PREFACE TO THIS EDITION

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As this important but almost forgotten book is brought back into print after seventy years, it would be fair first to remind the reader of the author's credentials. Sir Norman Lockyer (1836–1920) was one of the major English astronomers of his time. Born in Rugby, he completed his education on the Continent of Europe, and came to astronomy by way of private study and a clerkship in the War Office. In 1870 he was appointed secretary to the Duke of Devonshire's Royal Commission on science; a few years later, on the foundation of the Royal College of Science in London, he became director of the solar physics observatory and professor of astronomical physics. From 1866, he had been a pioneer in sun and star spectroscopy. He inaugurated *Nature* in 1869 and edited it until his death. His interests went far afield, as we shall see. Always something of a maverick, he suddenly abandoned the Royal College and removed the instruments to his estate at Sidmouth, where he founded his own observatory. It is now the "Lockyer's Observatory" and contains a mass of his papers still unpublished.

Lockyer's fame is solidly based on his study of the sun. In 1868 he described the flares and prominences of the sun as located in a layer he called the chromosphere, and applied the Doppler principle to its movements. In 1868 Lockyer and Janssen, working independently, discovered a spectroscopic method whereby the solar prominences could be studied in daylight, whereas previously they were observable only during a total eclipse. To commemorate this discovery, a medal bearing the names of both astronomers was struck by the French government in 1872. Lockyer received the Rumford medal in 1874, and was vice-president of the Royal Society in 1892–1893. Among his most important discoveries is that of a new element in the solar atmosphere that he called "helium" and that was found later among the rare gases on earth.

After 1890, Lockyer became interested in a problem which had also attracted Newton, that of bringing in astronomy to assist the chronology of history. After a careful investigation of Egyptian monuments on the spot, he published in 1894 his *Dawn of Astronomy,* a work of far-reaching consequences. Egyptologists dismissed it with good-natured laughter, advising the

cobbler to stick to his last, and the book dropped out of sight,[1] to the point that when Zaba wrote his important monograph on the orientation of the pyramids[2] in 1953, he was unable to find a copy within reach from Prague and lamented his inability to consult it.

For archeologists, Lockyer was not a member of the guild; despite his fame as an astronomer, they may have taken him for one of the usual excited pyramidologists (Piazzi Smyth, another astronomer, had created a stir a century earlier). There is no doubt that Lockyer showed obviously weak sides, such as his fanciful speculations about the origins of astronomy, or his equally imaginative reconstruction of Egyptian history, ancient totemism, and the like. One is disturbed by his hasty generalizations, as when he ventures to say that Isis stands for anything luminous to the eastward heralding sunrise (p. 293) or that Osiris stands for any celestial body becoming invisible (p. 296); or proposes as an alternative that mummies in hieroglyphs might indicate a setting star, horns and disk a rising one. Such remarks can breed uneasy diffidence, even among his admirers. On the other hand, it is not as arbitrary as it sounds to suspect an equation between Aphrodite, Artemis, and Persephone in cases where no immense architectural graveyard is available to confirm it.

Sir Norman Lockyer's merit lies in the kind of questions he dared to ask, in his unshakable awareness of a veritable technical language hidden in the myths, in his astronomical capacity to decipher it by investigating on the spot. He derived his conclusions about the astronomical character of Egyptian religion on the solidest architectural measurements and astronomical calculations, and then saw how these are represented in the "divine language" of inscriptions and literary texts. From a model like this we can see better how we have to proceed when we have only the latter kind of material to work with, as usually happens.

Lockyer not only had enough confidence to take for certain that the orientation of the temples had astronomical reasons but also used his instruments to work out which of the possible astronomical reasons would stand up under scrutiny.

All of this was beyond the ken of ordinary philologists, and so they chose to ignore it.

Later, Zaba had to start all over again. His main concern was the orientation of the pyramids, which are very accurately to the North and South

[1] Lockyer's later book on Stonehenge (1906), based on admittedly frailer evidence, suffered a similar fate at the hands of Celtic archeologists. A recent professional work (R. F. C. Atkinson, *Stonehenge,* London, 1956) dismissed his astronomical alignments on the summer solstice on plausible archeological grounds. The issue had been considered settled until last year when Professor Gerald Hawkins of Boston University took up the problem again with more alignments and a computer to help him, confirming Lockyer's suggested dates.

[2] Zbynek Zaba, "L'orientation astronomique dans l'ancienne Egypte et la précession de l'axe du monde" (supplement to: *Archiv Orientalni,* Prague, Czechoslovak Academy of Sciences, 1953).

(or East-West). He found it necessary to argue at length against the current opinion that the accuracy is purely coincidental, requiring no precise observational method. To such a pass we have come, and there are by now even historians of science willing to follow. Zaba himself yields to the trend, occasionally, and accepts without examination the opinion that non-meridional temples are oriented by nothing more than practical convenience, "symmetrophobia," and a general preference for the direction of the Nile. Had he been able to read Lockyer, he would have changed his mind.

Lockyer's thought, no doubt, requires deep revision. Yet there is another point that must be made from his work, and it leads to conclusions of the utmost importance. When a stellar temple is oriented so accurately that it requires several reconstructions at intervals of a few centuries, which involve each time the rebuilding of its narrow alignment on a star, and the wrecking of the main symmetry that goes with it; when Zodiacs, like that of Denderah, are deliberately depicted in the appearance they would have had centuries before, as if to date the changes, then it is not reasonable to suppose the Egyptians unaware of the Precession of the Equinoxes, even if their mathematics was unable to predict it numerically. Lockyer lets the facts speak for themselves, but it is he who has given the proof. Actually, the Egyptians do describe the Precession, but in language usually written off as mythological or religious. This is perhaps a habit so deeply ingrained in us after 400 years of the "warfare between religion and science" that we never realize how much it corrupts our judgment when extrapolated into ancient history of other civilizations. And now that by a strange turn of events in our scientific age, the Irrational has won out in the minds of scholars under the fashionable form of the Great Unconscious, the confusion has only become worse confounded.

Lockyer was not too bold, as is usually said; he was not bold enough. Had he lived in the time of Lepsius and Brugsch, he might have found more courage. He would have recognized planetary gods in the documents, had he not been bemused by the current verbiage about cult practices, which is making Egyptian history ever less interesting. The time has come to reopen the case, to honor Lockyer as a pioneer, and to carry on in his spirit, with securer data.

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