Editorial

Fabio Silva and Liz Henty

Uncertainty is a key concept in skyscape archaeology, as it should be in any academic discourse that features measurement so heavily. Any act of measurement carries with it a degree of uncertainty, whether one is measuring the length of a piece of string with a ruler, the orientation of a prehistoric passage grave with a compass or a modern building with a total station. Estimates are made, corners cut and there is always the precision of the measuring instrument to consider, usually advertised by the manufacturer as having the minimum uncertainty possible.

Equally important is the uncertainty of the inferences made from the quantitative data. A particular methodology might highlight a particular orientation as having been of importance to a particular society, but what is the uncertainty in the highlighted orientation? How certain can we be of the quantitative method's precision? If a set of monuments is mostly oriented towards a declination of -24° can we say that this constitutes evidence for an alignment to December solstice? Or, otherwise, is the uncertainty such that the method cannot actually distinguish orientations lying between -18° and -30° ? If the latter, can one really speak with certainty of a solstitial orientation when a lunar limit, for example, is equally likely? Inferential uncertainty is therefore of the utmost importance for any debate surrounding structural orientations, as it is for the authors of the papers in this issue.

This point is fleshed out by **Fabio Silva** in his Theory & Method Article titled "Inferring Alignments I: Exploring the Accuracy and Precision of Two Statistical Approaches". The author uses the Monte Carlo method to explore the inferential uncertainty of two statistical methods used to infer alignments from sets of orientation data. The two methods under comparison, the curvigram and maximum likelihood methods, are almost equally accurate, but the latter is far more precise than the former. More work is needed before the maximum likelihood approach can be applied across most realistic case studies, but the equations, figures and discussion provided by the author should alert future scholars to the dangers of ignoring measurement and inferential uncertainty.

Bernadette Brady is not in danger of falling into that trap in her Research Article "The Dual Alignments of the Solstitial Churches in North Wales". With careful attention paid to measurement uncertainty, she highlights 12 churches in northern Wales that

feature a solstitial orientation, a feature that none of the other 90 churches in these counties possess. Brady untangles the implications of having churches located in such varied landscapes oriented in such a way as to preserve a relationship with the midsummer sunrise in addition to a second alignment that clusters regionally. She argues that “the original fifth- or sixth-century churches, which were later rebuilt in stone, appropriated pre-existing sacred sites”, Celtic, and possibly pre-Christian, in nature.

The theme of medieval church orientations is continued in **José M. Abril’s** “Evidence of Churches Aligned to the Sun on the Patron Saint’s Day in Southern Spain after the Twelfth Century”. Equally taking uncertainty into account, the author finds frequency peaks that match the sunrise or sunset on the church’s respective patron saint feast day, which he supports by a case study focused on the town of Bujalance. Much as in Brady’s paper, the author finds that the patterns are not equally applicable across the studied region: “These patterns of alignment were a rare variant which was expressed with higher intensity in central Andalusia, Ciudad Real and Extremadura from the early fourteenth until the seventeenth centuries, surviving the Gregorian reform of the calendar.”

The concept of uncertainty, and the need to acknowledge it, applies to more than measurement: the interpretation of data is often mired with uncertainties, particularly when some datum is looked at in isolation. Instead, independent and complementary datasets can be sought in order to lower interpretative uncertainty, for instance by backing one’s claims with recourse to historical or epigraphical sources. In “Archaeological footprints of the ‘Celtic calendar’?”, **Marco V. García Quintela** and **A. César González-García** take a critical and systematic look at the idea of a pan-Celtic calendar, by considering the archaeological, epigraphical and historical sources that have been, often uncritically, used to support such claims. They conclude that though “there may be common aspects that connect all Celtic sites and areas, there was no common calendar as such”, although they make the case for a “shared time-reckoning system”. To shed light on this issue, the authors believe that a three-part complementary and interdisciplinary cultural astronomical research programme is necessary, that expands the number of archaeological case studies in Gaul, includes case studies in Great Britain and Ireland and considers whether any identified similarities across these regions were due to independent innovation or adoption.

