

# Mt2 (Cp7) THE MAPS OF MARINUS THE TYRIAN: A RECONSTRUCTION

WITH INFORMATION TAKEN FROM GEOGRAPHIKE HYPHEGESIS,  
BOOK 1, CHAPTERS 6-20, BY CLAUDIUS PTOLEMY

## SYNOPSIS

The map of Marinus the Tyrian is in fact the map used by Claudius Ptolemy but drawn on a different graticule. A simple investigation of the text of Claudius Ptolemy reveals that fact. Also indicated, despite the protestations by Ptolemy concerning the length of the oikoumene given by Marinus, is the fact that Ptolemy actually uses the same length, although he tries to hide the fact, to determine his oikoumene of only 180 degrees.

**INFORMATION AVAILABLE:** The chapters containing the data attributable to Marinus the Tyrian are as follows: (Please note for simplicity I am using the Stevenson text headings)

## CHAPTER 6: CONCERNING THE GEOGRAPHICAL NARRATIONS OF MARINUS

At the beginning of the chapter, Claudius Ptolemy states, *“If we examine closely his (Marinus) last work we find few defects. It would seem to be enough for us to describe the earth on which we dwell from his commentaries alone, without other investigations.”*

But Ptolemy in describing the earth from those commentaries interjects his own beliefs and although he infers there are at least three volumes of the Geography by Marinus the Tyrian, he does not explain them. Ptolemy also commits a form of plagiarism in that he infers he has updated the work of Marinus, when in fact it can be shown he has just copied it all. By analysing the text of Ptolemy, both written and tabular we can establish the supposed variations.

We can also gain an insight into what may have been the three volumes of the text by Marinus, and I venture the following;

Volume 1: A collection of itineraries both by land and sea, with timescales and or stadia lengths included. This would have been raw data which required to be analysed for geographical distances. It would also have contained information from preceding geographers.

Volume 2: The correction of the above data into distances upon the geographical world, based upon the latitudinal degree which we are told contained 500 Stadia of indeterminate length.

Volume 3: The Heavens, The Zodiac, Fixed Stars and their locations when observed from the earth. This is probably the work of Hipparchus. It would also have contained the star sights of Marinus which were no doubt used to confirm latitudes.

There was then the map or maps. Ptolemy states that there were many copies of the Geography of Marinus, which indicates a continual updating. He also states that through scribal error there are many mistakes, but he does not indicate what they may have been or if they affected the maps or how many maps there were.

## CHAPTER 7: THE OPINIONS OF MARINUS RELATING TO THE EARTH'S LATITUDE ARE CORRECTED BY OBSERVED PHENOMENA. Diagram Mt2D01

*“First of all, Marinus places THULE as the terminus of latitude on the parallel that cuts the most northern part of the known world. And this parallel, he shows as clearly as is possible, at a distance of 63 degrees from the equator, of which degrees a meridian circle contains 360 degrees. Now the latitude he notes as measuring 31500 stadia, since every degree, it is accepted, has 500 stadia.*

*Between Thule and the southern terminus he inserts altogether about 87 degrees which is 43500 stadia, and he tries to prove the correctness of this southern terminus of his by certain observations (which he thinks to be accurate) of the fixed stars and by certain journeys made both on land and by sea.”*

Thus we can calculate that the southern terminus was the Tropic of Capricorn, 23<sup>0</sup>50' south. We can also note that it is Marinus who determines the 63N latitude with its geographical consequences.

#### CHAPTER 8: THEY ARE ALSO CORRECTED BY MEASURING JOURNEYS ON LAND.

That Volumes 1 and 2 by Marinus were as opined may be confirmed by the data in chapter 8, where-in Ptolemy commences the chapter informing us of the distance Marinus gives from Ptolemais Trogloditica to Prasum, as 27800 stadia south of the equator ( see chapter 7) and then commences the second paragraph with the statement, *“Marinus then reduces the stated number of his stadia by half or less than half, that is to 12000 stadia which is about the distance of the winter solstice from the equatorial circle.”*

The whole of the first paragraph of chapter 8 is actually unnecessary. Firstly by the statements in chapter 7, but actually unless he is working from one text or Book and then moving to a second text or Book he totally mis-understands the data. That would occur if in dictating the first text and deciding that Marinus was wrong, Ptolemy decided to illustrate the fact and then discovered that Marinus in the second book had made all necessary adjustments.

It also begs the question, did Ptolemy make full use of the second book of Marinus?

#### CHAPTER 9: THEY ARE ALSO CORRECTED BY MEASURING JOURNEYS BY WATER.

*Ptolemy states,“ Marinus has shortened the measures of latitude around the winter solstice, but has given no sufficient reason for his contraction. Even should we admit the number of days occupied in the series of voyages that he relates, he has shortened the number of daily stadia and has reasoned contrary to his customary measure in order to reach the desired and correct parallel. He should have done exactly the opposite, for it is easy to believe the same daily distance travelled as possible, but in the even course of the journeys, or voyages or that they were wholly made in a straight line, he ought not to have believed.”*

It is unhelpful to our researches that Ptolemy did not explain the number of days travel allotted by Marinus. Future calculations from the distance measures given would have been easier.

#### CHAPTER 10: ETHIOPIA SHOULD NOT BE PLACED MORE TO THE SOUTH THAN THE PARALLEL WHICH IS OPPOSITE THE PARALLEL PASSING THROUGH MEROE.

*“Marinus describes the region of Agisymba and the promontory of Prasum, and the other places lying on the same parallel, as situated all on one parallel, which is opposite the parallel passing through Meroe. That would place them on a parallel distant from the equator in a southerly direction 16<sup>0</sup> 25' or about 8200 stadia, and by the same reckoning the whole width of the habitable world amounts to*

79° 25' or altogether 40000 stadia.”

But, who determined the parallel of Meroe?

