

Ancient Lighthouses - Part 1: The Literature

by Ken Trethewey

Gravesend Cottage, Torpoint, Cornwall, PL11 2LX, UK

Abstract: *There are very few standard works of pharology, perhaps because the subject is interdisciplinary and contains elements of history, geography, and engineering. Each of the previously published works presents the evidence of ancient lighthouses only as a brief introduction to in-depth analyses of more recent lighthouse history, and although each essay improves upon the one before, none provides satisfactory answers to the question of the origins of lighthouses. In the last two decades, the situation has become clearer.*

Pharology - A Specialist, Minority Subject?

In western cultures, one of the earliest things a child learns to recognize is a lighthouse. We know them so well we don't think much about them. We know they are found at the seaside, that they shine lights in the darkness, and that they are associated with ships, but we seldom give further thought to how lighthouses work or how they came to be built in a given location. Sometimes we might read quirky stories about the life of a lighthouse keeper and not realize that many lighthouses are automatic; thanks to technology, the life of the lighthouse keeper has been consigned to history. All this surely leads to the subject details being thought of as one of specialist, minority interest. Archaeologists who study ancient ports and harbours mostly put lighthouses at the bottom of their list of interests, as this work will demonstrate. Those who specialize in land excavations are almost entirely uninterested in lighthouses. Partly, this is due to difficulties in interpretation, but it is also the case that many sites are either underwater or have been extensively built upon. Few people know just how much the building of lighthouses has contributed to engineering in general. In other volumes in this series I will explore the many useful engineering advances that have been made possible thanks to lighthouse construction, and I too shall present my own version of the history of modern lighthouses. In this work I shall start at the beginning.

Despite this apparently minor position in the pantheon of academic study, the lighthouse is deeply embedded in the psyche of people growing up (in the western culture, at least). When people think of lighthouses, most get a positive vibe.

Lighthouses are almost always associated with everything that is good about humanity. Lighthouses are used as symbols and logos in many unrelated areas of everyday life such as AIDS charities, and other cancer support groups - anything involved with good where an action is seen as, literally, shining light into darkness. These are some of the most fundamental symbols of the human spirit. Of family, of love and of positivity for the future; life and death, good and evil, light and dark, right and wrong, wisdom and foolishness, civilization and barbarism.

In Plymouth UK, near where I live, John Smeaton's lighthouse that now stands on Plymouth Hoe¹ has become the unofficial logo of the city and is used everywhere in local life. Indeed, lighthouses have become universal icons, symbols or tokens that transcend nationality. So, far from being things of marginal interest, lighthouses have a fundamental place in current (Western) culture. Yet, in their earliest days, they seem to have received scant regard save from mariners. The unravelling of the early history of lighthouses has been much neglected. This book sets out to build another milestone in the history of a human endeavour that ought perhaps to be of *majority* interest.

Objective

The objectives of this paper are:

1. To survey the archive and legacy of written material that concerns the use of lights for marine navigation at night.

2. To describe a social, environmental and geographical context in which the first lighthouse might have been constructed.



Fig. 1-1: An impression of the Pharos of Alexandria in Egypt.⁶²

The Need For A New Study

When we start to learn history, perhaps we discover ancient Egypt - a subject that is itself well-known and exciting for inquisitive young minds. Once we have found out about the fabulous pyramids, we may focus on the Pharos of Alexandria, Fig. 1-1, whereupon we perhaps learn that it was one of the most amazing and magnificent structures ever built. We discover that the Egyptians built a lighthouse several hundred years before the birth of Christ, and how the people of that culture built a wonderful city that was, for a time, the busiest, most important trading city in the world. The Pharos was one of a group of marvellous ancient structures known as *The Seven Wonders of the World*.² Curiously, there was another member of the group called the Colossus of Rhodes that many writers since the sixteenth century have described as a lighthouse. To have not just one, but two members of the group that were lighthouses perhaps shows how important the idea was to writers of the Renaissance Period. Despite the fact that 20th century scholars have debunked the theory that the Colossus was ever a lighthouse, once an idea takes hold of the public imagination, it is hard to dispel. We need to con-

sider our current state of knowledge about these two structures in particular, to try to distinguish fact from fiction. The Colossus will be discussed shortly, whilst the Pharos will be the subject of Part 5 in this series.

If, at a superficial level, we ponder upon how the Pharos came to be built it all seems obvious. People have been travelling by sea since they first discovered how to build boats. That must have been a very long time ago. Surely they built lighthouses to help them navigate, perhaps like the one shown in Fig. 1-2? It may come as a surprise to discover that in the years prior to the building of the Pharos, there are few things that are certain when it comes to navigation at night. It is hard to find clear evidence of any ancient lighthouse structure, of how it was designed, built and operated, or of how long it was useful to mariners. This book will attempt to decipher this mystery.

As far as I know, this is one of a very few books in recent years that has seriously addressed the subject of ancient lighthouses and their origins, during which time there has been a great deal of research and information sharing across the Internet. Many authors have published books containing beautiful photographs of an enormous range of structures used as lighthouses, yet few

have decided to probe the distant past for a clearer picture of the sources of these ideas. So far, with but three exceptions, pharologists have failed to give adequate consideration to the subject of the earliest lighthouses.

Standards of publication have changed. In earlier times (and today in formal text books), in accordance with the scientific method, it was required to present precise data, backed up by citations that allowed a reader to challenge any stated fact. Today, writing and publishing styles have changed such that it has become more acceptable to present both fact and opinion side by side, providing that statements are backed up with supporting references and notes. This allows for more creative thinking and for the faster development of knowledge. I aim to take a more modern view of historical analysis.

Three well-known pharologists are considered to have published definitive works on lighthouses. In 1959, David Alan Stevenson, a member of the famous dynasty of Scottish lighthouse engineers, published a book entitled, *The World's Lighthouses Before 1820*.³ There had, of course, been many other books about lighthouses and their history, but this was the first thorough and reputable source for students of pharology. Yet it contains only 12 pages of material covering the topic of Ancient Lighthouses, that is, structures from the earliest times to the end of the Roman Empire, perceived by the British as around the year 400 when the Romans evacuated from England. Despite the British bias, this year does make a useful point of delineation and will be used to separate this volume from the next.

In 1975, Douglas Hague and his colleague Rosemary Christie published a book entitled *Lighthouses: Their Architecture, History and Archaeology*.⁴ Similarly, there were just 23 pages devoted to lighthouses before the Medieval period, but many lighthouse scholars considered these authors to have made the best analysis following the publication by Stevenson. For the first time, a serious study of lighthouse architecture had been made.

A third, in-depth analysis was made by Friedrich-Karl Zemke in the first volume of his series of books entitled *Leuchttürme Der Welt* (Lighthouses of the World).⁵ With more space available to him, Zemke was able to develop his lifetime of experience in much greater depth than had been

achieved previously. The work was available in German only.

Stevenson made a survey of the literature regarding locations in the ancient world and concluded that there was definite proof of the existence of fifteen lightstructures. Hague and Christie published their analysis of 41 locations and offered a map showing the disposition of sites of ancient lighthouses, both those for which there was solid evidence of their existence and those for which there was some doubt. Zemke's review, built upon the work of Hague and Christie and identified 50 locations. (Full details of these data are given in the Catalogue towards the end of this volume.)

My assessments about three highly regarded works of pharology are not intended to imply that there was anything inferior or inadequate about them. It is simply to say that there was so little that could be reported with certainty, and so much that could not be concluded about the origins of lighthouses. In view of the passage of time since the last published volume, we might now ask: Is there, somewhere, an answer to be found, or are we condemned to everlasting uncertainty? This work is intended to shed new light on the subject.

The Scope Of This Work

It is clear that geographical features have acted as navigational aids, whether on land or at sea, since the dawn of mankind. Active volcanoes such as Etna, Vesuvius and Stromboli in the Mediterranean provided brightness in otherwise dark skies and would have been identifiable over many miles of land and sea. It is obvious that, when available, geographical features were as useful to navigators as were the positions of the sun, the moon and the stars, but in this volume we shall consider who created the first artificial aids for navigation at night.

The location of the first lighthouse in history has been the subject of much speculation. The Pharos of Alexandria was one of the earliest, and certainly the most wonderful. However, it is commonly accepted that the idea behind the building of structures to assist navigation at night was already widespread by the time of the Pharos. The glaring absence of substantive evidence in support of an answer to the question, "What came before the Pharos?" has meant that few pharologists in the twentieth century have seriously reported on the matter. From the present perspective at the begin-



Fig. 1-2: An impression of an ancient fire-tower.⁶³

ning of the 21st century, and with the benefit of the most recent archaeological evidence, it would seem a good moment to survey the information now available.

New scientific techniques have inspired much new archaeology or reinterpretation of old archaeology, and we have learned much more about the lives of the earliest humans and their engagement with water-borne travel. This work will attempt to include all this new information in the context of ancient lighthouses. First, I shall give a detailed and critical review of what has already been written about lighthouses. I shall provide details of what I regard as the most significant works, omitting publications that are simply derivative. It will be necessary to analyze the earliest known written material and to consider how the study of languages might help us determine the context in which lighthouses might have come into existence.

An issue that is evident from the start is how, in a subject that must be nearly as old as the story of humanity, we can delve into pre-history - the time before writing was invented. In Paper 2, I shall describe the latest ideas about where humans came from and how they first learned to travel on water. Once they had learned this, they needed to navigate their way from one place to another and I shall describe what we know of the methods by which this was achieved. The need for lighthouses will become apparent and I shall suggest times when this might have happened.

In Paper 3, I shall describe the history and cul-

ture of some of the earliest seafarers - the ancient Greeks, and examine how they might have used navigational aids. In Paper 4, I shall make the same lines of inquiry about the Phoenicians, who are well recognized as being the most expert marine navigators. As I indicated previously, Paper 5 will contain a detailed description of the Pharos of Alexandria - the most important lighthouse that ever existed. Paper 6 will be a summary of some of the most well known lighthouses constructed in the centuries after the Pharos, mostly by Roman builders, up to the year 400 CE, the year chosen to end this study. Finally, I shall present a catalogue of the world's lighthouses from the earliest times to the year 400 CE. To counter the great deal of doubt that envelops much of this data, I shall include an estimate of the likelihood that a lighthouse existed at a given site.

Throughout this work I have tried to be as scientifically and historically correct as possible. However, the nature of some of the material is such that it does not meet the criteria for archaeological and historical certainty. Where other authors have refused to enter this world of speculation, I have taken upon myself the task of presenting a coherent thesis of the subject as accurately as I can, even without the necessary facts to confirm the theories. I understand fully that this approach may not please some readers, but I do this in the absence of any other comparable discussion. In so doing I hope to stimulate the pharologists and archaeologists of the future.

