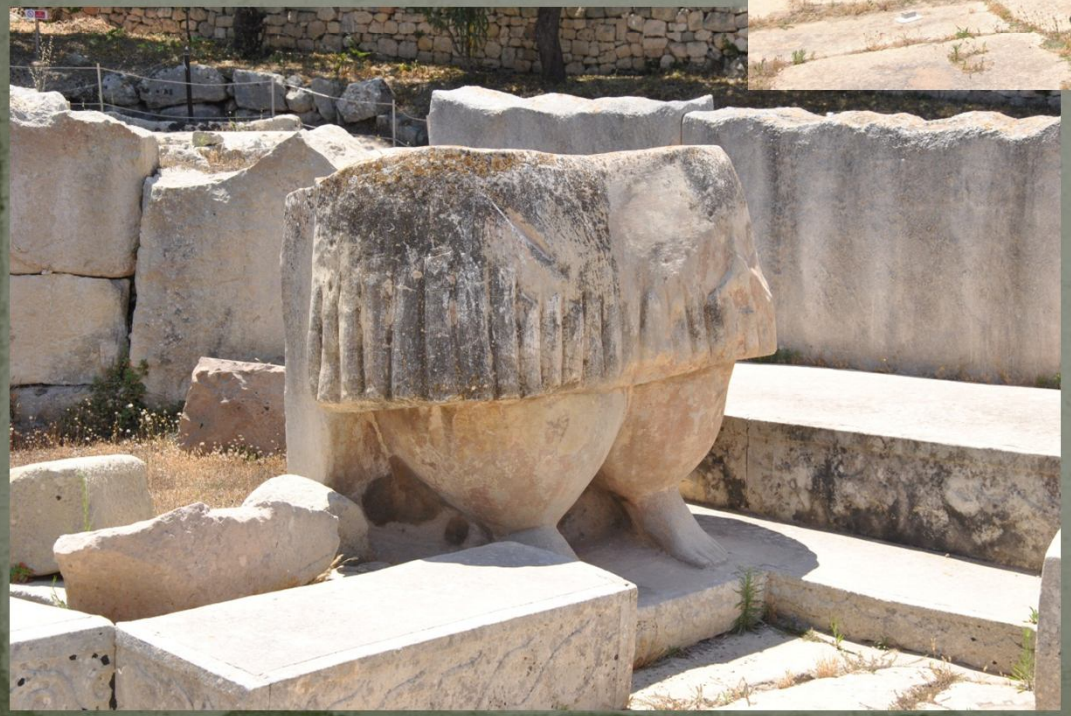


Grima, Reuben. 2001. An Iconography of Insularity: A Cosmological Interpretation of some Images and Spaces in the Late Neolithic Temples of Malta., Institute of Archeology, vol 12, 48-65.

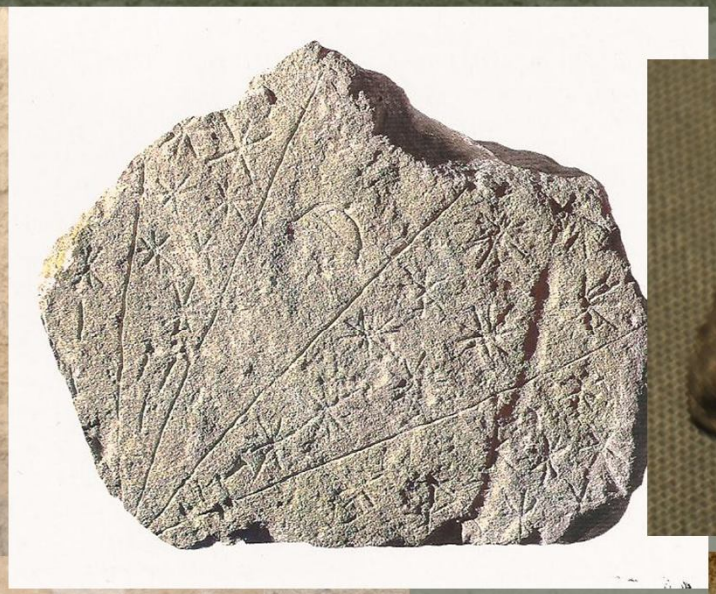








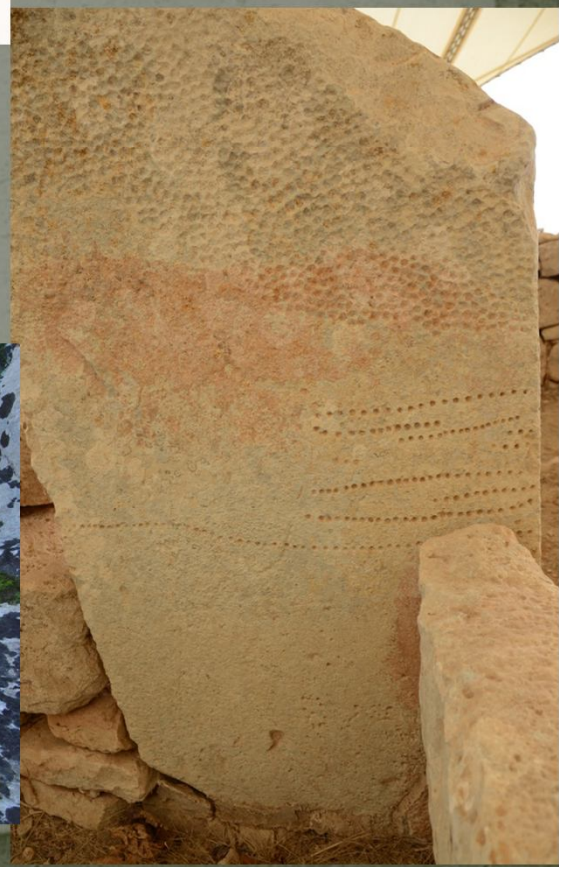


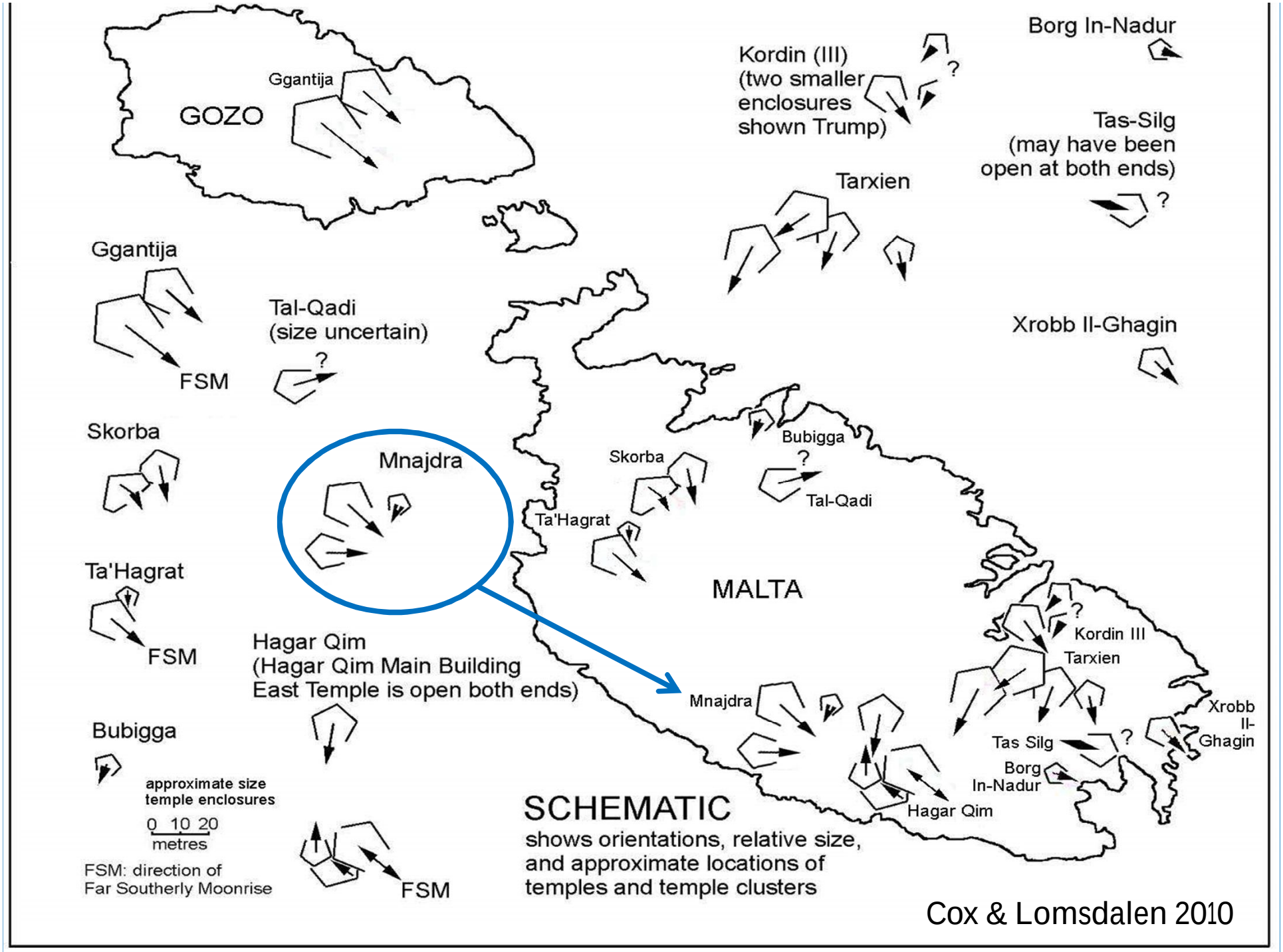











GOZO
Ggantija
Ggantija
FSM
Tal-Qadi
(size uncertain)
?
Skorba
Mnajdra
Ta'Hagrat
FSM
Hagar Qim
(Hagar Qim Main Building
East Temple is open both ends)
Bubigga
approximate size
temple enclosures
0 10 20
metres
FSM: direction of
Far Southerly Moonrise
FSM
Kordin (III)
(two smaller
enclosures
shown Trump)
?
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.