## CHAPTER 11: THE ERRORS OF MARINUS IN CALCULATING THE LONGITUDE OF THE HABITABLE EARTH.

Here Ptolemy states” *Marinus gives us the longitude, between two meridians, enclosing a total space of 15 hours (225 degrees)”*

Ptolemy considers this distance too great and reduces it,” *and that it be reduced, as it ought to be, it will be seen to include not quite the space of 12 hours, that is by locating the Fortunate Islands at the extreme west and placing at the extreme east the SERES, Sina and Cattigara”.*

This is not a scientific appraisal of longitude but a belief, an assertion without proof. That the distance is perhaps too long should have been evaluated from acceptable data and not arbitrarily altered.

Intriguingly Marinus has 225 degrees at 36N, i.e.  $225 \times 400 = 90000$  stadia

Ptolemy has 180 degrees at 00N, i.e.  $180 \times 500 = 90000$  stadia.

Thus the arbitrary figure possibly had a semblance of reason, or was chosen for simplicity.

Ptolemy continues,” *The distance from the Fortunate Islands to the Euphrates at Hieropolis, which we place with Marinus on the parallel passing through Rhodes, must be reckoned according to the number of stadia, determined by Marinus,---*” *“Marinus shows Rhodes to be 36° distant from the equator and each degree to measure approximately 400 stadia.” “The distance from the Euphrates at Hieropolis to the Stone Tower, Marinus gives as 876 Schena, or 26280 stadia. The distance from the Stone Tower to SERA the capital of the SERES, which is a journey of 7 months, he computes at 36200 stadia.”*

Ptolemy then states he will shorten these distances to make the necessary adjustment to account for deviations from a measurement along a parallel, which is the route distance of Marinus.

Thus we have the beginnings of the length of the oikoumene of Marinus the Tyrian.

## CHAPTER 12: THE CALCULATION OF LONGITUDE CORRECTED BY LAND JOURNEYS.

Ptolemy reduces the distance from the Stone Tower to Sera, viz., 36200 stadia by one half to 18100 stadia or 45 and one fourth degrees. But, he only reduces the distance from the Euphrates to the Stone Tower by 76 Schena, to 800 Schena or 24000 stadia, stating that this particular measurement has been verified. He then proceeds to describe the route as is discussed in my text Mt1.

Ptolemy’s text is followed by a summation of the longitudinal measure or length of the oikoumene using the measurements of Marinus with the two adjustments discussed previously in this chapter.

I quote,” *Adding the degrees which have been noted, they amount to 60 or 24000 stadia. When we have added the 45 ¼ degrees from the Stone Tower to SERA, the total distance from the Euphrates to SERA on the parallel of Rhodes will amount to 105° 15’. We will now add, from the distances which Marinus gives, the other degrees on the same parallel, and first of all from the meridian passing through the Fortunate Islands, as far as the Sacred Promontory of Spain 2° 30’, thence to the mouth of the river Baetis, and from the Baetis to the Strait and to Calpe is likewise 2° 30’, being one and the same distance; from the Strait to Caralis, a city in Sardinia, is 25°; from Caralis to the promontory of Lilybaeum in Sicily 4° 40’; from Lilybaeum to Pachynus is 3°; from Pachynus to Taenarus in Laconia is 10°; thence to Rhodes is 8° 15’; from Rhodes to Issus is 11° 15’; from Issus to the Euphrates is 2° 30’, and the sum of all these degrees is 72°. Hence, the length of the known earth, that is, from the meridian drawn through the Fortunate*

*Islands in the extreme west, to SERA in the extreme east is 177°15'.*”

By adding together the distances given by Marinus upon the 36<sup>th</sup> parallel we can establish the difference between the two measures.

Marinus has, 72° + 26280 stadia + 36200 stadia, which is 72 + 65.7 = 90.5, totalling 228.2 degrees.

This figure is never mentioned by Ptolemy, nor does he explain the difference quoted with the 225 degrees or 15 hours of Marinus. Ptolemy knew of the 90.5 degrees because he halves it at 45 ¼°.

### CHAPTER 13: THE SAME CALCULATION OF LONGITUDE CORRECTED BY SEA JOURNEYS.

Ptolemy commences the chapter with, “*One might then conjecture that the entire distance was only a certain total, by summing up the separate distances given by Marinus in sailing from India to the region of Sinarus and Cattigara, after taking account of deviations from the direct course, the variations in the rate of sailing, and the position of regions themselves.*”

The distances of Marinus are as follows; Cory to Curula 3400 stadia northwards; Curula to Palura 9450 stadia with the winter rising sun; THE SHORE OF THE GANGETIC BAY HE PLACES AT A FURTHER DISTANCE OF 19000 STADIA; from Palura to the city of Sada is 13000 stadia to the equatorial rising sun; Sada to Tamala is 3500 stadia and Tamala to the Golden Chersonesus is 1600 stadia both to the winter rising of the sun.

#### **Diagram Mt2D01.**

Ptolemy completely revises the above distances, but it should be noted that these only reflect the eastern coastline of India. The western coastline is not mentioned at all. My text Cp3, India Intra Gangem, fully discusses the data provided by Marinus and indicates that it is based upon the measurements provided by Strabo, but attributed to Eratosthenes. Thus the 19000 stadia mentioned above is a misnomer and one of those original Eratosthian distances.

### CHAPTER 14: CONCERNING THE VOYAGE FROM THE GOLDEN CHERSONESUS TO CATTIGARA.

*“Marinus does not tell the number of stadia from the Golden Chersonesus to Cattigara”.*

There is then a comparative measurement discussion apropos Africa/Libya and Ptolemy by a certain manipulation of the numbers arrives at a distance of 34° 45' from Cory to the Golden Chersonesus and then from Cory to Cattigara is given as 52 degrees.

