Cp3 INDIA INTRA ET EXTRA GANGEM + SINEA AND TAPROBANE

The maps of Claudius Ptolemy explained with a resolution of the place names including Cattigara.

SYNOPSIS

The text of *Geographike Hyphegesis* by *Claudius Ptolemy*[1] is a reworking of the original books (now lost) of *Marinus the Tyrian*. In Book 7 chapter 1, *Claudius Ptolemy* lists the sites which comprise the coastline of India from the Indus River to the Ganges. However the form of India which his map indicates is not reconcilable with a comparative geographical plot. Most of the maps of *Claudius Ptolemy* may be considered a reasonable representation of reality, but India is not. Research indicates that *Marinus the Tyrian and Claudius Ptolemy* utilised the *Eratosthian*[6] length for the coastline for India, between 109^0E and 148^0 30'E. However it is evident they did not realise that the *stadion*[2] length was an earlier version and not the 0.184Km utilised in their times. In Book 7, chapters 2 and 3, *MT/CP* list the sites from the Ganges Delta to Cattigara of the Seres. But, having stated that the limit of the oikoumene to the east was 180 degrees, *Claudius Ptolemy* was required to contort the littorals much as he had distorted Britannia and Scotland[3].

BASIC DATA

Claudius Ptolemy utilizes the details provided by *Marinus the Tyrian*, he adjusts some distances, generally those in the Middle or Far East, to ensure the length of the oikoumene, east/west, was no more than 180 degrees. *Marinus the Tyrian* had stated the length as 225 degrees.

Analysis of the Mediterranean Sea[4] and its length concluded that as the latitudinal degree determined by *MT/CP* was 500 stadia of 0.184Km, a distortion of the land masses was inevitable. That is evidenced by the fact that a geographical degree of latitude is 604 stadia of 0.184Km. To control this distortion the Mediterranean Sea was enlarged east/west by the inverse of a ratio well known to *MT/CP*, that of 36North, or 93:115. (This is sometimes called 0.8 or 4/5, and they are interchangeable in the *MT/CP* text.) Thus research has found that Mediterranean Sea was enlarged east/west from the Pillars of Hercules to Alexandria in Issus by the ratio 115:93.

Marinus the Tyrian provided longitudes for the Mediterranean Sea which were accepted by *Claudius Ptolemy*, but the residue of the longitudes were amended as *Ptolemy's* book 1, chapters 11 to 15 fully explain.

The final details are as follows: Book 1, chapter 12:
"from the meridian passing through the Fortunate Islands, as far as the Sacred promontory of Spain 2^0 30', thence to the mouth of the river Baetis, and from the Baetis to the Strait and to Calpe is likewise 2^0 30', being one and the same distance; from the strait to Caralis, a city in Sardinia, is 25^0; from Caralis to the promontory of Lilybaeum in Sicily 4^0 30'; from Lilybaeum to Pachynus is 3^0; from Pachynus to Taernarus in Laconia is 10^0; thence to Rhodes is 8^0 15'; from Rhodes to Issus is 11^0 15'; from Issus to the Euphrates is 2^0 30'; the sum of all these degrees is 72^0.

Then were added the following; "from the Euphrates to the Stone Tower is 24 000 stadia or 60 degrees; from the Stone Tower to Sera, 45^0 15'". The text states," *adding the degrees which have been noted, they amount to 60 or 24 000 stadia. When we have added the 45^0 15' from the Stone Tower to Sera, the total distance from the Euphrates to Sera on the parallel of Rhodes will amount to 105^0 15'".* Thus the oikoumene is $72^0 + 60^0 + 45^0$ 15' or 177^0 15'.

Chapter 12 ends as follows; *"Hence, the length of the known earth, that is from the meridian drawn through or terminated by the Fortunate Islands[5] in the extreme west to Sera in the extreme East is 177^0 15'".*

Thus with the Mediterranean Sea already wrongly drawn, i.e. it is actually 5^0 20'W to 36E geographical, or 41^0 20', but given by as *MT/CP* 7^0 30' to 69^0 30', or 62 degrees, naturally the discrepancy in the number of *stadia* must be accounted for. The distances are 20197 geographical and 25079 *stadia* by *MT/CP*. Thus distortion problems could only increase the further east travelled.

