

Astronomy and World Heritage

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1. Introduction

UNESCO's World Heritage List <http://whc.unesco.org/en/list> exists to help identify, protect and preserve sites and landscapes that are considered to be of outstanding universal value to humankind. This means that their significance reaches beyond national and cultural boundaries, and (if our attempts at preservation are successful) will remain as a source of inspiration for many generations into the future.

World Heritage Sites fall into two categories: cultural and natural. Following the 2009 meeting of the World Heritage Committee, there are currently 890 properties on the List, belonging to 148 'State Parties' (countries that adhere to the World Heritage Convention). Of these, 689 are cultural and 176 are natural, the remaining 25 being mixed (both cultural and natural). The cultural properties provide numerous examples of creative masterpieces from the distant as well as the more recent past, including places as diverse as the Acropolis in Athens, the temple complex at Angkor in Cambodia, the historic centre of Saint Petersburg, and the stone statues of tiny Easter Island, home for many centuries to the most isolated human community on the planet.

Science heritage in general, and astronomical heritage in particular, are poorly represented on the World Heritage List. While it is true that the List includes several ancient sites that have an established or postulated connection with astronomy—for example the Neolithic passage tomb at Newgrange in Ireland Ruggles99, Stonehenge in the UK Ruggles97 (Fig. 1), the Great Pyramids of Giza in Egypt Krupp97; Belmonte01 (Fig. 2), and several Mesoamerican ceremonial centres in Mexico and Guatemala Aveni01 (Fig. 3)—each of these is included only because of its broader archaeological and cultural significance. The same is true for sites important in the history of modern astronomy Hoskin97: thus the fourteenth-century meridian arc from Ulugh Beg's observatory in Uzbekistan is only included because it forms part of the historic city of Samarkand, the Observatory of St Petersburg because it forms part of the Historic Centre of St Petersburg, and the Old Royal Observatory at Greenwich because it forms part of Maritime Greenwich.

In fact, only one property has been explicitly inscribed because of its astronomical significance (along with its importance for the history of the earth sciences and topographic mapping). This is the Struve Geodetic Arc, a 265-point triangulation network set up in the nineteenth century by the astronomer Friedrich Georg Wilhelm Struve to determine the precise size and shape of the Earth. Thirty-four nodes of this network still survive, and these comprise a so-called 'serial nomination'—a World Heritage Site consisting of set of places rather than a single one-spanning ten modern countries from Norway down to the Black Sea.

Concerned at the situation with regard to astronomical heritage, the UNESCO Regional Bureau for Science in Europe (ROSTE) took steps back in 2005 that resulted



Figure 1. Stonehenge, showing the famous axial alignment upon winter solstice sunset. The monument is included in the World Heritage List as part of the property “Stonehenge, Avebury and Associated Sites”. Photo by Clive Ruggles.



Figure 2. The pyramids of Khufu, Khafre and Menkaure at Giza. The World Heritage property ‘Memphis and its Necropolis - the Pyramid Fields from Giza to Dahshur’ was inscribed in 1979. Photo by Clive Ruggles.

in the creation of a thematic initiative within UNESCO on Astronomy and World Heritage <http://whc.unesco.org/en/astronomy>. Its explicit aim was to identify, safeguard and promote properties connected with astronomy ‘as a means to promote in particular nominations which recognize and celebrate achievements in science’.

In October 2008, the UNESCO World Heritage Centre and the IAU signed a Memorandum of Understanding—a formal agreement to jointly progress the Astronomy and World Heritage Initiative. This established the IAU as a full partner in developing the



Figure 3. The Caracol at Chichen Itza, which forms part of the World Heritage property ‘Pre-Hispanic City of Chichen-Itza’. It is one of several buildings and complexes within Mayan ceremonial centres that have a proven or postulated astronomical connection and are already on the World Heritage List for other reasons. Photo by Clive Ruggles.

Initiative and shortly afterwards, in order to fulfil its commitment in this regard, the IAU set up a new Working Group on Astronomy and World Heritage.

This report will describe the work of the Working Group and what has been achieved to date.

2. Right and Wrong Directions

So, what has the Working Group achieved in its first nine months of existence? I would prefer to start by turning the question around, asking instead what the Working Group has most conspicuously not achieved. The reason for this is that the answer will come as a surprise to many people: we have not made any effort to construct a list of astronomical heritage sites that the IAU considers of greatest significance.

