The IAU’s involvement in the Astronomy and World Heritage Initiative: achievements and challenges

Clive Ruggles
UNESCO’s Astronomy and World Heritage Initiative
2004

**Aim:** to identify, safeguard and promote cultural and scientific values of properties connected with astronomy

http://whc.unesco.org/en/astronomy
The sky, our common and universal heritage, forms an integral part of the total environment that is perceived by humankind.
Heritage that bears witness to people’s interpretation and understanding of the sky from earliest times through to the present day stands as a record of the extraordinary diversity of ways in which our species has viewed, interpreted and understood the relationship between itself and the world—the universe—that we inhabit.
UNESCO–IAU Memorandum of Understanding
October 2008

Formal agreement between UNESCO and the International Astronomical Union to work together to implement the Initiative
UNESCO–IAU Memorandum of Understanding
October 2008

Formal agreement between UNESCO and the International Astronomical Union to work together to implement the Initiative

Extended April 2013

International Year of Light 2015
Astronomical heritage sites already existed on the World Heritage List (but not because of their significance in relation to astronomy) — e.g.:

- Kukulcan pyramid at Chichen Itza, Mexico
- Newgrange, Ireland
- Old Royal Observatory, Greenwich, United Kingdom
- Ulugh-Bek Observatory, Uzbekistan
- Great Pyramids of Giza, Egypt
- Stonehenge, United Kingdom
Prior to 2010, the only World Heritage List inscription explicitly relating to the heritage of astronomy was:

The northernmost node of the Arc

The Struve Geodetic Arc

A triangulation network extending from Hammerfest in Norway down to the Black Sea
2,820 km long
Constructed between 1816 and 1855 by Friedrich Georg Wilhelm Struve to measure the precise size and shape of the Earth
First precise measurement of a long segment of a meridian

(Norway, Sweden, Finland, Russia, Estonia, Latvia, Lituania, Belarus, Ukraine, Moldova)
The Jantar Mantar at Jaipur, India: inscribed 2010
Inscribed as part of “Historic Monuments of Dengfeng in ‘The Centre of Heaven and Earth’”

This extraordinary horizontal gnomon and 31m-long measuring scale was used for accurately measuring the length of the sun’s noontime shadow, and hence for determining the length of the tropical year and the curvature of the earth.
2013:

A number of State Parties have now placed astronomical heritage sites on their Tentative Lists:

E.g. Mykolayiv Observatory, Ukraine
Jodrell Bank Observatory, United Kingdom
Chankillo astronomical complex, Peru
WG on Astronomy and World Heritage (2008–15)

Commission C4 on World Heritage and Astronomy (2015–... )
NO list of eligible sites!!!
How can the IAU, together with UNESCO and its advisory bodies, help member states prepare credible dossiers?

Thematic studies

Portal to the Heritage of Astronomy

Direct involvement with State Parties as part of the “upstream process”
World Heritage Review no. 54 (2009)

Downloadable from
Portal to the Heritage of Astronomy
www.astronomicalheritage.net
IAU - ICONOS

Thematic Study of the Heritage Sites of Astronomy

Themes

Earlier Prehistory
Later Prehistoric Europe
Pre-Columbian America
Indigenous uses of astronomy
Ancient and medieval Far East
India
Mesopotamia and the Middle East
Ancient Egypt
The Classical World (ancient Greece; Hellenistic period; Rome)
Arabic and Islamic Astronomy
Medieval astronomy in Europe
Astronomy from the Renaissance to the mid-20th century
Contemporary astronomy and astrophysics (since the mid-20th century)
Space astronomy (including launch sites)
“Windows to the Universe” (Dark Sky places)
www.astronomicalheritage.net

Information exchange

Document repository

Discussion forum

All contributions are moderated by an editorial group comprising representatives of UNESCO, ICOMOS and the IAU
What makes astronomical heritage valuable?
Royal Observatory, Cape of Good Hope, South Africa

1820: Created; 1828: First building completed

First major scientific institution in the continent of Africa

First permanent observatory in the southern hemisphere

1832–3: First successful measurement of the distance of a star

Etc etc
Key issue:

How to deal with different categories of heritage

Tangible ‘immovable’ (i.e. fixed) heritage

Sites and landscapes

Tangible movable heritage

Objects and artefacts

Intangible heritage

Knowledge and ideas
The movable heritage of modern astronomy

Photographic plates

Portable instruments

Archives
What makes astronomical heritage valuable?