Data is available to aid the research as follows;” *The meridian, which is drawn through the source of the Indus river, Marinus places just west of the most northerly promontory of Taprobana, which is opposite Cory. From Taprobana the meridian which runs through the mouth of the Baetis river is distant a space of eight hours, or 120°, and furthermore the meridian passing through the Baetis is 5° from the meridian drawn through the Fortunate Islands. Whence we gather that the meridian drawn through Cory is distant from the meridian drawn through the Fortunate Islands by a little more than 125°. The meridian drawn through Cattigara is distant from the meridian through the Fortunate Islands a little more than 177°, which very nearly agrees with the distance we found elsewhere by measuring the parallel passing through Rhodes. If we grant that the entire longitude as far as the Metropolis of the SINES is 180°, or 12 hours' interval---the parallel of Rhodes is 72000 stadia.*”

The above text is an amalgam of the work by Marinus and Ptolemy. The explanation which follows this investigation of the original text and the diagrams I have drawn fully illustrate the machinations of Ptolemy.

## CHAPTER 15: CONCERNING DISCREPANCIES IN SOME OF THE EXPLANATIONS OF MARINUS.

Diagrams Mt2D04, Mt2D05, Mt2D06, Mt2D07

This chapter is fully covered later in terms of the text and an analysis of the supposed discrepancies of Marinus, which as the diagrams and explanation show these supposed discrepancies are continued by Ptolemy despite his protestations. He comments at length regarding the Mediterranean Sea and opposing Cities, giving examples which he himself actually perpetrates in his Geography. Thus we can basically establish that the positioning of places by Marinus, in many instances geographically reasonable and in other instances far better than the altered position determined by Ptolemy. However, Ptolemy has used the whole text and map(s) of Marinus for his Geography, he states that quite openly and thus it would appear he has forgotten these stated errors by the time he reads from the map the latitudes and longitudes which he has tabulated.

## CHAPTER 16: IN FIXING THE BOUNDARIES OF PROVINCES MARINUS HAS MADE SOME MISTAKES.

This very short chapter provides for no new material.

## CHAPTER 17: WHEREIN MARINUS DISSENTS FROM THE FINDINGS MADE IN OUR TIME.

Ptolemy states,” *the navigators say that the time of the passage is uncertain, (Golden Chersonesus to Cattigara) and that beyond SINA is the region of the SERES and the city of SERA. What regions lie east of this they say are unknown—* “. *“The journey from the capital SINA to the gate of Cattigara runs southwest, and therefore does not coincide with the meridian drawn through SERA and Cattigara as Marinus reports, but is more to the east.”*

From that text it will be readily understood that there is a confusion regarding the place-names for what we now know as China. That confusion is further exacerbated later in the text of Ptolemy. The chapter then has a resume of the Periplus of the Erythraean Sea.

## CHAPTER 18: THE INCONVENIENCE OF THE METHOD OF MARINUS FOR DELINEATING THE HABITABLE EARTH.

I quote,” *Recently the making of new copies from earlier copies has had the result of increasing some of the faults that were originally small into great discrepancies.*” *“That has happened in the work of Marinus several times, for copyists do not follow his last edition of a world map, but attempt to construct a map merely from commentaries.”* *“Although it is necessary to know the longitude as well as the latitude of any place that we may be able to fix its right position nevertheless in the edition of Marinus this cannot be immediately found.”* *“We find as a rule no note of both longitude and latitude.”*

Thus we may infer from this text that Ptolemy had access to several copies of the text and maps by Marinus, and that Marinus sought to continually update the text and maps he was producing.

## CHAPTER 19: OF THE CONVENIENCE OF OUR METHOD OF DELINEATING THE WHOLE EARTH.

*“We therefore are undertaking a double labour, first in keeping the intention that Marinus had throughout his whole work, besides that which we have obtained by corrections; and second in adding those things, with as much accuracy as possible, which to him were not known, partly on account of history then unwritten, and partly on account of a later series of more accurate maps.”*

That text infers Marinus and Ptolemy were far enough apart in historical timescale to allow for History to be rewritten and new information to become available. That however is a major point of

conjecture which I cannot comment upon. But, if Marinus lived in the 1<sup>st</sup> century CE and Ptolemy who we believe lived around 100 to 170 CE, (but was working in Alexandria in 150 to 170 CE,) there is the possibility they are perhaps as far as 100 years apart in their working lives.

But, what are the “later series of more accurate maps” which were available to Ptolemy and thus of the second century CE. Unless we have our dates totally wrong, Marinus should have been fully aware of the writings of Strabo and thus of the Geography of Eratosthenes. That fact is borne out by the usage of the Eratosthian Stadion by Marinus in his description of India, as my texts Es1, Es2 and Cp3 note. Thus, we can only assume it is the work of a Geographer such as Pomponius Mela who lived in the 1<sup>st</sup> century CE and was perhaps a contemporary of Marinus. Perhaps this is a non sequitur, a wishful requirement by Ptolemy? However there does not appear to be any other geographer that we are aware of.

## CHAPTER 20: OF THE LACK OF SYMMETRY IN THE MAP THAT ACCOMPANIES THE GEOGRAPHY OF MARINUS.

Diagram Mt2D02 and Mt2D03

It is only here that we read of the methodology of Marinus in constructing his map or maps. *“Marinus gives this point his deepest consideration, criticising and rejecting all previous methods of delineating distances on the surface of a sphere, yet nevertheless he chose a method which is the least satisfactory of all for locating distances with congruency. For with regard to the lines which he inserts for the parallels and meridians he writes in at equal distance from one another, as is the general custom, in the form of straight parallel lines. Only the parallel through Rhodes has he kept in right proportion to its meridian and the circumference of the equatorial circle. This parallel is distant 36<sup>o</sup> from the equator. In this he follows almost exactly the ratio of 5:4. In the case of the other parallels he has paid no attention whatever either to the right proportion of their length, or to their spheric shape.”*

Thus we clearly know that the map of Marinus was drawn with a latitudinal scale of 500 stadia and a longitudinal scale of 400 stadia, and we can evaluate the map distortions which would have occurred. But, unless the map was of sufficient size, i.e. something in the order of the Ebstorf Mappa Mundi, 3 metres per side, any difference between the scales would have been so small as to hardly have been noticed. The major distortion would have occurred at the 63<sup>rd</sup> parallel when the 400 stadia should have been 227 stadia. But this is only the same distortion as on a Mercator projection map. At c24<sup>o</sup> N, the Tropic of Cancer, the measure is 457 stadia, and as such 91% of the actuality.