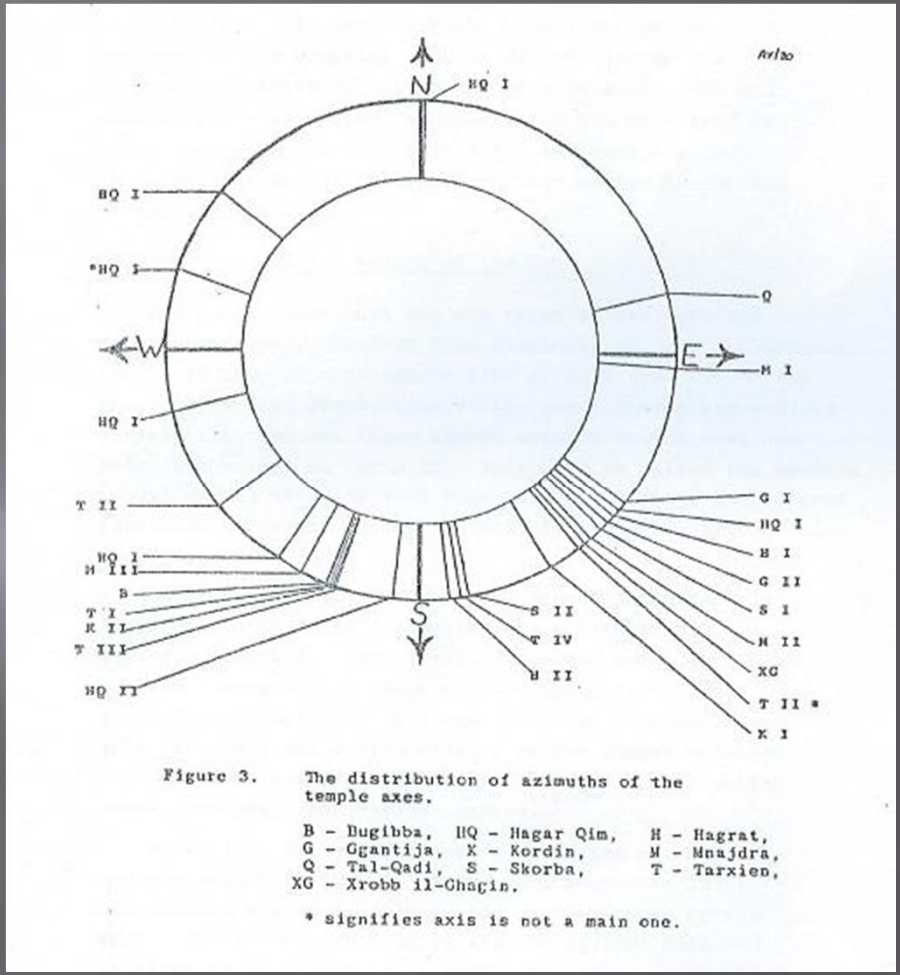


Figure 3. The distribution of azimuths of the temple axes.