A 21st Century Census Of Ancient Lighthouses

The 21st century has already brought a new dynamic to pharology. A deep and comprehensive study was made by Baldassare Giardina in 2010.⁶ To some extent this book has been influenced and assisted by his work. Giardina's publication is remarkable in many ways, although it has many errors and is written in a rather less than academic style. Its English language content exhibits a complete lack of editorial scrutiny, a problem perhaps with the translation, rather than the original Italian. Its illustrations are, in many cases, unsatisfactory, reproduced in poor quality monochrome. However, the book is published in both Italian and English, has a very great number of valuable references and presents extensive arguments in favour of the existence of lighthouses where so far, there has been little or no evidence.

Many of the 76 lighthouse sites presented by Giardina are supported by the original research papers, although a proportion of them are very difficult to obtain. The subject matter is almost entirely about lighthouses built after the Alexandrian Pharos, although the author does try to present his theory of the origins of lighthouses, and makes the best statement up to the date of publication. There is no doubt that, overall, it represents a big step forward for pharologists.

In 2009, Arthur de Graauw published a *Catalogue of Ancient Ports and Harbours* that is available on-line and kept updated. In 2016, 4,076 sites were listed, and, with the help of Christiansen and others, included evidence about the possible existence of lighthouses wherever it was found.⁷ It builds further upon the works of previous authors, and includes, wherever possible, results from the most recent archaeological investigations. In total, some 200 possible locations of lighthouses have been examined so far. Whilst constituting a priceless survey of its kind, and one that can undoubtedly be built upon, we should remember that its primary purpose was *not* to catalogue lighthouses, and that the pharological content is limited to presentation of data with no analysis.

We might briefly consider what constitutes 'proof' that these structures once existed. In English criminal trials, the standard of proof is that a crime was committed "beyond reasonable doubt".

It is a higher level than the civil standard of "proof on a balance of probabilities". Thus, the test of proof in a civil case is whether it is more likely than not, that an assertion is true. In many cases discussed in this book, I am inclined to apply the civil standard, rather than the criminal standard used by our more exacting predecessors. We might also consider the evidence that is available to reach this arbitrary standard of proof. Circumstantial evidence is evidence that relies on an inference to connect it to a conclusion of fact. By contrast, direct evidence supports the truth of an assertion without need for any additional evidence. In an ideal world, we might research the possible existence of a lighthouse and find some kind of verification, a detail that, after forensic analysis, would unambiguously provide an answer that a lighthouse did or did not exist. Unfortunately, in the real world, we can only answer a question with a degree of certainty. Everything is based upon a measure of certainty that ranges between zero and 100%. The law prefers to consider true/false situations - it would like us to think that a crime was or was not committed, but in the end it is usually accepted that an event takes place beyond reasonable doubt, say, >90%. The lesser standard of proof might reasonably be set at >50%. Our analysis in this book must work in parallel with these ideas, so my catalogue contains entries that are colour-coded to give a simple assessment of probability.

In the absence of an actual structure that we can visit (and, hopefully, climb!) we must accept that there may be a limited amount of evidence in support of a lighthouse having existed at any given point. In the far distant past, before the normal kinds of evidence can be found, we must resort to logical arguments made in the context of everything else that is known about the time. So, to decide if an answer to these kinds of questions about the earliest navigational aids is even possible, I shall offer a broad treatment of ancient history so as to provide a background whereby better estimates of probability may be made. Subjective though this may be, it is, I believe, the best we can achieve today and is a useful addition to what is still an evolving knowledgebase.

A Secret Story

The story of the most ancient lighthouses is one that has not been properly told. Like a long-lost photograph in an old suitcase, it has lain in the attic, hidden amongst piles of others, unnoticed - even ignored - amidst so many other seemingly more important records of our ancestors.

Pharologists have been sure that the secret was to be found somewhere, but without the full array of tools - deep language skills, access to the full spectrum of ancient texts, a detailed understanding of the relevant cultures, and, most importantly, the archaeological data - they have been unable or unwilling to put factual flesh on the theoretical bones. Over the past twenty years or so, thanks to modern forensics, researchers have now assembled most of the body and are expecting to complete the autopsy. Until now, the secret story has been protected by a small number of academics. This book is the first to present it to a wider audience. To do so will require in-depth descriptions of the latest analyses by archaeologists *and* classical scholars.

Lighthouse Archaeology

For knowledge of times before writing, we rely upon evidence provided by artifacts, sometimes decorated with art or symbols that give clues to the culture concerned. Even the shapes and material construction provide evidence of past civilizations. Compared with the study of literature, the science and practice of archaeology is comparatively recent, is time-consuming and develops in spite of centuries of damage to, and theft from, the world's most precious sites. In many cases, the original archaeologists are considered by scholars today to have caused irreparable damage to the sites they were investigating.⁸ Conclusions drawn from archaeological excavation are always subject to uncertainty and often a matter of interpretation based upon contemporary received wisdom. Thus, many conclusions formed during the 19th and early 20th century are being revised in the 21st. These conclusions of today may well be revised tomorrow when new evidence is uncovered. Fortunately, much still remains buried and, if there is ever to be a more definitive answer to the questions discussed here, it will surely be provided by future archaeological discoveries.

In the years since Stevenson completed his treatise, major discoveries have been made under the waters adjacent to Alexandria. Many pieces of stone have been found on the seabed that can be unambiguously assigned to the old Pharos, the destruction of which occurred over a period of centuries through both human and natural interventions. Apart from the remarkable discoveries under the waters of the harbour of Alexandria, however, there have been few studies of submerged lighthouse remains. Most of those that have been considered successful are reported here. However, archaeologists have still not made sufficient progress to answer the fundamental question posed by pharologists - What was the first lighthouse?

Earliest Texts

We have come to rely totally upon the written word and cannot imagine times when people did not document their activities. Writing developed from a plethora of events, some related, others not, some in parallel, others sequential.⁹ The earliest forms of writing used simplified pictorial representations of real objects. During the Egyptian civilization, a particular form of writing evolved around 3000 BCE that we call hieroglyphs, but these pictures were not necessarily linked formally to speech. The evolution of abstract symbols linked to vocal sounds is thought to have begun around 2000-1500 BCE in the Sinai region of ancient Egypt and is known as a phonemic script. Single syllables were matched to abstract symbols to make simple words, that later became more complex with the joining of multiple symbols and sounds. This Proto-Sinaitic writing evolved into a Proto-Canaanite script developed by Phoenicians and others living in the northern Levant. As Phoenicians travelled widely and established settlements, they spread their form of writing across the Mediterranean. It was then further adapted by the ancient Greeks to become the script for the Greek language, the forerunner of the European writing system. Another form of writing in two variations was developed on Crete, during the later years of the Minoan civilization, one called Linear A (2500-1450 BCE), the other, Linear B (1450-1200 BCE). Linear B was translated in recent times and shown to be an early form of Greek. Linear A has not been decoded so far, but is thought to have been an even earlier form of Greek. Once trading activities

became commonplace it became necessary to make precise records of transactions, and, in any society that used trade as part of its culture, the invention of a system of book-keeping was inevitable. It is thought that both Linear A and B were used in connection with the economic activities of the Cretan palace cultures. When the palaces were eventually destroyed, knowledge of the symbols disappeared with them.

The first texts of what one might call 'literature' are *The Iliad* and *The Odyssey*, both attributed to Homer around 750 BCE. These two books record events that are believed to have a basis in historical truth, although they described events that occurred perhaps 450 years earlier, i.e. ca. 1200 BCE. We shall investigate what these books tell us about lighthouses.

There are very few direct references that need to be considered. They are:

1. The reflection from Achilles' shield is likened to the light from a lighthouse

Homer: *The Iliad* - Book XIX 404-407 In: *The Iliad of Homer* trans. Alexander Pope, notes by Gilbert Wakefield (1796).¹⁰

2. Mention of the island of Pharos

Homer: *The Odyssey*, 4, 351-498. This is the reference to the entire story retold in the Prologue. Succinctly, Homer states on lines 356-8: "There is an island called Pharos in the rolling seas off the mouth of the Nile."¹¹

3. Seeing beacon fires on the shore

Homer: *The Odyssey*, X, 28-30. Trans. A. T. Murray, Loeb Classical Library Volumes, Cambridge, MA, Harvard University Press; London, William Heinemann Ltd. 1919/1995.¹²

I shall present an analysis of each in turn, but first let us consider the language in more detail.

Lighthouse Etymology

There remains some debate about how and when the equivalent of the word 'lighthouse' first appeared. It is agreed that 'pharos' has been the root word since the building of the structure in Egypt. The writer E. M. Forster was not the first to notice a similarity between pharos and pharaoh. According to him, Menelaus had met an old man when he first sought shelter on the island described in the Prologue. The conversation went

something like this.

Menelaus: "What island is this?"

Old Man: "Pharaoh's."

Menelaus: "Pharos?"

Old Man: "Yes."

It is tempting to accept this misunderstanding as the true origin of the word pharos. However, if we are to investigate the existence of the earliest lighthouses then we must analyze the etymology, not just of 'pharos' but of related words. Table 1-1 summarizes words that are relevant to this discussion.

There are two components to the concept of a lighthouse: function and appearance, that is, what does it do? What does it look like? In English, the word is a comparatively recent construction that for centuries was written as light-house, which illustrates the two components.

'Appearance' is a parameter that will be discussed in detail later. For the moment it is sufficient to remark that the English choice of 'house' is clearly but one possibility; the desirable functional property of 'elevation' whereby a light can be seen from a greater distance is better expressed with a word such as 'tower', as is the case in German with 'turm'. Around 1200 BCE the Phoenicians used the word 'tor' or 'tar' for both a tower and a hill, and from this came the word tor-is-fir to mean 'fire-tower'. It was a natural progression that led to the Roman use of the word 'turris' for tower.

We should note that a light was assumed to be stationary, for a moving light - perhaps a lantern carried by a human, an animal or a vehicle - is of no use for navigational purposes. An element of permanency in a fixed position is essential, and this would be part of the process by which navigators assessed the usefulness of lights seen ashore. It would take many viewing repetitions for navigators to accept a light as an aid to navigation, and so the association of a shore-based light with a built structure became the second element of the word 'lighthouse'.

In ancient times, 'light' was synonymous with the Sun, so it is hardly surprising that 'Sun', 'light', 'God' and 'King' have equivalence in Egyptian, Nubian and other ancient east African cultures. The sound 'ra' was most commonly used in this

Greek word in English alphabet	Greek word in Greek alphabet ¹	Translation	Comment
pha ²	φα	sun, radiance	Found in Egyptian hieroglyphics and Nubian culture.
phos	φως	light	
pharos	φάρων	lighthouse	
Phaëthon	φαέθων	Phaethon	A son of Helios, the sun god; also one of the two horses in mythology that pull the sun across the sky, the other being Lampos
pharaoh	φαραώ	pharao(h) ³	An Egyptian King-God.
phalêròs	φαληρὸς	shining	
phalarica	φαλαρικα	a fire-lance	
lampo	λάμπω	glitter, shine	
Lamos, Lampus	λάμπος	lamp	One of the two horses in mythology that pull the sun across the sky, the other being Phaethon
lampas	λαμπάς	light-torch	
skopins	σκοπιῆς	watchtower	As used by Herodotus ⁴
pur	πύρ	fire	See note. ⁵
purgos	πύργος	tower, fire-tower	See note. ⁵

Table 1-1 Etymology of words associated with 'lighthouse' in Greek.