There is also the descriptive text to evaluate. It was common in ancient times to use “towards the rising sun”, “towards the setting sun”, etc., and to qualify them with a seasonal time. We can only assume that such descriptions relate to the Mediterranean Sea and Alexandria in particular which is at 31N. It has been suggested that solar bearings were taken from Rhodes. If so the difference is marginal. Thus we have a definitive set of angular bearings for comparative research within the text.

Diagram Mt2D03 sets out the sun's path across the sphere of the earth and thus the sunrise and sunset bearings for any period of the year based upon 31N, Alexandria.

It should also be noted that at the Equinox, spring and autumn, the angle subtended at the top of a gnomon by the sun shadow at midday will always be the actual latitude of the gnomons position. Thus we have basic data with which to analyse the text of Marinus/Ptolemy.

## HISTORICAL CONTEXT OF THE RESEARCH PERIOD FOR THE MAP OF MARINUS

The 1<sup>st</sup> century CE is the Roman world and the time of the Julian/Claudian dynasty until 68 CE and then the Flavian dynasty 69-96 CE. This was followed by 96/98 M Cocceius Nerva; 98-117 Trajan

and 117-138, Hadrian.

In this period the Roman Empire expanded to include Armenia, Assyria, Mesopotamia and Dacia. There was history to be written and the ever expanding trade routes to consider. From the beginning of the Imperial Period of Rome, an extension of the long distance trade routes, which included, Ireland, Scotland, Germania, North and South Eastern Europe was very noticeable. Roman Africa was connected with central and west Africa, Egypt to eastern Africa and Ethiopia. Caravans brought long distance trade to and from the Orient. Southern India, China, Siberia and Ceylon (aka Taprobana) were in the forefront of the mainly exotic goods. Long distance travel was no longer the prerogative of peoples belonging to a particular trade. Now there was a hierarchy of specific attributes as opposed to trades. We now find non-specialised long distance traders (pragmathentes) who were assisted by Offices, Book-keepers and Agents.

And thus records were kept, journey times established and the beginning of data which can be used by historians collated. Originally it was no doubt to ensure that the principal of a trading organisation was not cheated on the journey. But importantly it is evident that information regarding the routes and timescales was transmitted to the Library at Alexandria and its very inquisitive Librarians.

### COMMENT

When we read of the trade routes known to Marinus, as text Mt1 illustrates, it is hard to understand why it could be thought that there was much significant information he was not aware of given the investigation he undertook. Thus we may consider that the comments of Ptolemy are made in the light of the fact he is editing the Geography of Marinus the Tyrian and not writing his own Geography and, that he required to show there was information only he was privy to, however little it may have been.

### THE DATA REQUIRED WHICH ESTABLISHES THE POSSIBLE MAP OF MARINUS

#### Diagrams Mt2D08, Mt2D09, Mt2D10 and Mt2D11

To establish the data relevant to the map or maps of Marinus it is necessary to move between chapters for continuity. It will be obvious to all that the continuity of the text written by Ptolemy is somewhat compromised by the extra-ordinary placement of data given the chapter headings. In fact if the Zamoyski Codex (National Library of Poland), a possible fourth edition of the Geography of Claudius Ptolemy is studied, it will be found that the chapters are re-arranged and in fact edited for content. The whole text is therein, but the order is somewhat re-arranged possibly to ensure a form of continuity.

Claudius Ptolemy clearly states that he accepts the measurements of Marinus for the Mediterranean Sea, i.e. from the Sacred Promontory at  $2\frac{1}{2}^{\circ}$  east to the Euphrates at  $72^{\circ}$  east, a spread of  $69\frac{1}{2}^{\circ}$ .

As text Cp2 has already shown the  $62\frac{1}{2}$  degrees from Calpe to Issus equates to 25080 stadia which is in fact the geographical distance equivalent measured at the equator, the favourite of Ptolemy.

Thus geographically from Calpe,  $5^{\circ}22'$  west to Issus at  $36^{\circ}10'$  east is actually  $41^{\circ}32'$  and a distance of 25086 stadia.

But in accepting the Marinus calculation, Ptolemy is also accepting the Map of Marinus, as the one is derived from the other.

Was it therefore Marinus who determined the overall latitudes, as it appears from the  $63^{\circ}$ N position of Thule in the texts? Ptolemy in the Almagest discusses land further north in Scythia. Was it therefore Marinus who determined the shape of Britannia, and thus the mis-shape that was made to fit predetermined latitudes? Ptolemy comments that he accepts all of the work of Marinus for the

Mediterranean Sea, but Britannia, Gaul and Greater Germania cannot be distinguished from the littorals of the Mediterranean Sea. They are part of the whole system. Thus was Ptolemy only required to read from the map or maps of Marinus to ascertain the latitudes and longitudes of each individual site and then re-position them on a map framework or graticule which agreed to his theory and corrected the over and under scales of the Marinus graticule based upon the 36<sup>th</sup> parallel?

As indicated above Ptolemy in his “Almagest”, for the northern extremity of his oikoumene, stated that the parallel  $64\frac{1}{2}^{\circ}$  north of the equator passed through the “Lands of the unknown Skythians”, and that Thule was at 63<sup>o</sup>N. This does not appear in his comments or on his maps.

In “Ptolemy’s Geography”, Berggren and Jones state,  
*”There is some reason to believe that at this stage (Almagest) Ptolemy accepted the estimate going back to Eratosthenes that the earth’s circumference is approximately 250000 stades, which was usually expressed by the equation of one degree of the earth’s equator with 700 stades.<sup>19</sup> Note 19 reads, The evidence is that Ptolemy assumes smaller time differences between the meridians of Rome, Alexandria, and Babylon in the Almagest than in the Geography, roughly in proportion that would result if the same stade distance had been converted to degrees of longitude using respectively 700 stades and 500 stades to the degree (Schnabel 1930, 219). On Eratosthenes’ measurement of the size of the earth, see, e.g. Dicks 1971, 390-391.”*

When chapters 6 to 20 are analysed, Ptolemy does not reduce any longitudinal measure before he considers India after the river Indus, or India Intra Gangem. Does he therefore accept the whole of the text by Marinus until the limit of the Indus River? Ptolemy is very cautious in stating the acceptance of any measure that is east of this point. However, he then extends his approbation to the location of Cory Island and the 125<sup>th</sup> meridian, by not complaining about the western littoral of India and stating that the source of the Indus River and Taprobane are slightly to the east of the 125<sup>th</sup> meridian.

