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Closing remarks

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Abstract. The purpose of this invited commentary is to present some general closing remarks on the global content of the 'Oxford IX' International Symposium on Archaeoastronomy, taking into account how we evaluate the course archaeoastronomy has taken over the past few years. It is significant that the interdisciplinary field of archaeoastronomy has already, by common consent, changed its name into 'astronomy in culture' (or 'cultural astronomy'). This happened several years ago, although it is still the case that the cultural aspect (cosmovision, or vision of the world) is not always taken sufficiently into account. The keynote presentations by Ruggles, Iwaniszewski and McCluskey addressed fundamental issues of method and theoretical concepts that should guide archaeoastronomical studies. The rest of the sessions as well as the posters were dedicated to case studies from different cultural regions of the world. This commentary synthesizes several common themes that were addressed in the many interesting papers from all over the world that were presented in the meeting. Finally I take up the proposition of Gary Urton that future efforts should be concentrated on the study of the production and maintenance of systems of knowledge in complex state societies as well as in more egalitarian rural communities. In my opinion it is an urgent task to begin discourse about the history of pre-Columbian civilizations in the Americas, a discipline of which the history of science and astronomy forms a fundamental part. The 'Oxford' International Conferences are a key forum for exchange and encounter regarding comparative studies with other ancient civilizations as well as indigenous traditions from all over the world.

Keywords. astronomy in culture, ritual, cosmovision, history of science, history of astronomy, anthropology, ethnohistory, archaeology, comparative studies

1. Introduction

It is not easy to do justice to such a most interesting event: in fact, it is practically impossible. First of all, let me express my thanks to the organizers of Oxford IX as well as to the institutions where the meeting took place and who sponsored its organization.

In the opening session, Clive Ruggles invited me to address the question of how we evaluate the course archaeoastronomy has taken over the past few years. Was it really more interesting twenty or thirty years ago than it is now? It is true that as an anthropologist and ethnohistorian I have been a witness, and to some extent a participant, in the development of archaeoastronomy in the Americas since the 1970s. But this does not induce me to idealize the past, taking into account that the whole social context of academic studies has changed a great deal; some aspects have improved, others not necessarily so. However, one comment can be made. In the 1970s and 1980s, archaeoastronomy was a new project—a task to be constructed as an interdisciplinary field of study—and it then had the appeal of evoking a promising future (Gingerich 1982; Gibbs 1982; McCluskey 1982; Isbell 1982; Aveni 1989; Ruggles & Saunders 1993). Whether it still has this appeal today is an open question.

From the 1990s onwards, the field of studies became more consolidated, and the organizers of this Conference, particularly Clive Ruggles, have contributed a great deal to this consolidation.

In my opinion, the Oxford IX Conference has been a very rich event with respect to the variety of topics presented, both among the oral presentations as well as the posters that considerably enriched the issues raised. Various disciplinary fields were represented as well as different cultures and countries from all over the world with their respective archaeological monuments and historical as well as ethnographic sources.

Since it is impossible to comment one by one on all the papers presented, I will only mention several thematic groups that can be distinguished from my point of view.

2. General issues

The opening session began with keynote presentations covering general issues that included thematic fields and methodological matters. The papers by Ruggles, Iwaniszewski and McCluskey definitely addressed fundamental topics that have to be dealt with again and again.

Clive Ruggles' introductory keynote (see pp. 1–18) stressed the fact that archaeoastronomical studies must apply scientific method by inference, not by testing. Fundamental issues of methodology, such as systematic data collection, are just as important as solid theoretical foundations. Ruggles emphasized that it continues to be important to improve scientific methodology in our case studies. I ask myself in this respect whether the scientific methodology applied by archaeoastronomy also means that we may speak of 'science' in ancient and non-literate societies all over the world. From my point of view this issue needs increasing attention as case studies accumulate.