There is a very good reason for this. The process of nominating properties for inscription on to the World Heritage List has been carefully established over many years and is universally respected by all the State Parties to the Convention. It involves several stages, with State Parties first having to register sites onto their national ‘Tentative Lists’ and then putting forward at most one property for inscription in any one year. The nominating country not only has to justify why the site should be considered of outstanding universal value but also has to draw up a credible plan for its management and protection. When a property is nominated for inscription, it is assessed not by UNESCO but by an independent Advisory Body: in the case of cultural applications this is the International Council on Monuments and Sites (ICOMOS). In the light of the report from ICOMOS, the World Heritage Committee makes its decision.

If the IAU were to publish its own ‘Tentative List’ this would undoubtedly be seen as an attempt to undermine the whole process, and would immediately result in the IAU’s input being ignored. In fact, Commission 41 had produced such a tentative list back in January 2008, but it clearly reflected the specialist knowledge and, to a significant extent, the countries of origin or domicile of the authors who contributed to it. The list has not

been made public for this reason, although it has served to inform the work that has followed.

A “right way forward” did, however, emerge soon after the formation of the Working Group. The basic problem is that ICOMOS is called upon to assess World Heritage List applications from a scientifically objective and politically neutral standpoint, but there are no clear criteria that can be used to assess astronomical heritage sites. If the IAU could work with ICOMOS to help develop such criteria, then not only would this help ICOMOS itself; it would also give State Parties a better idea of the criteria by which any astronomical heritage application would be judged, and thereby encourage them to put forward such applications.

Over the past decade and a half, when faced with similar situation in other subject areas, ICOMOS has worked (either on its own or in collaboration with a suitable partner organization) to produce a ‘Thematic Study’ <http://www.icomos.org/studies/>. This is a book-length document aiming to ‘establish what qualities best demonstrate outstanding universal value in the field concerned. Following a series of meetings in January 2009, the Working Group began a co-operation with ICOMOS to produce a Thematic Study on the Heritage Sites of Astronomy and Archaeoastronomy in the context of the UNESCO World Heritage Convention. In doing so we will produce a document that will present our overall vision on astronomical heritage, using examples of properties worldwide as examples and illustrations of the broad themes. This is a fitting activity for the International Year of Astronomy and we hope to complete the task by the end of 2009. This Thematic Study will then be formally submitted to UNESCO for approval and adoption.

3. Differing Views on Heritage

The project to produce a Thematic Study on astronomical heritage has much broader implications. No Thematic Study yet exists that addresses any field of science heritage, despite the fact that the UNESCO World Heritage Centre is committed to improve the recognition and celebration of the achievements of science, engineering and technology on the World Heritage List. Being the first Thematic Study to explicitly address any field of science heritage, ours must tackle a number of broad issues of wider relevance to the whole of science heritage. Fortunately, the study’s co-editor appointed by ICOMOS, Professor Michel Cotte, is a specialist in technology heritage, a related field in which ICOMOS has published three Thematic Studies (on the subjects of Canals, Bridges and Railways).

One of the trickiest issues is, in fact, encapsulated in the first of the Working Group’s Terms of Reference:

“To work on behalf of the IAU to help ensure that cultural properties and artefacts significant in the development of astronomy, together with the intangible heritage of astronomy, are duly studied, protected and maintained, both for the greater benefit of humankind and to the potential benefit of future historical research.” This statement rightly makes reference not only to the ‘tangible immovable’ heritage of astronomy—monuments, buildings and fixed instruments—that are eligible for inscription onto the World Heritage List, but to the range of associated types of heritage that, taken together, are crucial in assessing the scientific significance of a place: moveable instruments, documents, archives, and of course the discoveries that were made at the place in question, the ideas that were generated, and the personalities involved. These other artefacts and associations are categorised in heritage terms as ‘tangible moveable’ and ‘intangible’ heritage.

Of course, astronomical knowledge-whatever the time period or social context-is inherently intangible. And herein lies the heart of the matter. In order to assess the significance of a heritage site relating to astronomy we need firm criteria for assessing how the intangible heritage of astronomy in all its forms -varying from indigenous calendars and cosmologies to modern scientific facts and theories-together with the various types of moveable heritage-portable instruments and artefacts, archives, etc-contribute to our assessment of the universal value of the immovable architecture. These are the sorts of issues with which the Thematic Study is trying to come to grips.