Thus we may assume that any point noted to the west of the 125<sup>th</sup> meridian which is not commented upon is accepted. The only noted adjustment which would affect any map up to the 125<sup>th</sup> meridian is in Africa and concerns its southern extent.

### INDIA, INTRA AND EXTRA GANGEM

### Diagram Mt2D10

The map of India Intra Gangem that would have been produced from the data given by Marinus is considerably adjusted by Ptolemy from the promontory of Cory to the Ganges Delta. However Ptolemy appears to accept the location of that delta. Marinus describes the east coast of India and then to the Golden Chersonesus by distance measure and solar direction. Ptolemy recalculates these distances which on the face of it have no factual basis.

Thus Ptolemy produces a form for India I have described in text Cp3 as “sinuous as a snake”, and with no geographical basis. In fact text Cp3 indicates that both Marinus and therefore Ptolemy have used the description of India given by Strabo as attributable to Eratosthenes. That fact also includes the use of the Eratosthian Stadion of 157.5 metres. Thus the geographical distances, 68E to 92E or 24 degrees/13250 stadia of c184 metres is extended to 16000 stadia of 157.5 metres. Calculated we have,  $16000 \times 157.5 = 13700 \times 184$ , and thus a considerable error of longitude was introduced to northern Asia.

Marinus states the distance from Hieropolis to the Stone Tower as 26280 stadia, 876 Schena, but Ptolemy reduces this to 24000 stadia, 800 Schena, i.e. 90% of the distance in question and hardly an adjustment when compared to the 50% adjustments made elsewhere.

But, Marinus places the Stone Tower 26280 stadia or 65.7 degrees east of Hieropolis and thus a total longitude of 137.7 degrees or 9 hours from the Sacred Promontory of Iberia. Ptolemy places the Stone Tower, even though he has professed to a 2280 stadia or 76 Schena reduction in the distance, at 135 degrees from the Fortunate Islands. This is a 2 ½ degree shift east when the calculated distance should be 5.7 degrees and a longitude of c132E.

Ptolemy has stated this fact should be applied to his work and ignored it. That is unless he has merely reduced the route distance and applied a nominal longitude, which just happens to be 2 ½ degrees less in length than that of Marinus.

The diagrams accompanying the text have both the Marinus and Ptolemy maps thereon, with an overlay to illustrate the apparent coincident points which perhaps show that Ptolemy in adjusting India he was at all times using the map of Marinus and had to return to that base for continuity as he had not in fact carried out the original work, nor was he sufficiently able to totally ignore it and compose a totally separate map.

### SERICA OR SINAE THE LAND OF THE SERES

### Diagram Mt2D11, Mt2D12 and Mt2D13

Ptolemy distinguishes between Serica and Sinae, the land of Silk and China! We are given many place positions and descriptions of northern Asia, east of the Stone Tower, with a particular reference for Sera Metropolis, 177° 15'E and 38° 35'N. This is precisely the Smyrna parallel and thus the latitude given by Marinus in the Mediterranean Sea which Ptolemy has wholly accepted. But which Sera is it?

Can we assume that the original positions given by Marinus have been altered by Ptolemy? He mentions them previously but is non specific as appendix one illustrates.

Ptolemy in chapter 12 states he will reduce the distance from the Stone Tower to Sera and gives the distance as 18100 stadia/45 ¼ degrees. The Stone Tower he locates he locates at 135E/43N and Sera at 177° 15'E/38° 35'N. Thus we have, 135 + 45 ¼ = 180° 15'E, or some 3 degrees more than he has stated. This therefore is Ptolemy's capital for Serica and not the capital of Sinaes or the Seres.

Consider these facts;

Thyne Metropolis is assigned the co-ordinates, 180°E/3°S by Ptolemy and this is a completely new city that just suddenly appears in the listings;

Marinus places the capital of Sera on the Byzantium parallel at a calculated distance east of 228.2 degrees i.e. 72+65.7+90.5=228.2 degrees. However in text Mt1 it is shown that in all probability given the 225 degree/15 hour longitude quoted that was the distance measure used by Marinus from the Sacred Promontory of Iberia it is thus probably a total of 227.5 degrees from the Fortunate Islands.

From Ptolemy we read, Sera Metropolis at 177° 15'E/38° 35'N to Thyne Metropolis at 180E/3S, which is a shift in position of 41° 35'S and 2° 45'E or c21000 stadia direct measurement.

From Sera Metropolis by Ptolemy, 177° 15'E/38° 35'N to the Sera of Marinus at 228.2E/43N we have the same distance measure of c21000 stadia.

And thus by equating *Thyne Metropolis of Ptolemy to Sera Metropolis of Marinus*, we find that they are on a 5:4 ratio angular disposition and can only have been adjusted by Ptolemy using the original map of Marinus the Tyrian to produce the geometry required to achieve the layout. The diagrams indicate that 5:4 movement NE/SW and the equi-distant measurements.

## COMMENT

Claudius Ptolemy has taken the overall distance given by Marinus the Tyrian in his Geographical Books and as shown on his map, determined for unknown reasons that the oikoumene can only be 180 degrees in length and had to make adjustments to suit. It appears he has noted that Sera Metropolis is situated close to his desired limit for the oikoumene,  $177^{\circ} 15' / 180^{\circ}$  and, not having carried out the research accepted the oikoumene of Marinus. Thus in positioning of “The Capital of the SERES” he has merely used the difference between the two as a radius and projected the whole of “China”, its capital Xi’an/Sera in a southerly direction until it was within the confines of the 180 degree limit he had arbitrarily set. This of course produces the 5:4 ratio which is the graticule ratio of Marinus. Therefore he has corrupted what was a plausible map produced by Marinus and no doubt would have been celebrated far more than the map of Ptolemy with its peculiar eastern extremity.