But if an analysis of the distance proposed by *MT/CP* between the eastern Mediterranean and the Indus River is made, a totally different picture emerges. In order to simplify the data, with the Indus Delta situate at 24N it is in order to calculate from an alignment point N/S, the Sinai Peninsula at 28N, rather than Issus at 36N.

Thus from the Gulf of Aqaba to the Indus Delta on the *Ptolemaic map* is 66E to 109E, a distance calculated at 24N of 43^0 x 456.77 *stadia* or 19640 *stadia*. Geographically it is 34^0 30'E to 68E, or 33.5^0 x 551.78 *stadia* or 18848 *stadia*. This may be considered quite reasonable and an attempt to portray geographic accuracy. It is a 6 percent inaccuracy and illustrates that the *stadion* of 0.184Km was utilised.

However, if the Indian longitudinal measure is analysed, that is *"India intra Gangem"*, it is basically a 39^0 30' longitude from the Indus to the Ganges, which when calculated at 24N (as before) produces a length of 39.5^0 x 456.77 or 18042 *stadia*.

The geographical calculation is Karachi to the Eastern Ganges Mouth, or 67E to 92E, 25 degrees of 551.78 *stadia* or 13794 *stadia*.

This indicates an expansion by MT/CP of 1.308 or 150/115.

If the last sections are now analysed, book 7, chapters 2 and 3, *'India extra Ganges and Sinae'*, *MT/CP* state a longitudinal spread from 150E (18^0 00'N), the limit of the Gangetic Bay to Cattigara Sinae, 177^0 15'E (South 8^0 30'). That is 27^0 15'East, but 26^0 30'north/south.

The limit of 180 degrees for the oikoumene has intervened to produce a distortion of some magnitude. However, by a simple analysis of the coastal distances, the primary source and method of measuring distances as explained by *MT/CP*, both *India intra, India extra and Sinae* can be fully explained.

ERATOSTHENES OF CYRENE[6]

But it is first necessary to indicate the information available to, and used by *Marinus the Tyrian*, in forming the maps which have been produced.

Eratosthenes' research is explained within the text of *Strabo's Geographia*[7], and the following are text references within those books appertaining to India. These apply to *India intra Gangem* only, as *Eratosthenes* completed his measure of the oikoumene at "The capes of India". Although no doubt knowing there was land south of the equator in Africa he added 2000 *stadia* east and west as an insurance against an upset in the calculation of a 2:1 ratio, length/breadth of the oikoumene.

Strabo, Geographia.

2.1.7   Length of India northern side which *Megasthenes* calls 16000 *stadia,* whereas *Patrocles* says 15000 *stadia*. Both call the breadth of India 20000 *stadia,*(i.e. *Eratosthenes and Megasthenes*) but *Patrocles* states 12000 *stadia*.

2.1.12 Southern capes of India rise opposite Meroe (i.e. 16 25'N). From the south of India to the mountains there are 30000 *stadia.*

2.1.14 Taprobane; Large island off India to the south, it stretches in the direction of Ethiopia for more than 5000 *stadia.*

2.1.20 Strabo states, impossible that Meroe and Capes of India are on same parallel   .

2.1.22 India is rhomboidal in shape, having four sides, two washed by the sea (south and east), one the mountains and the fourth a river.

15.1.11 The west side of India (Indus River) is 13000 *stadia.* The East side of India is 13000 *stadia* plus 3000 *stadia* for the Capes. Those are the maximum and minimum breadths. The lengths are 16000 *stadia* and 16000 *stadia* plus 3000 for the Capes.