1 For consistency to assist readers unfamiliar with Greek, lower case letters have been used. To capitalize the letter φ (ph) it is replaced by Φ

2 In English there is an equivalence of sound between 'ph' and 'f'. This work will assume the former because of the relationship with pharos but in other European languages 'ph' has been replaced with 'f'.

3 The 'h' was added in English much later when the Bible was translated during the English Reformation.

4 Herodotus' use of this word with reference to a different site raises new issues to be discussed.

5 Note By Baldassarre Giardina: "The word before pharus is purgos; pur in Greek language, means fire. I believe that every time the ancient sources have written about "purgoi" at the entrance to harbours they meant a lighthouse. The position of this word is very important because it means just towers too. A lot of toponyms in Italy were given that word. Think about the Etruscan harbours named Pyrgi - thus purgoi. Just a lighthouse or a signal is not enough, there was, in my opinion, a system of signals (if you read Polybius and about so-called feuertelegraphie it's very clear). It is not so easy to say which was the first pharus although I believe too that was the one written by Homer at Hellespont (Sigeo hill), because I think that at practically every harbour entrance used this system."

Language	word
Arabic	manara
Armenian	p'aros
Bulgarian	far
Chinese	dengta
Croatian	svjetionik
Czech	majak
Danish	fyrstårn
Dutch	vuurtoren
English	lighthouse
Estonian	tuletorn
Finnish	majakka
French	phare
German	leuchtturm
Greek	faros
Hungarian	világítótorny
Italian	faro

Japanese	today
Korean	deungdae
Latvian	baka
Lithuanian	svyturys
Macedonian	svetilnik
Norwegian	fyr
Polish	latarnia morska
Portuguese	farol
Romanian	far
Russian	mayak
Serbian	fenjer
Slovak	lucerna
Slovenian	svetilnik
Spanish	faro
Swedish	fyr
Turkish	fener

Table 1-2 Words equivalent to 'lighthouse' in selected languages. Source: Google (2017)

context. The next step would be to arrive at our ancient root word 'pharos' by considering the linked sounds of 'pha' and 'ra'.

Light is also generated by fire, a process that held a place of fundamental importance in most cultures of the world. The Anglo-Saxon content of English provides the word 'fire', derived from the word 'fyr'. Similarities between 'ra', 'pha/fa', 'far', 'fyr', and thence to 'pharos', 'pharus', and 'Pharaoh' are striking. In the Bible, the name of the Egyptian king is given as 'par'ōh'. Various derivations of the word 'Pharaoh' state that the word is now retrospectively applied to all rulers from the Egyptian first Dynasty onwards, but that the word was not actually used until about 1200 BCE. This is surely due to the gradual emergence of written language from the spoken word since writing did not exist in the earliest days of Egyptian history. However, it has been pointed out that there is a much older link from these ancient kings to their Nubian and Ethiopian ancestors. An archaic version of 'Pharaoh' is 'Pharaon', a corrupted Latin phonetic spelling of the Nubian God-King named 'Kpa', and we note also that there is a Hebrew word 'paroh'.¹³ The Pharaoh (and kings generally) was the mortal link on Earth to God in the Heavens and the Sun was seen as the ultimate deity. We also note that in India, a king was a 'rajah'. The hieroglyph depicting the sun was a very simple disc or circular shape that linked Ra with the Sun and the Pharaoh. The crossover from 'pha' and 'Ra' to the Greek 'pur' is uncertain. It possibly occurred because of the Greek letter 'ρ' (rho, pronounced as 'r') but written like a 'p' in the our alphabet. (A fuller derivation is given in the notes.¹³)

At the most fundamental level, to define a night aid to navigation we require only one element: a word to describe light. From the mariner's point of view, it is irrelevant to know the method used to project the light - the 'appearance' element of the lighthouse. The words presented in Tables 1-1 and 1-2 show many examples of this. Other instances are found whereby the word includes a description of the source of light, that is, the housing in which the light is created. We have noted that the word 'lighthouse' is an example, and in German too where a tower rather than a house is defined. Inspection of Table 1-2 shows other examples where this is found to apply.

Finally, a most important observation is that

there have been clear links between the exhibition of lights as aids to navigation and the existence of temples and shrines in pre-Christian religions where fire has always been a key element. This will be a topic for discussion later.¹⁴

In this volume we shall find locations of ancient ports and harbours where the names began with the Greek letters φάρ, that is 'far-' or 'phar-', and we shall see how this indicates the existence of ancient lighthouses in these locations.

It appears that the word 'pharos' was not used in English until 1522.¹⁴ Latin and Greek words were being absorbed into language used in the British Isles by those with sufficient education to make such extrapolations across languages, namely monks and other scribes. The word 'lighthouse' arose independently in the English language, probably in parallel with the establishment and growth of activities of the Trinity House of Deptford Strond (London) formally set up in 1514 by Henry VIII. At this time, the preferred way of describing the provision of navigational aids was to write them as "beacons, buoys and marks". We have noted how the word was for many years written as lighthouse, the hyphen being finally dropped in the 20th century.

I have written extensively elsewhere about what structures may or may not be described as lighthouses.¹⁵ In the English language, there is much scope for argument over such matters. Indeed, in this volume my pages on nomenclature offer a logical and systematic English vocabulary that, I believe, better applies to navigational aids and distinguishes between them.

Lost In Translation?

Possibly the greatest advantage we have today is the availability of information, which, due to computers and the Internet, has never been so good. We are in a strong position to survey the evidence from both literature and archaeology and to make conclusions that fit the current state of our knowledge and understanding. To investigate matters further we need to consider aspects of the history of some early cultures. The obvious candidates to investigate are the Egyptians, the Romans, the Phoenicians and the Greeks, and this work will be presented in later papers.

We must first review ancient texts, as many others have done, but with a renewed focus. This



Fig. 1-3: Statue of Achilles in Hyde Park, London. In *The Iliad*, Homer wrote about the bright gleam of his shield. Translators interpreted it as providing a light for seamen, one of the earliest written allusions to a lighthouse.⁶⁴

approach is beset with problems, some of which are evident in the notes.^{10, 11} Ancient texts are written in old scripts with limited vocabulary, and, to gain maximum benefit, these obscure texts require conversion by experts who understand not just the word-for-word translation but the context in which the original words were written. The specified language may change from place to place and from time to time throughout its existence, placing an even greater burden upon the translator. A single copying error can have a big effect upon meaning. We would hope that the latest translations, where possible, will take account of all these possibilities. The text may have suffered varying degrees of damage and may be only partially legible. This necessitates extrapolation from one section to another and involves guesswork to maintain the sense of a piece. Worse still, whole tracts may be missing entirely.

Apparently dismissing anything earlier, Morkot, for example, argues¹⁶ that historical times are those based upon the evidence from the written word, beginning at the time of the Persian Wars,

around 490 BCE. Before that, the primary source of our knowledge must be archaeology, although evidence from such scientific disciplines as geology, climatology, anthropology, and more recently human genetics, is also required in most comprehensive archaeological studies, yet other scholars are content to discover real value in older texts.

The discovery of a written text that can be accurately carbon-dated to be contemporary with the event would represent the most obvious form of proof, but even if one were found we do not necessarily trust the veracity of the author. It is fair to say that most of the written historical records were written by journalists who are merely reporting what had been told to them. We all know how inaccurate this kind of writing can be! Similarly, drawings and paintings created many years after the existence of a structure are often fanciful and sometimes wildly inaccurate, yet they can be influential and opinion-forming.

Homer

In 1926, a graduate of the University of Chicago, M. C. Lang, wanted to trace the transmission of the *Iliad* and the *Odyssey* as far back into history as possible. He began to make the finest collection of Homeric manuscripts and stored them in his own library. In 2007, his collection was added to the wider archive of Classics manuscripts already stored at the University of Chicago.¹⁷

The *Iliad* and the *Odyssey* were epic poems composed for oral performance. They are thought to have been composed during the period from the eighth century BCE (or earlier) to the mid-seventh century BCE and written down by the mid-sixth century BCE. The earliest surviving example of Homeric papyri is from the third century BCE when scholars in Alexandria generated a stable text that was subsequently used as a master document for others to copy. Over 1,000 manuscripts of Homer's works exist, far more than for any other ancient author and many more of the *Iliad* than the *Odyssey*.¹⁸

Written on papyrus, parchment and paper, ancient texts had to be transcribed many times to enable them to remain accessible to scholars; there were many opportunities for errors, omissions and deliberate changes. Obviously, we should bear in mind that the texts we study today cannot precisely replicate thoughts in the minds of performers of

2800 years ago. We cannot even be certain whether ‘Homer’ was a single mind or a convenient name for part of the culture that had been handed down by word of mouth since the earliest times. With this in mind, let us move on as we continue to use the name of Homer in its usual context.

The earliest and most often quoted reference to a lighthouse in the classical Greek literature concerns book XIX of *The Iliad* in which Homer seems to refer to the light from Achilles’ polished shield acting like a lighthouse for seamen, Fig. 1-3. In many texts, the translation - written as poetry - seems to indicate a lighthouse.

*“So to night-wandering sailors, pale with fears,
wide o’er the watery waste a light appears,
which on the far-seen mountain blazing high,
streams from some lonely watch-tower to the
sky.”¹⁰*

In this 18th century version by Pope, we might agree that the translator wished to maintain the original in the form of English language poetry. The use of such a constraint places a greater discrepancy between the thoughts of the writer and translator, but achieves its poetic goal in an attractive way. For historians, anxious to preserve the original intent as closely as possible, it is necessary to dispense with poetry and accept carefully crafted prose in its place. In this modern translation - written as prose - a rather different interpretation is found:

*“Like the gleam that sailors catch at sea
from a fire burning on a lonely upland farm,
when the winds drive them unwillingly
from home over the teeming seas, such
was the gleam that went up into the
sky from Achilles’ ornamented shield.”¹⁰*

In the notes, I have attempted to illustrate the difficulties in translating passages such as these.¹⁰

Stevenson denied claims by other writers that Homer had referred to lighthouses.¹⁹ He made Pope responsible for an unwarranted allusion to lighthouses that was then copied by others. Surely there can be no doubt that Homer is referring to the idea that at night, sailors could extract navigational assistance from seeing a light on the shore? Such a capacity neither implies nor denies the existence of an edifice built specifically to behave as a lighthouse does today, but it is an unquestionable expression of the idea of lights to aid navigation -

conceived, so we are to believe, around 750 BCE.

Is it possible to make a judgment from this about the existence of lighthouses in the times of Homer?

We have not yet considered the need for dedicated manpower to maintain the light and therefore to act as a lighthouse keeper, especially as the translation indicates a remote mountain-top source for the light. The likelihood of keeping a remote location supplied with food and fuel is small. To conform with the schema set out in the section describing conventions and terms we should consider the difference between the three stages of navigational aids. Some of the translations suggest the deliberate creation of a light *and a building* to aid mariners.