Thus we can evaluate Cattigara, which was shown to be Canton in text Cp3, as well as Labadius Island, shown to be Hainan and position them as Marinus would have drawn.

## THE MAP OF THE OIKOUMENE ACCORDING TO MARINUS THE TYRIAN Photo Mt2P1

It is a reasonably easy task to draw the map of Marinus given that Ptolemy has been shown to accept virtually all of his Geography and thus the positioning of each Poleis and coastal locator. Using a graticule of 500 stadia latitude and 400 stadia longitude each point given by Ptolemy has been drawn where it corresponds to the Marinus original. That is I have ignored the alterations made by Ptolemy and inserted the original distance measures given by Marinus. I have had to forego extending Africa as there is just too little information available in Ptolemy’s text.

For comparison between that which Marinus states and Ptolemy’s ideas I have produced overlays of the two maps, as diagrams Mt2D12 and Mt2D13. There is a considerable coincidence between certain map points when this is done and it indicates the original of Marinus being continuously utilised by Ptolemy to make the alterations he considers necessary.

The map has been produced as a whole unit and also as a set of sections which overlap to enable it to be read at a larger scale. They are diagrams Mt2D08 to D11 inclusive. The overall map is a digital photo of the original (see Mt2P1, Mt2P2 and Mt2P3), and has been produced at two scales in order to facilitate easier reading. The sectional maps are drawn at A3 and scan copied as usual. They are in fact the same map drawn twice with greater overlaps to enable the text to be followed section by section.

From the overall map it can be seen that if it had been drawn to a slightly larger scale, the ease with which the latitudes and longitudes could be read off to enable a new map or maps to be drawn on a varying projection is a simple task. My map is drawn using 5mm for latitude and 4mm for longitude which for those interested you can utilize a 1:200 and 1:250 scale rule to read off the degrees.

## CONCLUSION

Ptolemy intends to be quite open and honest in his critique of the work by Marinus the Tyrian. That is the impression given by the statements he makes in Book One. But, when the criticisms are analysed and the actual work by Ptolemy researched it is evident that he intended to do no more than completely copy and plagiarise Marinus’ work. The evidence for that is the complete lack of a carry

through when he has criticised Marinus for one reason or another. It is as though he has forgotten all that he had written.

But in inventing a new capital for “China”, Thyne Metropolis, and placing it at the geometric distance obtained from the location by Marinus of “The capital of the Seres”, surely is a step too far even for a plagiarist.

But let me be quite clear concerning the work of Claudius Ptolemy.

His *Almagest*, *Tetrabiblos* and *Geography* are fantastic works of astronomical and geographical thought. The tabulation of places and poleis by latitude and longitude was probably the most sensible act of the second century of our era apropos cartography. The projections for his maps have been used since then and will continue to be used. Thus he is rightly celebrated, but we must not exclude the original author.

To our dismay we know so little about Marinus the Tyrian, but that should not stop us placing him before Ptolemy as a first class geographer. Without Marinus there would be no Ptolemy! That the whole of the eight books are based upon the work of Marinus, even though he did not tabulate the latitudes and longitudes, he provided the base map or maps from which those same co-ordinates were taken.

Perhaps it is time to consider where practical to replacing Ptolemy with MARINUS.

## MICHAEL J FERRAR

### APPENDIX 1

#### References to SERA in the *Geographike Hyphegesis* of Claudius Ptolemy

For ease of reference I am using the text by Stevenson, and thus his page numbers, starting with Book 1.

- P32, Chapter XI      -placing at the extreme east the Seres, Sina and Cattigara  
                             -the distance from the Stone Tower to Sera, the Capital of the Seres which is a journey of 7 months he computes at 36200 stadia  
                             -the journey from the Stone Tower to Sera was exposed to winter tempests  
                             -although he did not come to Sera in person but sent others there
- P33, Chapter XII      -for the Stone Tower is on the parallel that passes through Byzantium and Sera is more to the south and on the parallel that passes through the Hellespont  
                             -distance Stone Tower to Sera  
                             -Stone Tower to Sera, the total distance from the Euphrates to Sera on the parallel of Rhodes  
                             -Fortunate Islands in the extreme west and Sera in the extreme east is  $177^{\circ} 15'$
- P34, Chapter XIII      -India to the region of Sinarus and Cattigara
- P35, Chapter XIV      -Marinus does not tell the number of stadia from the Golden Chersonesus to Cattigara  
                             -If we grant that the entire longitude as far as the metropolis of Sines is  $180^{\circ}$

P37, Chapter XVII -The navigators say that the time of the passage is uncertain and that beyond Sina is the region of the Seres and the city Sera  
 -The journey from the capital Sina to the gate of Cattigara runs to the southwest

Book 6, chapter XVI, Location of Serica

-These are the important towns of Serica (15) and the last is Sera Metropolis, 177° 15' and 38° 35' (Hellespont)

Book7, Chapter III, Location of Sinae

-Sinae is terminated on the north by the accessible part of Serica; on the east by the meridian marking the unknown land; on the west by India beyond the Ganges along the indicated boundary as far as the Great bay (Sinus Magnus)

Sinarus Bay	178 00	south 2 <sup>0</sup> 20'
Cattigara Sina, roadstead	177 00	south 8 <sup>0</sup> 30'
The cities of interior Sinae have the following names		
Acathara	178 20	21 15
Aspithra	175 30	16 15
Coccoranagara	179 00	south 2 00
Sarata	180 00	south 4 00
Thyne Metropolis	180 00	south 3 00

Book 7, Chapter V -borders on the eastern races of Greater Asia, namely the Sinae and the Seres  
 -The extreme eastern region of the world known to us is defined by the meridian passing through the Metropolis of Sinae, which meridian is distant from that drawn through Alexandria measured to eastward on the equator 119 ½ degrees, that is about 8 hours.