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



Mnajdra Facade



Photo: TL

Horizon Astronomy



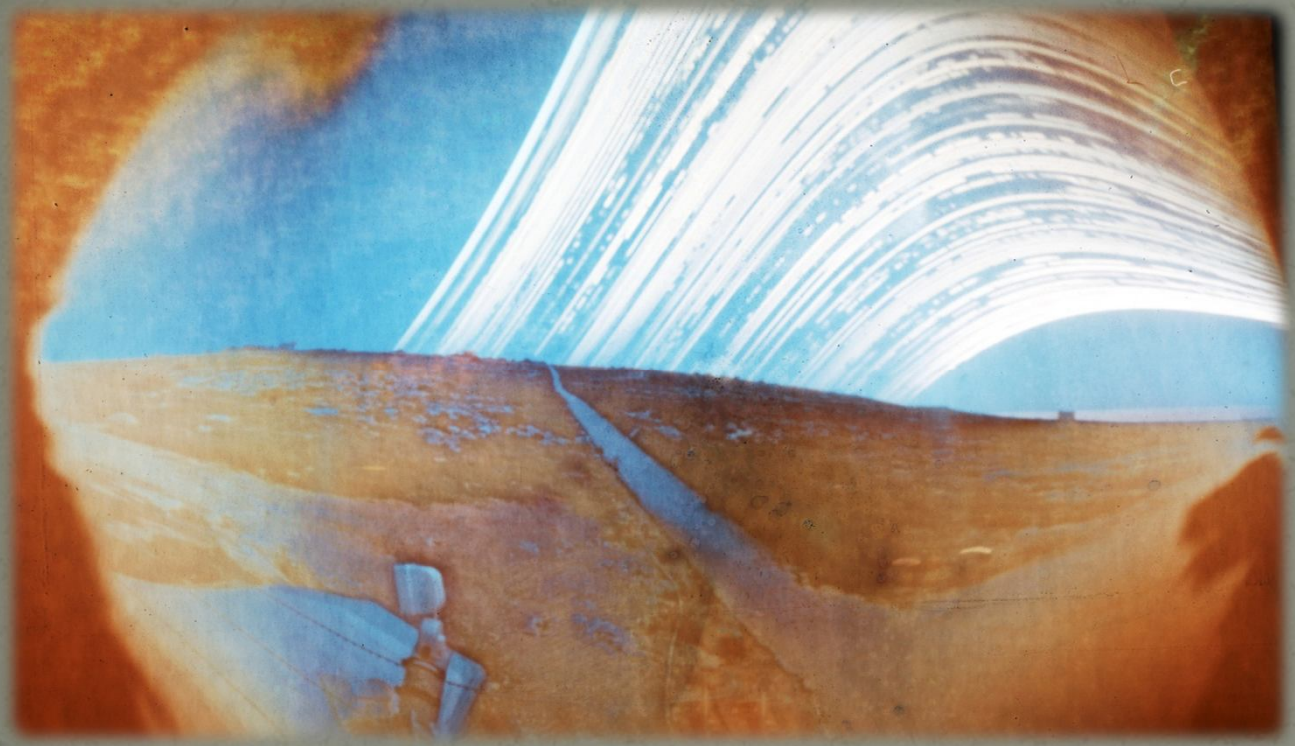
Summer Solstice

Equinox

Winter Solstice

Photo: TL

Solargraphy of Mnajdra Eastern Horizon



December 22, 2010

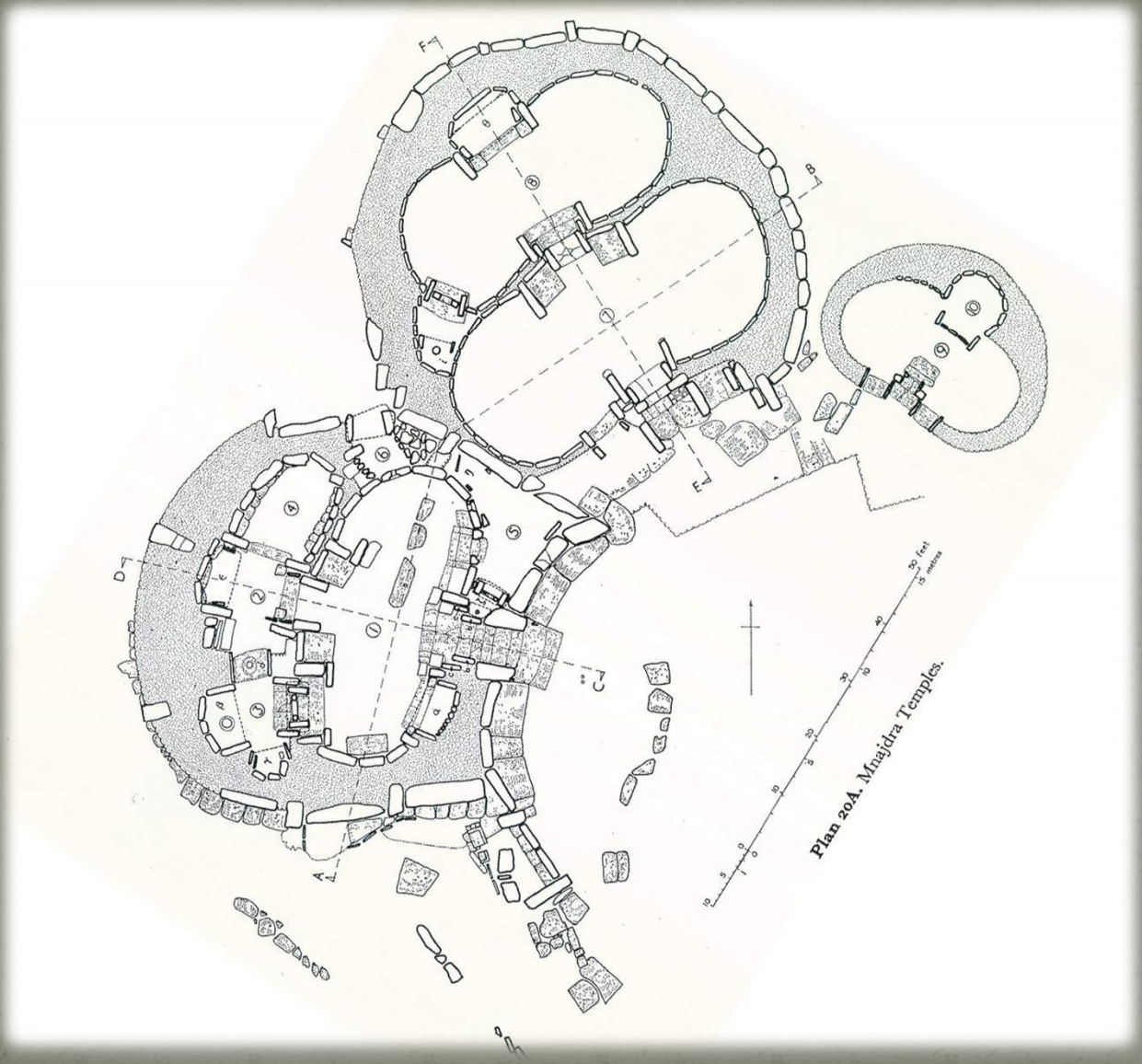
until

June 22, 2011

Project: Tarja Trygg

Solargraphy assistant:
T. Lomsdalen


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

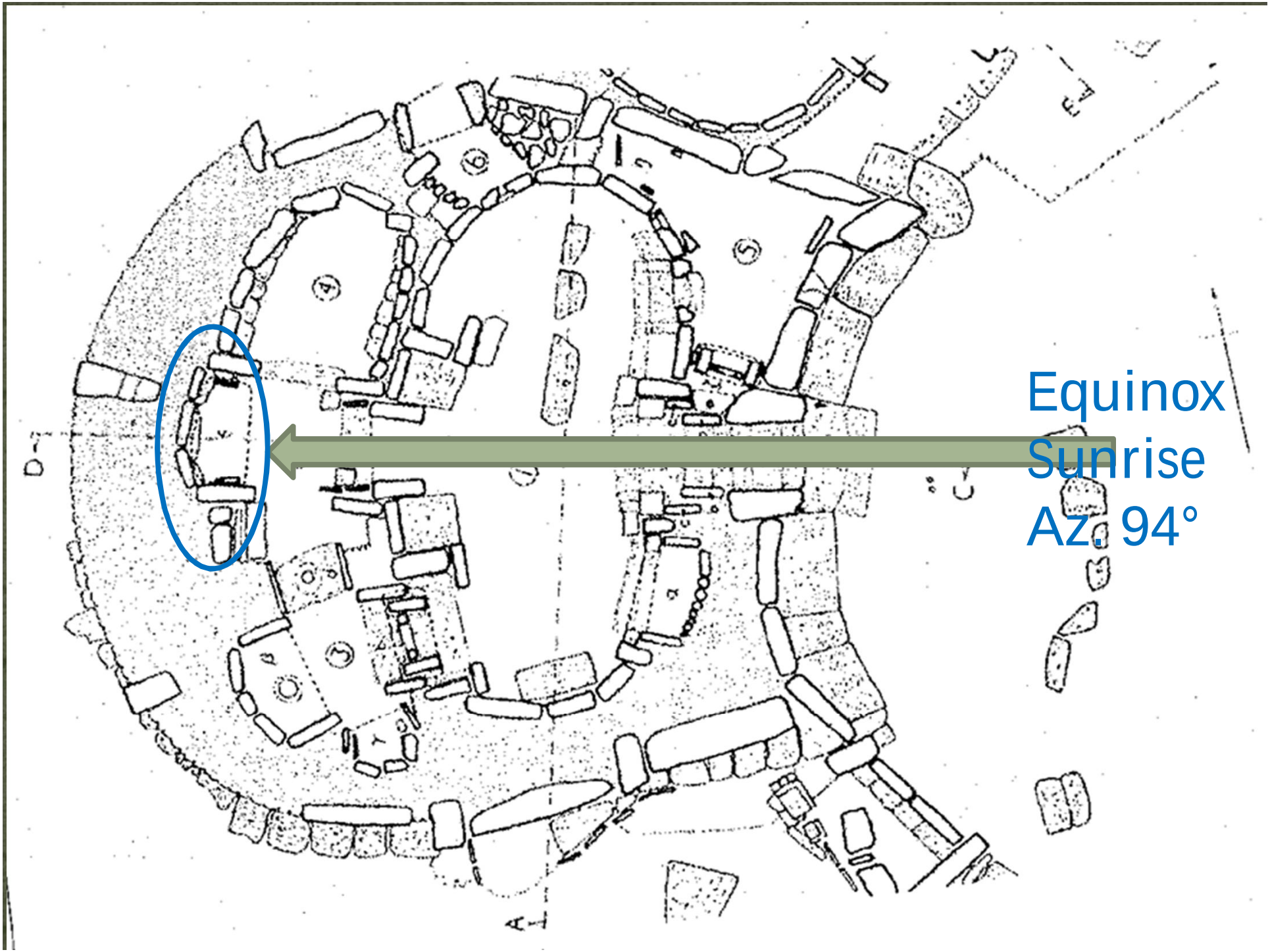

Equinox
Sunrise
Az. 94°


Photo: TL



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

Sunrise seen
from

the back altar

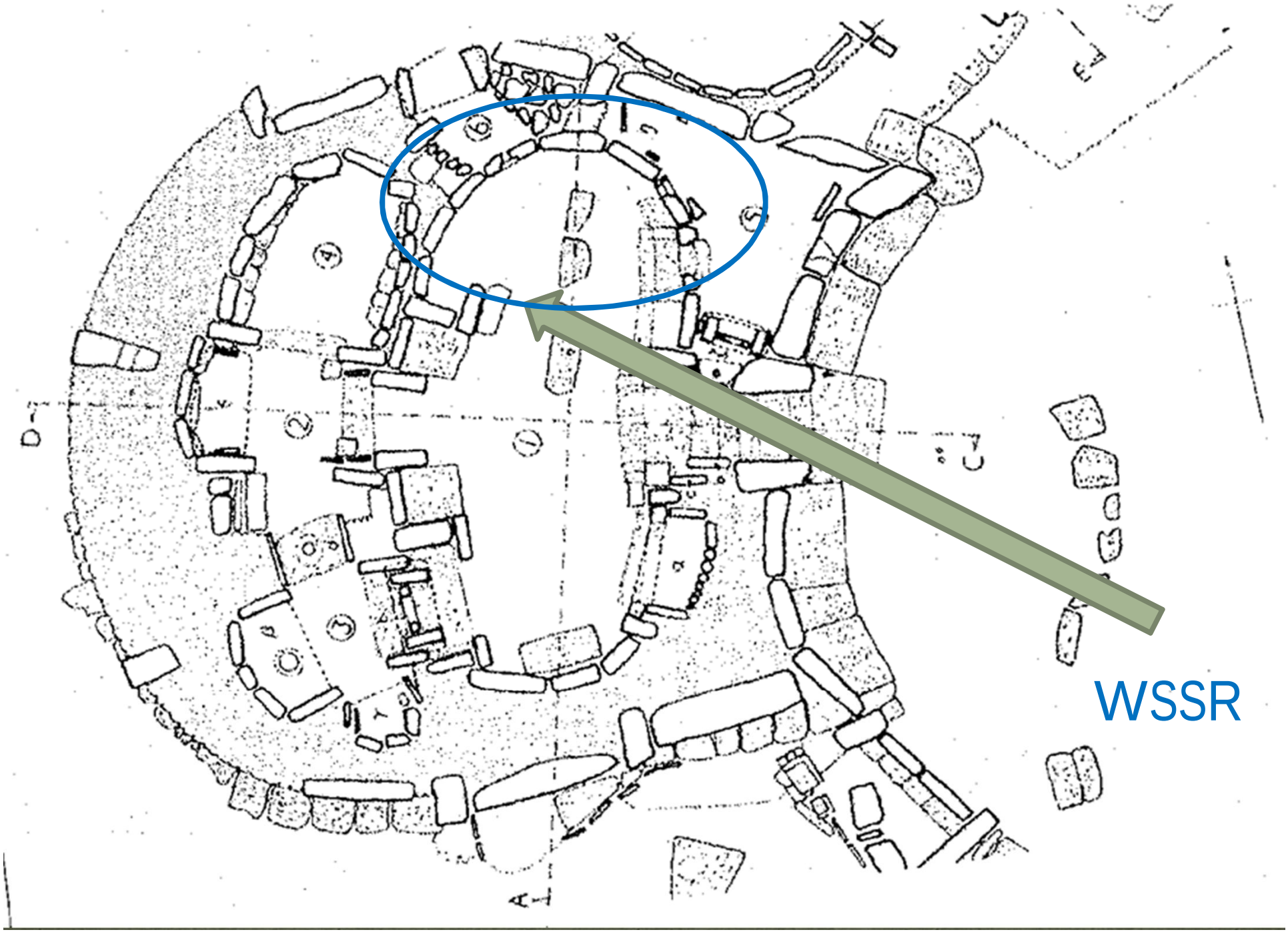


Photo: TL

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