ERATOSTHENES' DATA TESTED[8]   **Diagram Cp3D01**

Having been given a complete picture of the form of India, it is possible to test those measures against the geographical form of India and establish the measure used. Thus the following side measurements can be so tested;

North West; the course of the River Indus   13000 *stadia*
North East; the course of the River Ganges   16000 *stadia*
South West; the coast from the Indus Delta to Sri Lanka   19000 *stadia*
South East; the coast from the Ganges Delta to Sri Lanka   16000 *stadia*

Diagram 1 illustrates the measurements as above and the accuracy with which they accord with the geographical plot, when a *stadion* of 157.5 metres is utilised. A full text named *" Cp1,Eratosthenes, Hipparchus and Strabo: Geographia. The length of the oikoumene measured on an aslant alignment*"[8], has an explanation of that *stadion* which is, as stated, 157.5 metres and comprises 350 Remen, an Egyptian measure.

INDIA INTRA GANGEM, MT/CP PLOT   Diagram Cp3D02

If map 10 of Codex Lat V F 32[1] is studied, or a new map as indicated on diagram 2 is drawn using the co-ordinates of Book 7, chapter 1, the Indus Delta is situate at 20N, 110-113E and the Ganges Delta 18N, 145-148 30'E. The two degrees latitudinal shift reflects reality in that the Indus Delta is geographically 24N, 68E and the Ganges Delta 22N, 88-92E. The calculated *MT/CP* distance is thus 38^0 30' x 472.76 stadia or 18200 *stadia* of 0.184KM. This is vastly over distance, as the geographical measure is only 24^0 x 556 stadia or 13344 *stadia* of 0.184Km.

It is in fact an expansion of 10^0 16' geographical.

If *Marinus the Tyrian* was so zealous in his search for information, as *Claudius Ptolemy* informs us in Book 1, chapter 6, and *Eratosthenes* had established the length of *India intra Gangem* as 16000 *stadia*, why was it increased to 18200 *stadia*?

There is a surprisingly simple explanation.
Eratosthenes determined that the length of the coastline from the Indus to the Ganges was 19000 plus 16000 *stadia* of 157.5 metres, a total of 35000 *stadia*. **(Diagram Cp3D01)**

By using either Map 10 (Codex) or a newly drawn map as discussed above, the actual coastline length proposed by *MT/CP* can be established. From the Indus Delta to the Ganges Delta, using in fact both maps as a check/balance, Codex Lat V F 32, indicates 10 degrees of Latitude measuring 92.5mm. The basic longitude measure for the map coastline is at 19N where a degree is 472.76 stadia. Thus any length in millimetres can be converted to stadia. The measured length is c675mm or 34500 *stadia* of 0.184Km.

In order that an accurate measure was produced as a check, the *MT/CP* plot was drawn to a scale of 1:6000000 and the coastline length measured again so that it could be compared with an Atlas map of the same scale. A larger scale is entirely unnecessary as the comparative accuracy could not be confirmed owing to the geographical coastline indicating each nook and cranny on a large scale map. This is not what the text, data or maps of *MT/CP* are capable of indicating.

The length when computed was 1065mm which calculates to 34730 *stadia*.
Eratosthenes determined the length as 35000 stadia.
Thus it can be fairly assumed that *Marinus the Tyrian* took *Eratosthenes*' measure of 35000 *stadia* as the coastal length of India, completely mistook the length of the *Stadion* used, if in fact it could have been assessed, and led *Claudius Ptolemy*, with his reduced length and breadth of the oikoumene to contort the final coastline plot.

The contortions of the coast of India thus are the product of those two errors, and the extra ordinary length determined by that coastal measure.

Having drawn an *MT/CP* plot to a scale compatible to an Atlas map it is possible to mark off on a thin cotton each and every point on the *MT/CP* map by following the coastline precisely and then overlaying the same cotton onto the Atlas map and establishing what may have been the origins of the *MT/CP* places so named.

Diagram 3 indicates this overlay and each GREEN DOT is the corresponding marker for Ptolemy's Book 7, chapter 1 list of 89 positions as they could be placed.