Moving from the Atlantic to the Mediterranean, **Frank Ventura** and **George Agius** search for complementary material evidence to substantiate or refute the supposed equinoctial alignment of the Neolithic temple of Mnajdra, in the island of Malta. In this long overdue paper, titled “An Investigation of the possible Equinox Alignment at Mnajdra, Malta”, is described the discovery, by the authors, of a posthole that might have been used as a marker for December solstice sunrise as seen from the mentioned temple’s entrance. This find, made by the authors almost 30 years ago, has not been fully integrated into the academic discourse surrounding the temple’s orientation or that of its internal façade, which is suggested to track the position of sunrise over the course of a year. A second posthole was also found, though it is off the June solstice sunrise position by about three degrees, making it difficult to argue that they could have bisected “the

angle between the solstices on the ground in their attempt to orientate the temple to the equinox". Sadly George Agius passed away shortly before publication and we hope that this paper serves as a reminder of his contributions to the field.

In effect, this problem extends well outside of the Mediterranean. In a return of our Reprints section, **Clive Ruggles'** "Whose Equinox?" first raised the problem of uncritically interpreting an easterly–westerly orientation as "equinoctial" as if the equinox was a universally recognised feature. The author argued that, as presently defined, the equinox is a modern concept and one should instead seek alternative explanations that make sense for the society being studied. Ruggles has expanded upon this in a new postscript, where he concludes that the equinox "remains useful as a point of reference for *us*, [...] provided that we are not led implicitly to the assumption that it was also a meaningful point of reference for *them*."

Phenomenology is another method of gathering data, and one that can most readily be used to propose and explore alternative interpretations to archaeological sites. In this arena, **Ilaria Cristofaro's** Theory & Method Article "Reflecting the Sky in Water: A Phenomenological Exploration of Water-skyscapes" is a breath of fresh air. Through auto-ethnography and reflexive phenomenology, the author remarks upon and highlights the role water spaces can have as a means for reflecting the sky, something that "is often undervalued when interpreting archaeoastronomical sites." Her own thoughts and experiences, as she concludes, "aim to inspire new perspectives on sky-and-water related case studies and give value to the practice of reflexive phenomenology as a crucial method of research."

Three major conferences and/or sessions in the field of skyline archaeology occurred in Great Britain in 2016. In June, not far from the solstice, "The Astronomy in Skyscapes – Archaeoastronomy beyond Alignments", a session of the National Astronomy Meeting, was held at the University of Nottingham, and is here reviewed by **Frank Prendergast**. Around the autumnal equinox, the city of Bath hosted the 24th conference of the European Society for Astronomy in Culture, Europe's largest gathering of cultural astronomers. Titled "The Marriage of Astronomy and Culture: Theory and Method in the Study of Cultural Astronomy", this conference tried to push the boundaries of the field, as the review by **A. César González-García** shows. A few months later, and just before the December solstice, a session titled "Visualizing Skyscapes: Material Forms of Cultural Engagement with the Heavens" was held at the Theoretical Archaeology Group meeting at the University of Southampton, reviewed here by **Daniel Brown**.

In a field that is short of textbooks, Giulio Magli's undergraduate-oriented *Archaeoastronomy: Introduction to the Science of Stars and Stones* is a welcome addition and is reviewed in this issue by **Javier Mejuto**. *The Use and Reuse of Stone Circles: Fieldwork at Five Scottish Monuments and its Implications*, edited by "honorary skyline archaeologist" Richard Bradley and Courtney Nimura, is reviewed by **Liz Henty**, who highlights the importance of a careful attention to the archaeological record. Finally, **Pamela Armstrong** reviews another archaeologically-minded volume, David Field and David McOmish's *Neolithic Horizons: Monuments and Changing Communities in the Wessex Landscape*.

We would also like to draw readers' attention to the new Notices section on **Software**. With the continued rise of computational tools and approaches within archaeology and archaeoastronomy this feels like a natural extension of the journal's desire to keep its readers up-to-date with the latest research. We have, therefore, invited the developers of the most widely used software packages to provide us with up-to-date summaries of the latest versions and, therefore, draw attention to new facilities and what can be expected in the near future.

Finally, and as per usual, we would like to thank our contributors and everyone involved in the publication of our journal.