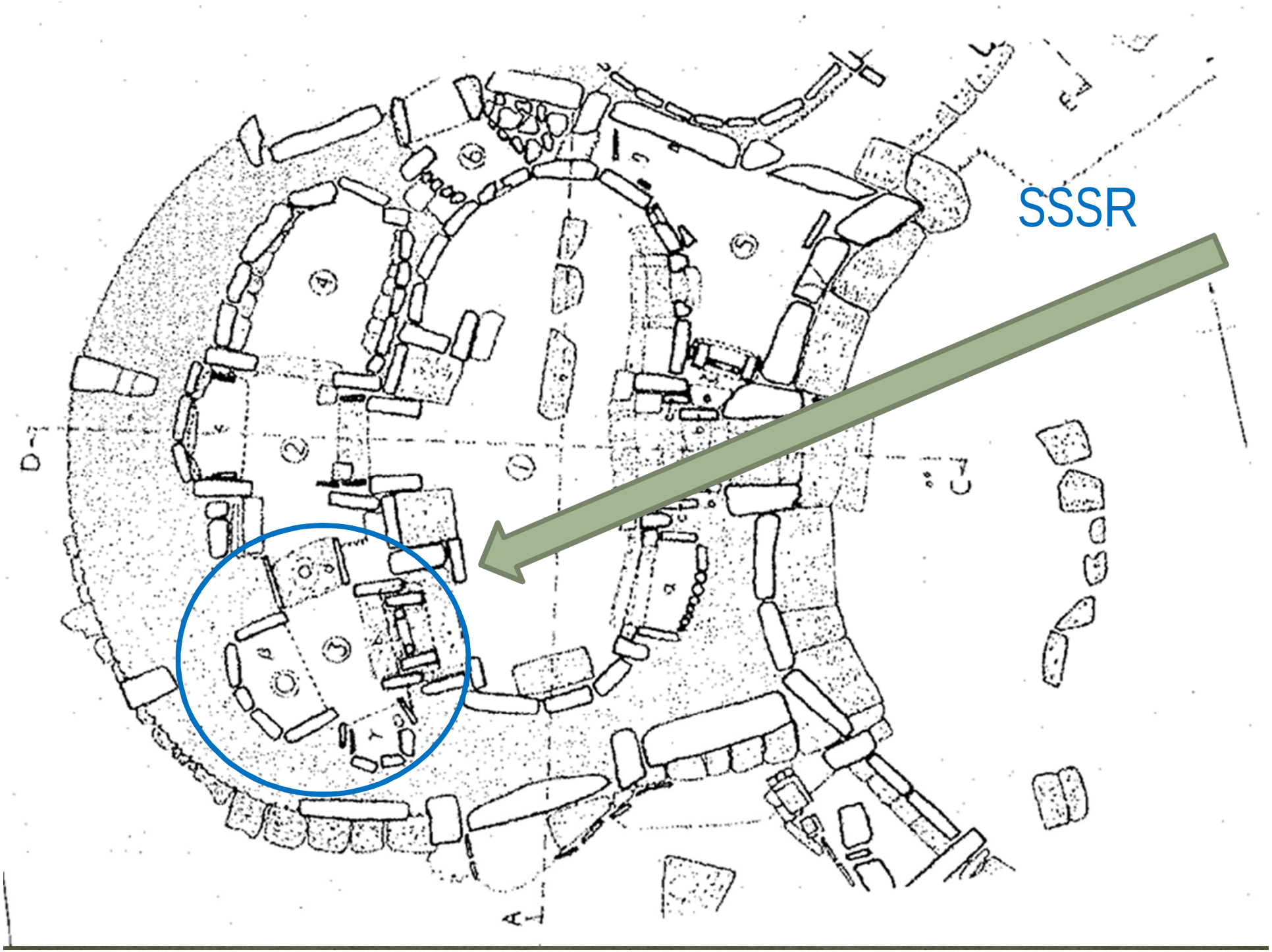

SSSR







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

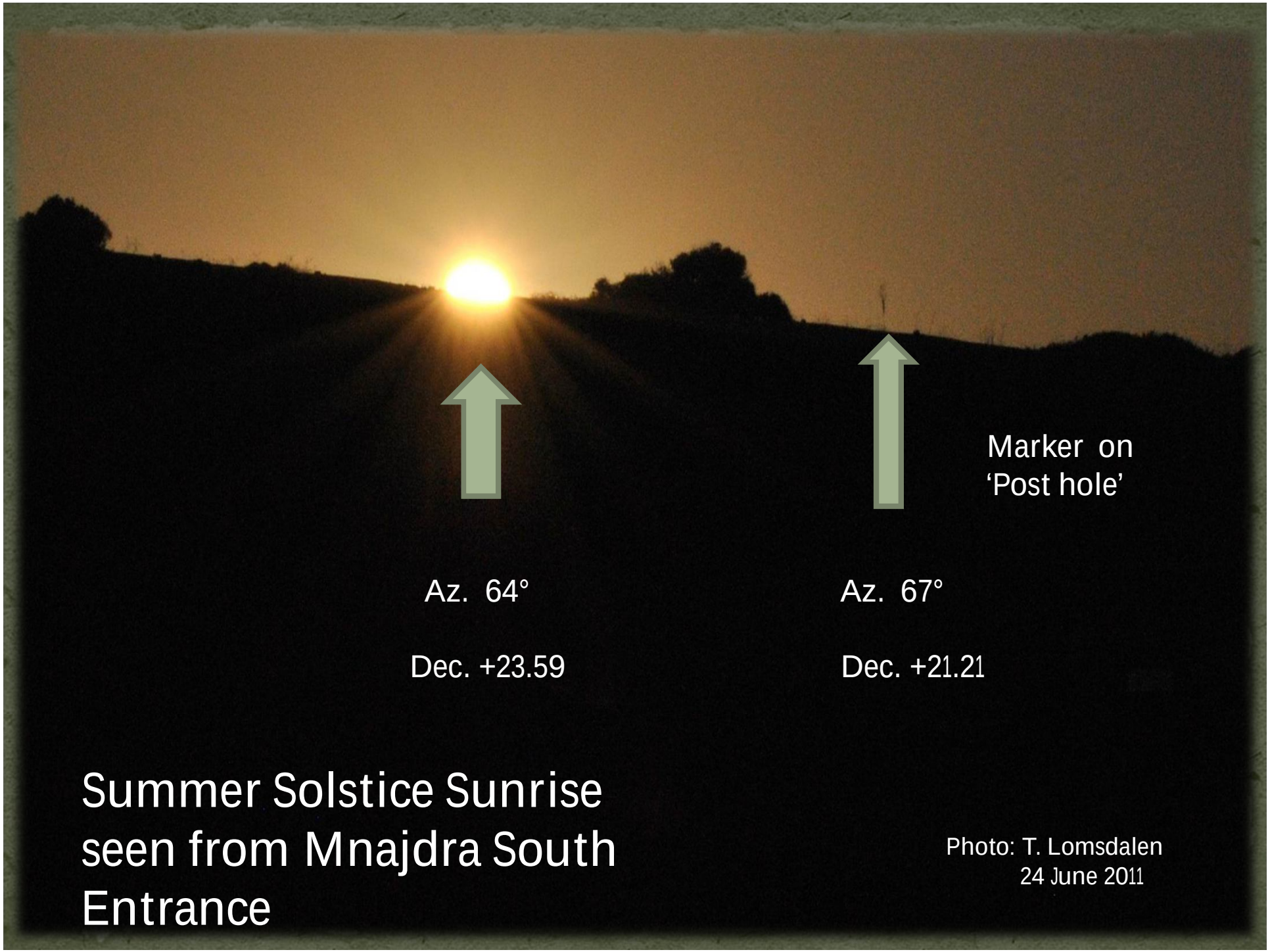
sunrise from left

hand orthostat



Photo: TL

Rediscovering the SSSR posthole, June 2011

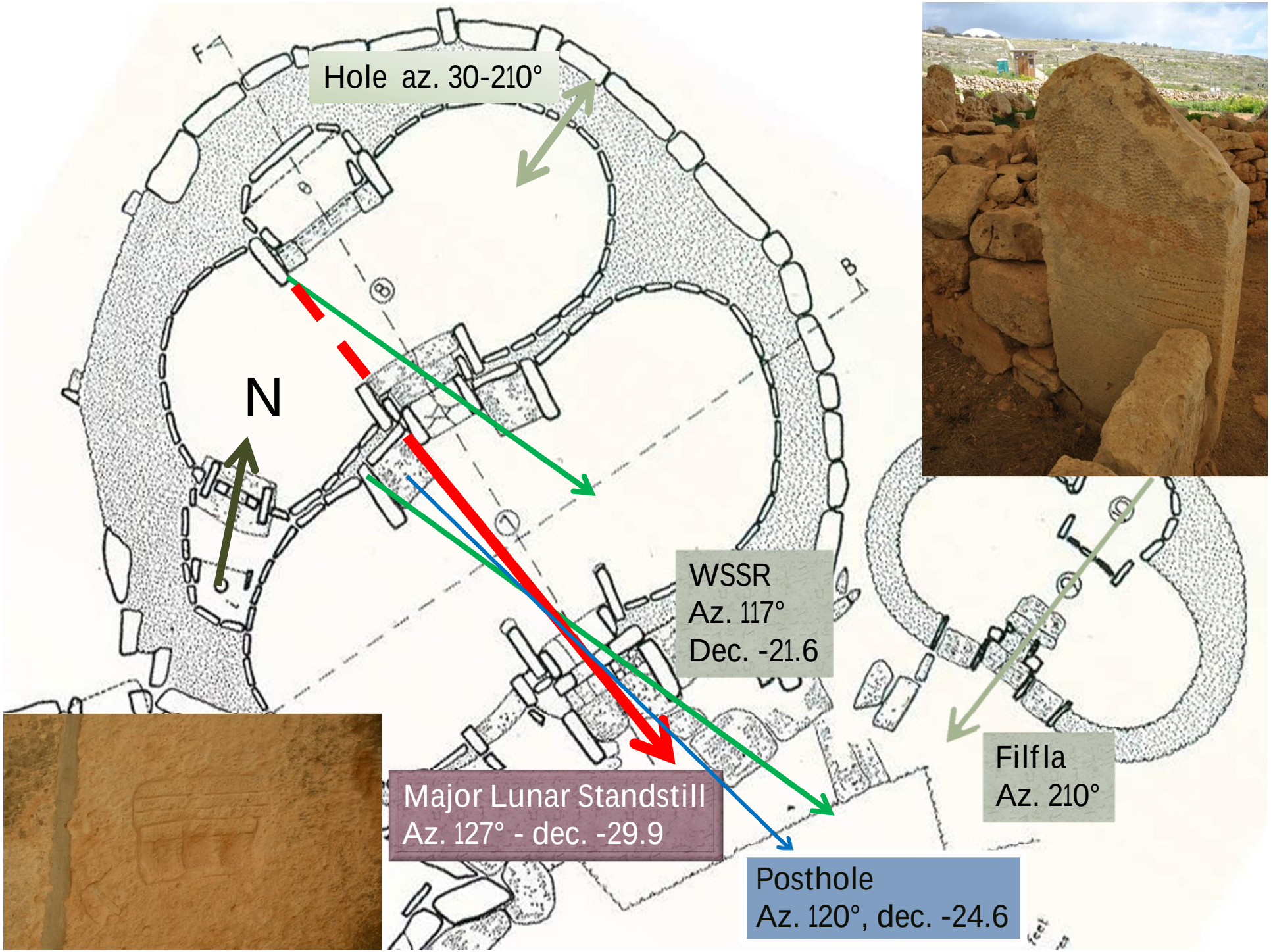


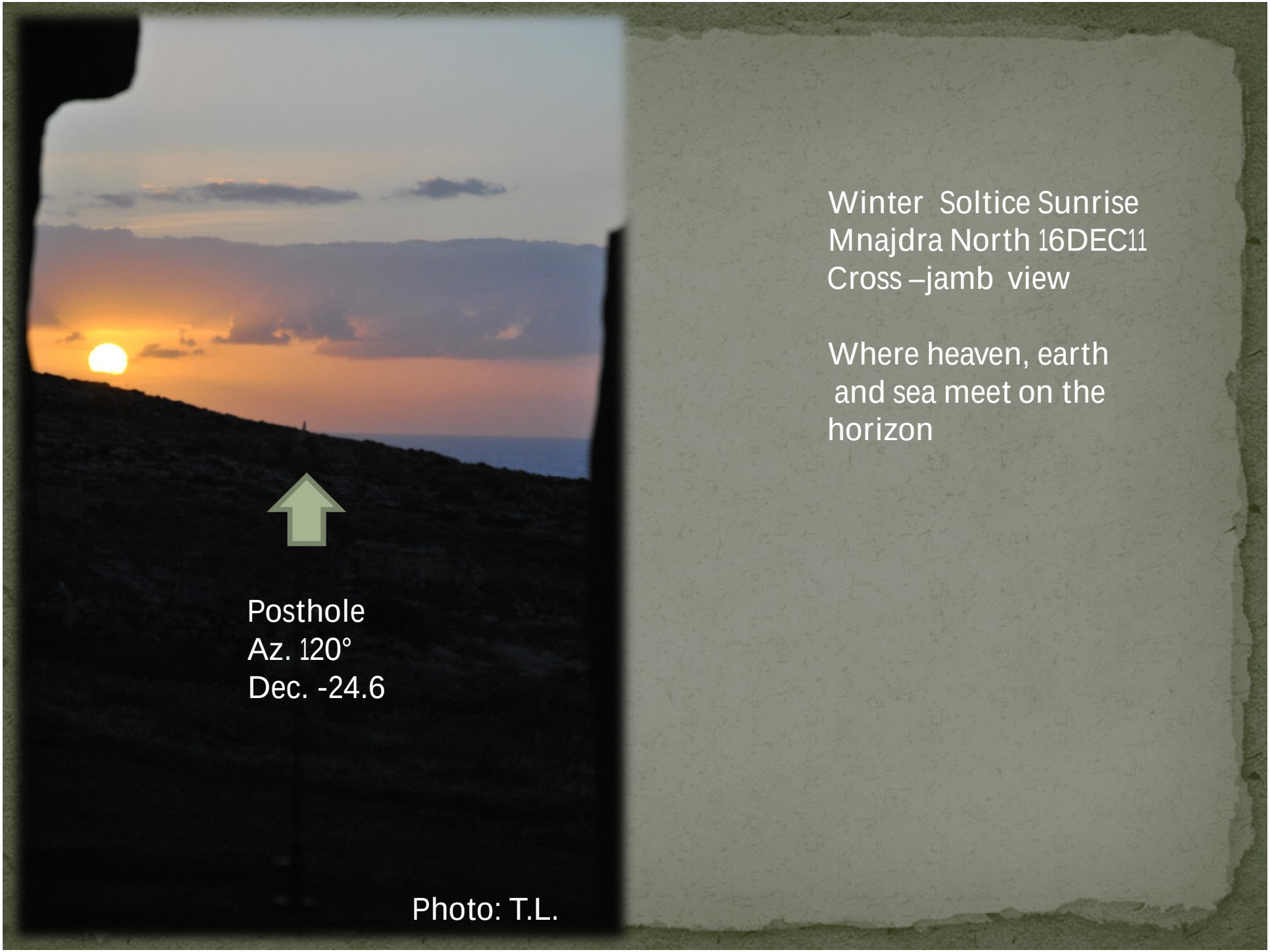
Summer Solstice Sunrise seen from Mnajdra South Entrance