INTERIM CONCLUSIONS

Using information from travellers and voyagers[9] *Eratosthenes* in the 3rd century BCE established the correct distances for the rhomboid of India. In the first century of our common era *Marinus the Tyrian* misunderstood the measure utilised and led *Claudius Ptolemy* in his *Geographike Hyphegesis* to produce contortive shapes to territories which could easily have been avoided if only they had both, (*MT/CP,*) ascertained the correct length of a degree of Latitude.

Claudius Ptolemy has again used the ratio governed by 115 which is the radius[5] length of the world map detailed in Book 1, chapter 20. It is comprised of the following;" *It being given that there are*

115 parts into which we divide the equator (sic), of these parts the parallel passing through Rhodes, which is 36^0 distant from the equator measures 93 and further the parallel which is 63^0 distant from the equator and passes through Thule measures 52 such parts." The 115 parts are in fact the sum total of 36^0 + 27^0 + 52^0 or parts. Thus India has an assigned length, not a natural or geographical length. Then the coastline is added, 35000 stadia long, but limited to a latitude of 11N and not the true latitude of 8N. The fact that *Eratosthenes'* stadia is, or may be at variance with the stadia of *MT/CP* appears not to have been considered.

INDIA EXTRA GANGEM AND SINAE   **Diagrams Cp3D04 and Cp3D05**

Claudius Ptolemy having established that the length of the oikoumene should be no more than 180 degrees has thus been forced to make major contortions to the landforms when constructing the map of *India extra Gangem and Sinae*, as described in Book 7, chapters 2 and 3.

But this is territory which *Eratosthenes* did not map or measure and thus it is expected that the *stadion* of 0.184Km will be used and can thus provide a direct measure for the overall coastline.

As before Codex Lat V F 32, map 11, *India extra Gangem and Sinae* was utilised as well as a newly drawn map of comparative scale to the Atlas. But here there was found to be a major problem with the Codex map as drawn. This map includes the equatorial line which should enable the scale to be measured quite accurately, and should be coincident with the latitudinal side bar scales. The equatorial line covers 45 degrees from 135E to 180E and measures 330mm, thus each degree is 7.333mm. The side latitudinal scales measure 37 degrees and equals 240mm or 6.486mm per degree. The north scale bar is 45 degrees measuring 230mm, which if calculated at the 37N latitude should use 400 stadia per degree, and thus from the equatorial scale be a length of 263.5mm. The side note appended to the map confirms the measure of 400 *stadia* (or 50 *miliaria),* which would be equally acceptable at 36N. Thus unfortunately this beautifully drawn map, map 11 Codex Lat V F 32, has errors which preclude its use in a proper comparison.

The re-plot of the map, as **diagram Cp3D04** indicates, produced a length of 5050 *stadia* or 930Km.

Again a cotton thread was used to trace the coast line of *MT/CP*, marking each point and the thread transferred to the Atlas map for comparison. This is as diagram 5, and again each GREEN SPOT indicates the position of a point in the text of MT/CP and the coincidence of major harbours on both plots.

It is clearly indicated on diagram 5 that the coastal length from the River Ganges via Singapore, Bangkok, the Mekong Delta and the Gulf of Tonkin ends quite accurately at the Chinese city of Canton on the Pearl River. *Cattigara Sina, roadstead, 177E, south 8^0 30'* is thus none other than Canton and its roadstead harbour on the Pearl River.

Canton itself was a major port of the eastern Han Dynasty, and when a new flowering of that dynasty occurred around the BCE/CE period and overseas trade followed, Nan-Hai, as Canton was then known exported silk to the Roman Empire.

The roadstead, unusually mentioned by *Ptolemy* is a reminder that the harbour is shallow and large vessels would use Whampoa, some 16 Km below Canton. A striking feature of Canton is the fact that it is surrounded by a wall some 9Km in circumference. Thus the descriptive text by Ptolemy, as diagram 4, is confirmed.