#### Note.

There are four papers explaining the Geography of Claudius Ptolemy by this author. The first is entitled: Claudius Ptolemy: Falsification, Regimentation or Symmetry? The map of Britannia examined and the turning of Scotland resolved. The third, (this paper being the second,) is entitled, India intra et extra Gangem + Sinae and Taprobane. The maps of Claudius Ptolemy explained with the resolution of place-names including Cattigara Sina. The fourth is entitled; The Text of Marinus the Tyrian and Claudius Ptolemy, Geographia: Book 4, chapters 1, 6, 7 and 8. The west coast of Libya explored and the zero longitude determined. They are texts, Cp1, Cp2, Cp3, and Cp4

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Codex Lat V F. 32. Library of Naples. 27 maps published originally in Italy (1990) by Orsa Maggiore SpA. and latterly in England by Magna Books, Leicester.

Diller, A. (1934). *Review of above book*. ISIS, vol., 22, pp533/539.

Strang, A. (1998), "*Analysis of Ptolemy's Geography*", Cartographic Journal vol., 35 N<sup>o</sup>1, pp 27-47

Berggren, JL, and Jones, A. (2000). *Ptolemy's Geography. An annotated translation of the theoretical chapters*. Princeton and Oxford.

2] 'Xenophon'; "*The Persian Expedition*", (trans., R Warner,) 1949, Penguin, London.

3] '*Strabo, Geography*'. (trans., H L Jones.) Loeb Classical Library  
Harvard and London, 1917-1932. The text is also available on-line.

4] 'Quintus Curtius Rufus'; "*The History of Alexander*", ( trans., J Yardley, 1984,) Penguin Classics, London.

5] 'Arrian'; "*The Campaign of Alexander*", (trans., A De Selincourt, 1958,) Penguin Classics, London.

6] Dilke, O A W. (1990), "*Ancient Sources for Greek Coastal Topography*",

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Also in; "Harley, J B. and Woodward. D. (1987), "*The history of Cartography*" volume 1. 'The cartography in pre-historic, ancient and medieval Europe and the Mediterranean'. University of Chicago. Chapters 11 to 16 inclusive.

7] Ifrah, G. (1994-1998) "*The Universal History of Numbers*", The Harvill Press, London. Chapter 16, pp182-185.

8] Ponsich, M. (1974), "*La Navigation Antique dans le Detroit de Gibraltar*", in

Melanges offerts a Roger Dion, Editions Picard, Paris, p257-274.

Arnaud, Pascal. (1993), De la durée á la distance: l'évaluation des distances maritimes dans le monde gréco-romain. *Histoire & Mesure* Vol. 8 no 3, 225- 247

Several conversion scales were in use for high-sea navigation, mainly; 700 stadia per solar day, 1000 stadia per 24 hour day, 500 stadia per solar day. Distances taken along the coast were much more accurate (down to a one-stadion interval!) and segmented, but seem to belong to a far larger panel of scale-systems. In Section 3, Le probleme de la valeur du stade, is discussed.

Eratosthenes and his predecessors had plenty of nautical measurements: see for example Herodotus on the Black Sea (switching between fathoms, stadia, and time measurements---days' and nights' sailing--- and measurements in stadia.

'*Herodotus, The Histories*', (trans. A.de Selincourt and revised by A.R.Burns) 1972. Penguin Books Ltd. London.

In Book 4.34, *Herodotus* commences the section with the words, 'I cannot help laughing at the absurdity of all map-makers- there are plenty of them-', and proceeds to describe the known world. He states later, 'As for Libya, we know that it is washed on all sides by the sea except where it joins Asia, as was first demonstrated, so far as our knowledge goes, by the Egyptian king Neco, who, after calling off the construction of the canal between the Nile and the Arabian gulf, sent out a fleet manned by a Phoenician crew with orders to sail round and return to Egypt by way of the Pillars of Heracles'.

9] Wiseman, T P. (1992) "*Julius Caesar and the Mappa Mundi*" in "*Talking to Virgil*", University of Exeter Press, pp22-42.

For a full discussion of the Roman World Survey and its aftermath in and on the landscape of Europe, see,

Ferrar, M J. (2007) 'With Michael from Italy to Ireland', published on [www.journalofmaps.com](http://www.journalofmaps.com) It is available for selection now and on this site as StM1 text.

See 6, O A W Dilke, in *History of Cartography*, Chapter 12, pages 205/206.

10] 'Pliny the Elder'; "*Natural History: A Selection*", Penguin Books 1991

11] Oxford Classical Dictionary, 3<sup>rd</sup> edition, O U P, 2003. P238,"*Bematists*, the surveyors of Alexander the Great". It should also be noted that this dictionary contains many catalogue references to ancillary subjects in this paper, i.e. Maps, measures, and the people mentioned in this text.

Oxford Dictionary of Classical Myth and Religion; O U P, 2003. This book contains many references to mythical characters such as *Hercules*.

Websters' New Geographical Dictionary; 1988, Merriam-Webster inc. New York. P803-*Jebel Musa* and P955-*Pillars of Hercules*.

12] Doursther, H. (1858) "*Dictionnaire Universel des Poids et Mesures Anciens et Modernes*; Bruxelles.

For a full explanation of the Egyptian measures and world measure, linked to the ITERU, which is not only the name of the River Nile, but their itinerary measure, see, *Cartographical Journal*;

Ferrar, M J. (2009), 'Eratosthenes, Hipparchus and Strabo: *Geographia*' and its sister paper, 'Strabo: Declarations of Eratosthenes: Factual or Misquoted' See also End Note Comment. Es1 and Es2 texts on this website

13] Dilke, O A W.(1971), "*The Roman Land Surveyors*", Newton Abbot.

14] Diller, A.(1948). "*The Ancient Measurement of the Earth*". *ISIS*, vol XL, p6/9.