In the oldest written version available to us there was no word for lighthouse; the one we have in today’s Greek is σταθμῶ that has been translated variously as station, but which has also been translated as steading, homestead, farm, standing-place.¹⁰ It seems unquestionable that the word relates to a built structure of some kind, but to answer our question we need to know its purpose. We cannot with certainty deny that it might have been a lighthouse, but if the mountain-top source of light was coming from a farm, say, then we are faced with the question as to whether the light was displayed deliberately for mariners or whether the seamen had become used to seeing the farm light, set for other purposes. Since there can be no definitive resolution of this issue, more investigation is required to decide upon the truth concerning the building of the first true lighthouse.

We met the second important reference to lighthouses in the Prologue where Homer apparently quotes the island of Pharos by name:

*“There is an island called Pharos in the rolling
seas off the mouth of the Nile, a day’s sailing
for a ship with a roaring wind astern.”¹¹*

There are many references to lighthouses in ancient texts whereby the word ‘pharos’ (Greek) or ‘pharus’ (Latin) is used. However, with the exception of one, they were written *after* the building of the Alexandrian tower.

We find the word ‘pharos’ in Greek symbols in line 355 of Book XIX of Homer’s *Iliad*, which is generally agreed to have been composed around 750 BCE.¹¹ This quotation alone has resulted in debate:

Was the island named after a lighthouse?

or

Was a lighthouse named after the island?

The Pharos with which we are familiar was built around 280 BCE.²⁰ If Homer used the word ‘pharos’ then it is surely the case that this lighthouse was named after the island. However, the discussion of etymology renders a degree of assurance that, in the first instance, an island would not be called Pharos unless it was already in use as a lighted aid to navigation. We should conclude from this that lighted aids to navigation were in use at the time of Homer. Of course, this tells us nothing else about form or construction.

However, it becomes crucial to ask a key question: Was this really the original word used by Homer, or is it the result of changes made to his text during copying? Manuscripts were, of course, copied by hand, and it seems likely that changes occurred over centuries of copying. If such a change was made after the construction of the Pharos then the arguments were once more invoked. If the changes were made after the death of Homer, but before 280 BCE, then the conclusions are not necessarily incorrect, but inaccurate. Further investigation shows that Homer’s two epic poems were composed for oral performance. They were:

“...composed sometime from the eighth century BCE (or earlier) to the mid-seventh century BCE and written down by the mid-sixth century BCE, likely in conjunction with performances at the Panathenaia Festival in Athens ... The earliest surviving example of Homeric papyri is from the third century BCE, about the time that scholars in Alexandria produced a relatively stable text that was subsequently used by scribes to produce copies.”²¹

We notice that it is possible for the insertion of the word ‘pharos’ into the manuscript soon after 280 BCE - in the knowledge that the Pharos and its island already existed, the more so since it was apparently scholars in Alexandria who made the “stable” text. These scholars, no doubt with the best of intentions, may simply have wished to enhance the meaning of the verse by using a word that had recently come into common use, where there was none before. This text was faithfully reproduced thereafter containing the name Pharos

as if it had been originally used by Homer when it had not. There are no other known references that use the word ‘pharos’ in ancient texts that can be dated before its use at Alexandria. Thus, the line of inquiry into the origin of the application of the word ‘pharos’ to a lighthouse, and in particular to the Alexandrian tower, leads us nowhere. In view of the complete absence of any other pre-280 BCE occurrences of the word ‘pharos’, the balance of probabilities lies in favour of the word first being used at Alexandria for its magnificent tower.

Before we leave Homer, however, there is a practice that is of some importance to this discussion that does not directly involve lighthouses. Homer refers to the use of beacon fires in the context of a distress call:

“Just as smoke goes up to the skies from a town on some far away been the good island which enemy troops are besieging: all day long the men fight a desperate battle from their town walls, but at sunset beacon fires blaze up one after the other, and the light shoots up into the sky for neighbours to see and come to the rescue in their ships...”²²

This is not a matter of uncertainty over translation for the idea is expressed clearly. Later the principle was adopted by the military for signalling purposes and we shall consider shortly its relevance to lighthouses.

The Nile Delta

The ancient text attributed to Herodotus (484-425 BCE) is titled *The Histories* and is now considered the founding work of history in Western literature.^{23 24} Herodotus is a frequently cited author whose work, written ca. 440 BCE, is considered to be especially reliable since much of it was gained first-hand through extensive travelling. The reader is quickly impressed by his attention to detail and his desire for accuracy. Although there are some very early fragments of the texts in existence, we have no clear measure of certainty as to the precision or otherwise of their details.²⁵ Some have been shown to be remarkably accurate, others not, but overall the work is very impressive and has formed the basis of much of our understanding of ancient history.

For our study, we must accept that Herodotus makes no mention of any pharos - neither by



Fig. 1-4: Satellite image of the Nile Delta region (2015). The fertility provided by the waters of the Nile is clear by the extent of the green land. Approximate locations of the Seven Mouths of the Nile where they existed in about 1250 BCE are indicated by green markers. West to east: 1. Canopic, 2. Bolbitic, 3. Sebennytic, 4. Phatnic, 5. Mendesian, 6. Tannitic, 7. Pelusiac. There are now only two main branches, due to flood control, silting and changing landscape: the Damietta (corresponding to the Phatnic, or Phatnitic) to the east, and the Rosetta (corresponding to the Bolbitic) in the western part of the Delta. White pins are locations of places of interest; yellow pins are locations with ancient lighthouses.⁶⁵

name, nor even in the sense of a lighthouse. He does not overtly discuss any roles that might be associated with the keeping of a light in a lighthouse. He does not mention the island of Pharos. We might call that a disappointing start! However, Herodotus writes at length about Egypt, and, when we consider the great importance of the River Nile to the early history of humans and their travel on water, there is much useful material for us to study.

Long before the city of Alexandria was founded, there was an important settlement at one of the seven mouths of the Nile. It was the most westerly of the seven and was called the Canopic Mouth,

and the settlement was Rhacotis. Fig. 1-4 illustrates the locations of important sites in the Nile Delta.

In the early part of Book 2, Herodotus describes at length his observations on the geography of Egypt, and includes some very prescient comments that resonate strongly with our present understanding. He writes that the Nile Delta was originally a great gulf and that it was:

“turned into dry land by the silt brought down from the Nile.”²⁶

The Ionian Greeks had apparently decided that Egypt was defined by the Delta and that therefore

there was a time when the Egyptians had no country at all. The Delta region had been defined thus:

*“Now if we agree with the opinion of the Ionians, who say that only the Delta is Egypt, and that its seaboard reaches from the so-called Watchtower of Perseus forty schoeni (224 km) to the Salters at Pelusium, while inland it stretches as far as the city of Cercasorus, where the Nile divides and flows to Pelusium and Canopus, and that all the rest of Egypt is partly Libya and partly Arabia — if we follow this account, we can show that there was once no land for the Egyptians;”*²⁷

Herodotus showed remarkable understanding when he wrote:

*“I do not believe that the Egyptians came into being at the same time as the Delta (as the Ionians call it); on the contrary, they have existed ever since men appeared upon the earth, and as the Delta increased with the passage of time, many of them moved down into the new territory and many remained where they originally were.”*²⁸

Herodotus then goes on to describe the various locations where the Nile finally met the sea, that is, the seven mouths shown in Fig. 1-4.

He tells the story of Menelaus used in my Prologue quite differently. His version is that Menelaus was told by the Trojans that Helen was in Egypt with King Proteus. Menelaus then:

*“... sailed up the river to Memphis and when he had given a true account of all that had happened, he was most hospitably entertained and Helen, having suffered no evils, was restored to him with all the rest of his property.”*²⁹

Significantly, Herodotus makes no mention of an island close to the Canopic mouth, and the word ‘pharos’ does not appear in his text.

So what might we make of Herodotus’ mention of a watchtower? Homer was clear about the use of beacon fires for transmitting signals. Herodotus actually names a watchtower but frustratingly goes no further, as if all his readers understand and there is no need to be more descriptive. He implies that the tower is situated at the Canopic mouth, but Strabo also names it and his location is near the Bolbitine mouth.³⁰ Except that it could have been part of a military defence structure, he describes it no further. The Watchtower of Perseus

is a structure that has so far escaped any other description and must remain a mystery. However, the subject of watchtowers was described by other writers and will be discussed shortly. Egyptians called the place Peguat or Pikuat; the Greeks called it Canopus (sometimes Canobus) after a legendary commander who fought in the Trojan War and was supposedly buried there. Homeric myth claims that Canopus was founded by Menelaus, and named after the pilot of his ship, who died there after being bitten by a serpent.

Even in Homer’s time there was great activity at this doorway to the Nile. It was wide enough and deep enough to accept passage by the largest ships intent to reach the great emporium at Naucratis, a Greek port that had been granted special status by the Pharaoh and to which almost all trading vessels were directed.³¹ We have already seen how Homer is supposed to have made specific reference to the island (of Pharos?) near the Canopic mouth:

*“There is an island called Pharos in the rolling seas off the mouth of the Nile, a day’s sailing for a ship with a roaring wind astern. In this island is a sheltered cove where sailors put in to draw their water from a well and afterwards launch their trim ships into the deep sea.”*¹¹

The location of Canopus has been identified as about 2 km east of present Abu Qir, but Strabo had also placed Canopus due west of Heracleion.³² Which of the two sites was established first is not known.

For 1600 years, covering a period from 800 BCE to 800 CE, the city of Thonis-Heracleion (the Egyptian and Greek names of the city) flourished at the entry point to the Canopic mouth of the Nile, whereupon it vanished under the sea until it was rediscovered in 2000 by an underwater team led by Frank Goddio.³³ The team discovered the ancient city 6.5 km off today’s coastline, within an overall research area of 11 by 15 km in the western part of Abu Qir Bay. The argument about whether Thonis and Heracleion were one and the same was settled definitively - they were!

Herodotus describes how, having stolen Helen for his bride, Paris was returning to Troy from Sparta when his ship was blown off course towards Egypt:

“... at last, the gale continuing as bad as ever, he found himself on the coast, and managed to get ashore at the salt pans, in

*the mouth of the Nile now called the Canopic. Here on the beach there was a temple, which still exists, dedicated to Heracles ...*¹³⁴

Our interest might be raised by this mention of a temple close to the sea, where we might expect an eternal flame to provide an aid to mariners. Of especial interest to us is that Herodotus goes on to relate a tale that includes an encounter with ...

*“the warden of that mouth of the Nile, a man named Thonis.”*¹³⁵

Is it too much of a stretch to the imagination that Thonis as “warden” might also have been the senior priest at the temple of Herakles whose responsibility was to keep the light burning at all times of day and night? In a 21st century world where it is now common to speak of probabilities, we might assess the likelihood of this favourable proposal - the balance of probabilities - as 50% or greater. Does the jury agree?