4. Increasing Awareness

Another of the Working Group's Terms of Reference is "To work, in conjunction with IAU C41 (History of Astronomy), IAU C46 (Education) and other Commissions and Working Groups within the IAU as appropriate, to enhance public interest, understanding, and support in the field of astronomical heritage." Outreach will be of vital importance in the longer term, but the Working Group has also been working to increase awareness throughout its first year of existence. Astronomy and World Heritage is one of twelve Global Cornerstone Projects for the International Year of Astronomy 2009. The September issue (no. 54) of UNESCO's quarterly magazine *World Heritage Review* is devoted to astronomical heritage and science heritage, with contributions by Working Group members. The year has also seen various conferences and meetings in which astronomical heritage and the work of the Working Group has been discussed and advanced, including a conference dedicated to the topic in Kazan, Russian Federation, in August.

What will perhaps prove to be the Working Group's most important activity is advancing thanks to a collaboration developed through the IYA Global Cornerstone Project. The objective is to create a public database of properties with a relationship to astronomy, not just those that are already on the World Heritage List (for which see UNESCO's Astronomy and World Heritage 'Timeframe' http://whc.unesco.org/pg.cfm?cid=281&id_group=21&s=home). The first stage in this process is to transfer and modify the contents of the existing 'timeframe' and to transfer it on to the Working Group's own website where it will act as the basis for the new database.

But if the Working Group must avoid producing its own list of astronomical heritage sites that it considers most significant, lest it be seen to be undermining the established nomination process, how can it consider developing such a database? The answer is that it can still provide a forum for others to exchange information-i.e., to view and discuss sites from the widest possible range of places and times. The database will be accompanied by a prominent disclaimer making it clear that the inclusion or otherwise of any particular property has no bearing whatsoever upon the outcome should it be nominated for inscription onto the List. However, we do hope that in the longer term this forum will be of considerable assistance to State Parties considering the nomination of astronomical heritage sites of their own.

5. Dark Skies

A considerable proportion of the world's population today live in places where light pollution denies them the opportunity of ever experiencing a truly dark night sky. To

such people, it may be all the harder to communicate the importance of cultural sites relating to the sky. This in itself makes the protection of dark sky places a matter of some relevance to anyone concerned with the protection of cultural heritage relating to astronomy.

However, one can go further. The presence of a dark night sky enhances the natural significance of a place. Why, then, should we not recognise the presence of a pristine night sky, free of light pollution, as a natural characteristic that contributes to universal value? As a result of the Starlight Initiative and the Starlight Declaration of 2007 (<http://www.starlight2007.net/>), UNESCO and the IAU are working to protect the dark night sky, for example through the creation of “Starlight Reserves”. If one regards dark sky sites as places having a natural heritage relating to astronomy, then strong parallels emerge between the cultural and natural aspects of astronomical heritage and efforts to encourage their recognition. In particular, this suggests the need for strong links with the IUCN (the International Union for the Conservation of Nature), the Advisory Body to UNESCO that assesses nominations relating to natural rather than cultural heritage.

During 2009, the Working Group has developed strong links with the Starlight Initiative and been represented at two of its meetings. A significant outcome of the first, in Fuerteventura in March, was the establishment of a “Dark Skies Advisory Group” whose remit is to support IUCN activities relating to dark skies. This Group includes representation both from our Working Group and from ICOMOS.

It is conceivable that, just as some World Heritage sites derive their outstanding universal value from a combination of their cultural and natural heritage, so some places may achieve this by combining cultural heritage relating to astronomy with the natural heritage of the dark night sky.

6. Conclusion

Astronomical heritage is not just important because every human culture has a sky. Astronomy is nothing less than a fundamental reflection of how all people, past and present, understand themselves in relation to the universe. It is for this reason that we must take urgent steps to identify, protect and preserve the most outstanding manifestations of both our cultural and natural heritage relating to the sky. We can hope that the IAU, through its Working Group on Astronomy and World Heritage, working alongside UNESCO and its Advisory Bodies, will be able to take some significant steps towards ensuring that vital aspects of our astronomical heritage are not lost forever.

References

- Aveni, A. F. 2001, *Skywatchers* (Austin: University of Texas Press)
- Belmonte 2001, *Archaeoastronomy no. 26* (supplement to *Journal for the History of Astronomy* 32), S1
- Hoskin, M. A. 1997, *The Cambridge Illustrated History of Astronomy* (Cambridge: CUP)
- Krupp, E. C. 1997, *Skywatchers, Shamans and Kings* (New York: Wiley)
- Ruggles, C. L. N. 1997, in: B. W. Cunliffe & A. C. Renfrew (eds.), *Science and Stonehenge*, (Oxford: OUP), p. 203
- Ruggles, C. L. N. 1999, *Astronomy in Prehistoric Britain and Ireland* (New Haven and London: Yale University Press)