15] Zeidler, J.(1997) *“Die Lange der Unterwelt nach agyptischer Vorstellung”*, in

Gottinger Miszellen 156, 1997, pp101-112.

General notes. The text at the beginning of the Amduat states, 'This god enters the western gate of the horizon. Seth stands along the shore. It is 120 iteru coming to this gate, before the bark reaches the netherworld dwellers. One then continues to Urnes (i.e. once equated with Ouranos).' An early division of the Duat is the Urnes, 309 iteru long. The other divisions are of equal length, and produce an overall length of  $12 \times 309 = 3708$  iteru, to which must be added the distance for Egypt. The length of Egypt is stated as early as the Middle Kingdom as 106 iteru. Thus we have a total of 3814 iteru, or  $3814 \times 20000 \times 0.525\text{m} = 40047\text{Km}$ .

The Egyptian ITRW or Iteru is found in inscriptions called a 'river unit': an early source for this unit is the White Chapel of Sensuret 1 at Karnak. It corresponds to 20000 cubits. The Greek term for this measure is *Skhoinus*. The New Kingdom, about 1550 to 1069BCE, has written sources referring to a smaller unit, the 'cord measure' (Egyptian =  $x \text{ t n nwH}$ ), corresponding to 100 cubits.

Jacq, C. (2002), *The Flaming Sword*. (trans., Sue Dyson) Pocket Books, London. Page 131, quote, 'Do you know, for example, why it is stated that the length of the DUAT, the intermediary world between the sky and the underground ocean, is 3814 iterus, to use a map-maker's term? Because it corresponds to the perimeter of the earth.' End quote.

16] Berriman, A E.(1953) *“Historical Metrology”*, J M Dent and Sons, London

17] Ferrar, M J, and Richardson, A. (2003) *“The Roman Survey of Britain”*, BAR 359; 2003. British Archaeological Reports, Oxford

18] Fischer, I. (1975), *“Another look at Eratosthenes' and Posidonius' determinations of the Earth's circumference”*, Q. J.L. R. Astr. Soc. 16 [1975], pp152-167.

19] Rawlins, D.(1982), *“The Eratosthenes-Strabo Nile Map. Is it the earliest surviving instance of Spherical Cartography? Did it supply the 5000 stade Arc for Eratosthenes experiment? , in 'Archive for History of Exact Science', 1982, vol., 26 pp211-219.*

20] Tierney, J J. (1963), *“The Map of Agrippa”*, R Irish Ac. Vol. 63, Section C, 4.

END NOTE

As most readers will be computer literate, I offer this information for further study.

Go to, [http://en.wikipedia.org/wiki/pseudoscientific\\_metrology](http://en.wikipedia.org/wiki/pseudoscientific_metrology)

Contents items 2 and 3. Quote,

*“2. The circumference of the Earth: From the 18<sup>th</sup> century, inspired by the statement of Aristotle that the circumference of the Earth was calculated as 400,000 Stadia, it became a belief among members of the French Academie des Sciences that ancient linear measures were all derived directly from the circumference of the Earth. Archaeologist Jean Antoine Letronne, in 1822, tried to show the connection to a supposed pre-Greek measure of the Earth.*

3. *The Grand Scheme*: By the time measurements of Mesopotamia were discovered, by doing various exercises of mathematics on definitions of the major ancient measurement systems, various people (*Jean-Adolphe Decourdemanche* in 1909, *August Oxe* in 1942) came to the conclusion that the relationship between them was well planned.

*Livio C Stecchini* claims in his, "A History of Measures",

"The relation among the units of length can be explained by the ratio 15:16:17:18 among the four fundamental feet and cubits. Before I arrived at this discovery, *Decourdemanche and Oxe* discovered that the cubes of those units are related according to the conventional specific gravities of oil, water, wheat and barley. [2] (<http://www.metrum.org/measures/length.htm>)"

*Stecchini* makes claims that implies [stet] that the Egyptian measures of Length, originating from at least the 3<sup>rd</sup> millennium BC, were directly derived from the circumference of the earth with amazing accuracy. According to "Secrets of the Great Pyramid" (p.346 [3] (<http://www.csus.edu/indiv/v/vonmeierk/3-03INC.html> ) ), his claim is that the Egyptian measurement was equal to 40,075,000 meters, which compared to the International Spheroid of 40,076,596 meters gives an error of  $0.004\%_{\circ}$ . No consideration seems to be made to the question of, on purely technical and procedural grounds, how the early Egyptians, in defining their cubit, could have achieved a degree of accuracy that our current knowledge can only be achieved with very sophisticated equipment and techniques." End quote.

## COMMENT

The above text is written in terms which not only show scepticism but also a great ignorance of comparative fact. The criticism is also self defeating with regard to the Egyptian measurement of the world which has now been recorded, and can be fairly expressed as 40,047,000 meters. *Livio C Stecchini* may have been over enthusiastic with a comparison to the International Spheroid, but the rest of the comments are balderdash. The complexity of ancient Egyptian measure and the undoubted accuracy of their achievements, before us in the landscape, indicate a capability that in certain spheres today we cannot emulate without recourse to machinery and possibly a GPS system.

They had a measure equal to 12,000 cubits, now the *Parasang*, but formerly the *Iteru or Itrw*, and that is an itinerary measure, not one for fields and general usage. It was probably designed as a measure to calculate the length of the River Nile, from which it gains its title.

Their knowledge and capabilities should never be underestimated!

But, we must question the later usage of the Egyptian world measure. Is it a case of non recognizance of texts in the pantheon of Egyptian writings or a non acceptance that such a phenomenon was possible? If the data was available to the Greek scholars when the *Ptolemaic Kingdom* was formed, would they have used or ignored it?

We must also consider the possibility that the survey details *Eratosthenes'* utilised were Egyptian and that the original method of measurement we find attributed, the distance between the Well at Syene and Alexandria, is an Egyptian original.

Thus, Egypt probably provided the Geographers with their base data.

Michael J Ferrar.