Watchtowers

We noted above how Herodotus had mentioned a watchtower. The watchtower was also described by Strabo:

*“After the Bolbitine mouth there runs out to a great distance a low and sandy promontory. It is called Agnuceras (or Willow Point). Then follows the watch-tower of Perseus, and the fortress of the Milesians.”*¹³⁰

Duggan, one of the few writers to seriously address the missing lighthouses prior to the Pharos, writes:

*“The Watchtower of Perseus, possibly that bronze clad tower in which Danaë conceived Perseus by Zeus, at the western end of the Delta on a spit of land extending out into the sea, according to Herodotus, was termed a watchtower rather than a pharos, but which seems to have been another Pharonic coastal marker building, given its location and Danaë/Perseus’s Egyptian associations, presumably carrying a marker light at night, but which seems to have been of a smaller size from that of the Pharos on the Pharos Island, and hence presumably described as a tower rather than a pharos, although both had watchmen and both, one can surmise, carried marker lights for navigation at night.”*¹³⁶

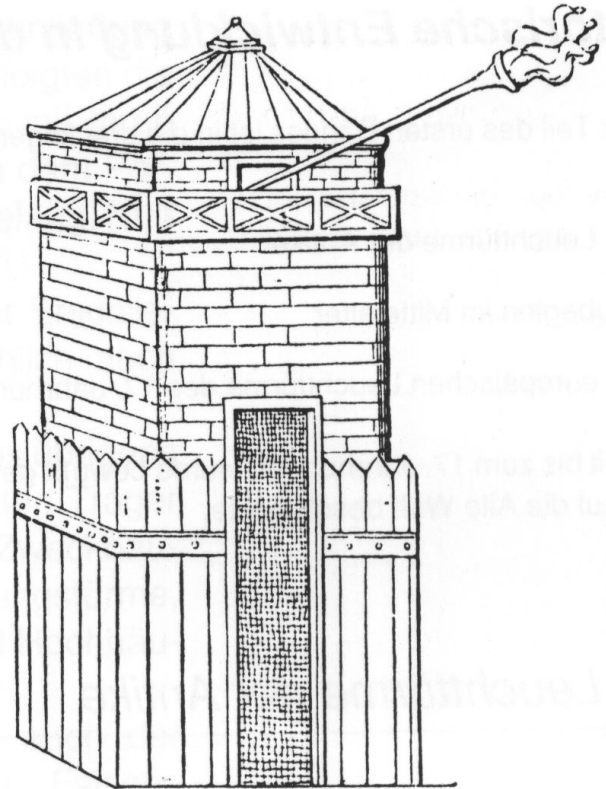


Fig. 1-5 Watchtower, fire-tower or pharos?¹³⁶

Giardina discusses the uses of towers for purposes other than navigation, especially those that are of a military nature - watching for approaching enemies, and sending signals to allied troops.³⁷ We read earlier how Homer had referred to the use of beacon fires for distress signals, and this is certainly a simple case of message transmission.²² However, it soon became obvious to military commanders that useful messages could be signalled across open spaces much faster than by sending a messenger.³⁸ Fig. 1-5 shows a typical ancient tower that could have been used for many purposes.

The techniques have been well documented in the classical literature, and for the purposes of this paper, it is those written prior to the existence of the Pharos that are of most interest. For example, Thucydides (460 to 400 BCE) describes the attack on Piraeus by Knemos and Brasidas during the Peloponnesian War as involving fire signals on both sides, not just for true signals, but also false ones that would confuse the enemy.³⁹ This technique of signalling was not, of course, restricted to night-time but was used throughout the day. The limitation of lighted aids to navigation being shown only at night also seems unnecessary, especially in view of the present-day UK practice of leaving lights on during the day as well as the night.

There is clear overlap between messaging and the functioning of lighthouses:

The sending of a message as a warning, or to mark a place of safety;

The understanding that it was necessary for the receiver to recognize and correctly translate the meaning of the message;⁴⁰

The knowledge that the exhibition of false lights might act to confuse an enemy (or cause a ship to be wrecked).

It seems unlikely that, having constructed elevated platforms to enhance visibility by a greater distance, men would not make use of the opportunity to provide assistance to navigation. Unfortunately, we have no evidence that this was actually the case.

Other Textual References

Referring to the Christian tradition that associates lighthouses with charity and love for his fellow man, W. J. Hardy wrote in 1895:

“We do not, of course, claim for Christian charity the credit of originating the idea of these warning signals for ships. Long before the dawn of Christianity, Lybians, Cushites, Romans, Greeks, and Phoenicians had protected navigation by the means of lighthouses...”⁴¹

It is entirely reasonable to theorize that the first lighthouses appeared on the Nile, so we shall spend some time now considering the question, as it was tackled in the literature.

The word Cushi, also spelled Kushi is a Hebrew term used for a dark-skinned person, usually of African descent.⁴² Initially the word was used by Hebrew-speaking Jews to refer to individuals of Ethiopian origin, that is, from the Biblical land of Cush. Cush or Kush is the name of an ancient ethnic group who came from the land of Kush, centered on the Upper Nile and Nubia (modern-day Sudan). Mentioned in the Hebrew Bible, they are considered descendants of Noah’s grandson, Cush the son of Ham. According to Ethiopian historians, the Kushite Empire also controlled the mountainous regions around the source of the Blue Nile at first, and the Cushitic and Agaw peoples of Ethiopia (including the Bete Israel or Ethiopian Jews, who have largely migrated to Israel) still maintain

traditions of descent from Cush.

Berbers (or Amazighs, giving rise to the name Amazons) were an ethnic group indigenous to North Africa. Libyans and Cushites (Libu and Cushi) were cultural groupings within the ethnic family of Berbers; Libyans occupied parts of the northern Sahara and coastline where present-day Libya is situated. Cushites were considered to have occupied the lands of lower (northern) and western Egypt before the people known as Egyptians were named. It was commonly written that the “first lighthouses” were built by Libyans and Cushites.⁴³

Whilst the world has many records of Egyptian history, there is very little to inform us about these two peoples and a possible association with lighthouses, so the origin of this idea remains obscure. For many readers, the short statement of “fact” offered by writers rings hollow. This is because in the English Western culture, there is no legacy for these peoples who for decades or even centuries have been regarded as inferiors to the well known great civilizations. However, in the light of the latest theories about the evolution of *homo sapiens*, these peoples were at the heart of the expansion of intelligent humans out of their African homelands and forerunners of the Greeks, Romans, Phoenicians and Egyptians by thousands of years. If we agree (for the moment; this will be discussed in depth in Paper 2) to assume that seaborne navigation had always relied upon the observation of inhabited sites by night, then surely it would have been in the cultures of the peoples who inhabited the North African coast that the ideas about lighthouses were first developed? A very good digest of this seriously neglected period of history is given by unknown authors.⁴⁴

In pharology, the considered opinions of David Alan Stevenson should not be questioned without due consideration. As a descendant of the Stevenson family of lighthouse engineers he is unquestionably qualified to pass judgment on matters relevant to his family’s magnificent engineering works. However, as a historian he did not possess better tools for analysis of pre-historical events than any serious researcher today. Indeed, researchers today have the benefit of ready access to the work of many thousands of both professional and amateur investigators. One thing seems certain, however. Conclusions about the history of early lighthouses in the millennia before the birth

of Christ will always be subject to argument.

Stevenson lived and worked in times when far less was understood about the foundations and customs of ancient cultures than we do today. His decision to give but the scantiest regard to the real existence of ancient lighthouses is forgivable and probably related to his family trait of precision and accuracy. Without precise documentary evidence, Stevenson chose not to give more than a cursory consideration to the subject. Indeed, there are occasions when he is definitively against propositions that have since gained wider acceptance.

Stevenson is dismissive of the definite existence of any lighthouse prior to the Pharos at Alexandria and makes little attempt to discuss the possibilities.⁴⁵ Nevertheless, he does admit the possibility that lighthouses might have been in existence prior to the building of this massive edifice. In consideration of what came before the Pharos of Alexandria, there is one important idea that seems unarguable and Stevenson expressed it thus:

“It seems unlikely that the construction of a lighthouse of such tremendous proportions and the maintenance of its great fire would have been contemplated had not lighthouses already proved of value to ships, and persistent penetration into the mists of Antiquity may yet reveal earlier instances of navigation lights.”⁴⁶

Religious Connections

The situation that existed at Sigeum is of prime importance to this work, for it highlights the importance of religion in ancient cultures and its links to marine travel.^{47 48}

There is a very clear relationship between religious thinking and the building of towers. The idea of looking upwards to the heavens has a deep significance in humans of most civilizations and the possibility of climbing a tower so as to approach those gods who might be looking down from on high was very appealing. Ideally, the tower would be as tall as possible, or else built on a hill or mountaintop so as to further reduce the distance to heaven. The setting of a fire on top of the tower seems to be similarly deep-rooted.

Numa Pompilius was the king of Rome who succeeded Romulus, and reigned from 715 to 673 BCE. He is attributed with the foundation of the Temple of Vesta and the Vestal Virgins, to whom he

gave the responsibility of maintaining the eternal flame for Vesta, goddess of hearth, home and family. Thus, we have here a strong association between fires that burn constantly, the security and comfort of home and family and the need to pray to the gods to deliver mariners safely back from the dangers of the sea. The idea that a fire tower established in a home port would be a beacon and navigational aid to seamen clearly has a most ancient derivation. Mariners and travellers alike would have visited the temples and sought guidance on the safety of forthcoming voyages, as well as to offer thanks for past deliverances. This was especially true at Sigeum, of which more will be said later.

From as early as 1300 BCE, these customs took root in the Phoenician culture, as well as that of the Greeks. A tower may well have existed on Achilles’ burial mound, but it was not necessary for the mound to have been lit at night, and in such a prominent location, and with such a level of cultural importance, Sigeum could easily have become known as a lighthouse in later times - once the idea had been more generally accepted by the existence of the Pharos.

There is strong evidence that temples had a secondary function as aids to navigation. Their continuously burning flames provided plenty of illumination at night for them to be seen at a distance by mariners, and, by day, their intrusion into the natural lines of the landscape made them easily visible, if not for smoke rising up from them.