Stanisław Iwaniszewski (see pp. 30–37), on the other hand, insisted that although the sky is a real experience, only cosmovision (vision of the world) can supply its framework of meaning. He asserts that people's explanation of what is perceived in the sky depends on the patterns of culture—they validate an established worldview. We may ask whether, according to this approach, worldview is understood in terms of cosmovision, a concept that has been introduced into archaeoastronomy in the Americas over the past thirty years. The different emphasis of these two interpretative terms masks a whole complex epistemological discussion. This aside, the fact that astronomy in embedded in culture is certainly a fundamental issue that has become increasingly important over the years. Thus the interdisciplinary field of archaeoastronomy, as it is practised today, has rightly transformed itself into 'astronomy in culture' (or 'cultural astronomy').

In his keynote talk, Stephen McCluskey (see pp. 19–29) pointed out that there exist different perspectives regarding archaeoastronomy or astronomy in culture among historians of science themselves. I agree entirely with this point of view judging from my own experience as an ethnohistorian working in Mesoamerica. This also applies to other disciplinary perspectives. Since archaeoastronomy brings together scholars from different fields, a lack of communication also arises from their different backgrounds. It is a question of emphasis: one's perspective can become very different according to the discipline one is working in. One always thinks that the other field is homogeneous and sees the different approaches only within one's own field.

However, there is a fundamental theoretical difference between looking for scientific thinking implied in cosmovision and seeing it in terms of mythology. I agree with McCluskey that we should take up once more the discussion of what comprises early science in history. McCluskey referred to the definition given by George Sarton, that "Science is systematized positive knowledge . . . [it is] cumulative and progressive". Another definition

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was given by Coleman (1967), who defined scientific knowledge as "the construction of a system based on observable facts the results of which can be compared systematically with subsequent observations to confirm their validity". According to this perspective, one that I have applied in my own work, archaeoastronomy can make a fundamental contribution to the establishment of a history of science in early civilizations. I think that the legitimacy of this goal is generally accepted in Asia, but in the Americas we are still a long way behind.

3. Various themes

According to the program of Oxford IX, the rest of the sessions as well as the posters were dedicated to case studies from different cultural regions of the world. We had sessions on ethnoastronomy from South America and Mesoamerica; the Maya Calendar and the context of the 2012 prophesy; case studies from Polynesia and Asia (China, Japan, Thailand and India), as well as the Arabic world and also from Europe; and in the final session two papers on North America.

A highlight of the meeting was certainly the animated discussions that arose on the second day on the archaeoastronomy of Chankillo, Peru (Ghezzi & Ruggles 2007; see also pp. 144–161). These discussions continued and became ever more passionate on the excursion to the site on the Peruvian coast led by Iván Ghezzi. Other highlights of the conference were the several formal presentations that Gary Urton gave on the archaeoastronomy of Cuzco and his collaboration with Tom Zuidema on the sacred geography of the Inca capital, as well as his talk on 'The role of Khipu Cord-Keeping in Inka Astronomy, Calendrics and State Administration'. Urton also illuminated his colleagues on the topic of khipus on our extremely interesting excursion to the Inka site of Puruchuco (see Fig. 1).