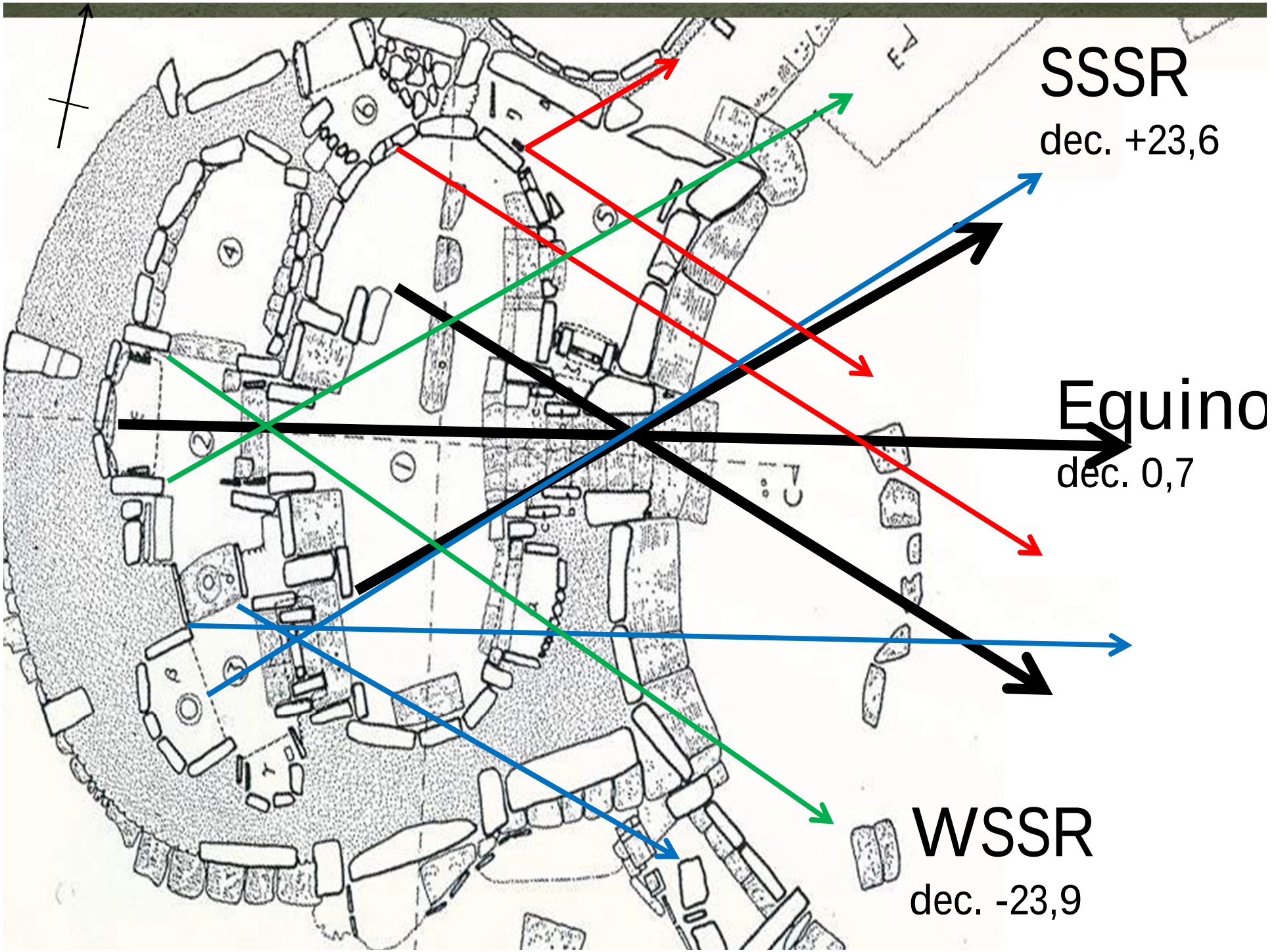
Photo: T. Lomsdalen
24 June 2011






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


Winter Soltice Sunrise
Mnajdra North 16DEC11
Cross –jamb view
Where heaven, earth
and sea meet on the
horizon
Posthole
Az. 120°
Dec. -24.6
Photo: T.L.

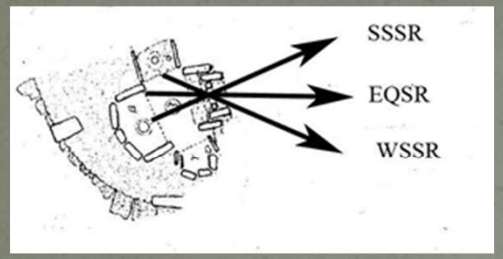

SSSR
dec. +23,6
Equino
dec. 0,7
WSSR
dec. -23,9

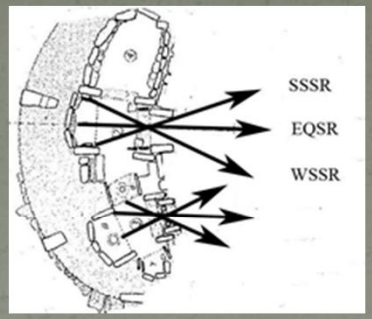
Reuben Grima

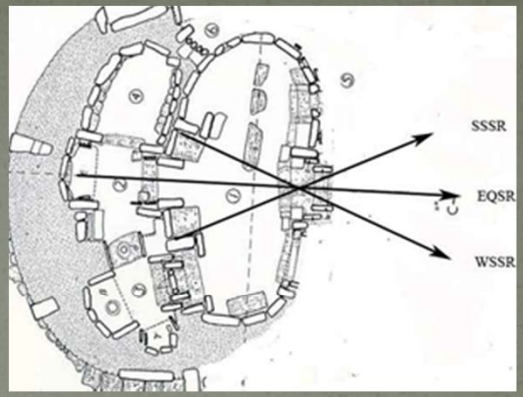
- The precise dating of Mnajdra is not free of difficulty as chronology is based on limited stratigraphic evidence and more on typology;

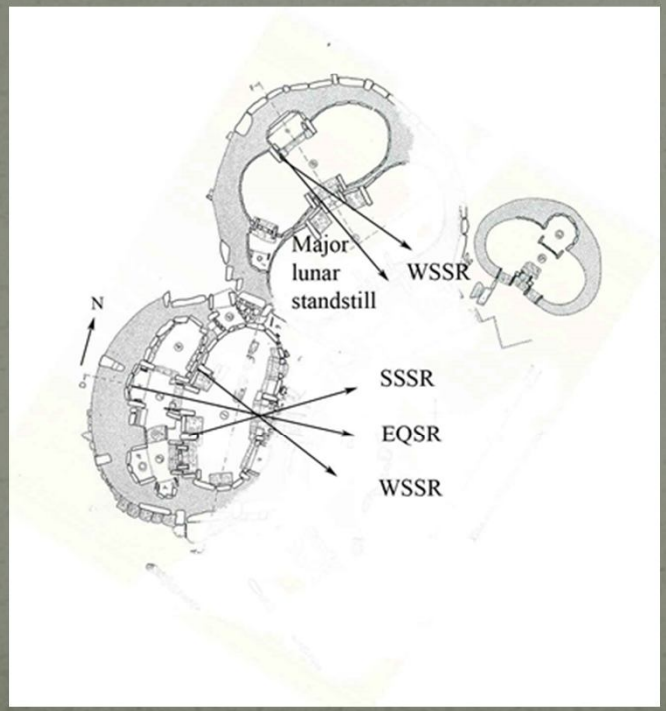
  'we are on shaky gound'.

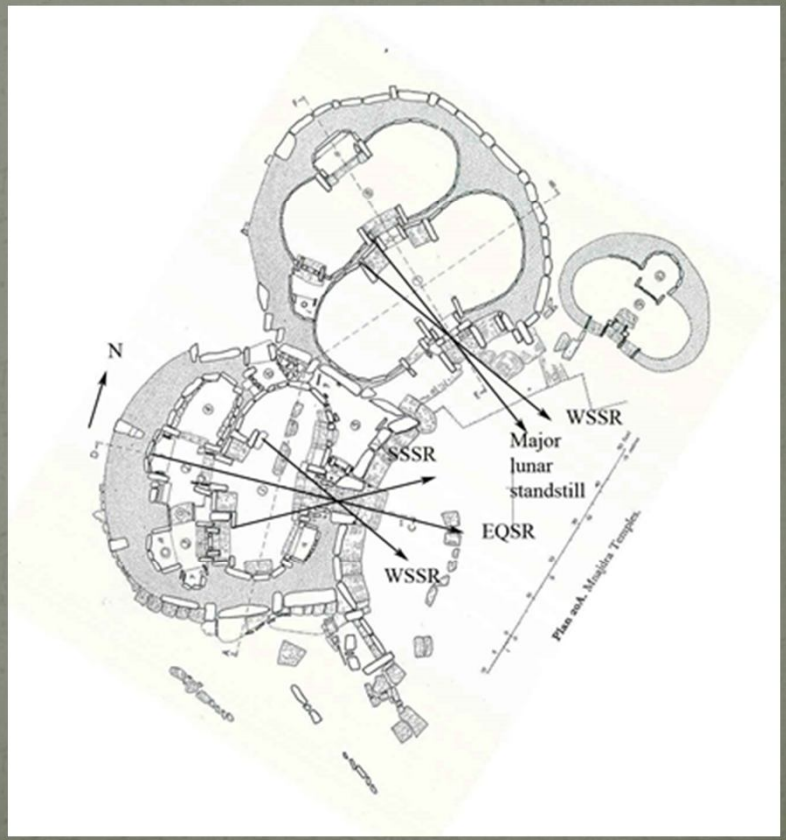
- Lomsdalen, Tore, 2014a. Sky and Purpose in Prehistoric Malta; Sun, Moon and the Stars of the Temples of Mnajdra, Ceredigion, Wales, UK, Sophia Centre Press.,Appendix II, pp. 186-207