In the time of Herodotus this situation was well established:

*“I took ship for Tyre in Phoenicia, where I had learned by inquiry that there was a holy temple of Heracles. There I saw it, richly equipped with many other offerings, besides two pillars, one of refined gold, one of emerald: a great pillar that shone at night; and in conversation with the priests, I asked how long it was since their temple was built. I found that their account did not tally with the belief of the Greeks, either; for they said that the temple of the god was founded when Tyre first became a city, and that was two thousand three hundred years ago”.*⁴⁹

The decision about how much we should rely on circumstantial evidence will always be with us. For example, in Homer’s *Odyssey* we come across

the following:

*“For nine days we sailed, night and day alike, and now on the tenth our native land (Ithaca) came in sight, and lo, we were so near (the shore) that we saw men tending the beacon fires”.*¹²

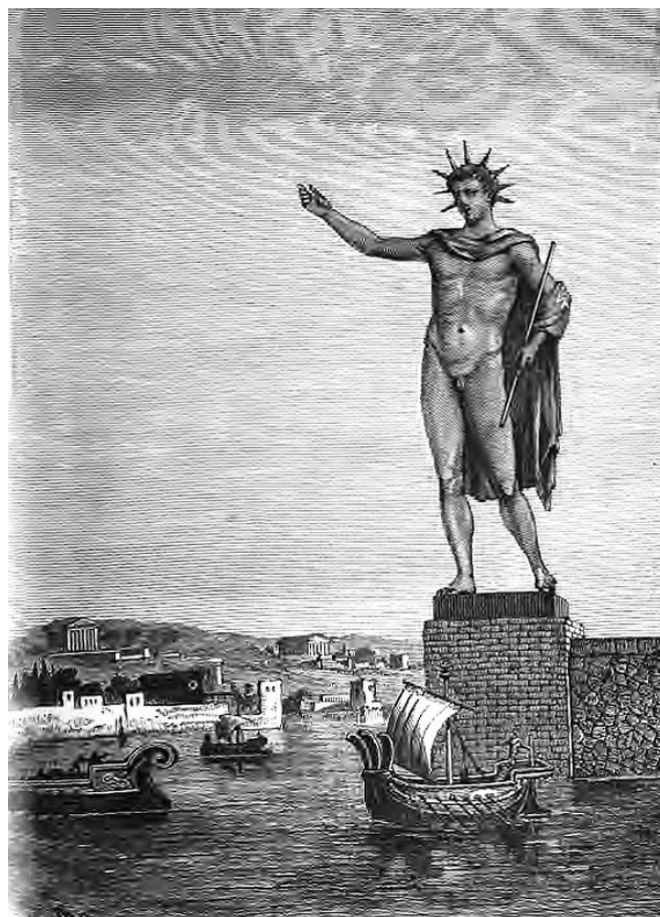
However, the same passage has also been translated as:

*“Nine days and nights we sailed, and on the tenth our own land was in sight, near enough to see men tending fires”.*¹²

Duggan discusses the presence or absence of the single word ‘beacon’ in the translation. It is clear that individuals lighting fires along the coast put themselves at risk of attack by pirates and other foes. However, the importance of using fires as navigational beacons might outweigh that risk. For our purposes, it is tempting to believe that they were indeed beacon fires intended to assist navigation, but the interpretation is not clear cut.⁵⁰ If we seem to be adopting looser rules of interpretation when we believe that lighted aids to navigation were commonplace in the second millennium BCE, then I would argue that it is because today we have a much larger body of evidence and many more analyses and translations to work with. There is probably no material evidence of ancient people burning wood as navigational aids, although perhaps archaeologists might discover traces of ash in certain strategic positions where we know there were religious sanctuaries. These are the issues we face in our search for the earliest navigational aids.

The Colossus of Rhodes

Besides the Pharos, there was another member of the group of Seven Wonders of the World that has been described as a lighthouse. The Colossus of Rhodes was a giant construction, similar to New York’s Statue of Liberty (and which certainly inspired it) that stood somewhere in the port of Rhodes.⁵¹ It was constructed under the direction of a master sculptor, Chares of Lindos, in 280 BCE, as a representation of Helios, the Greek titan-god of the sun. It took 12 years - 292 to 280 BCE - to build and was 33 m (108 ft) in height. This height probably did not include its pedestal, in which case the overall height was much greater. For stability, it was filled with blocks of stone.⁵² Figs. 1-6 to 1-13 show a number of different representations of the



*Fig. 1-6: A possible posture for the Colossus in which the separated legs share the same plinth. However, the outstretched arm is most unlikely from an engineering point of view.*⁶⁷

Colossus, whilst Fig. 1-9 shows the actual harbour entrance today.

Rhodes is the largest in a group of Greek island territories known as the Dodecanese. Its position is strategic for ships en-route from the west to Egypt and the Levant, and so it was a popular way-point for marine transport. Its history followed the expected path whereby it was occupied by people of the neolithic bronze age, and then by Minoans and Mycenaeans in turn. Phoenician presence on the island is reported to have occurred at Ialysos, and in the middle of the first millennium BCE the island was fought over by Greeks and Persians. Eventually, in 408 BCE, under Dorian Greek control, its three main settlements, Lindos, Ialysos and Kameiros, collaborated to build a new capital called Rhodes on the site of the island’s best natural harbour. Whilst trying to remain politically neutral, it was inevitable that its strategic position would attract the envy of expansionist forces and it changed hands twice more. In 357 BCE the island was conquered by Mausolus of Halicarnassus



Fig. 1-7: This cartoon of explorer Cecil Rhodes was intended to represent 19th. c. British presence in Africa. Clearly, it was inspired by the currently perceived form of the Colossus of Rhodes.⁶⁸

(whose tomb is one of the other Seven Wonders of the Ancient World) and fell into Persian hands in 340 BCE. Finally, it was taken into the Hellenistic empire of Alexander the Great in 332 BCE.

After Alexander's death in 323 BCE there was a period of struggle for power during which the people of Rhodes sided with Ptolemy I of Egypt for commercial reasons, but were then punished for their decision by one of Ptolemy's opponents, Antigonus, who laid siege to Rhodes in 305 BCE. Despite serious violence, the Rhodians emerged successful from the siege and celebrated by building a giant statue that has become famous in history as the Colossus. The noun *kolossus* was already a western Asiatic word for a statue and was applied by the Dorian Greeks to this unique construction.

The central argument regarding the Colossus is that authors have claimed that Helios carried a flame and that this was therefore a lighthouse like the Pharos. We are not sufficiently certain of the dates of the two monuments, but the Colossus may have preceded the Pharos in completion, if

not conception. For a short period of time, until its destruction in 226 BCE, it was certainly a contemporary of the Pharos, and of massive proportions and similar function. However, the much-quoted role of lighthouse probably arose because of another misinterpretation of ancient language.

One of the earliest reports of the Colossus occurred in some poetry written to celebrate the Rhodian victory over potential oppression.⁵³ As an inscription, it was mounted on the statue's plinth. The unknown poet used the following words:

"Not only over the seas but also on land did they kindle the lovely torch of freedom and independence."⁵⁴

Of course, such words in a poetic context should not be taken literally; the desire to do so must be resisted for it leads to the conclusion that a torch carried by the Colossus was lit and that the statue was therefore a lighthouse.

With regard to the structure itself, the Colossus - so it was thought - bestrode the entrance to the harbour forcing arrivals to pass between its legs as they entered. There were many illustrations depicting the Colossus, some of which are reproduced here. Most are fanciful and based upon erroneous reporting, for engineers will understand the extreme difficulty of constructing such an enormous object, and they will pronounce it impossible to have the statue bridging the two moles - a distance estimated by some as being 200 m. It is unfortunate that later images helped to cement the false idea of the Colossus astride the port entrance.⁵⁵ Shakespeare himself alluded to it in his play, *Julius Caesar*.⁵⁶ The idea of a great man standing astride his domain was carried forward in the public consciousness by cartoons such as one of the English explorer, Cecil Rhodes in which he was depicted standing astride the entire length of Africa, a popular idea at the height of the British Empire.

Its construction is thought to have been similar to the Statue of Liberty whereby a hollow skeleton of iron members supported a metal skin of copper in New York and bronze in Rhodes. Whilst it has been possible for humans to climb the inside of the arm of Liberty where, for years, lights were indeed shown to shipping entering New York and caused it to be regarded as a genuine lighthouse, its ancient ancestor was likewise claimed to have been lit by fire, although no satisfactory means of achieving it has ever been presented. Perhaps it



Fig. 1-8 Above: *The Colossus of Rhodes*, illustrated in 1572 by van Heemskerck.⁶⁹

Fig. 1-9 Below: *The harbour of Rhodes today*, showing two unlit columns and a lighthouse in the fort (E4744). *The Colossus may have stood here where there were more extensive foundations.*⁷⁰



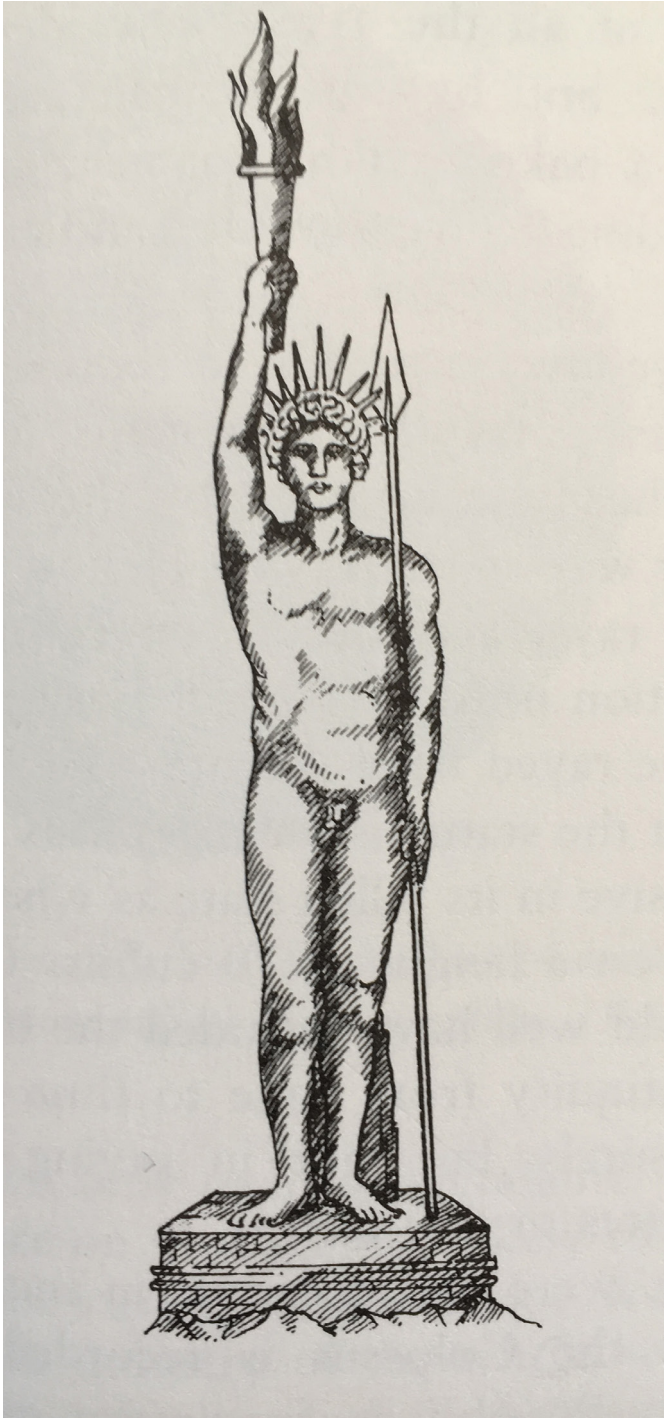
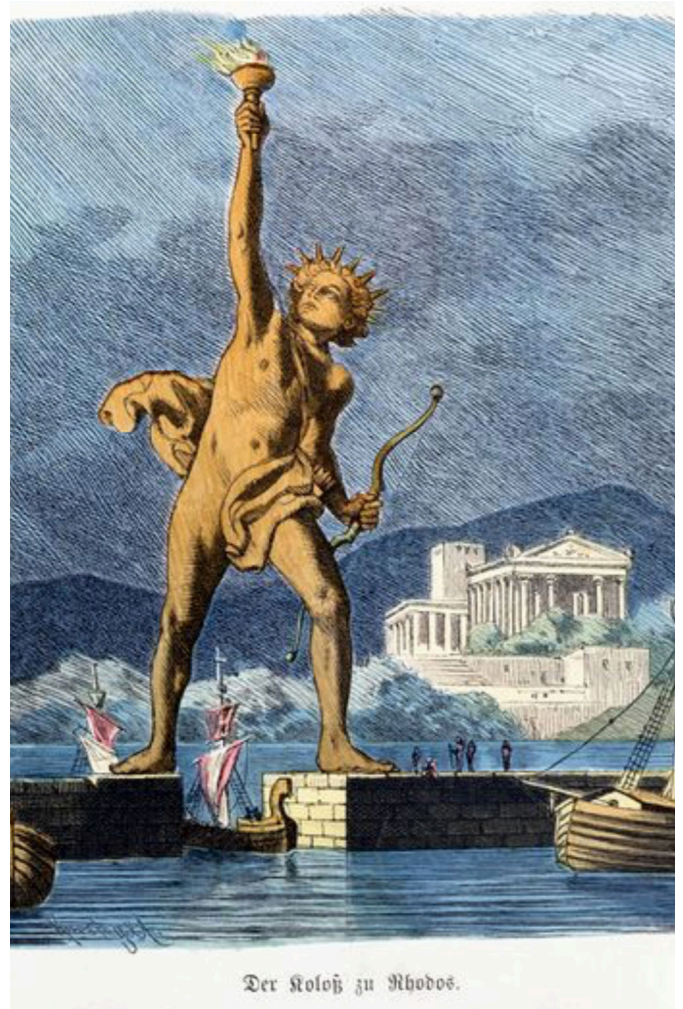