From a science heritage standpoint:

Intangible associations can be highly important in assessing the value of a place.

Authenticity and integrity: alteration with time is inevitable and inherent and tends to add value.
Another key issue for astronomers: How to recognise and protect the dark night sky
Heritage Sites of Astronomy and Archaeoastronomy in the context of the UNESCO World Heritage Convention

PRELIMINARY VERSION PRESENTED AT “SIDE-EVENT” AT 2015 WORLD HERITAGE COMMITTEE, BONN, JULY 2015

Thematic Study, vol. 2

Aims:

Further explore and clarify some of the key general issues that can arise in the particular case of astronomical heritage sites.

Facilitate (in specific cases) the eventual preparation of a full nomination dossier should a State Party decide to prepare one.

Focus particularly on how dark sky issues might best be represented within nomination dossiers for various types of astronomical heritage sites.
## List of Extended Case Studies: themes and issues

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Seven-stone antas (dolmens)
4th millennium BC, Portugal and Spain

All 177 antas for which the orientation can be measured are oriented to a point within the rising arc of the sun.

Without exception!

Mellizo, Valencia de Alcántara, Spain
Chankillo, Peru — c. 200 BC
from Retrospective statement of OUV (2011), since adopted by UNESCO:

Authenticity

... At Stonehenge, several monuments have retained their alignment on the Solstice sunrise and sunset, including the Stone Circle, the Avenue, Woodhenge, and the Durrington Walls Southern Circle and its Avenue.

Although the original ceremonial use of the monuments is not known, they retain spiritual significance for some people, and many still gather at both stone circles to celebrate the Solstice and other observations ...
Management issue: Maintaining the integrity of the astronomical sightlines
Paris Observatory (17th to 20th century)
Science heritage v. technology heritage

Hubble space telescope

Buzz Aldrin descending to the moon

Viking 2 Mars lander

Baikonur cosmodrome, Kazakhstan
Natural heritage of the dark night sky

Dark sky parks and starlight reserves are NOT eligible for consideration (for WHL nomination)

BUT:

Dark skies associated with a cultural sites or landscape can strengthen its value as astronomical heritage

“The ability to see natural starlight preserves the visual links to the sky that have connected humankind to the cosmos throughout history”
Major optical observatory sites

“Windows to the Universe”

Cerro Tololo, Chile

Mauna Kea, Hawai‘i, USA

Gran Telescopio Canarias, Spain
Dark sky areas

Aoraki–Mackenzie International Dark Sky Reserve, New Zealand

East Alpine Starlight Reserve and Großmugl starlight oasis, Austria
Star clocks (and sun clocks) of Oman

Northern Oman: high rainfall in mountains provides water for irrigation

Aflāj (sing. Falaj) irrigation systems date back to at least 1000 BC

Regulation of irrigation by stellar observations extant in at least 5 villages in 2005
Star markers in Al Fath

Sha'ra = Sirius 
α Canis Majoris

Dhakarayn = Arcturus 
α Boötis

a ≈ ¼ hr

Top line of studs = points for watching al-Sha'ra

Bottom line of nails / holes = points for watching Dhakarayn

Mohammed b. Aamar al-Habsi

Al Fath April 2006
How can the IAU, together with UNESCO and its advisory bodies, help member states prepare credible dossiers?

Thematic studies

Portal to the Heritage of Astronomy

Direct involvement with State Parties as part of the “upstream process”
AWHI into the future:

Commission and its Working Groups are available to advise interested parties on particular nomination projects

Portal to the Heritage of Astronomy maintained for foreseeable future

Work with advisory bodies on further Thematic Studies, addressing broader issues relating to science and technology heritage

Steering Group of National Focal Points to maintain strategic oversight of the AWHI on behalf of interested state parties