The corollary to this determination is again indicated from within the text of *MT/CP*, where in Book 7, chapter 2, it is stated, "*Likewise there are three other islands of the Anthropophagi which are called Sabadicae, the middle of which is in 160E, south 8^0 30'; Labadius or Barley Island is said to be a most fruitful one, and to produce Gold. This has a metropolis on the north side toward the west called Argentae, which is in 167E, south 8^0 30', the eastern end of the island is in 169E, south 8^0 00'.*"

Canton is situate at 23^0 10N, 113 10'E, but situate at 19N, 110E is Hainan Island. This a most fruitful island is full of natural resources such as titanium, manganese, tungsten, bauxite, molybdenum, cobalt, copper, gold and silver. Its agricultural produce is commensurate. The island has been settled for some 3000 years. Coincidence or not, Gold is available as well as Silver, the capitals name.

INTERIM COMMENT

Thus it is possible to opine that the coastal voyage from the *Ganges to Canton* was well known and measured quite accurately. The fact that *Claudius Ptolemy* was required to draw a fictional coastline

because of his pre-conceptions regarding the size of the planet and length of the oikoumene did not stop the actual measurement of the coastline being accurately portrayed. This is despite the fact that *Claudius Ptolemy* has at times arbitrarily altered the measurements given by *Marinus the Tyrian*. In fact this coastal measurement system is the mainstay of the *MT/CP* data for constructing their world. This is fully described in Book 1, chapters 9 and 13.

However Book 1, chapters 13 and 14 require to be analysed in depth to ascertain the contrary statements and the obvious mis-understanding of the data they have uncovered.

PTOLEMY BOOK 1, CHAPTER 13   Diagram Cp3D06

The chapter commences as follows;" *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 a direct course, the variations in the rate of sailing, and the position of the regions themselves.*"

There is then a description of the coast of India from Cory Promontory to the Gangetic Bay. The following is a précis;

1) After the promontory called Cory, which closes the bay of Colchis, he says that the bay of Argaricus is next, and that it extends to the city of Curula, a distance of 3400 stadia. He adds that the city is situated north of the promontory of Cory.
2) From Curula the course is towards the winter (sic) rising sun as far as Palura and measures 9450 stadia
3) The shore of the Gangetic bay he places at a further distance of 19000 stadia.
4) From Palura to the city of Sada is 13000 stadia by navigating the aforesaid bay toward the equatorial rising of the sun.
5) Thence from Sada to Tamala is 3500 stadia in the direction of the winter rising sun.
6) Next from Tamala to the Golden Chersonesus is 1600 stadia toward the winter rising sun.

Apart from the obvious error in 2) which should be <u>summer </u>rising sun, the data can be unpicked and resolved.

Diagram 6 has the above data presented in linear form to explain the text and thus indicates the continued use of the Eratosthian stadia of 157.5 metres. The distances are misquoted, or at best mis-understood, and indicate a lacking of attention to detail in that having explained so much in chapter 1, *Claudius Ptolemy* does not adhere later to the distances and information he is, at some length, explaining.

Reversing the text order, the distances from the Golden Chersonesus, using a stadion of 0.184Km there is an excellent match to the coast line to the Ganges Delta. From this point, travelling westerly Ptolemy has two cities named Palura, However, one is circa 9450 stadia of 157.5 metres, the Eratosthian stadia distant, and then a further 3400 stadia distance does in fact produce a match for Curala, possibly now called Cuddalore. This point is certainly at the end of the bay formed by the coastlines of both Sri Lanka and India.

The comment concerning 19000 stadia can be taken as applying from several points , but it does actually match the totals of the east coast of India at 13000 stadia plus the two three thousand stadia distances of the "capes of India" within the text of Strabo.

In chapter 14, the sailing distance to Cattigara is discussed, with at first 20 days' sail from the Golden Chersonesus to Zaba , and then the text *"He lengthens the distance, interpreting some days to mean many days, and believing (ridiculously it seems to me) that the expression "some days" was used because the days were to many to be counted."*

By using units of measure provided by *Marinus,* 13000 stadia, we can equate this to 20 days' sailing, and thus from the Golden Chersonesus, at 650 stadia per day[9], the end point would be the eastern fringe of the Gulf of Siam and the start of the Mekong Delta. At this point is the archaeological site of OC EO[10], an important city in the 1st to 7th centuries CE. Excavations show a busy port area and finds include Roman coins. The distance to Cattigara is then in the order of a further 13000 plus 3400 plus 1600 stadia as has already been measured from the Ganges delta to the Golden Chersonesus. That is a further 28 days' sailing even with adjustments by *Claudius Ptolemy.*

That there is a confusion of distance measures, with many exhibiting the same figure, comes as no surprise. This is apparent in the whole text as has been previously shown.