Fig. 1-10 Above: A recent impression of the Colossus of Rhodes depicting the most likely pose with closed legs and upward-stretched arm.⁷¹



Der Kolos zu Rhodos.

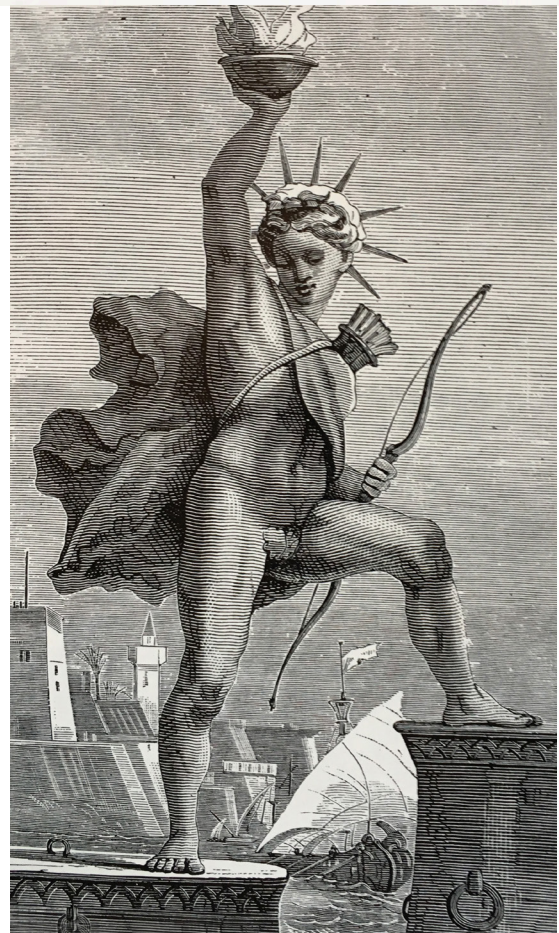


Fig. 1-12 Right below: The idea of the Colossus bestriding the harbour entrance has been reproduced so many times that it is now irrevocably embedded in culture.⁷³



Fig. 1-13: A seventeenth century engraving of the fall of the Colossus. It seems to indicate that the Colossus was not at the entry to the port, but on high ground remote from the harbour.⁷⁴

was imagined that a system of internal ladders led to the apex of the torch, as is the case in New York.

There is not a great amount of descriptive material available from ancient authors, and it was not until the 15th century that writers began to speculate upon the great statue. There is no doubt of the existence of the Colossus, for there are accounts written by Pliny the Elder⁵⁷ and Strabo⁵⁸ who both saw its remains lying on the ground after it was destroyed by an earthquake in 226 BCE having survived, according to Pliny, for sixty-six years. Some writers have suggested that invading forces pulled down the statue with ropes and sold the bronze, but these reports are discredited as deliberate strategy by early Christians to paint evil on the reputation of Muslims.

The fallen figure was known to have been left on the ground for years afterwards. Pliny and Strabo described its general size and shape, but unfortunately omitted details that would have helped us greatly. Strabo described it clearly as a “votive offering” and we must surely conclude that this excluded it from a primary role as a lighthouse, except insofar as lights might have adorned its base

for the purposes of worship rather than navigation.

The statue was without doubt hollow, rather than solid, for to have made a solid object of such size out of any casting metal such as bronze would have required far too much mass of material to be melted and cast into shape. A skeleton of metal members - probably iron - would have been constructed onto which cast panels of bronze were affixed. Some writers insist that the panels were wrought (hammered into shape), but this was simply too difficult for metal workers of the time because of the nature of bronze. (In contrast, wrought copper for the Statue of Liberty was an easy process.)

As to its form, modern analysts believe it was most likely a large, but simple pillar, in the shape of a nude or semi-nude man and without separated legs, Fig. 1-10. There is a good likelihood that it held aloft an unlit torch, for to have arranged the lighting of such a feature seems extremely unlikely. Lights around its base, however, are entirely possible, placed there for reasons of worship. The methods used in its construction will be discussed in another volume of this series, but in any case

have been described in some detail by Higgins.⁵⁹

A famous article by Maryon - an archaeologist and a sculptor - was perhaps the most persuasive in debunking the idea that the statue straddled the harbour entrance, since when it has been generally agreed that it must have stood to one side, perhaps as in Fig. 1-6.⁶⁰ It may have stood at the end of one mole, or in the port itself. Today, the harbour entrance is guarded by two modest pillars, with a modern lighthouse built inside the walls of Fort St. Nicolas (Fig. 1-9). It is possible that the Colossus stood on the larger foundation of the fort, in which case its collapse would have cast its debris over the relatively limited confines of the this outcrop, rather than on the harbour mole. There it would have lain out of the way of the busy port activities. Giardina supports its location inside the grounds of the fort and suggests that the Colossus *appeared* to be lit because of reflections from the great number of other lights burning around the harbour.⁶¹ There remain those who support the idea that the Colossus was not built in the harbour at all, but in the vicinity of the Turkish School at the head of the Street of Knights where it is thought that the Temple of Helios once stood. This appears to be suggested in Fig. 1-13. For many scholars, this site for what was undoubtedly a wondrous artifact is by far the most likely, a conclusion that perhaps does not excite many readers, but where future archaeologists might make fruitful discoveries. Nevertheless, we must conclude that the Colossus of Rhodes was never a lighthouse, as defined in the context of this book.

Conclusions

1. 'Homer':

a. Suggestions that 'Homer' referred to the existence of lighthouses are misleading.

b. The works contain no unambiguous references to the purposeful setting of fires or the building of platforms or towers for the primary purpose of guiding mariners.

c. The works do contain references to the use of lights at night to assist navigation.

2. Reports of the existence of lighthouses before the Pharos:

a. Reports written after 280 BCE were influenced and perhaps rendered misleading by the existence of the Pharos.

b. The misinterpretation by writers that lighthouses existed arose out of the use of existing lights for navigational purposes.

c. All lighted aids to navigation were of secondary function, that is, their primary purpose was not navigational assistance.

d. The idea of using lights as aids to navigation was so commonplace that writers and story tellers before writing made no special reference to them.

e. Lights were shown primarily for religious, military and political purposes.

3. Ancient Language:

a. There is no evidence that the content of contemporary languages included the word 'pharos' until the building existed.

b. There are not enough uses of words that could be translated as 'lighthouse' for us to be confident that the practice of building and using lighthouses was extant before the building of the Pharos.

c. In view of the great number of ancient texts, inscriptions and epigrams, there are very few that directly refer to lighthouses. Those that do can be explained by misinterpretations during translation and other vagaries of understanding of ancient practices. Once the Pharos had been built and its fame had quickly spread, it was possible to erroneously apply its lighthouse function to other situations.

4. Watchtowers:

a. Watchtowers may have been important for short time periods only, constructed for military observations and signalling.

b. Watchtowers may have had a useful secondary function of providing lighted aids to navigation on a temporary or short term basis, and their long term use as navigation aids is doubtful but cannot be excluded.

Notes

1 The lighthouse that stands on Plymouth Hoe is the original Eddystone lighthouse built by John Smeaton to stand on that dangerous reef in 1759. In later volumes, this lighthouse will be discussed extensively.

2 Clayton (1988).

3 Stevenson (1959).

4 Hague (1974).

5 Zemke (1992).

6 Giardina (2010). The work of Baldassare Giardina first came to my attention in 2016, long after I had started working on this book. Inevitably, there is extensive overlap, and I have latterly taken into consideration a great deal of the factual data contained in his book - with the author's knowledge - especially in the section devoted to the Catalogue. I have tried to indicate precisely where I have referred to Giardina's work. However, I wish to make it clear that the study presented in this book is the result of over fifty years of research by me, and that the analysis and conclusions are my own.

7 De Graauw (2016), Vol 1.

8 Wikipedia: Heinrich Schliemann (2017). The story of Heinrich Schliemann's excavations at Troy are often quoted in this context.

9 Fischer (2001)

10 Homer: The Iliad, Book 19, 375-380, trans. E. V. Rieu (1950), notes by Peter Jones, Penguin Classics (2003).

Homer: The Iliad, Book 19, 404-407. In *The Iliad of Homer* trans. Alexander Pope, notes by Gilbert Wakefield (1796). The original words of Homer were translated by Pope as:

*So to night-wandering sailors, pale with fears,
wide o'er the watery waste a light appears,
which on the far-seen mountain blazing high,
streams from some lonely watch-tower to the sky.*

Rieu's translation of 1950 was first revised by his son in 1988 and then by Jones in 2003 and reads:

*"Like the gleam that sailors catch at sea
from a fire burning on a lonely upland farm,
when the winds drive them unwillingly
from home over the teeming seas, such
was the gleam that went up into the
sky from Achilles' ornamented shield."*

The 2017 Internet version available at classics.mit.edu/Homer/iliad.19.xix.html was translated by Samuel Butler thus:

"As the light seen by sailors from out at sea,

*when men have lit a fire in their homestead
high up among the mountains, but the
sailors are carried out to sea by wind and
storm far from the haven where they would
be - even so did the gleam of Achilles'
wondrous shield strike up into the heavens."*

Clearly, these differences of interpretation suggest an inspection of the original Greek words. The difficulties of taking language that is about 2800 years old and making it sensible to modern readers become apparent. Taken from the website www.perseus.tufts.edu the Greek lines (375 to 380) are literally translated as follows. Single Greek words are presented with English alternatives in parenthesis.