SSSR
EQSR
WSSR

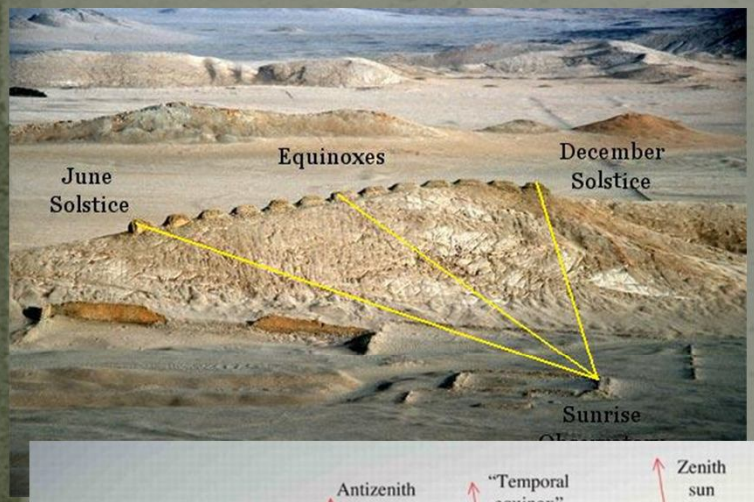

SSSR
EQSR
WSSR

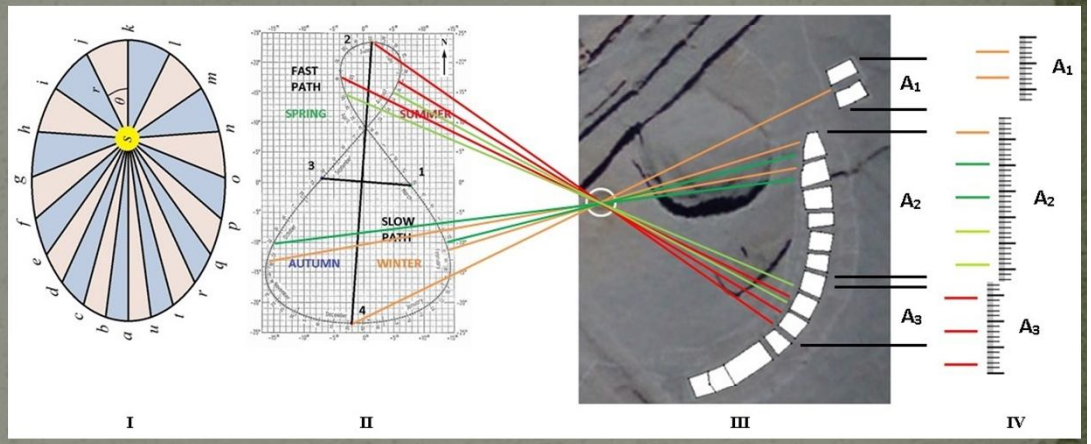

SSSR
EQSR
WSSR

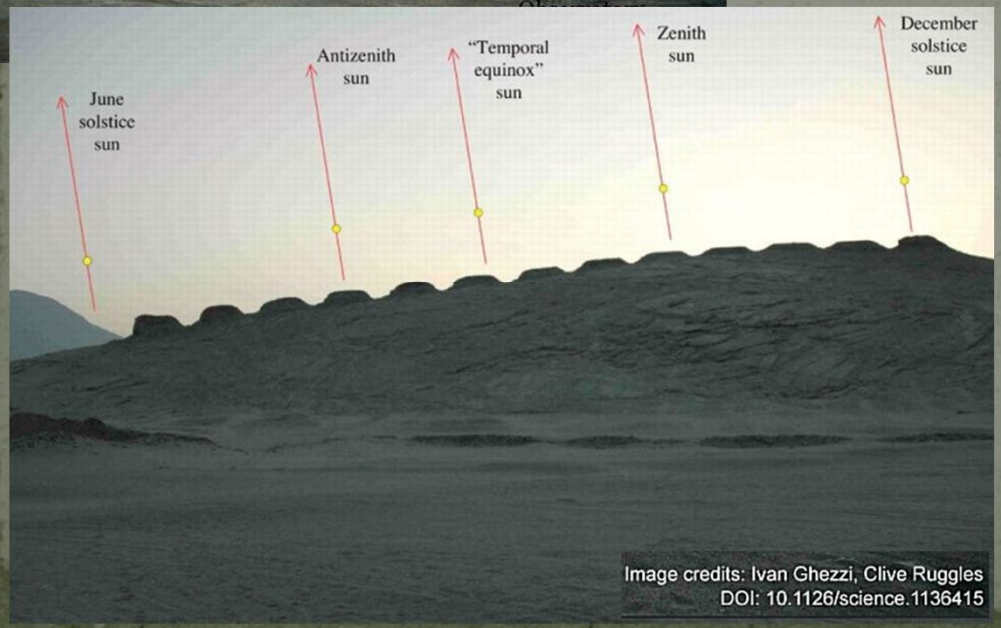

Major
lunar
standstill
WSSR
N
SSSR
EQSR
WSSR


N
WSSR
SSSR
Major
lunar
standstill
EQSR
WSSR

Chankillo & Taosi solar observatories





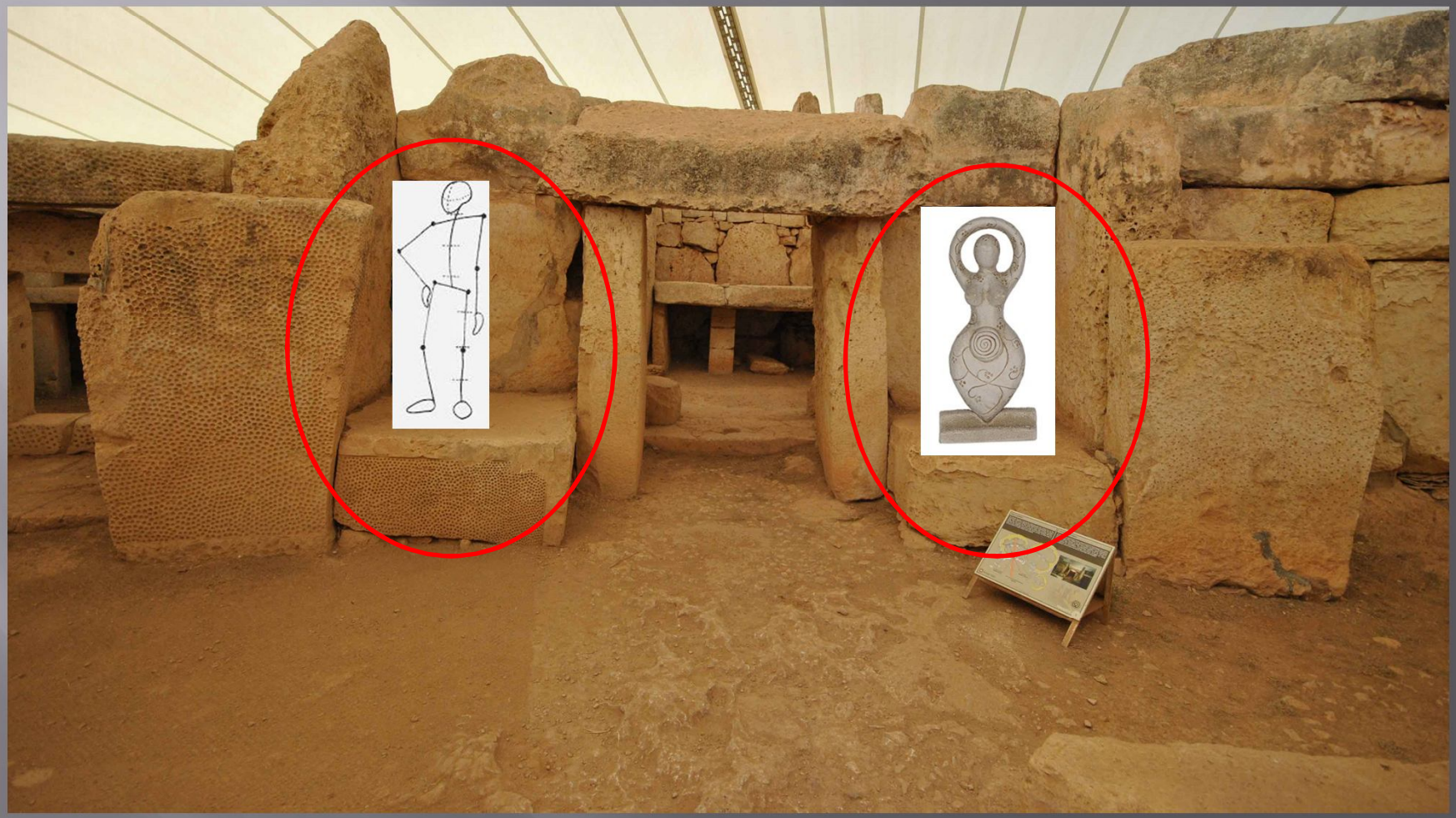


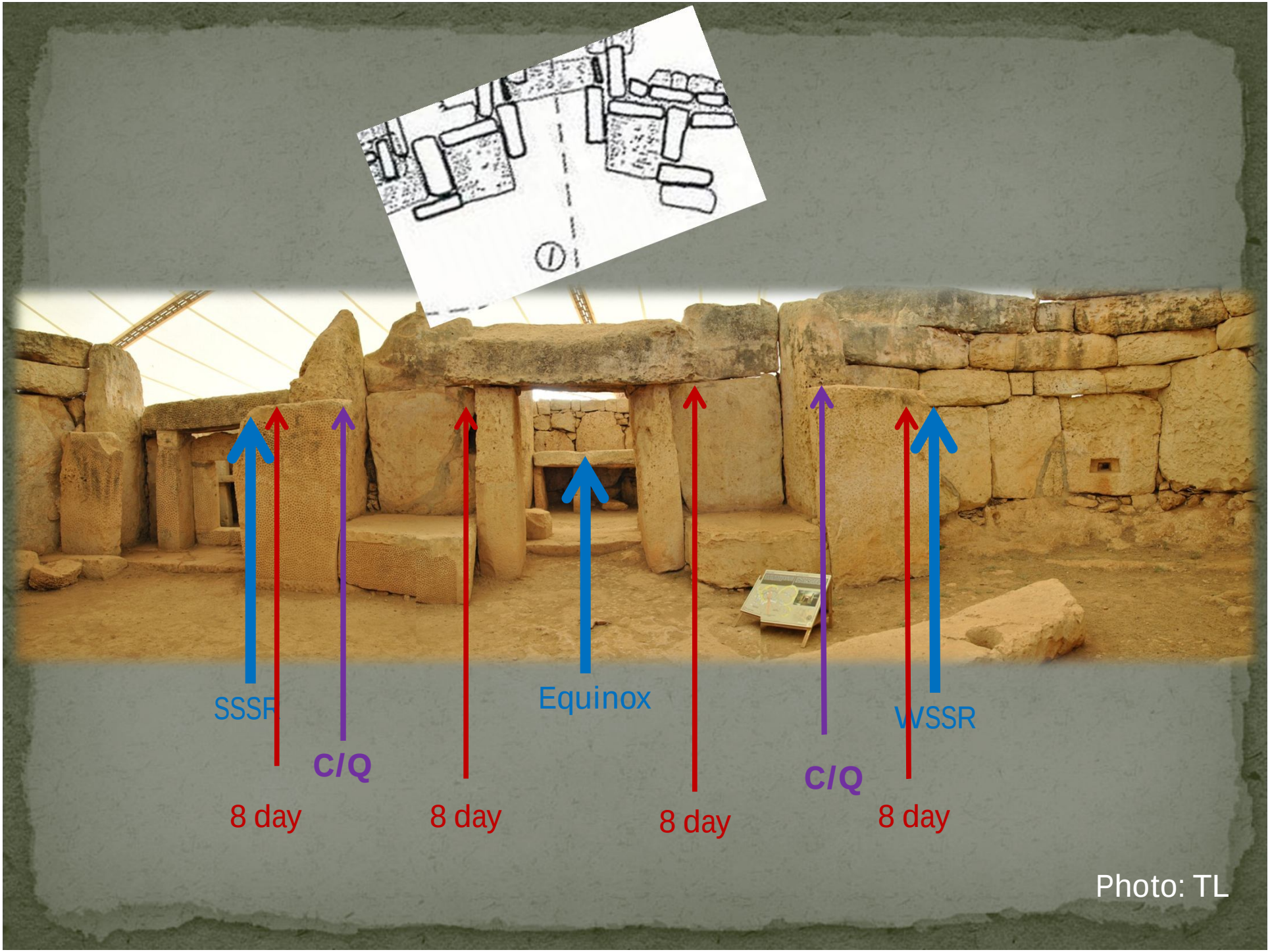


A Calendar in Stone?

- 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


JUN
Soltice
MAY
JUL
MAY
AUG
APR
AUG
MAR
SEP
Equinox
FEB
OCT
FEB
NOV
JAN
NOV
DEC
Solstice

MAY & AUG



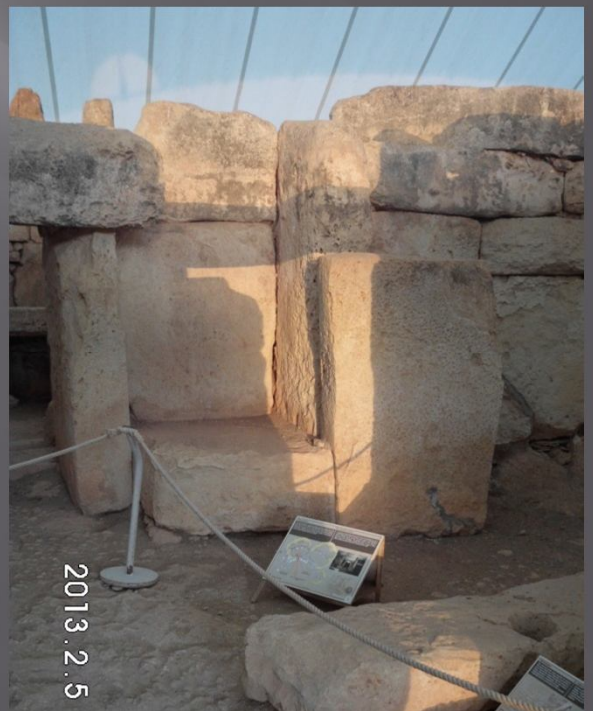
APR & AUG



FEB & OCT



FEB
&
NOV

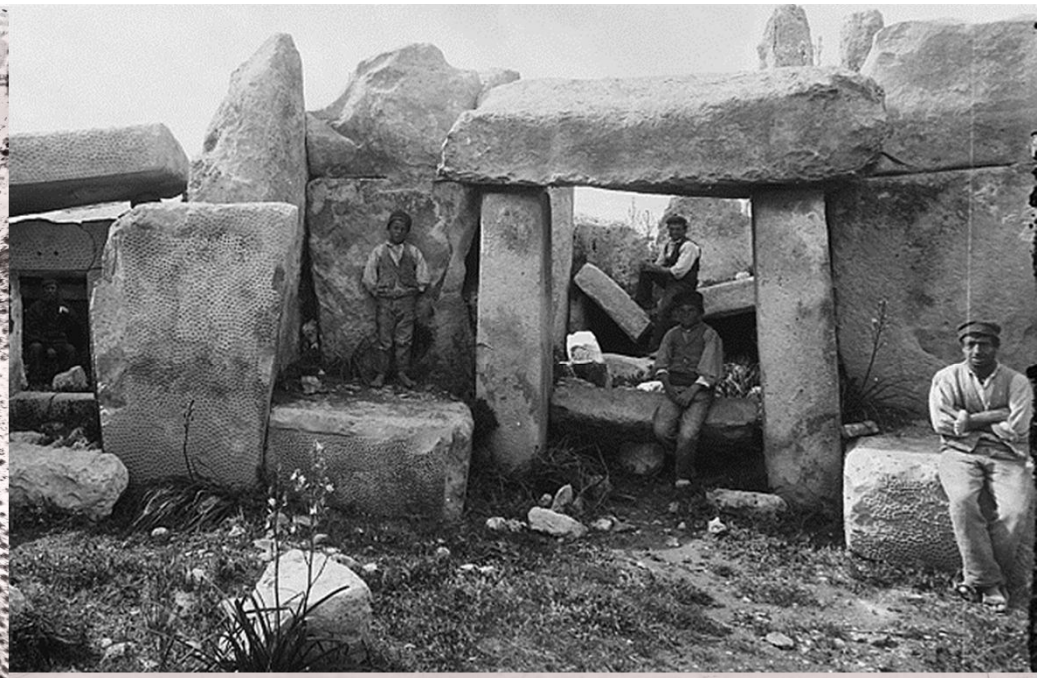


Intentionality

Was there a deliberate purpose behind the construction?

To what extent is the original architecture intact ?









- Astronomical pehenomena in the universe
- 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.
Brennan, Martin, 1983. The Stars and Stones, London, Thames and Hudson Ltd.
Cox, John. 2001. The Orientations of Prehistoric Temples in Malta and Gozo, University of Texas Press, xvi, 24-37.
Cox, John. 2009. Observations of Far-Southerly Moonrise from Haga Qim, Ta'Hagrat and Ggantija Temples from May 2005 to June 2007, Cosmology Across Cultures, ASP Conference Series, 409, 5.
Evans, J. D., 1971. The Prehistoric Antiquities of the Maltese Islands: A Survey, London, The Athlone Press University of London
George Agius, Frank Ventura, 1980. Investigation into the Possible Astronomical Aligments of the Copper Age Temples in Malta, Malta, University Press.
Giorgia Fodera Serio, Michael Hoskin, Frank Ventura. 1992. The Orientations of the Temples of Malta, Journal for the History of Astronomy xxjii, 107-119.