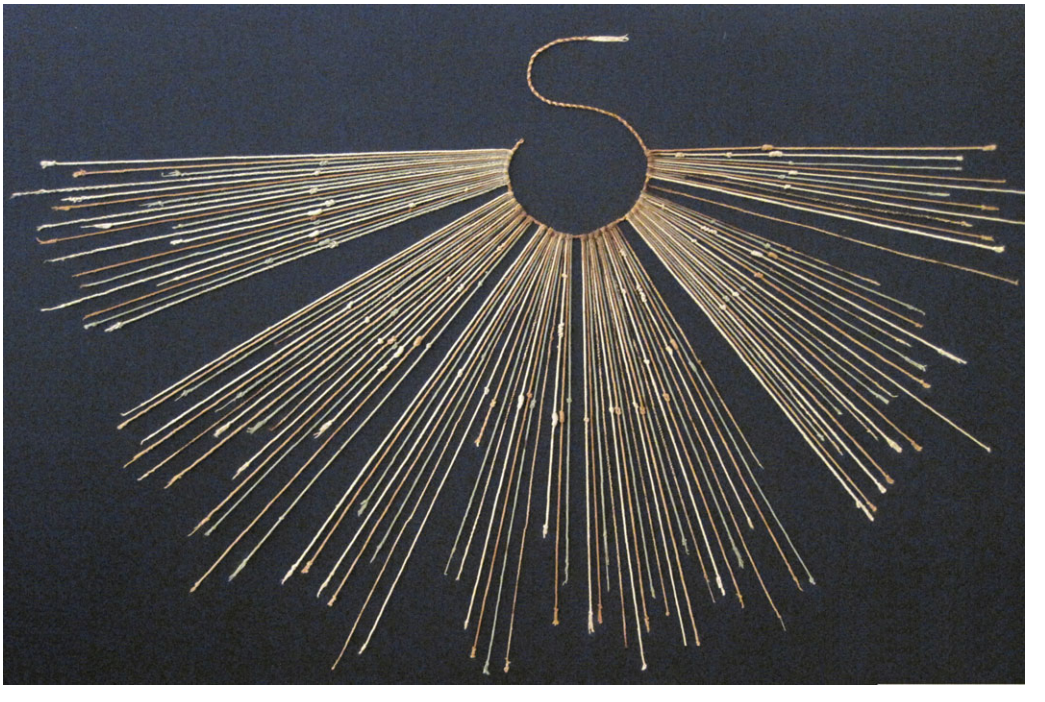

Figure 1. Khipu UR063 at Puruchuco museum. Photo: Clive Ruggles.

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I will now identify and comment on some of the other themes that arose at the conference.

3.1. *Alignment studies*

Alignment studies continue to dominate the field. By this time there exists a vast body of evidence on this topic. I would like to stress, however, that alignment studies really belong to the more comprehensive topic of ritual landscapes. This is not always clearly recognized. Alignments represent societies' efforts to establish a coordination of time and space projected into the landscape, and we need to ask ourselves why societies do this—what are their cultural, religious, and cosmological motives for establishing alignments in architecture and in the planning of whole settlements? I think a lot more can be done relating archaeoastronomy to these cultural issues. More attention should also be paid to the expansion of ancient states that imposed such principles of organization, i.e. the coordination of time and space, for example when the Incas expanded their empire conquering diverse ecological zones. At the conference we heard about Huanuco, Socaire, and the complex road system imposed by the Inca state. This road system—the Capac Ñan—also embodied important cosmological dimensions.

3.2. *Mountains*

Within these alignments, mountains play a very prominent role. Some thirty years ago, when we first became aware of the importance of sacred mountains as points of reference for the alignments of buildings and whole settlements, it was not yet clear that this was a phenomenon shared by cultures all over the world, albeit particularly so in Mesoamerica and the Andes (Broda *et al.* 2001).

3.3. *The Pleiades*

A further point of common interest at the conference, particularly in relation to ethnographic studies from different cultures from all over the world, was the important role of the Pleiades. This particular role is increasingly being documented, a fact that was taken up by several interesting papers. The importance of certain other stars in relation to meteorology was also discussed.

3.4. *Sun v. moon*

The alignments studied continue to relate principally to solar dates, but the moon, and particularly lunar standstills, were mentioned in several papers. This topic was also taken up in the heated discussion about the significance of the calendrical alignments at Chankillo.

3.5. *Navigation*

The relevance of stellar observations in the context of navigation was frequently mentioned.

3.6. *Agriculture*

The relationship of the solar cycle to agricultural activities was also emphasized in several presentations. Years ago, little awareness existed of this factor in relation to the calendar, and it is significant that now it is being generally accepted.