375

ὡς δ' ὅτ' ἄν ἐκ πόντοιο σέλας ναύτησι φανήη
As but when (he came) (from out of) (light, brightness, flame)
seaman...

376

καιομένοιο πυρός, τό τε καίεται ὑψόθ' ὄρεσφι
kindle fire (the following) burns (aloft, on high) mountain
377

σταθμῶ ἐν οἰοπόλῳ: τοὺς δ' οὐκ ἐθέλοντας ἄελλαι
(station, standing place) in lonely: against (the following) (to
be willing) storm-wind

378

πόντον ἐπ' ἰχθυόεντα φίλων ἀπάνευθε φέρουσιν:
sea on (full of fish) beloved (afar off, far away) carrying:
379

ὡς ἀπ' Ἀχιλλῆος σάκεος σέλας αἰθέρ' ἵκανε
(so thus) (far away) Achilles shield (light, brightness, flame)
the heaven come

380

καλοῦ δαιδαλέου: ...
beautiful cunningly: ...

From the same website, these Greek lines are translated as below:

375

*And as when forth o'er the sea there appeareth to seamen
the gleam*

376

of blazing fire, and it burneth high up in the mountains
377

*in a lonely steading: but sore against their will the storm-
winds*

378

bear them over the teeming deep afar from their friends;
379

*even so from the shield of Achilles went up a gleam to heav-
en, from that shield*

380

beautiful and richly-dight.

www.perseus.tufts.edu English Translation by A.T. Murray, Ph.D. in two volumes. Cambridge, MA., Harvard University Press; London, William Heinemann, Ltd. 1924.

The ambiguity as to whether Homer is referring to a lighthouse or not centres on the word σταθμός (stathmos) meaning station in modern Greek, but which has also been translated as steading, homestead, farm, standing-place etc.

11 Homer: The Odyssey, Book 4, lines 356-8 Penguin Classics edition (2003) trans. E. V. Rieu (1946). The following lines are accompanied by literal translations using the website www.perseus.tufts.edu:

354:

*νησος ἔπειτά τις ἔστι πολυκλύστῳ ἐνὶ πόντῳ
island thereupon anything sum stormy into sea*

355:

*Αἰγύπτου προπάροιθε, Φάρον δέ ἐ κικλήσκουσι,
(the river Nile) (in front of), Pharos but ? call*

356:

*τόσσον ἄνευθ' ὄσσον τε πανημερίη γλαφυρή νηῦς
(so great) (without) (how great) thou (all day long) hollow ship*

357:

*ἦνυσεν, ἧ λιγύς οὔρος ἐπιπνείησιν ὄπισθεν:
accomplish shrill (fair wind) (blow upon) behind*

12 Homer: The Odyssey, X, 28-30. Trans. A. T. Murray, Loeb Classical Library Volumes, Cambridge, MA, Harvard University Press; London, William Heinemann Ltd. 1919/1995.

“Nine days and nights we sailed, and on the tenth our own land was in sight, near enough to see men tending fires”.

The same passage in a different translation [Homer: The Iliad, Book XIX, 375-380, trans. E. V. Rieu (1950), notes by Peter Jones, Penguin Classics (2003)] reads:

“For nine days and nights we sailed on; and on the tenth we were already in sight of our homeland, and had even come near enough to see people tending their fires ...”

The subtlety of the translation is significant and indicates the difficulty of making a precise conclusion.

13 <http://www.ga-adangbe.com> (2017):

The Greek title word “Pharaoh” consist of two words, the actual noun “Pha” and “Ra” and with an additional sound “oh” as an appraisal sound of liturgy. The pronunciation of the word “Kpa” which became difficult to the foreign tongue was spelled as “Pha”, while “La” (fire) - the material description of the solar-fire of the Sun - also became to the foreign tongue as “Ra”. The historical evident of the then “God-Kpa” (Khepera or Ptah) elaborates his Attributes as the Universal Sun-God of Fire, solar or heat around or of the Sacred Sun-God “La”, now Khepera. The Divinity “LA-KPA” name was literally and phonetically spelled as “Ra-Pha”, while

the Divinity “KPA” alone was spelled as “PHA” and the Divinity “LA” alone was spelled as “RA”. The Royal Title “La-Kpa” was introduced and addressed to every king as the manifestation and attribution to the Divinities “La” and “Kpa” by the pre-Egyptian Nubians.

14 Duggan (2014), p378.

15 Trethewey (2013).

16 Morkot (1996).

17 Most (2013).

18 <https://www.lib.uchicago.edu/e/webexhibits/homerinprint/preprint.html>

19 Stevenson (1959), p7.

20 The precise dates remain unknown. However, the date of construction is discussed in more detail in Chapter 5. In this work, I have decided to use 280 BCE.

21 Homer Before Print: The University of Chicago Library, <https://www.lib.uchicago.edu/e/webexhibits/homerinprint/preprint.html>

22 Homer: The Iliad, Book 18, 208-213. (The use of beacon fires as distress signals.)

23 Arnold (2000).

24 Herodotus; de Sélincourt (1954).

25 No original manuscripts of Herodotus are known to exist. The earliest forms are possibly among the Oxyrhynchus Papyri, a group of manuscripts discovered during the late nineteenth and early twentieth centuries by papyrologists Bernard Pyne Grenfell and Arthur Surridge Hunt at an ancient rubbish dump near Oxyrhynchus in Egypt. They date from around the 3rd c. BCE.

26 Herodotus: The Histories 2, 11. The Nile Delta.

27 Also in Herodotus, Aubrey de Sélincourt (1954); revised by John Marincola (1996), Penguin edition (2003), Book 2, Chapter 15. (The geography of Egypt.)

This text taken from: <http://www.perseus.tufts.edu>, translated by Godley (1920). According to this source Herodotus uses the word σκοπιά that has been translated as lookout-place, but could also be a watchtower.

28 Herodotus: de Sélincourt (1954): Book 2, 118-119. (The Egyptians migrate down the Nile.)

29 Herodotus: de Sélincourt (1954): Book 2, Chapter 15. (Menelaus in Egypt.)

30 Strabo: Geographica, Bk 17, Ch 1 §18. (The Watchtower of Perseus and the Nile mouths - §17.)

“After the Bolbitine mouth one comes to a low and sandy promontory which projects rather far into the sea ; it is called Agnu-

Ceras. And then to the Watch-tower of Perseus and the Wall of the Milesians ; for in the time of Psammitichus (who lived in the time of Cyaxares the Mede) the Milesians, with thirty ships, put in at the Bolbitine mouth, and then, disembarking, fortified with a wall the above-mentioned settlement."

- 31 Herodotus: The Histories, Book 2,178-180. (Gift of Naucratis to the Greeks.)
- 32 Strabo, Book 17, Ch 1, §17.
- 33 Robinson (2015).
- 34 Herodotus: The Histories, 2.113. (The temple of Herakles at the Canopic Mouth.)
- 35 Herodotus: The Histories, 2.114 (Meeting the warden of the Canopic Mouth.)
- 36 Duggan (2014), p384.
- 37 Giardina (2010), p1-11
- 38 In German this form of signalling was called Feuer-telegraphie: Diels (1965).
- 39 Thucydides III, 22. (Fires for military signals).
- 40 The need to distinguish one lighthouse from another so as to interpret the precise location.
- 41 Hardy (1895), p18.
- 42 Wikipedia: Cushi (2016).
- 43 Renard (1990).
- 44 Anon: Brief History and Pre-History of Libya; www.temehu.com.
- 45 Stevenson (1959), p6.
- 46 Stevenson (1959), p5.
- 47 Talbot (1913), p2.
- 48 McCormick (1936), p9.
- 49 Herodotus: The Histories, 2:44. (The temple of Herakles)
- 50 Duggan (2014), p385.
- 51 Harris (1985).
- 52 Higgins (1988), p130.
- 53 Beckby (1957). The accepted version of the inscription at the base of the Colossus of Rhodes is given in the reference. By an unknown author it reads:
To you, O Sun, the people of Dorian Rhodes set up this bronze statue reaching to Olympus, when they had pacified the waves of war and crowned their city with the spoils taken from the enemy. Not only over the seas but also on land did they kindle the lovely torch of freedom
- and independence. For to the descendants of Herakles belongs dominion over sea and land.*
- 54 Litchfield West (2003).
- 55 Wikipedia: The Rhodes Colossus, 20170818. This shows the cartoon of Cecil Rhodes published in Punch magazine of London in 1892.
- 56 In Shakespeare's Julius Caesar (I,ii,136–38) Cassius says of Caesar:
*Why man, he doth bestride the narrow world
Like a Colossus, and we petty men
Walk under his huge legs and peep about
To find ourselves dishonourable graves*
- 57 Pliny: Nat. 36, 18.
- 58 Strabo: Geographica 14, 2.
- 59 Higgins (1988), 124-137.
- 60 Maryon (1956).
- 61 Giardina (2010) p8-9.
- 62 Image © Alan Jones (2001).
- 63 Image © Mark Lewis (2017).
- 64 Photo: anon; Downloaded from www.blackcablondon.net.
- 65 Google Earth
- 66 Watchtower, Fire-tower or Pharos? Zemke (1992).
- 67 Image by Sidney Barclay (1880) in the public domain: [https://commons.wikimedia.org/wiki/File%3AColosse_de_Rhodes_\(Barclay\).jpg](https://commons.wikimedia.org/wiki/File%3AColosse_de_Rhodes_(Barclay).jpg)
- 68 Wikipedia: The Rhodes Colossus, 20170818. This shows the cartoon of Cecil Rhodes published in Punch magazine of London in 1892.
- 69 The Colossus of Rhodes (1572), Maarten van Heemskerck [Public domain], via Wikimedia Commons; https://commons.wikimedia.org/wiki/File%3AColossus_of_Rhodes.jpg
- 70 Photo reproduced under Creative Common Licence, by Anita (2012). The number E4744 refers to the International registration number of the modern lighthouse in the photo.
- 71 Higgins (1988), p129.
- 72 The Colossus of Rhodes over the Harbour. Painting by Ferdinand Knab, 1886.
- 73 Whitney, (1989), p14.
- 74 Image by Antonio Tempesta (1555-1630) from Florence, published in 1610. It was Plate 2 in the series "The Seven Wonders of the World." Owned by the Los Angeles County Fund, the image is in the public domain.

Bibliography

Conventions used

1. References are given in the usual format: Smith (2002), p123. Multiple citations having the same author and year are given the suffix a, b, c etc.
2. A reference given as Smith (online) has no date if it is continuously updated. Specific information downloaded from the Internet is given a date of download.
3. Entries in the Bibliography are considered relevant to the content of this book, but are not necessarily to be found in the references.
4. Entries are in alphabetical order of the first author's last name. Unnamed authors are assigned the usual 'Anon'.

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