Giorgia Fodera Serio, Michael Hoskin, Frank Ventura. 1993a. Possible Tally Stones at Mnajdra, Malta, Science history Publications Ltd, JH ,xxiv, 171-183.
Giorgia Fodera Serio, Michael Hoskin, Frank Ventura. 1993b. Possible Tally Stones at Mnajdra, Malta, JHA, xxiii.
Grima, Reuben. 2001. An Iconography of Insularity: A Cosmological Inerpretation of some Images and Spaces in the Late Neolithic Temples of Malta., Institute of Archeology, vol 12, 48-65.
John Cox, Tore Lomsdalen. 2010. Prehistoric Cosmology: Observations of Moonrise and Sunrise from Ancient Temples in Malta and Gozo Journal of Cosmology, Vol. 9.
Magli, Giulio, 2009. Mysteries and Discoveries of Archaeoastronomy From Giza to Easter Island, New York, Copernicus Books.
Michallef C.,2000, Alignments Along the Main Axes at Mnajdra Templs, Journal of the Malta Chamber of Scientists
Renfrew, Colin, 2007. Prehistory: The Making of the Human Mind, London, Phoenix.
Ridly, Michael, 1971. The Megalithic Art of the Maltese Island, Polel, UK, The Dolphin Press.
Tilly, Christopher, 2004. The Materiality of Stone: Explorations in Landscape Phenomenology:1, Oxford, Berg.
Thomson FosterM.,1999, Orientation-A Design Determinant is Utilized as a Means to Explore the Maltese Lower Temple of Mnajdra as a Possible Solar Calendar, INSAP II, Malta
Trump, David H., 1972. Malta: An Archaeological Guide, London, Faber and Faber Ltd.
Trump, David H., 2002. Malta Prehistory and Temples, Malta, Midsea Books.
Vassallo, Mario. 2000. Sun Worship and the Magnificent Megalithic Temples of the Maltese Islands, The Sunday Times of Malta.
Zammit, Themistocles, 1929. Malta: The Islands and their History, Valletta, The Malta Herald