TAPROBANE; AN ENIGMA   Diagrams Cp3D07 and Cp3D08

If *Marinus the Tyrian* was so precise in his studies, he must but have read that *Strabo* placed the Island of Taprobane some 7 days' sail from the southern parts of India as diagram 7 illustrates. In fact he would have read the following;

In 2.1.14, *Strabo* states: *'Well, then, let us pass on to the country that rises opposite to the Cinnamon-producing Country and lies toward the East on the same parallel. This is the region about Taprobane. We have strong assurances that Taprobane is a large island in the open, which lies off India to the south. It stretches lengthwise in the direction of Ethiopia for more than five thousand stadia, as they say;---. Now if we assign to this island a breadth that is proportional to its length, and if we add thereto the expanse of the sea between it and India, the sum would be a distance of not less than three thousand stadia – as much as the distance from the border of the inhabited world to Meroë – that is, if the capes of India are to rise opposite Meroë; but it is more plausible to set down still more than three thousand'.*

If we study the text of *Strabo*, '15.1.14-15', the island of Taprobane is either eight thousand *stadia,* or five thousand *stadia* in length, and a seven days' sail or a twenty days' sail from southern India. We are told by *Strabo*, quoting *Onesicritus,* there are other islands between Taprobane and India, *"though Taprobane is the furthest south"*. The text here is virtually the same as in *Pliny,* book 6.81[12], that the island of Taprobane is located within the Eastern Sea, '*and stretches along the side of India from east to west'.* He also confirms that it was once thought of as being a twenty days' sail, but now has been fixed at seven days' sail, *'with reference to that covered by our (Roman) ships'.*

However, *Pliny*[12] also states in 6.86-7, *'The nearest promontory in India is called Coliacus, four days' sail away – passing, in mid-voyage, the Island of the Sun.'* And, in 6.88 we read, *'The envoys also informed us that the side of Taprobane facing India is 12800 stadia (1250 miles or 2011Km, from the translator) long and lies south-east of India.*

Thus we may conclude that the Island of Taprobane, which *Onesicritus,* an Admiral in the Navy of Alexander the Great proved was an Island, is not the same island as is being discussed above. It is in all probability Sumatra. But, could it be that the 'Island of the Sun' is in fact the Sri Lanka of today?

Claudius Ptolemy places an island off Cory Promontory between India and his Taprobane, calling it Cory Island. Then gives Taprobane a length of 7500 *stadia,* and a coastline of 25780 *stadia*, which is c75 percent of the length of the coast line of *India intra Gangem*. The island is almost a continent.

Diagram 8 compares same scale plots of three islands; Madagascar, Sumatra and Ptolemy's Taprobane. The coastline lengths are noted as 23700, 22500 and 25870 stadia. Madagascar is in the southern ocean and is possibly marked by the Ptolemaic co-ordinates for Prasum Promontory, given as 80E, S15 00'. However Sumatra is closer to the east/west orientation stated, and is a 7 days' sail from India.

This research has led to the conclusion that there has been a conflation of data regarding Madagascar and Sumatra; Madagascar has the Magnum Littus and Sumatra the thousands of Islands. They are both of a size to be easily mistaken for each other and in description are similar also. What is evident is that the island of Taprobane given the details written by those ancient geographers was never Sri Lanka. Cory Island would be applicable as Sri Lanka, as diagram 8 indicates in the size comparisons.

