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Giulio Magli

Archaeoastronomy

Introduction to the Science of Stars and Stones

 Springer

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Introduction

It was 21 December 1969. A few minutes before dawn in Newgrange, Ireland.

Archaeologist Michael J. O’Kelly carefully checked that his latest discovery, a narrow opening located directly above the entrance to the tomb, was unobstructed by any pieces of wood or debris. Then, he closed the door, walked up the corridor to the end room and sat down. He waited. Shortly afterwards, the Sun appeared on the horizon, filtered through the window, reached the chamber and cast a ray. In this way, an appointment between stars and stones that had been set up 5000 years previously was finally attended again. And a new science, archaeoastronomy, was officially born.

Since then archaeoastronomy has undergone a long and sometimes arduous development, gradually leading up to the comprehensive, well-grounded scientific discipline that it is today. However, all the ingredients were already in place at that moment: a monument built by knowledgeable architects, a shining star, and a scientist, eager to understand how and why those ancient architects connected their building with the sky.

This book is intended as an up-to-date, easy-to-follow presentation of the subject. As a second, but equally important aim, it also intends to arm the reader with the necessary set of instruments that will enable him to distinguish between serious archaeoastronomical research and the vast amount of pseudo-archaeological clap-trap masquerading as archaeoastronomy which is readily available on the Web and in bookshops. The volume is self-contained and can therefore be approached by any curious person, from the archaeologist or astronomer interested in the applications of this discipline to the general reader. However, it has been designed basically as an undergraduate textbook and is the fruit of my eight years experience of teaching the archaeoastronomy course at the Faculty of Civil Architecture in the Politecnico of Milan (indeed it is the only course of its kind offered in an Italian university). And of course, any academic book worth its salt would not be complete without a section of exercises at the end.

The material is organised as follows. I have with some reluctance included the concepts that are essential for grasping technical aspects of the subject—for example, in learning how to carry out the archaeoastronomical analysis of a site—in Part I.

The reason is that any self-respecting course in archaeoastronomy must first deal with at least the basics of such notions. As a result, from the very first pages the reader will be faced with technical material, such as astronomy with the naked eye, positional astronomy and data analysis. This part may be potentially off-putting for even the most ardent reader, and my suggestion is that the author's order need not be strictly respected. One possibility may be to start studying only Sects. 1.1–1.6 of Chap. 1 (basic astronomy with the naked eye of the Sun and the stars, and precession) and then proceed, considering the rest of Chap. 1 as a handy reference guide if a particular concept needs to be explored. Chapters 2 and 3 can then be browsed through briefly, and the bulk of Part I left to be studied at the end, in order to have a complete overview and tackle the final exercises and/or fieldwork. A similar line could be followed (and it is actually followed by myself) in teaching the same material.

Part II is divided into three chapters. Chapter 4 discusses at some length the birth of the relationship between astronomy and architecture and can be omitted at a first reading. It shows how the two have developed side by side since ancient times, and seeks to demonstrate that they actually started together. The reasons behind this connection are explored at length in Chap. 5, which is devoted to the nexus between religion, power, astronomy and architecture. Key concepts such as hierophany and sacred (or cosmic) landscape are introduced and discussed against the historical and anthropological background of archaeoastronomy. Chapter 6 then explores the scientific foundations of archaeoastronomy as well as its relationship with the humanities. The goal is essentially to emphasise the ways in which this discipline can be used as a tool in understanding some significant aspects of the past civilisations, but also to warn against the dangers of indiscriminate or possibly naive use.

Part III is devoted to the detailed description of a dozen or so significant places. The choice of the sites has been made with the objective of giving a sample of achievements made but also of explaining some of the problems inherent in this discipline; the list contains several well-known, spectacular monuments and landscapes but also less famous ones which are, nevertheless, fascinating and instructive from various viewpoints. There is of course no aim at completeness, and I apologise in advance to any reader who might be disappointed at not finding a particular country or site mentioned. However, after studying this book the reader will be able to read the relevant literature on any place or site that has piqued his interest and seek it out, both virtually and in reality. Further, most of the places that I have only touched on briefly in the book are discussed—concisely but effectively—in the entries of the recent *Handbook of Archaeoastronomy and Ethnoastronomy*, edited by Clive Ruggles (2015).

As mentioned, the book ends with a series of exercises which the reader can attempt using free astronomical and virtual globe software. Of course, there is no substitute for field experience, which is recommended to all readers whenever they have the opportunity. However, this software allows us to simulate fieldwork on our own PCs, and this greatly facilitates teaching—and learning—archaeoastronomy. Besides, leaving aside the Sun, the appointments fixed with the other stars are no

longer valid today, due to the phenomenon called precession, and therefore have to be recreated with a computer anyway.

Well, without further ado, let me lead you into this book by borrowing two verses from a Italian poet whose identity, I believe, is not infernally difficult to guess. The verses, supposedly pronounced at dawn a few days after the spring equinox of 1301, read: *Ma seguimi oramai che 'l gir mi piace/ché i Pesci guizzan su per l'orizzonta*, that is (author's translation): *But now follow me, because I would like to go/since the Fishes are already quivering on the horizon.*