3.7. *Calendrics*

In the context of the study of calendrics, a very complex and rich topic, it must be taken into account that the calendar is not only based on astronomical observations. The

calendar is not pure astronomy, it is social practice, closely tied to other social, economic, political and religious activities. Some papers presented interesting facts about the role of calendar-making in the formation of unified states in different parts of the world.

3.8. *Astrology*

Interesting data were presented at the meeting concerning the relationship between calendrics and astrology, and especially about the astrological use of the calendar in China, India and Babylon (Uruk). These facts are very suggestive as regards to Mesoamerica, where indigenous sources talk a good deal about the astrological aspects of the ritual calendar, the *tonalpohualli*, its mantic associations being represented in the codices. From the point of view of Mesoamerican studies it is very interesting to note that other ancient civilizations also created intimate links between astronomy and astrology and concerned themselves greatly with astronomical facts in the service of astrology and divination.

3.9. *Astronomy and ritual*

Cultural astronomers today accept without question the importance of ritual in relation to astronomical observation. An innovative approach aired at this conference was to investigate the use of music in ritual: we heard about chants dedicated to the planets in the context of Hindu rituals.

Another aspect is the role of ritual specialists and their link to astronomical observations. McCluskey pointed out that one way of learning more about astronomical practices is to study the role of ritual specialists in different cultures. As examples he mentioned two outstanding studies by participants in earlier Oxford meetings: the Arabic world studied by David King, and Barbara Tedlock's (1982) studies of the role of ritual specialists among the Maya Quiche of Momostenango, Guatemala. Tedlock's pioneering work in Mexico is actually being followed up by a number of ongoing field studies on the role of ritual specialists in modern Indian communities, while ethnohistorians are studying the role of priest-astronomers and their relationship to ritual and the state as documented in the historical sources. This kind of research runs parallel to, and can benefit a great deal from, comparative studies within the Americas. This is particularly the case in the Andes and with respect to Inca khipu specialists, priest-astronomers about whom Gary Urton spoke in his magnificent talk.

Urton also spoke about the production and maintenance of systems of knowledge and how states maintain such systems of knowledge. I concur with Urton and would emphasize that a fundamental trait of complex states, with their bureaucratic organization, is that they have full-time specialists dedicated to astronomical observation. Not all societies have this institution, and this constitutes a fundamental difference between such states and more egalitarian rural communities. It is a difference we need to take into account.

3.10. *Other themes*

Within complex state societies, we may also study the role of the perception of latitude, i.e. geographical location. In the Americas we have initiated the study of this subject (Broda 2006). In this context we might also mention the role of numbers, or the mathematics used in astronomy, in architecture and in the orientation of buildings and sites. It is an urgent task to learn more about the development of indigenous arithmetic and geometry, disciplines that are implicit in the processes studied by archaeoastronomy.

4. Conclusion

I am convinced that it is important to introduce new fields of research that place astronomy in its cultural context in novel ways. Comparative studies of the use of astronomy in different cultures are important, although very difficult to put into practice, and it certainly is an asset of the 'Oxford' conferences that they bring together such a wide range of regional specialists and different disciplinary backgrounds. For me as a Mesoamericanist, the most interesting aspect of attending international meetings of this kind is to listen to our colleagues from, and specialists on, Asian civilizations.

We can learn a good deal from these comparisons. In Asia, for example, experts do not talk of *pre*-history, but rather of the complex processes involved in creating ancient native records and texts. We should begin urgently to speak of the history of pre-Columbian civilizations in the Americas, and to recognise this as a discipline of which the history of science and the history of astronomy form a fundamental part (Brotherston 1992).

Finally, I should say that some of the best papers here were presented by young scholars, some of them working on their postgraduate theses. Their enthusiasm was an excellent contribution to this meeting, since they are the ones who have the task of continuing the development of astronomy in culture.

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