CONCLUSIONS

Marinus the Tyrian was diligent in his researches into previous geographers' texts and generally interpreted the data correctly. However, in reading either the text of *Eratosthenes* or that same text as incorporated in the text of *Strabo*, failed to recognise the fact that *Eratosthenes' stadion* was not the *stadion* in use during his lifetime. Thus in portions of his work there were conflicting distance measures. *Claudius Ptolemy*, then deciding to take the work of *Marinus the Tyrian* and literally rework it to form his own text, not only failed to recognise the same fact but also failed conclusively to determine the exact length of a degree of latitude. Thus the scene was set for a monumental blunder; the world was reduced from an accurate 252000 stadia of 157.5 metres to an in-accurate 180000 stadia of 184 metres.

Thus *Claudius Ptolemy* was led to limit the oikoumene to 180 degrees, expand the Mediterranean Sea by a ratio of 115/93 and then expand the coastline of *India intra Gangem* by 150/115. By setting a limit, quite arbitrarily, for the oikoumene at 180 degrees east, the coastline of *India extra Gangem and Sinae* was destined to be as distorted as the coast of Britannia at Scotland, and the Mediterranean Sea lands. There was then the mistaken identity of Taprobane, perhaps a conflation of both Madagascar and Sumatra, to finally compound the errors.

But, the details when examined are so very recognisable, confirming the very real and precise measures, no doubt gained from the coastal voyages and original world surveys, and particularly that requested by Julius Caesar[11].

Had *Claudius Ptolemy* realised his full potential as a cosmographer he would have investigated the correct length of a degree of latitude. Unfortunately he did not.

<div align="right">**M J FERRAR 2009**</div>

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 second is entitled: The Mediterranean Sea of Marinus of Tyre and Claudius Ptolemy. An investigation of the methodology and distance measures utilised. The third, 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.

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Historiographic Interpretation	Stade/metres length	composition unit x number
Herodotus/Gosselin	99.75	200 assyrian cubits
Pliny/Macrobius	148.2	500 Pelasgic feet
Pliny/d'Anville	148.2	Schoenus/40 300 assyrian cubits

Pliny/Hultsch	157.5	Schoenus/40
Pliny/Dreyer/Stahl	157.5	300 royal cubits
Lehman-Haupt	165	600 plinian feet
		300 talmud cubits
Polybius (Pelasgic)	177.9	600 pelasgic feet
Strabo/Pliny, Olympic	185.2	600 olympic feet
		625 roman pedes
		500 egypt remen
Drabkin Philetarian	197.6	400 assyrian cubits
Ptolemaic/Royal/Hultsch	210	400 royal cubits
Lehman-Haupt	296.4	600 assyrian cubits
Babylon/Assyrian Ush	355.68	720 assyrian cubits
Klein's superstadion	1896	???

The *stadion*.

Engels, D. (1985), 'The length of Eratosthenes' stade', American Journal of Philology, 106: 298-311.

Pothecary, S. (1995), 'Strabo, Polybios, and the stade', Pheonix, 49 (1): 49-67

3) Ferrar, MJ, 2009, "Claudius Ptolemy: Falsification, Regimentation or Symmetry. The Cartographical Journal ?

4) Ferrar, MJ, 2009, The Mediterranean Sea of Marinus of Tyre and Claudius Ptolemy. The Cartographic Journal ?

5) Ferrar, MJ, 2009, The text of Marinus the Tyrian and Claudius Ptolemy, Geographia, Book 4, Chapters 1,6,7 and 8. Tha Cartographic Journal ?

6) Oxford Classical Dictionary, 3rd Edition, 2003. Oxford University Press
"Eratosthenes", page 533

Harley, J.B. & Woodward, D. (Eds.) (1987) The History of Cartography: Vol. 1: Cartography in Prehistoric, Ancient, and Medieval Europe and the Mediterranean. University of Chicago Press

Aujac, Germaine. in The History of Cartography, chapter 10; "Greek Cartography in the Early Roman World", pp166/67 and pp173/75; "The Map of the inhabited world recommended by Strabo" and discusses the work of Hipparchus. Chapter 9, "The growth of an empirical cartography in Hellenistic Greece", pp148/60, but see 153/57.

Cortesao, Armando.(1969-1971). History of Portuguese Cartography; Coimbra, Junta de Investigacoes do Ultramar-Lisboa, 2 vols. See1:82, where he speculates that Egyptian cadastral surveys may have been available to Eratosthenes in his calculations of the distance between the two points of observation.

Rawlins, D.(2008). Eratosthenes lighthouse ploy; Earth radius 40800 stadia: in DIO, The International Journal of Scientific History, vol 14, march, pp3-12.

Fischer, Irene.(1975). Another look at Eratosthenes and Posidonius' determinations of the Earth's circumference, in Q. JL. R. ASTR. SOC. 16, pp152-67

Gues, K. (2004), Measuring the Earth and the *Oikoumene*: zones, meridians, *sphragides* and some other geographical terms used by Eratosthenes of Cyrene. In, Space in the Roman World, Its Perception and Presentation, R.J.A. Talbert and Kai Brodersen (Eds.) Lit Verlag, Münster, 11-26
ibid, O. C. D. Hipparchus, page 708

Dicks, D. R.(1960), The geographical fragments of Hipparchus; The Athlone Press, London.

Shcheglov, Dmitriy A,(2005), Hipparchus on the latitude of Southern India, Greek, Roman and Byzantine Studies, 45 (2005) pp 359-380.

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

8) Ferrar, MJ, 2009, "Eratosthenes, Hipparchus and Strabo: Geographia. The length of the oikoumene measured on an aslant line. The Cartographical Journal, ?

9)   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. Paris.

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, stades, and time measurements---days' and nights' sailing--- and measurements in stadia.

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

10)   Malleret, Louis, (1962,) L'Archeologie du delta du Mekong, Tome troisieme, La culture du Fu-Nan, chapitre XXV, OC-EO et Kattigara, pp421-54. Paris.

11)   Roman world survey. Wiseman T P, (1992), Julius Caesar and the Mappa Mundi in'Talking to Virgil', section 3, pp22-42, and appendices pp227-230.
Univ. of Exeter Press, Exeter. This section discusses the survey commissioned by Caesar and carried out after his death. It took place between 40 and 18 BCE and was finally completed by Marcus Agrippa and Augustus. The data comes from the Mappa Mundi of Hereford, Cornwall and Ebstorf (original now lost). It is recorded in two ancient texts, by Julius Honorius and Aethicus.

12)   *Pliny; "Natural History",* (trans. H. Rackham), Loeb Classical Library, Harvard and London, 1938.

13)   Diller, Aubrey. (1948), "The ancient measurement of the Earth", ISIS, volume XL pp 6-9.
. In 1948, *Aubrey Diller* answered a question posited by *Professor Sarton* regarding, *"a convenient summary of what was known about ancient measurements of the Earth."* The paper duly published in *ISIS* describes the people involved and the measurements attributed to the great circle. However, there is one telling paragraph which must be quoted in full:

"The only direct evidence of the length of Eratosthenes' stade is a solitary, but apparently reliable statement in PLINY XII 53; "schoenus patet Eratosthenis' ratione Stadia XL". This transfers the problem from the stade to the schoenus, which was an Egyptian measure of 12,000 cubits. Now Egyptologists, on the basis of measurements of the pyramids and other archaeological evidence, have long maintained that the Egyptian Cubit was about 0.525 of a metre. On this showing the schoenus would be 6300 metres, and Eratosthenes' circumference would be 6300 schoeni or 39690 Kilometres. The result is very near the truth but the stade involved is unknown and irrational (157.5 metres, c9.45 to a Roman Mile). This is at present one of two acceptable conversions of Eratosthenes' measurement of the earth."

There are as *Aubrey Diller* makes plain several schoeni;
20,000 royal cubits = 1 schoene = 6.5245 miles or 10.50 Km
This measure is of course also the ITRW or ITERU previously discussed.
1 schoene = 2 parasang = 60 Greek stadia or 6.71 miles/ 10.8 Km.
1 schoene = 1 parasang = 30 Greek stadia
12,000 royal cubits = 1 schoene = 3.9148 miles or 6.3 Km.

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